

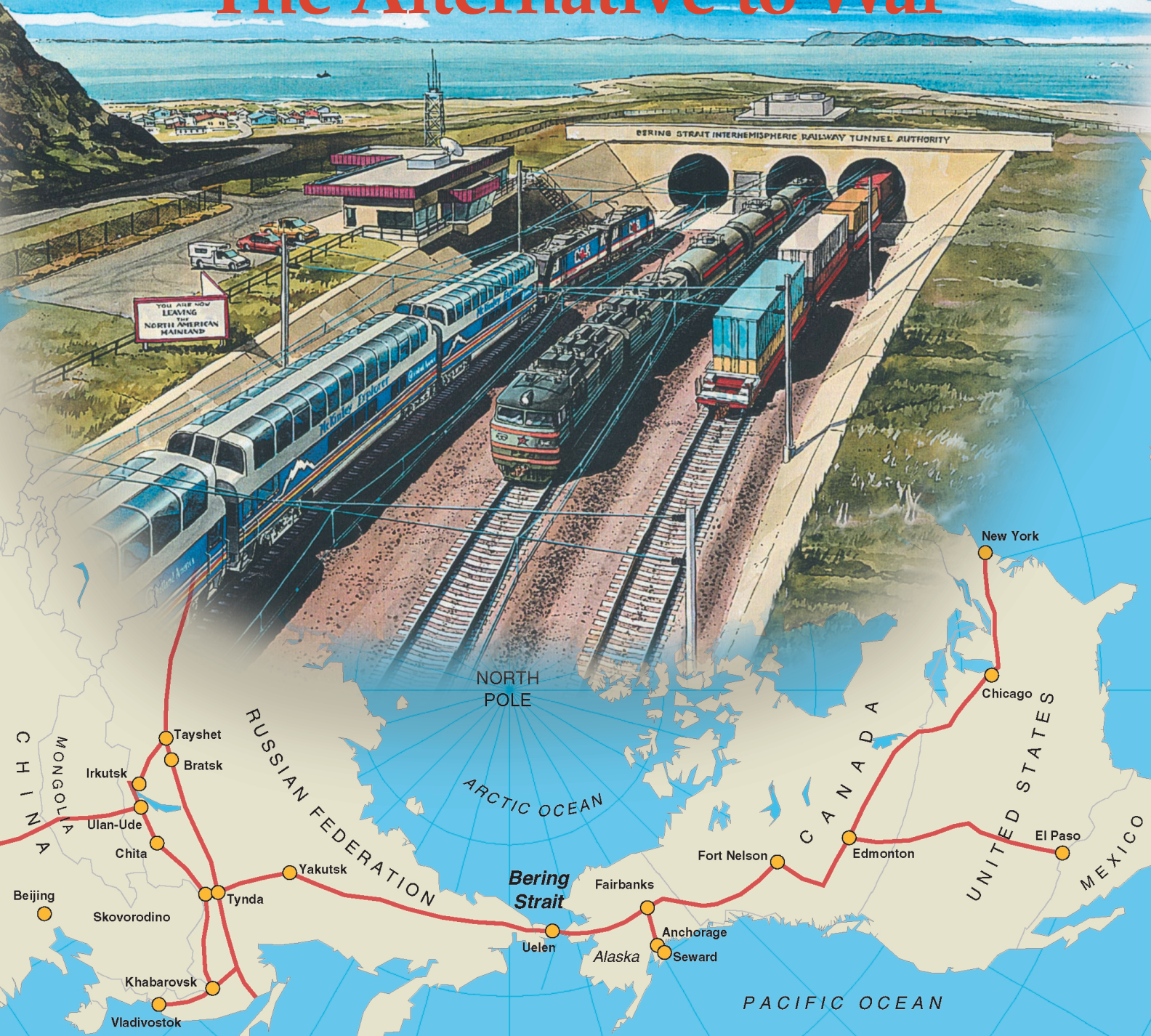
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MEGAPROJECTS The Alternative to War



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The persecution of Purdue University scientist Rusi Taleyarkhan by a science mafia intent on proving that his experiments in “bubble fusion” are a fraud, is a 21st Century witch-hunt.

Like the original attack on cold fusion that hit Stanley Pons and Martin Fleischmann after their March 1989 announcement, this is not a scientific controversy. The real issue has nothing to do with science, but everything to do with the *control* of science. In all matters related to the atomic nucleus, any fundamental experimental or theoretical discovery of principle is barred from being pursued, by a policy which has been in effect since the death of Franklin Roosevelt, and with a vengeance since the agreements reached at Pugwash beginning about 1958.

The phenomenon known as bubble fusion refers to the bubbles formed in deuterated acetone that is heavily bombarded by sonic vibrations; as these bubbles collapse, they create hot enough temperatures for atoms of deuterium to fuse. Taleyarkhan said that he measured fusion by-products in his experiments at Oak Ridge National Laboratory in 2002, and again at Purdue University in 2005. When the magazine *Science* published Taleyarkhan’s research article March 8, 2002 (R.P. Taleyarkhan et al., “Evidence for Nuclear Emissions During Acoustic Cavitation”), it pushed his detractors into high gear.

The disbelief and accusations came from the usual anti-cold-fusion crowd (although bubble fusion is not “cold” fusion); from other researchers who are looking into a similar phenomenon, sonoluminescence, the emission of light flashes from the bubbles formed in a container of liquid that is bombarded by sonic vibrations; and from the press, especially, *Nature* magazine.

The effect could not be reproduced, claimed some well-known physicists who tried to do it. Others, not so well-known, were able to reproduce bubble

fusion. At this point, normal scientific practice would be to encourage more experiments, and see what happens.

Attacks and Intrigues

Over the past five years since Taleyarkhan published his research, there have been attacks and intrigues instead of more experiments.¹

In brief, after initial accusations about “misconduct,” Purdue University conducted an internal investigation that found no improper action on Taleyarkhan’s part. But this wasn’t enough for those opposed to such research. The headlines in the press told the story: “Researcher Cleared of Misconduct, But Case Is Still Murky,” for example, is the headline of the Feb. 13, 2007 *New York Times*.

Then Congress threw its weight into the act. North Carolina Democrat Brad Miller, who heads the oversight subcommittee of the House Science and Technology committee, wrote a letter March 21 to Dr. Martin C. Jischke, president of Purdue University, in effect demanding that Purdue explain why its first investigation had exonerated Taleyarkhan, when “... many disturbing questions remain about the scope and adequacy of the investigation.”

Miller asked for all the pertinent documents, so that the subcommittee could review the case.

Asked why Miller latched on to this particular investigation, his staffer on the Oversight Subcommittee told *21st Century* that Miller had “read about it in *Nature* magazine”!

Purdue has agreed to carry out a further investigation, and now the witch-hunters are arguing that Purdue must have “independent” persons (meaning those hostile to the idea of bubble fusion?) on the reviewing committee.

Behind the Witch-hunt

What is really going on here?

When the nuclear genie was released for mankind’s civilian use after World War II, Bertrand Russell and his co-thinkers of the British imperial persua-

sion vowed that further such discoveries would not be permitted, and that those who pursued such research would suffer the consequences. Like Zeus, who raged to punish Prometheus, because he dared to give the power of fire to man, Russell and such American stooges as the real "Dr. Strangelove," Albert Wohlstetter, worked to prevent nuclear knowledge from getting into the hands of scientists.

The Taleyarkhan case is an attempt to shut down a scientific investigation into an "unpermitted" area. Not all of the attackers of Taleyarkhan may understand

that. Their motivations may in some cases be personal, or, they may deludedly believe that there are no new physical principles to be discovered. ("The laws of physics won't allow it," as physicist Michio Kaku said about beam weapons.)

But this anti-science inquisition is following the same general pattern as the storm that greeted Fleischmann and Pons in 1989, when they announced their anomalous results of finding fusion at low temperatures.

Whether or not bubble fusion is actual fusion, this deadly anti-science policy

can no longer be tolerated. A dedication to the improvement of mankind through scientific progress is the fundamental law of the land of the United States, as elaborated in the Declaration of Independence and U.S. Constitution. Whoever disagrees with that, elected official or citizen, is unfit to serve in such capacity.

Notes

1. A summary of the ins and outs of the Taleyarkhan battle, including links to many of the primary documents can be found in *New Energy Times* (<http://newenergytimes.com/news/2006/NET15.htm#bubbletroubleand> <http://www.newenergytimes.com/BubbleTrouble/BFControversy.htm>).

Schiller Institute Issues Open Letter to Governments To Stop Global Warming Hysteria

The Schiller Institute, chaired by Helga Zepp-LaRouche, launched an international campaign in May to unite the opponents of the Global Warming Hoax into an effective opposition. To this end, the Schiller Institute is soliciting signatures in support of the following "Open Letter to Governments and Parliaments." Among the signers so far are three expert reviewers for the Inter-governmental Panel on Climate Change.

Scientists and others who wish to sign the open letter can do so at <http://www.bueso.de/openletter>.

Open Letter to the Governments and Parliaments of the World

We, the undersigned, demand that the governments and parliaments of the world immediately stop the spreading of hysteria about alleged Climate Change.

Since the appearance of the unscientific film of hedge-fund manager, Al Gore, and the 4th IPCC Report, an outright campaign of indoctrination of populations and legislators has been under way, up to the point of "reeducation campaigns" in the schools in some countries.

Contrary to the massive propaganda, the scientific basis of the hypothesis of man-made climate change has not been established, and the media depiction of a "scientific consensus" is

dangerously misleading to the population. This theory is being spread worldwide by a small group of questionable political institutions like the IPCC, with the help of massive financial backing.

A precedent for the resistance of established scientists is the Petition Project of the Oregon Institute of Science and Medicine against the damaging effects of the Kyoto Protocol, which has been under way since 1998 and has been signed by 17,200 natural scientists so far.

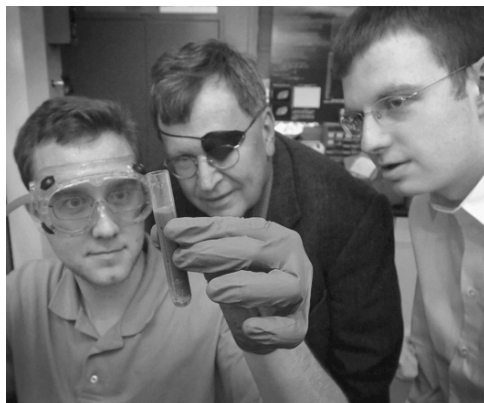
Existential challenges of the 21st Century, like the threatening scarcity of energy and water in a world with a growing population, will force drastic increases of energy generation, which can only be ensured through scientific and technological progress. Measures to save energy and increase efficiency disregard not only this fact, but also neglect the fact that the portion which can be saved from private households is minimal compared to industry and commercial traffic. In the face of the already endangered energy supply due to lack of investment in nuclear power generation, the proposed reduction of CO₂ emissions would irrevocably disrupt worldwide economic development.

The most tragic and perfidious aspect of the political and economic measures currently demanded in industrialized nations, is the pretense of acting in the interest of future generations and nations

in the developing sector. It is precisely the latter which are most adversely affected by the anti-industrial policies of "Climate Protection." As the Organization of African Unity, the Group of 77 at the United Nations, and the Non-Aligned Movement have warned, an internationally enforced reduction of CO₂ emissions would in reality mean a prevention of industrial, and thus social development, and therefore promote genocide on a world scale.

Against the background of a deep social and economic crisis, it is utterly irresponsible not only to be promoting an unproven hypothesis as truth, but above all to be spreading a dangerous existentialist and anti-humanist image of man. As Martin Durkin, the director of the documentary, "The Great Global Warming Swindle," aired on Britain's Channel 4, confirmed in an interview on March 14, and as historical documentation proves, the historical roots of this so-called environmental movement are very much related to those of fascism and the eugenics movement at the beginning of the 20th Century.

Therefore, we hereby call on the governments and parliaments of the world to allow an open debate of this subject, immediately outlaw all programs of "re-education" in schools using Al Gore's propaganda movie, and under no circumstances to allow the passage of legislation based on such a questionable and obviously politicized theory.



David Umberger/Purdue News Service

Purdue researchers demonstrate their method for producing hydrogen by adding water to an alloy of aluminum and gallium. The hydrogen could then be used to run an internal combustion engine. At center is Jerry Woodall, a distinguished professor of electrical and computer engineering, with doctoral students Charles Allen (holding test tube), and Jeffrey Ziebarth.

WITH ALUMINUM AND NUCLEAR POWER, WATER CAN REPLACE GASOLINE

A Purdue University engineer has developed an ingenious method of generating hydrogen at the point of use for internal combustion engines. The low-temperature process uses a liquid alloy of aluminum pellets dissolved in gallium. When water is added, it is spontaneously cleaved, releasing hydrogen while the oxygen binds to the aluminum, forming aluminum oxide. Nuclear power would be used to reconvert the aluminum oxide. Jerry Woodall originally discovered the reaction while working in the semiconductor industry in 1967.

The hydrogen could be used as generated in internal combustion engines (at 25 percent efficiency) or in future fuel cell engines (at 75 percent efficiency). The high cost of aluminum, now over \$1 per pound, is the main constraint to the process becoming competitive with gasoline. Woodall calculates that the process would be competitive if electricity from a dedicated nuclear power plant were used to regenerate the aluminum through fused salt electrolysis. "A midsize car with a full tank of aluminum-gallium pellets, which amounts to about 350 pounds of aluminum, could take a 350-mile trip and it would cost \$60, assuming the alumina is converted back to aluminum on-site at a nuclear power plant," Woodall said at a press conference on May 15. The gallium, though expensive, is not used up in the process. Woodall pointed out that if fuel cells become available, the high efficiency of the hydrogen reaction would make it competitive even without such aluminum recycling.

This technology gets around two problems in using hydrogen for transportation fuel: No hydrogen need be stored in the vehicle, and no hydrogen need be piped to, or stored at, fueling locations. The end product of the hydrogen combustion in the auto is simply water.

SIBERIA: SLEEPING RESOURCE GIANT ABOUT TO AWAKEN

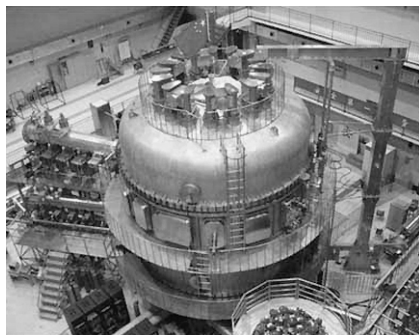
"We've got rich reserves of just about the whole periodic table," Alexander Khloponin, governor of Siberia's Krasnoyarsk region, stated. In what some are calling the "new industrialization," Khloponin told a conference in Krasnoyarsk in February that more than 300 investment projects totaling \$400 billion were planned for Russia by 2015-2020—two-thirds of it destined for east of the Urals. But the ability to realize these depends on state investment in infrastructure. Khloponin warned that those projects could not succeed without massive state infrastructure investment—in road and rail links, airports, housing, services—estimated at \$150 billion. These are vital, Khloponin said, to attract new settlers and reverse a declining Siberian population.

CHINA TO HAVE WORLD'S MOST ADVANCED NUCLEAR FUSION TEST REACTOR

China's Institute of Plasma Physics in Hefei is doubling its capabilities to carry out its "artificial Sun" nuclear fusion program, and plans to spend \$30 million for a new heating system and other technologies, Institute deputy director Song Tao Wu told a group of visiting foreign journalists in May.

In addition to its Russian-designed HT-7 tokamak, China has designed and built the Experimental Advanced Superconducting Tokamak (EAST), now the world's most advanced fusion device, and the first to have superconducting magnets for plasma confinement. EAST will be a testbed for technologies proposed for the International Thermonuclear Experimental Reactor (ITER) project, now under construction in Cadarache, France. ITER is a collaborative effort of the European Union, the United States, Japan, Russia, India, South Korea and China, and is scheduled for operation by 2016. China has pledged to meet 10 percent of the ITER budget, and will send 30 fusion scientists to it.

China, which has been working on thermonuclear fusion for 50 years, is also collaborating with the San Diego-based company General Atomics, which in February carried out a plasma discharge experiment on the EAST, working remotely. General Atomics has the largest privately operated U.S. tokamak, the Doublet III.



Institute of Plasma Physics, Chinese Academy of Sciences

China's EAST tokamak, the first to use superconducting magnets, which enable it to confine the fusion plasma for a longer period of time.

WILL BRAZIL GIVE ANGRA 3 NUCLEAR REACTOR A GREEN LIGHT?

Plans for Angra 3, Brazil's third nuclear reactor, could be approved at a meeting of the National Energy Policy Council in June, and Odair Goncalves, head of the government's nuclear energy commission, is confident that the plant will get the go-ahead despite opposition from Environment Minister Marina da Silva. Angra 3 was originally planned as a twin unit to Angra 2, a 1,270-megawatt-electric pressurized water reactor, which started up in 2000. Parts for the reactor had been purchased before the project was frozen because of a lack of funds, and more than 70 percent of the equipment is already on site. It is estimated that the project will cost \$3.5 billion to complete, *World Nuclear News* reported May 18.

The two operating nuclear power units at Angra have a combined generating capacity of 1,896 megawatts and provide about 3 percent of Brazil's electricity. Brazil has its own uranium resources and has been mining uranium for use in Brazil's power plants since 1982. The Brazilian government has planned for the construction of up to eight new nuclear power plants by 2030.

There is growing evidence of collaboration on nuclear energy among Brazil, India, and South Africa. President Lula da Silva will be in India in early June, and a discussion on commercial nuclear collaboration is on the agenda.

ANTIBODIES FROM SURVIVORS COULD SAVE LIVES OF BIRD FLU VICTIMS

A study published in the May *Public Library of Science (PLoS) Medicine* journal, has proven the benefit of an old technique for a new disease. The authors utilized neutralizing antibodies taken from convalescent victims of the H5N1 avian flu, and, using new biotechnologies, created an immortal human B cell line which would churn out just the desired antibody. Antibodies from four separate patients in Vietnam were tested for their ability to neutralize H5N1 virus both *in vitro* and *in vivo* using a mouse model.

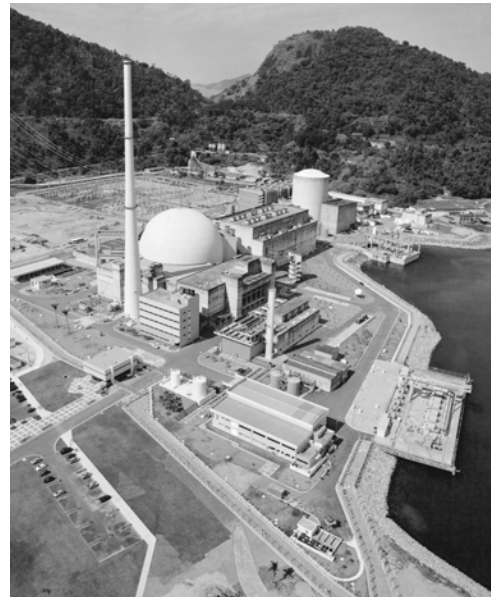
Because it would take months to gear up, produce, and distribute an effective bird flu vaccine, were a pandemic to arise, the ability to extract and produce effective antibody preparations from local survivors, which could be injected into local victims, would be a valuable adjunct to anti-virals and pre-pandemic vaccines.

The authors chose several efficacious antibody preparations, and tested them in mice infected with either the same strain of virus that infected the antibody donors, or a different strain from Indonesia. All the antibodies were capable of protecting mice with the bird flu, if given just before, or within three days after the mice were infected. Some of the preparations even showed cross immunity for the different strain of H5N1.

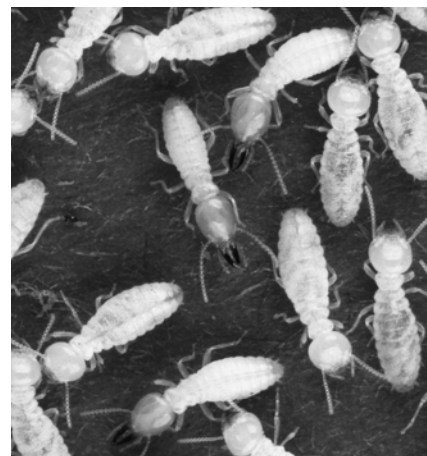
The authors cite an interesting review from the *Annals of Internal Medicine* (Oct. 2006) showing that, during the 1918 Spanish influenza pandemic, many hospitals were using blood products from flu survivors, and injecting them into severely ill patients. The review study concluded that such practices cut mortality rate by perhaps 50 percent where used.

LET THEM EAT BUGS!

Dr. Monica Ayieko of Maseno University in Kenya thinks she has the answer to starvation and malnutrition in Africa, and if she has her way, women of rural Africa will soon be adding yet another task to their never-ending work: gathering bugs to supplement the family meal. Termites and mayflies are plentiful, even during drought, she claims, and they are full of protein, fatty acids, and vitamins. They could be a valuable supplement to the starchy staples, corn and cassava. She even foresees a cottage industry for rural women trading in bugs.



The Angra nuclear power site, with Angra 2 in the foreground. Will it have a twin?



USDA

Gathering bugs is fine for chimpanzees, but what Africa's young people really need is education, so they can dream of travelling to Mars, instead of to the next termite mound.

Is Al Gore Afraid To Debate Lord Monckton?

Lord Monckton of Brenchley, member of the British House of Lords and leading opponent of the global warming hoax, has taken out ads in the *New York Times*, the *Wall Street Journal*, the *Washington Post*, and other media challenging Al Gore to debate. Monckton's first challenge to Gore was issued March 14, but remains unanswered.

Lord Monckton told EIR News Service that he is emphatic on pursuing this debate challenge. He described modern environmentalism as a "new national socialism and a messianic movement intent on destroying industry."

In November 2006, Monckton issued a 40-page research paper on the fraud of global warming, titled "Apocalypse Cancelled." The environmentalist's "precautionary principle" is killing people, he said, and he gave the example of the DDT ban, noting that this year, after 30 million people had died of malaria since the ban, the World Health Organization has finally agreed to bring back DDT for spraying on the inside walls of houses.

Lord Monckton also calls for the United Kingdom to start building—not merely designing, or holding a ten-year planning inquiry about—12 nuclear power stations.

Pasteur Institute Entomologist: 'Warming Won't Spread Malaria'

Paul Reiter, a medical entomologist who heads the Insects and Infectious Disease unit at the Pasteur Institute in Paris, says that scare stories about global warming spreading malaria are "complete bull."

Reiter, who was interviewed April 6 by Gregory Murphy, quit the Intergovernmental Panel on Climate Change calling its approach unscientific, but had to threaten a lawsuit to get his name taken off the IPCC reports. In his interview for *Executive Intelligence Review*, Reiter lambastes the IPCC process as "bullshit," and ridicules Al Gore's phony film depiction of the malaria scare.

The full interview can be read at: <http://www.larouchepub.com/eiw/public>



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British TV Film Exposes Global Warming Lies

A made-for-television documentary, "The Great Global Warming Swindle," which aired March 8 on Britain's Channel 4, has poked a big hole in the global warmers' claim of a scientific "consensus" on the issue. The documentary will be available in July from the producers, wag-TV, in DVD format, at \$19.99 (see <http://www.wagtv.com> for more information.) An Internet version can be found on Google Video, where the documentary is already becoming an underground classic.

The lie that no reputable scientist opposes the global warming myth is overturned within about the first five minutes of viewing: The film features more than a dozen experts, in climatology, oceanography, meteorology, and biogeography from such institutions as NASA, the International Arctic Research Center, the Pasteur Institute, and MIT.

In the remaining 70 minutes, you will become engrossed in a penetrating and intellectually stimulating overturning of the entire CO₂ hypothesis. Carbon dioxide, whether man-made, or from the far more abundant natural sources, such as volcanoes and ocean absorption, does not determine climate. You will learn, instead, that it is the output of the Sun, varying over both short-term and long-term

cycles, which drives climate on the Earth.

You will also see a presentation by one of the Danish scientists who just established the exciting connection between cosmic rays and climate.

A surprise ending makes the clear case that environmentalism is genocide. In a visit to an African clinic, just a few miles outside the plush meeting halls of the United Nation's Nairobi conference on climate change, we see the real meaning of the solar power myth. In a building with only a solar panel to supply its electricity, health workers must decide whether to turn on the lights, or the tiny refrigerator used to store vaccines and medicines.

The documentary's closing words come from ecologist Dr. Patrick Moore, a co-founder of Greenpeace, who left that movement in disgust: "The environmental movement has evolved into the strongest force there is for preventing development in the developing countries.... I think it's legitimate for me to call them 'anti-human.'"

21st Century showed the film to Congressional staff in March.

Vatican Conference Challenges Global Warming Hysteria

The April 26-27 Vatican Climate Change Conference in Rome drew scientists and political figures from both sides of the issue, at the end of which the Vatican concluded that there is no evidence of man-induced climate change,

and that the urgent priority for humanity is the development of the Third World.

Cardinal Renato Martino, head of the Pontifical Council *Justitia et Pax*, the organizer of the event, chaired the meeting, focussing on the new paganism and on depopulation policies hidden behind climate hysteria. In his concluding speech at the conference, Cardinal Martino said:

“Man has an undisputable superiority within Creation and, in virtue of his being a person endowed with an immortal soul, cannot be equal to other living beings, nor considered a disturbing element to the naturalistic ecological balance...” The Social Doctrine of the Church,” Martino said, “must deal with many current forms of idolatry of nature, which lose sight of Man. Such ecologies often emerge in the debate on demographic issues and the relationship among population, environment, and development.”

“The Church,” Martino concluded, “is confident in Man and in his ever new capacity of finding solutions to problems posed to him by history. Such capacities allow him to often reject the ever recurring, gloomy and unprobable catastrophic predictions.”

In a reference to Al Gore’s role in promoting climate hysteria, Antonino Zichichi, chairman of the World Federation of Scientists, slammed the fact that “the [climate] discussion has not been conducted among scientists, but has been used in such a way that public opinion has the feeling that we are able to explain the climate of the past, the present and the future. Nothing is farther away from the truth.”

Lord Christopher Monckton, who has publicly challenged Al Gore to debate him on global warming, reported that Zichichi also attacked the use of computer models by the Intergovernmental Panel on Climate Change to determine how the climate is going to change during the next century. It’s hard enough doing the computations for particle physics using a supercomputer (which has relatively only few factors), Zichichi said. Climate modelling requires thousands of factors to be integrated, an almost computational impossibility.

Vice Chair of IPCC Shatters Global Warming Consensus

The much-vaunted consensus over

global warming shattered like ice April 18, when the Russian vice chairman of the Intergovernmental Panel on Climate Change (IPCC) penned an op-ed for *Ria Novosti*: “I think the panic over global warming is totally unjustified. There is no serious threat to the climate,” wrote Yuri Izrael of the Russian Academy of Sciences.

Academician Izrael is the head of the Institute of Global Climate and Ecology in Russia, and one of three vice-chairmen of the IPCC, the international body whose reports have claimed that human-induced global warming is a scientific certainty.

“There is no need to dramatize the anthropogenic impact, because the climate has always been subject to change under Nature’s influence, even when humanity did not even exist,” Izrael wrote. He does not deny that there are changes in climate going on, but writes that “we are more threatened by the cold than by global warming.”

If it becomes necessary to deal with warming, Izrael argues, controlling human use of CO₂ is not an effective means. “Instead, it makes sense to decrease solar radiation by 0.3 percent to 0.5 percent.” This can be most effectively done using stratosphere-based aerosols, and Russian scientists are now studying how to do this, Izrael says. Reducing CO₂ emissions will both take much too long, and be extremely expensive—about \$18 trillion this century. “The method of aerosol impact on the stratosphere is much cheaper, hundreds of times faster, and, if need be, can be easily stopped,” Izrael argues.

Argentine LYM Surprises Gore in Buenos Aires

Members of the LaRouche Youth Movement surprised Al Gore at the First Biofuels Congress of the Americas in Buenos Aires May 11, where he delivered the keynote address.

Gore did not endear himself to the audience, by showing satellite photos and slides to “prove” that population growth and economic development had “spoiled” nature in some South American countries, incredibly citing the case of impoverished Bolivia as an example.

After an hour of Gore’s speech, with no question period scheduled, LYM member Betiana Gonzalez called out from the

audience, “Al Gordo, Al Gordo,” and fired off several questions in rapid succession: “Why won’t you debate Lord Monckton?” “Why do you want to reduce population growth?” and “Why did you stop generic drugs for AIDS in Africa?”

Gore froze, visibly disconcerted, and then left the stage. When hotel security escorted her from the auditorium Gonzalez was surrounded by media and cameramen, who wanted to know what she had asked Gore.

The LaRouche Youth Movement has been surprising Gore across the United States and around the world. To read more about the LYM, see www.larouchepac.com.

British Meteorologist: Climate Models Are ‘Invalid’

Piers Corbyn, a British astrophysicist and meteorologist commented that climate models are invalid, and it’s “rubbish in equals rubbish out,” in a May 2 interview with Gregory Murphy for *Executive Intelligence Review*.

Corbyn said: “Computer modelling for weather forecasting, and indeed for climate forecasting has reached its limits. No amount of improved computer power will get past the really basic climate inputs.”

The London-based meteorologist has based his accurate weather forecasts on the magnetic cycles of the Sun.

“It’s not the case that carbon dioxide drives temperatures,” Corbyn said. “When you leave Ice Ages, it’s the other way around: The temperatures go up first, and then carbon dioxide levels go up. And if you look at the fluctuations during the Ice Ages, you can see that, actually, temperature goes up and down, about twice as fast, and twice as often, as carbon dioxide levels go up and down.”

Corbyn continued: “That means that at least about half the time, they’re going to be moving in opposite directions, and half the time, they’ll be moving in the same direction. I mean, essentially, that they are unconnected. They probably are connected in some complex way, but there’s no evidence anywhere that carbon dioxide systematically drives temperature. Where there is evidence of some sort of driving, it’s the other way around.”

To read the full interview, see http://www.larouchepub.com/other/interviews/2007/3422piers_corbyn.html

Arctic Researcher Calls Gore's Film 'Science Fiction'

Dr. Syun-Ichi Akasofu, who just retired as director of the International Arctic Research Center (IARC) of the University of Alaska, was interviewed by LaRouche Youth Movement member Ian Overton on April 23.

"My criticism of the IPCC's report," Akasofu said, is simply that I do not know how 2,500 scientists can agree that the present 100 years is almost entirely due to the greenhouse effect. There is no evidence for

that! There is no paper that studies the natural components of the retraction of the present ice. No paper! So they have no basis to say 'most'; it's an assumption!"

"[T]emperature has been increasing, from ... as far as we can go back, to about 1700. This has been happening well before the Industrial Revolution, so we have to consider that natural change," Akasofu stated.

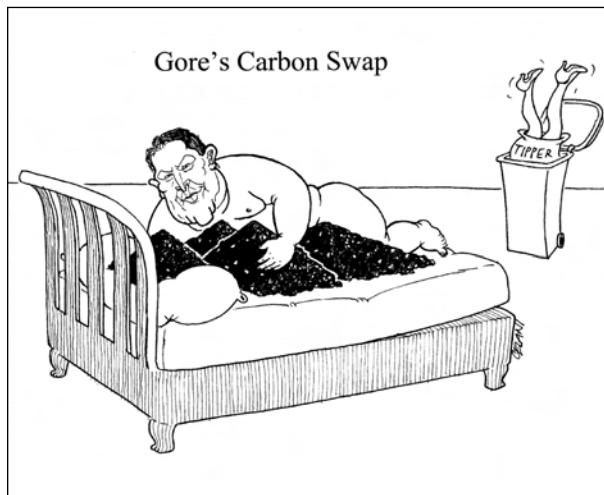
The full interview appears in the May 11 *Executive Intelligence Review*, at http://www.larouche.com/other/interviews/2007/3419dr_akasofu.html.

IPCC Expert: Climate Models Are Just 'Computer Games'

Climate models are nothing more than computer games, an expert reviewer for the Intergovernmental Panel on Climate Change told *21st Century's* Greg Murphy. The problem with the climate computer models, the scientist said, is that they are based on a bottom-up approach as opposed to a top-down approach.

"Think of a cat stalking a bird," the climate expert said. "You see the cat tense, and creep towards the bird. Now picture only the bird's nervous system, and with that information, try to model the cat stalking. That is the equivalent of a global climate model."

The expert also commented on how information-age thinking has negatively affected science writing. He noted that when he was in school you were taught to use a slide rule, and in using a slide rule you had to have an idea of what the result



would be. Nowadays, people just grab an algorithm off the shelf and use it, without any thought about what kind of result they will get. He pointed to the trend in articles in leading peer-reviewed journals such as *Science* and *Nature*, which use numerical values out to several decimal places, most of which are wrong.

The scientist concluded by asking the following question:

In the past two and-a-half billion years of the Earth's oxygen atmosphere, there have been only two climate states—one glacial and the other interglacial. In that time, the Sun's output has increased by 30 percent, yet the temperature has increased and decreased only a small amount over the period. So how can a mere 0.4 percent of man-made CO₂ now be catastrophic?

Think about that the next time you hear Al Gore talk about global warming, or you read the next big climate change scare story, he said.

Hedge Fund Manager Gore Profits from Carbon Caps

Al Gore and David Blood, cochairmen of the London-based hedge fund Generation Investment Management, gave their "Blood and Gore" view of the world, in an interview that appeared in *The McKinsey Quarterly* for May 2007.

The Blood and Gore hedge fund's main business is carbon management and trading, referring to schemes based on coercing governments to impose caps on CO₂ and other so-called greenhouse gas emissions from industry and agriculture, and then creating a specula-

tive market in emissions allowances.

When asked how he balances his "value" of "sustainability investments" and the profit motive for his hedge fund, Gore was unequivocal: "Our objective in innovation with this new model was to focus on the best return for our clients, full stop."

"The context of business is clearly changing," Blood said, in answer to a question of what "principles govern the approach" of their hedge fund. "We are now confronting the limits of our ecological system, and at the same time societal

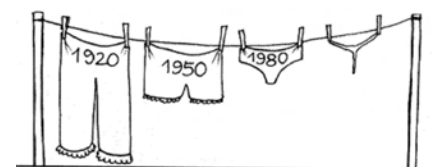
expectations are widening. On top of that, multinational businesses are often-times better positioned than governments to deal with some of the most complicated global challenges, such as climate change, HIV/AIDS, water scarcity, and poverty."

Gore singled out the slave-labor company Wal-Mart for praise, for its "commitment to 'green' their supply chain."

NASA/SOHO CD Shows There Is No Global Warming Consensus

An educational CD-Rom, available on a NASA website, shows that contrary to claims of the climate mafia, the Sun is the primary driver of climate, and scientists do not agree that CO₂ is the cause of global warming. The CD can be downloaded or ordered at http://sohowww.nascom.nasa.gov/freestuff/cd_info.html#getcopies

The section of the CD on the subject of "Sun and Climate," shows convincingly how variations in the Sun's irradiance, solar wind, the Sunspot cycle, and Earth's orbital variations affect Earth's climate. "The Sun is naturally the primary driver and energy source for atmospheric and ocean systems and the Earth's surface climate," the NASA CD reports.



Proof of global warming

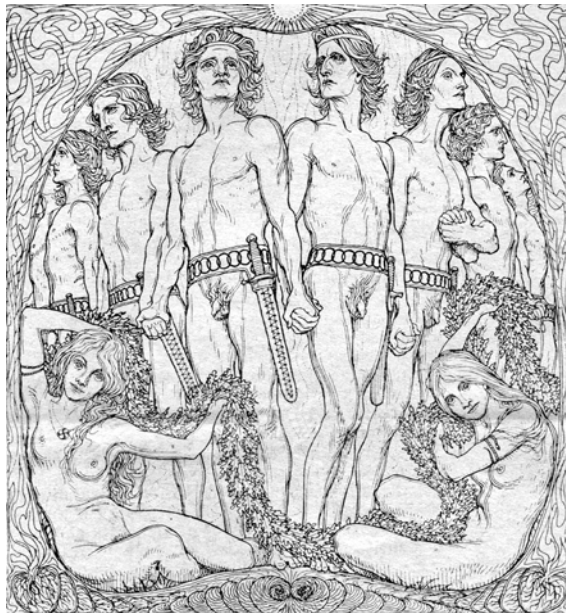
The Road to Hell Is Paved Green

by Leandra Bernstein

The modern environmentalist movement was intentionally created as a fascist movement to accomplish in the United States what the British-spawned Nazis never could with Germany. Other LaRouche Youth Movement writers have made it clear that today's environmentalist movement is a directly commissioned asset of the same circles and families of London and Wall Street, who have actively sought to destroy the United States since even before 1787.¹ However, what is missing from this picture, is a deeper view of the most recent historical precedent to today's environmentalist movement: the Nazi regime.

For the dignity of humanity, we are presently in a war. This war is being fought every day on the streets, and is led by the LaRouche Youth Movement (LYM), in bringing the science of Bach and Kepler to the population. Even a culture that has fallen into degeneracy can rediscover the need for mankind, and man's true, defining character, which is located in his ability to discover and actively organize the universe, as the Presidency of Franklin D. Roosevelt demonstrated. The enemy is the notion, typified by British asset Al Gore's environmentally friendly fascism, which views the majority of mankind as vermin, or worse. This notion of mankind, like a childhood disease, if left untreated by those of us who are sane enough to apply the benefits of modern science, would inevitably lead to the physical degradation of the planet, and the willful death of entire nations and peoples.

The conditions are as severe as Al Gore is clinically stupid. But what is clear, is that Lyndon LaRouche and the LYM, are moving to a position internationally where, in concert with the nations of Russia, China, and India, we could lead the shift to a modern echo of Roosevelt's postwar plans for decolonization and sovereign, physical-economic development under a fixed-exchange-rate system, and thus free



This romanticized drawing of German youth typifies the back-to-nature cults in the pre-Nazi period and later.

mankind from the Anglo-Dutch Liberal empire, and its use of environmentalist movements, and similar cults, to destroy mankind.

Authoritarian Land Control:

The Reich Nature Protection Laws

In 1935, the Third Reich passed the *Reichnaturaenschutzgesetz* (RNG) or the Reich Nature Protection Laws, the most extensive and unified nature protection laws passed by any nation until that time. The passage of the RNG overturned the Weimar constitution's federalist provisions for nature protection and land planning, and laid the groundwork for authoritarian land control and later, colonization.

Section 18 of the RNG allowed Reich Master of Forestry, Hermann Göring, to designate as Reich Nature Protection Areas any areas that "decorate or enliven the appearance of the landscape," or "lie in the interest of the animal world," especially if those areas protect "song-birds and small game animals (e.g.,

trees, groves of trees or bushes, ridges, avenues, old fortifications, hedges, parks, and cemeteries)."

Under Section 24 of the RNG, the previous owners of property that had been seized by the state and deemed protected, were denied indemnification; the people were not protected or paid compensation. Indemnification claims were ignored because, according to Nazi dogma, a person who was concerned with individual gains threatened the interest of the public welfare. This was repeated in the duplicitous mantra: "The common good takes precedence over the individual good."

Furthermore, Section 20 of the RNG required that any individual or group that wished to conduct a project "which might lead to essential alteration in the free landscape" must first consult a Reich Nature Protection Officer from one of the agencies under Göring. Section 20 established the green-brown police force that oversaw the land seizures, and prohibited private individuals and organizations from developing land, unless the state deemed it necessary.

The possibility of a fascist movement cannot be understood by looking simply at the trait of authoritarian top-down control. Rather, a fascist movement exists as such because of the broad-based support for it from the population. The most vocal supporters of the RNG were typically conservationists and activists in the *Heimatschutz* (homeland protection) movement, who had for years pressured the parliament to pass a unified land protection laws.

SCIENCE and the LaRouche Youth Movement

Reacting to a fear of industry and technology, and believing that nothing but socialism could unite the country wrecked by war and economic devastation, this grouping called for the protection of the countryside against disfigurement from unchecked industrial developments and sprawl.

Pre-Nazi nature protection agencies in Rhineland-Westphalia and Prussia took an aggressive approach to conservationism, and under the federal provisions of the constitution, they passed extensive *Naturschutz* (nature protection) state legislation. Conservationists viewed these industrial regions of Ruhr, Duisburg, and Cologne, as “the bloodiest wounds of the German landscape.”

Nationwide, authoritarian land laws could not have passed under the federalist provisions of the Weimar constitution, and so required the abolition of the federal structure of Germany, as happened in 1933. Many Germans, particularly *Heimatschutz* advocates, embraced the dissolution of the parliament, which they despised for its impotence and ceaseless partisan infighting.

When the RNG was passed, Rhineland cultural affairs officer Hans Kornfeld said that the new law was “a load off the minds of nature's friends. Their decades-long efforts had finally found the resonance that raised the care of nature from a hobby to a duty for the entire people.... It was left up to the National Socialist state, which is founded on *Blut und Boldten* [blood and soil] to pass the Reich Nature Protection Law. The 'parliamentary system' had repeatedly endeavored to do this, but the spiritual conditions were missing to make it a reality.”

The RNG laws were supposed to “protect nature,” but actually just gave the Nazis

license for their murder policies. With sense enough to see the absurdity of an anti-industrial policy, Paul Shultze-Naumburg, president of the Homeland Protection Association, argued that it was possible to attain “harmony” between nature and technology through careful planning and land use. Schultze-Naumburg was later responsible for “modernizing” the conservationists, by helping them integrate their environmental goals with the goals of racial hygiene.

He taught that land disfigurement was caused by the impurities in the people living on the land. Sick people stamped the land with their sickness, their factories, hotels, and shops. He argued that Jewish capital and American industrialism had disfigured the German landscape and diverted Germany from its organic foundations. It was the advocates of *Heimatschutz* who were indispensable in purging the landscape of “incompetence, capitalist thinking, and all Jewish-American

relics of a bygone era.”

The conservationists of the *Heimatschutz* movement were likewise indispensable for what followed the passage of the RNG. Beginning in 1936, the Third Reich launched the “Battle for Production,” which required massive land reclamations and land-planning schemes to ensure self-sustainability in food production, transportation, and industrial capacity leading into the war. During the Reich's period of Inner Colonization, the Battle for Production's land reclamation extended into the protected areas. Soldiers and paid public servants drained marshlands, rerouted streams, and built dams and dikes, under the motto: “Change wasteland into arable land!”

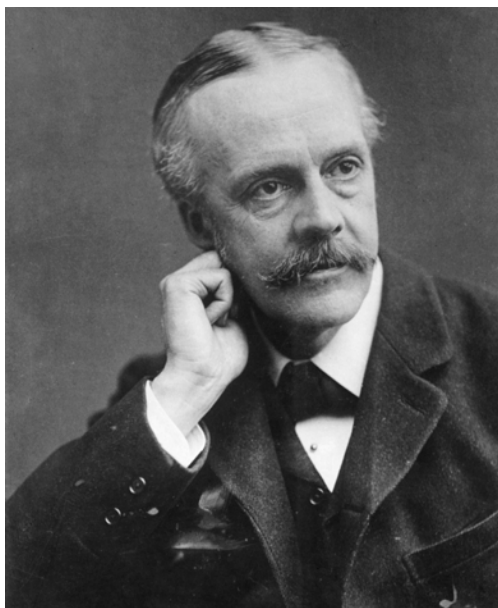
The conservationists argued for the rights of the fish and small birds; they argued for *Heimat* (love of homeland), and their spiritual connection to the land, and cited the provisions from the RNG, but nature was suddenly less important than the drive to war.

With the invasion of Poland, Sept. 1, 1939, the regime required even greater expansion of military installations and raw materials consumption. Before colonizing in the East, the military made much use of the Reich's protected areas. The open fields of Wahner Heath were transformed into a shooting range. In the Haardt Forest in the Ruhr, the linden and acacia groves were used to hide anti-aircraft artillery. In late 1939, in Bonn, a district nature protection officer pleaded with the local anti-aircraft division not to destroy a nearby acacia grove. The officer cited the RNG, and *Heimat*, and memory, and the spiritual connection to the fatherland.

But it was never about *Heimat*, although the feeling-state helped. It was never about protecting nature, though it gave people a false, warm sense that they were doing good. Environmentalism was a predicate for war, genocide, and empire.



Hermann Göring (at left) with Adolf Hitler (right) and Field Marshal von Blomberg near Hitler's retreat. As Reich Master of Forestry in 1935, Göring had the power to designate any place as a “Nature Protection Area.”



Library of Congress

Eugenics was not a Nazi creation. Sir Arthur Balfour (1848-1930), founded the Eugenics Society in the late 19th Century, from where it spread to other countries. Balfour held many government posts, including Prime Minister (1902-1905), and Foreign Minister.

Eugenics

To put the subject at hand in context, look back at Abraham Lincoln's defeat of the British-backed Confederacy, and consider the subsequent spread of the American System of Political Economy throughout a major portion of the planet. Consider the relations between the continental powers, an international alliance of sovereign nation-states. Consider, from the other side, what this alliance implied for the existence of an empire.

In the late 19th Century, Sir Arthur Balfour, with the British Round Table of Cecil Rhodes, founded the Eugenics Society. Beginning at the turn of the century, with the U.S. traitors, the Rockefeller and Harriman families, the British Eugenics Society bred in its likeness a second generation of eugenics societies throughout the United States.

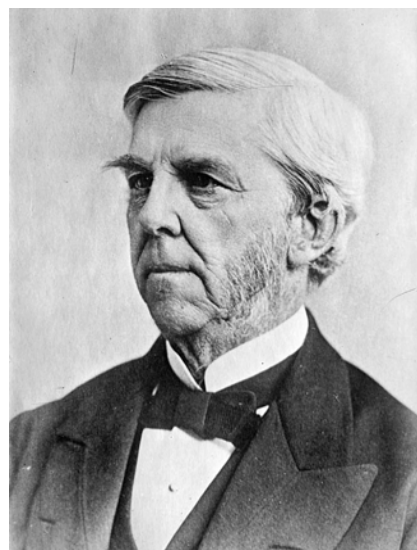
Americans like Stanford University president David Starr Jordan, and other influentials, were recruited to validate the pseudo-scientific theory that there was no difference between a man and an animal, but some (that is, the rich and white), were more fit to survive.

So, these prestigious men of science at Harvard, Yale, Princeton, and so on, were recruited to the fancies of Darwin's cousin, Sir Francis Galton, and claimed that, just as the characteristics of plants and animals are transmitted hereditarily, so human characteristics, like intelligence, criminality, and poverty, were passed through the blood. In celebration of this pseudo-scientific breakthrough, the U.S. Supreme Court ruled in 1927, in favor of national eugenics laws, giving legal justification for the forced sterilization of criminals, the feeble-minded, and other "degenerates." As Justice Oliver Wendell Holmes, Jr., stated: "It's better for all the world, if instead of waiting to execute degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind.... Three generations of imbeciles are enough."

So the science was used to justify the political end of eliminating the unfit—the insane, the feeble-minded (that is, the poor), African-Americans, Italians, Poles, Jews, criminals. In the period from 1908-1914, the United States brought in more than 7 million immigrants, while the eugenics declared that there was simply not enough space, not enough employment, not enough housing, and certainly not enough resources for people, especially the degenerates, to procreate.

Margaret Sanger, a tireless advocate of population control, wrote in 1926, that if the U.S. government would offer yearly pensions or bonuses to individuals who would allow themselves to be sterilized, "The number of feeble-minded would decrease and a heavy burden would be lifted from the shoulders of the fit." Sanger was the founder of the anti-population Planned Parenthood.

With such success in the United States, the Rockefeller Foundation began flooding millions of dollars into German eugenics institutions, to individual scientists and researchers. In 1926, the Rockefeller Foundation contributed \$317,000 to turn the Institute



Library of Congress

Supreme Court Justice Oliver Wendell Holmes, Jr. (1841-1935) ruled in 1927 in favor of national eugenics laws to sterilize "degenerates." As he stated, "Society can prevent those who are manifestly unfit from continuing their kind.... Three generations of imbeciles are enough."

for Brain Research, which had previously operated out of a single room, into the central training institution for the German eugenics. By 1934, the German institutions had taken root, and doctors were performing more than 5,000 sterilizations per month.

Until the U.S. restriction of foreign grants under the 1939 Trading With the Enemy Act, the Rockefellers' funds helped train some of the most horrendous agents of Nazi eugenics, in particular, Otmar von Verschuer, the teacher of the infamous Dr. Josef Mengele, the Auschwitz camp physician.

There were certain projects that American eugenics never had the means to conduct, such as germ plasm experiments on twins. In the 1930s, the Rockefeller Foundation paid for eugenics research on twins carried out by Verschuer and his assistant Mengele. Mengele resumed this research when he was stationed at Auschwitz. With a wealth of human test subjects, he searched the boxcar arrivals for twins.

Harmony vs. Balance

A formula for conjuring Hell on Earth: Start with an axiomatically fixed model. Invest your mortal identity into making

that model a reality. If a paradox arises in the process of fulfilling the ideal, ignore the paradox and push ahead even harder, or address the paradox with lofty justifications for why you ignored it. It is a simple formula that has produced an extensive web of sophistries from the Nazi regime to the modern environmentalist movement.

To build a society, we must work, in truth, toward a dynamic organization of human and non-human life. With a more rigorous understanding of that conception, we avoid the Hell on Earth that has been grossly misnamed "harmony with nature."

Musical harmony is discovered through motion. The common belief that musical harmony can exist in a vertical chord, is incompetent and dangerously so. The chord is a fixed unit, within a pre-established key. If a note from a foreign key should possibly be introduced, the harmony is broken, and cannot be resolved except by its removal.

Consider, then, J.S. Bach's conception of harmony as expressed in the "Trotz" section of "Jesu, meine Freude." Consider the dissonance of "Ich steh hier und singe," which, if taken as a fixed thing, in and of itself, would appear as an unsolvable crisis. But this crisis arose from a motion within a lawfully ordered composition. Through the continuation of the piece, we find that what had appeared as a dissonance, was a necessary inflection point for the elaboration and lawful development of the composition as a whole.

The idea that careful land planning and population control could establish "harmony with nature" should be seen in this context.

Eastward Expansion

In February 1920, Gottfried Feder, an urban theorist and founder of the pre-Nazi German Workers Party, drafted the Nazi platform entitled "The 25-Point Program." This program was used as a rallying point for recruiting the core of the Nazi Party, and gaining support throughout the population. Some crucial points: First,

"Only a member of the race can be a citizen. A member of the race can only be one who is of German blood, without consideration of creed. Consequently no Jew can be a member of the race."

The Program called for colonies to provide the sustenance of "our people," and also called for the expulsion of non-citizens from Germany, in the event that it became impossible to sustain the non-Germans. In his book *The New City*, Feder elaborated how the program would be carried out in practical terms, proposing that the country should be organized into decentralized, self-sustaining "Garden Communities." This type of organization was supposed to bring man back into "harmony" with nature, and solve the great crises of modernity: alienation and class conflict.

Nazi landscape planner Alwin Seifert took the landscape plan a logical step

further and said that these Garden Communities could have only native plants, in order to produce a healthy tribe of industrial workers. Between 1933 and 1936, the Rhenish Regional Planning Society and the German Labor Front completed 6,850 small houses and garden suburbs, the layout of which, it was said, encouraged workers of limited means, but sound racial health, to produce large, racially pure families.

After the September invasion of Poland, Hitler signed the secret decree of October 1939 outlining the three major goals of eastern expansion. The intention was to repatriate German citizens and ethnic Germans living abroad, eliminate the harmful influence of alien portions of the population on the Reich, and establish new German territories for the resettlement of Germans returning from abroad. Essentially, the goals of expanding the Reich were based on British-styled imperial colonization.

However, in order to colonize Poland, the Nazis had to first cleanse the landscape, creating "empty space," a concept that fascinated land-planners. Seifert wrote in 1941: "If the East is to become home for Germans from all over Germany, and if it is to flourish and become as beautiful as the rest of the Reich, then it is not enough just to cleanse the towns of past Polish mismanagement and construct clean and pleasant villages. The entire landscape must be Germanized."

This meant the obliteration of all relics of Polish culture.

At a conference at Poznan on Jan. 24, 1940, the Reich Commission released a report entitled "Basics of Planning for the Building-Up of the Eastern Areas." The report announced: "In the following material, it is taken for granted that the entire Jewish population of this area, roughly 560,000 people, has already been evacuated or will leave the area in the course of this winter. Therefore it is practi-

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This pre-Nazi euthanasia poster reads: "Look who you're carrying. One person with birth defects costs an average of 50,000 reichsmarks by the age of 60."



The town of Auschwitz in 1940, before being “cleansed” by Nazi land planners.

cal to count on a population of 9 million people.... At the same time, 3.4 million Poles should be deported, little by little.”

This expulsion left millions homeless.

Some towns were evacuated so quickly that the people didn't have time to take their possessions with them. Despite the progress in creating “empty space,” Nazi administrators noted insufficient cooperation in implementing the evacuations. A memorandum from the Reich Office for Spatial Order, to the planning staff of the Reich commissioner, ordered: “The evacuated persons should not be put to work. They should be taken directly from the transport trains, divided into small groups, spread as evenly as possible across the country, and then left to fend for themselves. One can thereby avoid a massing together of troublesome elements, in view of possible turbulence throughout the country.”

The Germans had no idea what to do with so many people, and so whole towns and villages were put into boxcars, shipped to various, remote parts of the country and “unloaded.” That same year, in Germany, eugenicists began implementing an extensive program of euthanasia for the elderly and the insane, using poison gas chambers.

The colonization project included landscape planners and architects, and was proposed to German university stu-

dents. Heinrich Friedrich Wiepking-Jürgensmann, chair of the Institute for Landscape Design at the University of Berlin, wrote *The German East: A Priority Task for Our Students*, predicting “a golden age for the German landscape and garden designer that will surpass everything that even the most enthusiastic among us had previously dreamed.”

As the policy of the RNG revealed itself in practical terms, the architects and land planners had access to full knowledge of their designs. In sanity, no one could deny the violence used in creating the new German settlements, but because the Nazi maenads were brainwashed by their romantic attachments to their mission, they were totally dissociated from the actual atrocities they were committing. As the planners drafted new designs to meet the industrial and agricultural needs of the war mobilization, they included in the layout of new towns and villages, space for satellite work camps and death camps.

The Requirement of Man for Science

As horrifying as the *Heimatschutz* environmentalist movement was, it is not phenomenal. What it shows us is the extreme effects of a typical folly of man, who, in absence of a commitment to the knowledge and use of universal principles, attaches himself to a fantastical,

impossible ideal. The development of the modern environmentalist cult, which is not separate from the post-industrial, utopian cult of globalization, is characterized by such folly, but it can be remedied.

The political intervention by the International LaRouche Youth Movement, is driven by our intent to master the works of Kepler and Bach, making it the only force on the planet capable of applying the necessary remedy. I explain: If not for passion and rigor in both science and music, which is to say, love of truth for truth's own sake, then how does our society take shape? And in whose image is mankind, when we organize ourselves around a common fantasy, rather than what is universally true?

On April 3, 2007, the United States Supreme Court ruled, in the case of *Massachusetts v. the Environmental Protection Agency (EPA)*, that carbon dioxide—what people breathe out and plants take in—is a harmful air pollutant (!) and, according to the 1990 Clean Air Act, it must be regulated and reduced. According to the court, it is possible to overturn the ruling, only on the grounds of science:

“EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.”

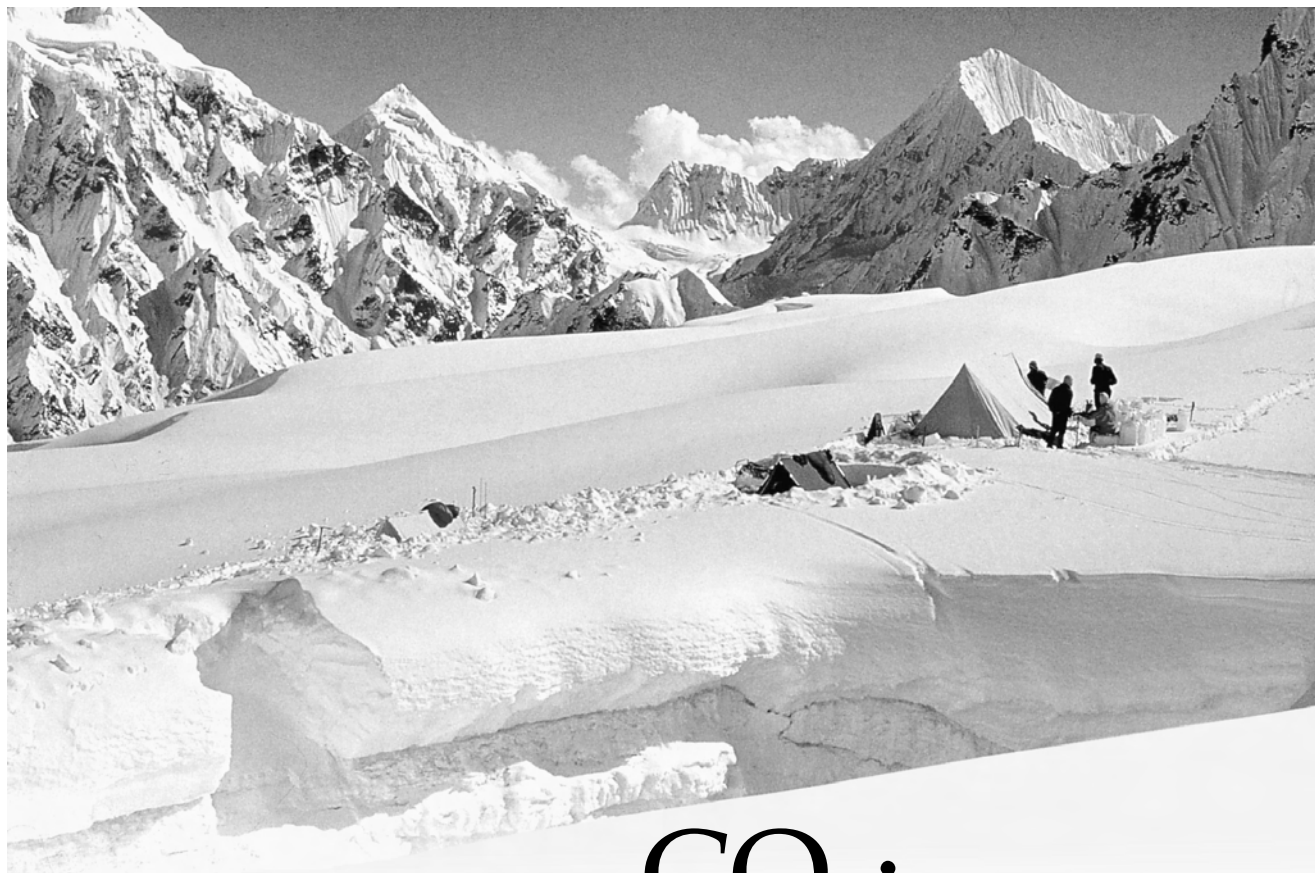
It is for this reason, that we commit ourselves to a science of discovered universal physical principles; and in waging our fight on those grounds, this generation has a good shot at building this planet out of Hell.

Notes

1. See, for example, “The New Environmentalist Eugenics: Al Gore's Green Genocide,” by Rob Ainsworth, *EIR*, March 30, 2007, http://www.larouchepub.com/eiw/public/2007/2007_10-19/2007-13/pdf/36-46_713_ainsworth.pdf.

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Courtesy of Zbigniew Jaworowski

CO₂: The Greatest Scientific Scandal Of Our Time

by Zbigniew Jaworowski, M.D., Ph.D., D.Sc.

The campsite near the giant Langtang Glacier, north of Katmandu, Nepal, on one of the author's expeditions to excavate ice samples.

Introduction

On Feb. 2, 2007, the Intergovernmental Panel on Climate Change (IPCC) again uttered its mantra of catastrophe about man-made global warming. After weeks of noisy propaganda, a 21-page "Summary for Policymakers" of the IPCC Fourth Assessment Report, 2007, was presented in grandiose style in Paris to a crowd of politicians and media, accompanied by a blackout of the Eiffel Tower to show

that electric energy is bad. The event induced a tsunami of hysteria that ran around the world. This was probably the main aim of this clearly political paper, prepared by governmental and United Nations bureaucrats, and published more than three months before the IPCC's 1,600-page scientific report, which is to be released in May. In the words of the IPCC, this delay is needed for adjustment of the main text, *so that "Changes . . . [could be] made to ensure consistency with the 'Summary*

for Policymakers.’” Not a single word in these 1,600 pages is to be in conflict with what politicians said beforehand in the summary!

This is a strange and unusual method of operation for a scientific report, and even stranger is the frankness of the IPCC’s words about the delay, disclosing its lack of scientific integrity and independence. It is exactly the same *modus operandi* demonstrated in the three former IPCC reports of 1990, 1995, and 2001: First the politics, then the science.

The IPCC style was strongly criticized some years ago, in two editorials in *Nature* magazine (Anonymus 1994, Maddox 1991). In each of these criticisms, *Nature* used the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) as an ideal example of how an independent and objective scientific report should be prepared, in this case a report on the global risks from all sources of radiation, including nuclear weapons and Chernobyl. The UNSCEAR assessments presented each year to the U.N. General Assembly are regarded as a bible of the science of ionizing radiation. Yes, UNSCEAR mostly fits *Nature’s* description—but for a price. Because UNSCEAR’s scientific reports often widely differed from the catastrophic views of the United Nations Environmental Programme or of the former U.N. Secretary-General, the U.N. bureaucracy has squeezed the finances of UNSCEAR, down to a level that caused almost a complete halt of its activity (Jaworowski 2002).

This obviously is not the case with the IPCC, which is stuffed with money, and in agreement with the U.N. politics, which are dominated by greens and misanthropic fanaticism. During the past six years, the President of the United States devoted nearly \$29 billion to climate research, leading the world with its unparalleled financial commitment (The White House 2007). This was about \$5 billion per year, more than twice the amount spent on the Apollo Program (\$2.3 billion per year), which in 1969 put man on the Moon. A side-effect of this situation, and of politicizing the climate issue, was described by meteorologist Piers Corbyn in the *Weather Action Bulletin*, December 2000: “The problem we are faced with is that the meteorological establishment and the global warming lobby research bodies which receive large funding are now apparently so corrupted by the largesse they receive that the scientists in them have sold their integrity.”

The question arises: Were the decisions concerning this enormous funding for global warming research taken out of genuine concern that the climate is allegedly changing as a result of CO₂ industrial emissions, or do some other undisclosed ideas stand behind this money, IPCC activity, Kyoto, and all the gruesome catastrophic propaganda the world is now exposed to? If this concern is genuine, then why do we not see a storm of enthusiastic environmentalists and United Nations officials demanding to replace all fossil-fuel plants with nuclear plants, which have zero emission of greenhouse gases, are environmentally friendly, more economical, and safe for plant workers and much safer for general population than other sources of energy (Jaworowski 2006)?

Why do we not see a global-scale effort to replace the internal combustion automobile engine with a zero-pollution compressed-air engine? An improved version of such an engine, invented in 1870 by Ludwik Mekarski, drove the trams in Nantes and Paris for 34 years after 1879, transporting millions of passengers. Pneumatic locomotives were working in the mines the world over until the end of the 1930s. A pneumatic car is not pie in the sky, but a real thing, now under construction, which in its French version drives some 300 km before the air tank must be refilled, at a cost of about \$2 per 100 km. Can you imagine the beneficial, stabilizing consequences for global politics and economy, and for urban hygiene, of such a replacement, com-



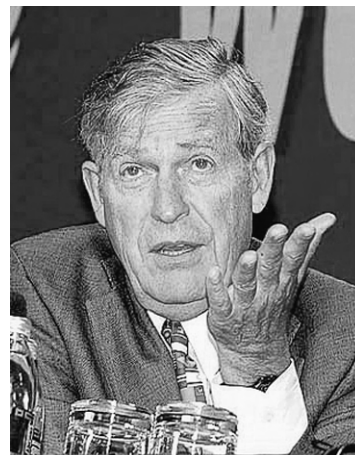
Mark Garten/UN Photo

Maurice Strong

ined with a switch from oil, gas, and coal into nuclear energy? But at the November 2006 mass meeting in Nairobi of 6,000 followers of Kyoto (including U.N. Secretary-General Kofi Annan, the Presidents of Kenya and Switzerland, and a cortège of ministers from some 180 countries), the participants were pressed to not even mention nuclear energy.¹

The concern at the top about “climate change” is not genuine, and there are hidden motives behind the global warming hysteria. Although there is not the space in this paper to discuss these motives fully, they may be illustrated by the following citations (for full references, see Jaworowski 1999).

- Maurice Strong, who dropped out of school at age 14, established an esoteric global headquarters for the New Age



UN Photo

Tim Wirth

A sample trio of the Malthusians behind the global warming hysteria.



Richard Benedick

movement in San Luis Valley, Colorado, and helped produce the 1987 Brundtland Report, which ignited today's Green movement. He later became senior advisor to Kofi Annan, U.N. Secretary-General, and chaired the gigantic (40,000 participants) "U.N. Conference on Environment and Development" in Rio de Janeiro in 1992. Strong, who was responsible for putting together the Kyoto Protocol with thousands of bureaucrats, diplomats, and politicians, stated: *"We may get to the point where the only way of saving the world will be for industrial civilization to collapse."*

Strong elaborated on the idea of sustainable development, which, he said, can be implemented by deliberate *"quest of poverty . . . reduced resource consumption . . . and set levels of mortality control."*

- Timothy Wirth, U.S. Undersecretary of State for Global Issues, seconded Strong's statement: *"We have got to ride the global warming issue. Even if the theory of global warming is wrong, we will be doing the right thing in terms of economic policy and environmental policy."*
- Richard Benedick, a deputy assistant secretary of state who headed policy divisions of the U.S. State Department, stated: *"A global warming treaty must be implemented even if there is no scientific evidence to back the [enhanced] greenhouse effect."*

The Four Basic IPCC Lies

But let us switch back to the IPCC 2007 report. The four basic statements in the "Summary for Policymakers" are:

(1) Carbon dioxide, the most important anthropogenic greenhouse gas, increased markedly as a result of human activities, and its atmospheric concentration of 379 ppmv (parts per million, by volume) in 2005 by far exceeded the natural range of 180 to 300 ppmv over the last 650,000 years.

(2) Since 1750, human activities warmed the climate.

(3) The warmth of the last half-century is unusual, is the highest in at least the past 1,300 years, and is *"very likely"* caused by increases in anthropogenic greenhouse gas concentrations;

(4) Predictions are made that anthropogenic warming will continue for centuries, and between 2090 and 2099 the global average surface temperature will increase 1.1°C to 6.4°C. Various scare stories of global catastrophes are prophesied to occur if man-made CO₂ emissions are not curbed by drastic political decisions. The obvious beneficial effects of warming for man and all the biosphere are downplayed.

Except for CO₂, all these points are garlanded with qualifications such as "likely," "very likely," "extremely likely," "with



The co-chairmen of the IPCC Working Group I, in Paris, Feb. 2, after the "Summary for Policymakers" was approved by the group: Susan Solomon (center) and Dahe Qin (right). At left is Martin Manning, head of the Technical Support Unit.

very high confidence," and "unequivocal."

In fact, to the contrary, all these points are incorrect.

The first "Summary for Policymakers" statement on the man-made increase of CO₂, is a cornerstone of the IPCC report, and of the global warming edifice. This statement is a manipulation and a half-truth. It is true that CO₂ is "the most important anthropogenic [trace] greenhouse gas," but a much more important greenhouse factor is the water naturally present in the atmosphere, which contributes some 95 percent to the total greenhouse effect. This basic fact is not mentioned at all in the "Summary for Policymakers." Also not mentioned is the fact that 97 percent of the total annual emission of CO₂ into the atmosphere comes from natural emissions of the land and sea; human beings add a mere 3 percent. This man-made 3 percent of CO₂ emissions is responsible for a tiny fraction of the total greenhouse effect, probably close to 0.12 percent. Propositions of changing, or rather destroying, the global energy system because of this tiny human contribution, in face of the large short-term and long-term natural fluctuations of atmospheric CO₂, are utterly irresponsible.

The Truth About Ice Cores

Because carbon dioxide ice core records are regarded as a foundation of the man-made global warming hypothesis, let us dwell on them for a while.

The basic assumption behind the CO₂ glaciology is a tacit view that air inclusions in ice are a closed system, which permanently preserves the original chemical and isotopic composition of gas, and thus that the inclusions are a suitable matrix for reliable reconstruction of the pre-industrial and ancient atmosphere. This assumption is in conflict with ample

evidence from numerous earlier CO₂ studies, indicating the opposite (see review in Jaworowski et al. 1992b).

Proxy determinations of the atmospheric CO₂ level by analysis of ice cores, reported *since 1985*, have been generally lower than the levels measured recently in the atmosphere. But, *before 1985*, the ice cores were showing values much *higher* than the current atmospheric concentrations (Jaworowski et al. 1992b). These recent proxy ice core values remained low during the entire past 650,000 years (Siegenthaler et al. 2005)—even during the six former interglacial warm periods, when the global temperature was as much as 5°C warmer than in our current interglacial!

This means that either atmospheric CO₂ levels have no discernible influence on climate (which is true), or that the proxy ice core reconstructions of the chemical composition of the ancient atmosphere are false (which is also true, as shown below).

It was never experimentally demonstrated that ice core records reliably represent the original atmospheric composition. Other proxies demonstrated that many millions of years ago, CO₂ levels in the atmosphere reached, at various times, 377 ppmv, 450 ppmv, and even 3,000 ppmv (Kurschner et al. 1996, Royer et al. 2001), and that during the past 10,000 years these levels were, as a rule, higher than 300 ppmv, fluctuating up to 348 ppmv (Kurschner et al. 1996, Royer et al. 2001, Wagner et al. 1999, Wagner et al. 2002). The results of these last studies prove false the assertion of stabilized Holocene CO₂ concentrations of 270 ppmv to 280 ppmv until the industrial revolution.

The results of the cited pre-1985 studies are strongly supported by direct CO₂ measurements, carried out in the pre-industrial and 20th Century atmosphere (see below). About 2



Courtesy of Zbigniew Jaworowski

The author (right) working with ion exchange columns in a laboratory tent at Kahiltna Glacier, Alaska, 1977.

billion years ago, the CO₂ atmospheric level was 100 or perhaps even 1,000 times higher than today. According to today's climate models, the Earth would have been too hot for life at that time (Ohmoto et al. 2004). However, geologic evidence suggests there was not a Venus-style, "runaway warming." Instead, life flourished then in the oceans and land, with such enormously high levels of this "gas of life," from which our bodies and all living creatures are built (Godlewski 1873). Yet, Greens now call this gas a dangerous "pollutant."

There are four other arbitrary assumptions behind the CO₂ glaciology, which were used to support the first assumption above:

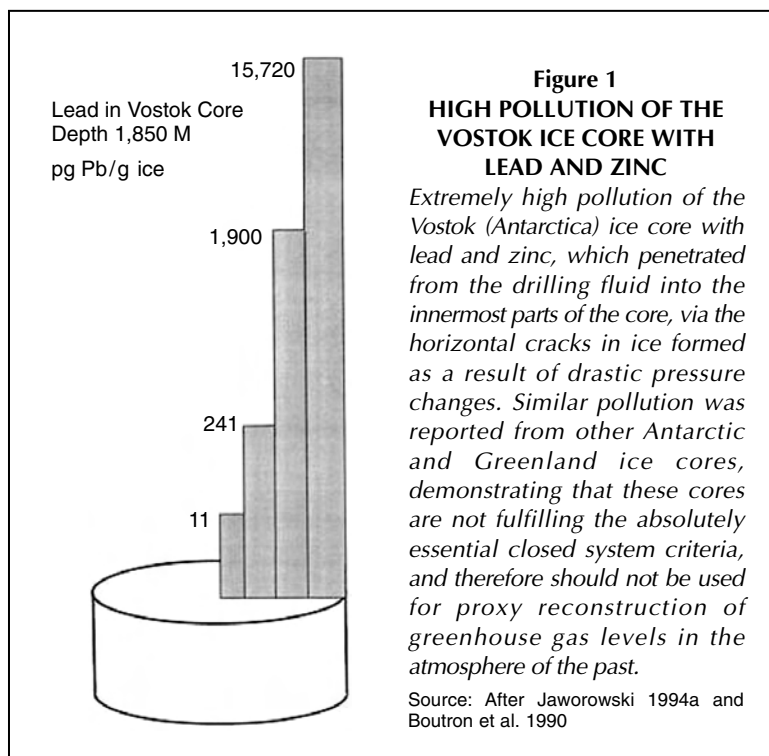
(1) No liquid phase occurs in the ice at a mean annual temperature of -24°C or less (Berner et al. 1977, Friedli et al. 1986, Raynaud and Barnola 1985).

(2) The entrapment of air in ice is a mechanical process with no differentiation of gas components (Oeschger et al. 1985).

(3) The original atmospheric air composition in the gas inclusions is preserved indefinitely (Oeschger et al. 1985).

(4) The age of gases in the air bubbles is much younger than the age of the ice in which they are entrapped (Oeschger et al. 1985), the age difference ranging from several tens to several thousands of years.

More than a decade ago, it was demonstrated that these four basic assumptions are invalid, that the ice cores cannot be regarded as a closed system, and that low pre-industrial concentrations of CO₂, and of other trace greenhouse gases, are an



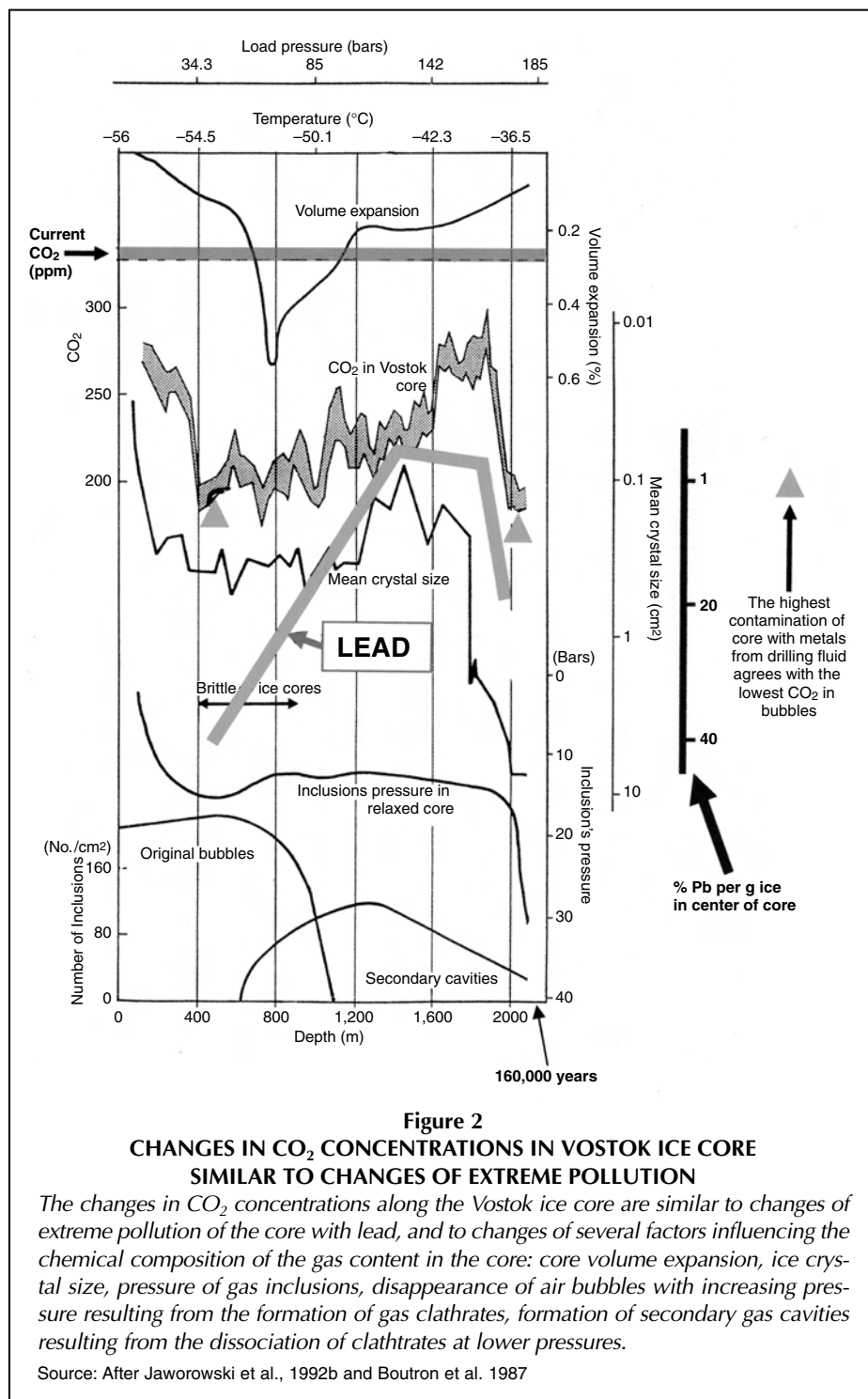


Figure 2
CHANGES IN CO₂ CONCENTRATIONS IN VOSTOK ICE CORE
SIMILAR TO CHANGES OF EXTREME POLLUTION

The changes in CO₂ concentrations along the Vostok ice core are similar to changes of extreme pollution of the core with lead, and to changes of several factors influencing the chemical composition of the gas content in the core: core volume expansion, ice crystal size, pressure of gas inclusions, disappearance of air bubbles with increasing pressure resulting from the formation of gas clathrates, formation of secondary gas cavities resulting from the dissociation of clathrates at lower pressures.

Source: After Jaworowski et al., 1992b and Boutron et al. 1987

components, are related to the solubility of gases: In cold water, CO₂ is more than 70 times more soluble than nitrogen (N₂) and more than 30 times more soluble than oxygen (O₂). Liquid water is commonly present in the polar snow and ice, even at the eutectic temperature of -73°C (see review in Jaworowski et al. 1992b).

Therefore, the conclusions on low pre-industrial atmospheric levels of greenhouse gases cannot be regarded as valid, before experimental studies exclude the existence of these fractionation processes. Such studies were proposed by this author (Jaworowski 1994a, Jaworowski et al. 1992b), but for years they were not performed. In response to criticism of the reliability of ice records, CO₂ glaciologists could only state that the ice core record itself proves that the changes in greenhouse gases are not caused by post-deposition processes, but accurately reflect atmospheric changes (Raynaud et al. 1993).

Only recently, many years after the ice-based edifice of anthropogenic warming had reached a skyscraper height, did glaciologists start to study the fractionation of gases in snow and ice (for example, Killawee et al. 1998), and the structure of snow and firn which might play a first-order role in changing gas chemistry and isotopic profiles in the ice sheets (Albert 2004, Leeman and Albert 2002, and Severinghaus et al. 2001). Recently, Brooks Hurd, a high-purity-gas analyst, confirmed the previous criticism of ice core CO₂ studies. He noted that the Knudsen diffusion effect, combined with inward diffusion, is depleting CO₂ in ice cores exposed to drastic pressure changes (up to 320 bars—more than 300 times normal atmospheric pressure), and that it minimizes variations and reduces the maximums (Hurd 2006).

artifact, caused by more than 20 physical-chemical processes operating *in situ* in the polar snow and ice, and in the ice cores. Drilling the cores is a brutal and polluting procedure, drastically disturbing the ice samples—Figures 1 and 2 (Jaworowski 1994a, Jaworowski et al. 1990, Jaworowski et al. 1992a, and Jaworowski et al. 1992b).

Some of these processes, which all cause fractionation of air

This is illustrated by comparing for the same time period, about 7,000 to 8,000 years before the present, two types of proxy estimates of CO₂. The ice core data from the Taylor Dome, Antarctica, which are used to reconstruct the IPCC's official historical record, feature an almost completely flat

time trend and range, 260 to 264 ppmv (Indermuhle et al. 1999). On the other hand, fossil leaf stomata indices² show CO₂ concentrations ranging widely by more than 50 ppmv, between 270 and 326 ppmv (Wagner et al. 2002). This difference strongly suggests that ice cores are not a proper matrix for reconstruction of the chemical composition of the ancient atmosphere.

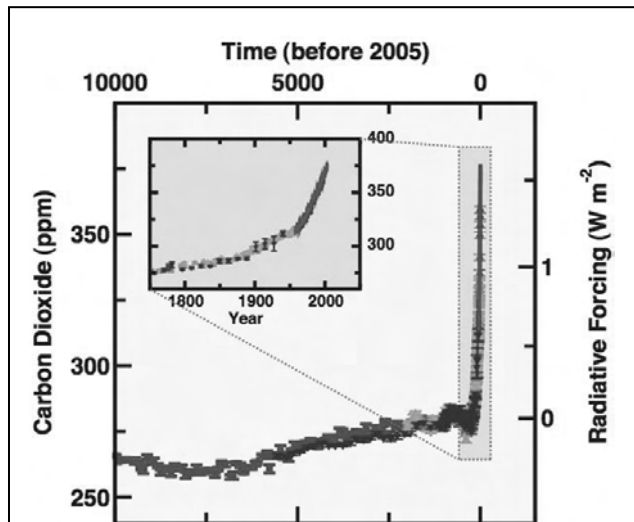
The CO₂ ice core data are artifacts caused by processes in the ice sheets and in the ice cores, and have concentration values about 30 to 50 percent lower than in the original atmosphere. Ice is an improper matrix for such chemical studies, and even the most excellent analytical methods cannot be of help when the matrix and samples are wrong.

Before basic research on gas differentiation was even started, a plethora of glacier studies on temporal trends of greenhouse gases had been published during past decades, aiming to demonstrate that: (1) these gases are responsible for climatic changes, and (2) that their level in the atmosphere was increased by human activity. These studies are beset with a unilateral interpretation and manipulation of data, and with an arbitrary rejection of both the high greenhouse gas readings from the pre-industrial ice, and the low readings from the contemporary samples (Jaworowski 1994a, Jaworowski et al. 1992b).

Were the CO₂ ice core data and their interpretation correct, then they should be treated as evidence that during the past 650,000 years, CO₂ had no discernible effect on the global temperature. This for two reasons: first, the temperature increase appears *before* the claimed increase in CO₂; and second, there are monotonically low proxy CO₂ levels in the ice cores during the periods of warm climate, both in ancient and modern times.

In the ice cores, the isotopically determined temperature signal and the signal of CO₂ air concentrations are out of phase by hundreds to several thousands of years (Jaworowski et al. 1992b), with the temperature increases always *preceding* the rising CO₂ levels, not the reverse (Caillon et al. 2003, Fischer et al. 1999, Idso 1988, Indermuhle et al. 2000, Monnin et al. 2001, and Mudelsee 2001). This suggests that the increasing temperature of the atmosphere is the causative factor for CO₂ increases, probably via higher erosion of the land and gas exhalation from the warmer ocean.

We have observed this in modern times. Solubility of CO₂ in warm water is lower than it is in cold. When climate warms, less CO₂ can be retained in the upper 3,000-meter layer of oceans, and it is exhaled into the atmosphere, where the CO₂ content is more than 50 times lower than it is in the ocean. This is the reason that between 1880 and 1940, when the global average temperature warmed up by about 0.5°C, the direct measurements in the atmosphere registered a very large increase of CO₂, from about 290 ppmv in 1885 up to 440 ppmv in 1940—about 60 ppmv higher than now (Beck 2007). In this period, the man-made emissions of CO₂ increased only by a factor of 5. Then, between 1949 and 1970, the global temperature decreased by about 0.3°C, and the atmospheric CO₂ level dropped to about 330 ppmv (Boden et al. 1990). Now, when man-made CO₂ emissions are 30 times higher than in 1880 (Marland et al. 2006), the CO₂ atmospheric level is similar to that recorded before the 1940s climatic warm



Source: After IPCC 2007.

Figure 3
THE CO₂ 'HOCKEY STICK' CURVE

A false representation of the CO₂ atmospheric concentration trend over the past 10,000 years. Values before 1958 do not represent the atmospheric concentrations, but the artifacts caused by depletion of CO₂ from ice, and by arbitrarily changing the age of samples.

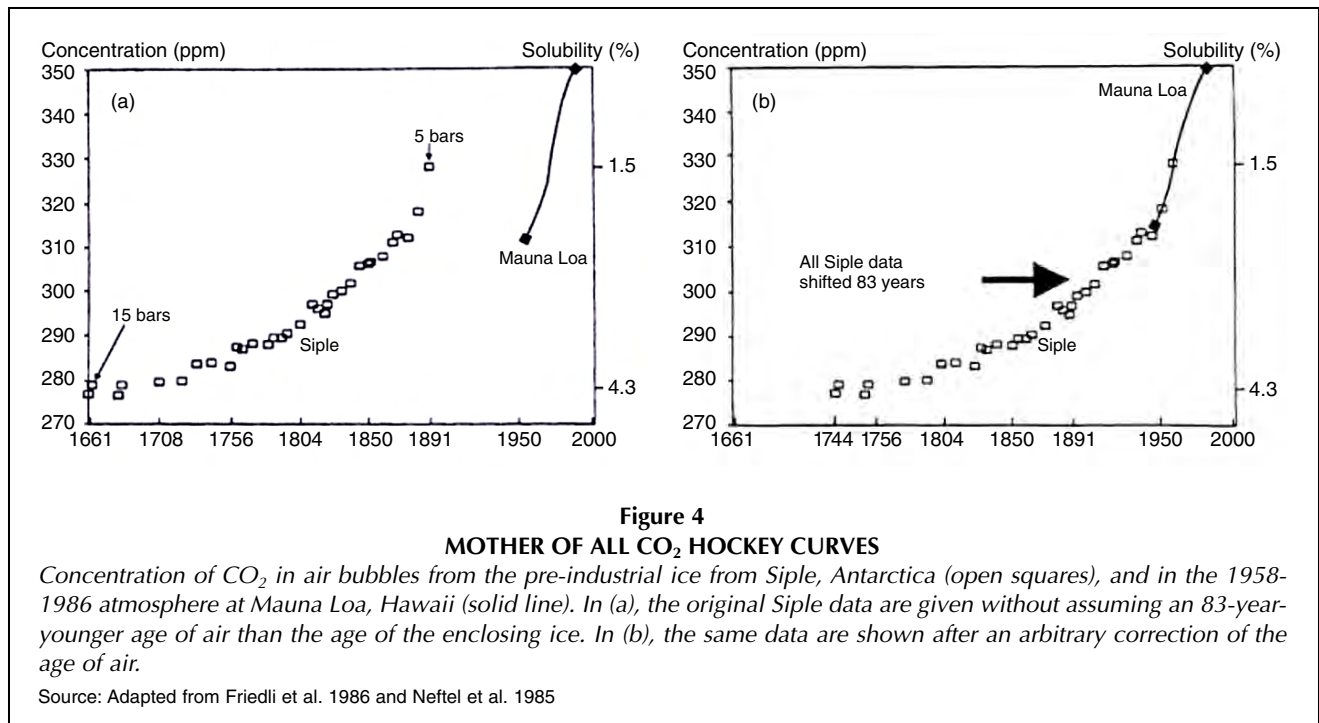
event.

The CO₂ concentrations in the air inclusions in ice, which are assumed to be pre-industrial or ancient, are always about 100 ppmv below the current atmospheric level (Indermuhle et al. 1999, Pearman et al. 1986, Petit et al. 1999; see also the review in Jaworowski et al. 1992b). Yet, during the past 420,000 years, the climate was often much warmer than the present, (Andersen et al. 2004, Chumakov 2004, Ruddiman 1985, Shackleton and Opdyke 1973, Zubakov and Borzenkova 1990, and Robin 1985). Even about 120,000 years ago, when the global surface temperature was as much as 5°C higher than now (Andersen et al. 2004), the atmospheric CO₂ concentration derived from glacier data was only 240 ppmv (Petit et al. 1999)—that is, below the current level by some 130 ppmv.

More recently, during the Holocene (8,000 to 10,000 years before the present) when the temperature of the Arctic was 5°C warmer than now (Brinner and al. 2006), ice core records show a CO₂ level of about 260 ppmv (IPCC 2007).

The Hockey Stick Curves

On the basis of assumption piled upon assumption, several versions of CO₂ "hockey stick curves" were compiled, by combining the distorted proxy ice core data and the recent direct atmospheric CO₂ measurements. The authors of such studies claimed that their curves represent the atmospheric CO₂ levels during the past 300 years (Neftel et al. 1985, Pearman et al. 1986, Siegenthaler and Oeschger 1987), or the past 10,000 years (in the "Summary for Policymakers"), Figure 3, or even the past 400,000 years (Wolff 2003). They all show low pre-



industrial CO₂ concentrations, ranging from about 180 to 280 ppmv during the past 400,000 years, and soaring up to about 370 ppmv at the end of the 20th Century. These so-called hockey stick curves were published countless times as a proof of the anthropogenic increase of CO₂ in the atmosphere. They were created by illegitimately mixing the false proxy ice core data with direct measurements in the atmosphere.

However, the worst manipulation was the arbitrary changing of the age of the gas trapped in the upper part of the core, where the pressure changes were less drastic than in the deeper parts. In this part of the core, taken from Siple, Antarctica, the ice was deposited in the year 1890, and the CO₂ concentration in it was 328 ppmv (Friedli et al. 1986, Neftel et al. 1985), and not the 290 ppmv needed to prove the man-made warming hypothesis. The same CO₂ concentration of 328 ppmv was measured in the air collected directly from the atmosphere at the Mauna Loa volcano, Hawaii, 83 years later in 1973 (Boden et al. 1990). So, it was shockingly clear that the pre-industrial level of CO₂ was the same as in the second half of the 20th Century.

To solve this “problem,” these researchers simply made an *ad hoc* assumption: The age of the gas recovered from 1 to 10 grams of ice was arbitrarily decreed to be exactly 83 years younger than the ice in which it was trapped! This was not supported by any experimental evidence, but only by assumptions which were in conflict with the facts (Jaworowski 1994a, Jaworowski et al. 1992b). The “corrected” proxy ice data were then smoothly aligned with the direct atmospheric measurements from Mauna Loa (Figures 4a and 4b).

Thus, falsified CO₂ “hockey stick curves” were presented in all the IPCC reports, including Figure 3 in the “Summary for Policymakers” in 2007. These hockey sticks were credulously

accepted by almost everyone, together with other information on greenhouse gases determined in the ice cores, which were plagued by improper manipulation of data, an arbitrary rejection of high readings from old ice, and an arbitrary rejection of the low readings from the young ice, simply because they did not fit the preconceived idea of man-made global warming. It is a habit that become all too common in greenhouse gas and other environmental studies (Jaworowski 1994a, Jaworowski 1994b, and Jaworowski et al. 1992b).

Direct CO₂ Measurements in the Atmosphere

We thus find ourselves in the situation that the entire theory of man-made global warming—with its repercussions in science, and its important consequences for politics and the global economy—is based on ice core studies that provided a false picture of the atmospheric CO₂ levels. Meanwhile, more than 90,000 *direct* measurements of CO₂ in the atmosphere, carried out in America, Asia, and Europe between 1812 and 1961, with excellent chemical methods (accuracy better than 3 percent), were arbitrarily rejected. These measurements had been published in 175 technical papers. For the past three decades, these well-known direct CO₂ measurements, recently compiled and analyzed by Ernst-Georg Beck (Beck 2006a, Beck 2006b, Beck 2007), were completely ignored by climatologists—and not because they were wrong. Indeed, these measurements were made by top scientists, including two Nobel Prize winners, using the techniques that are standard textbook procedures in chemistry, biochemistry, botany, hygiene, medicine, nutrition, and ecology. The only reason for rejection was that these measurements did not fit the hypothesis of anthropogenic climatic warming. I regard this as perhaps the greatest scientific scandal of our time.

From among this treasure of excellent data (ranging up to

CO₂ -1812 - 2004 Northern Hemisphere, Chemical Measurement

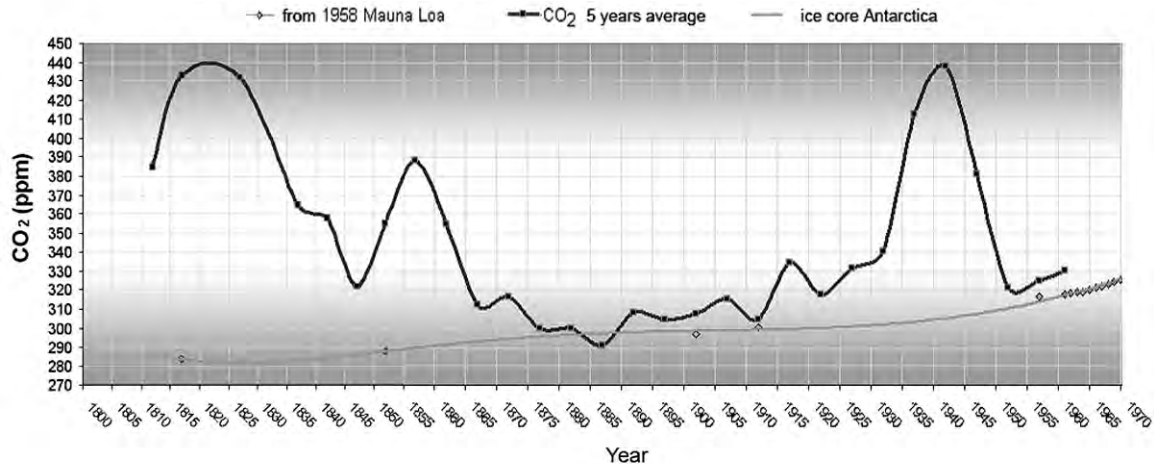


Figure 5

FIRST RECONSTRUCTION OF TRENDS IN CO₂ ATMOSPHERIC CONCENTRATION BASED ON ACTUAL MEASUREMENT

This first reconstruction of trends in CO₂ concentration in the Northern Hemisphere is based on more than 90,000 direct chemical measurements in the atmosphere at 43 stations, between 1812 and 2004. The lower line are the values from Antarctic ice core artifacts. The diamonds on the lower line (after 1958) are infrared CO₂ measurements in air from Mauna Loa, Hawaii.

Source: Adapted from Beck 2007

550 ppmv of measured CO₂ levels), the founders of the anthropogenic global warming hypothesis (Callendar 1949, Callendar 1958, and From and Keeling 1986) selected only a tiny fraction of the data and doctored it, to select out the low concentrations and reject the high values—all in order to set a falsely low pre-industrial average CO₂ concentration of 280 ppmv as the basis for all further climatic speculations. This manipulation has been discussed several times since the 1950s (Fonselius et al. 1956, Jaworowski et al. 1992b, and Slocum 1955), and more recently and in-depth by Beck 2007.

The results of Ernst-Georg Beck's monumental study of a large body of direct atmospheric CO₂ measurements from the 19th and 20th Century, smoothed as five-year averages, are presented in Figure 5. The measurements show that the most important political message of the IPCC in 2007 is wrong: It is not true that the CO₂ atmospheric level during the pre-industrial era was about 25 percent lower than it is now, and it is not true that anthropogenic emissions of CO₂ have caused what is actually our beneficially warm climate today.

Direct atmospheric measurements indicate that between 1812 and 1961, the concentrations of CO₂ fluctuated by about 150 ppmv, up to values much higher than those of today. Except for the year 1885, these direct measurements were always higher than the ice core data, which are devoid of any variations. During the 149 years from 1812 to 1961, there were three periods when the average CO₂ concentration was much higher than it was in 2004, 379 ppmv (IPCC 2007): Around the year 1820, it was about 440 ppmv; around 1855,

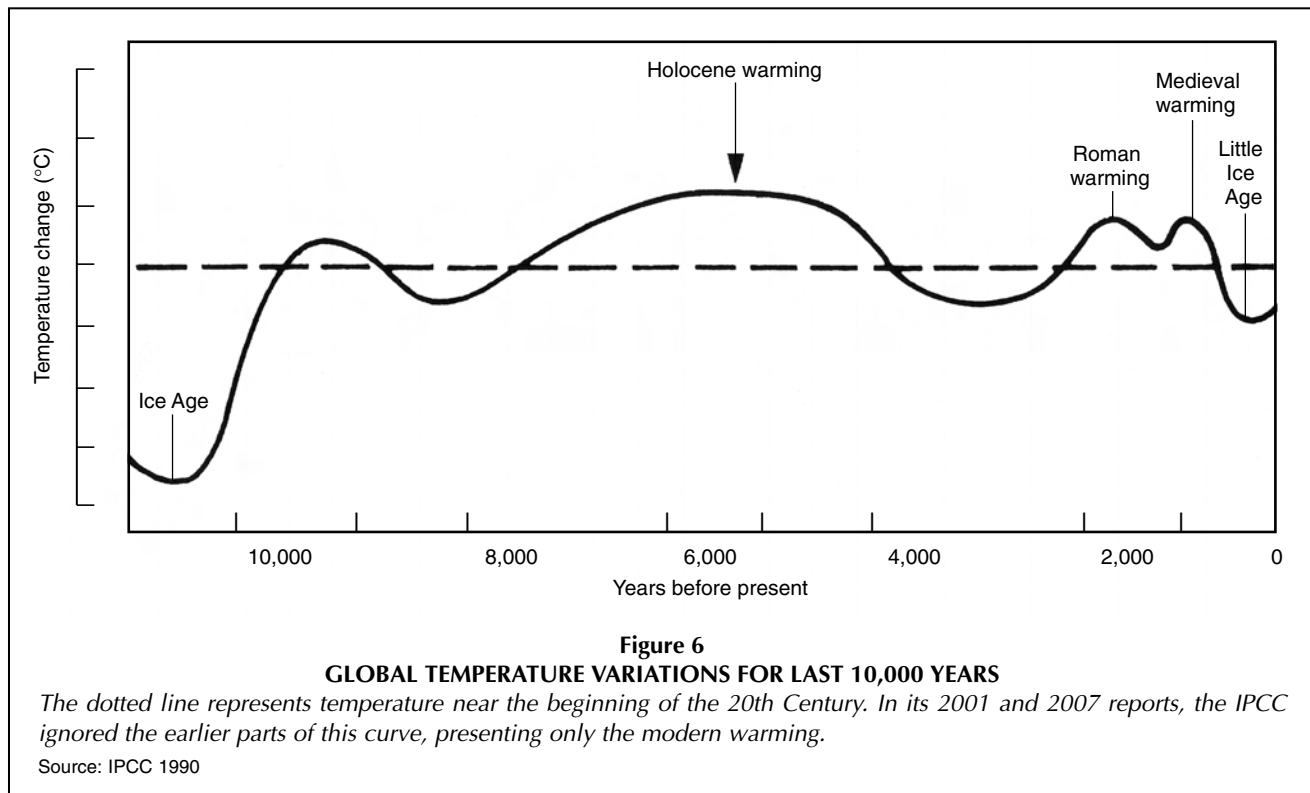
it was 390 ppmv; and around 1940, it was 440 ppmv. Data compiled by Beck (Beck 2007) suggest also that changes of the CO₂ atmospheric concentration *followed*, rather than preceded, the temperature changes. These findings make the man-made global warming hypothesis invalid.

Anthropogenic Warming That Isn't

The second most important message of the "Summary for Policymakers" of 2007 is that "Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse concentrations." However, neither the "Summary for Policymakers" document, nor the three former IPCC reports, supported this statement with any convincing scientific evidence.

The infamous temperature hockey stick curve, the leading symbol of the IPCC report in 2001, was created to show that the global average temperature in the 1990s was unusual and the highest in the past 1,000 years. The Medieval Warming (the years 950 to 1300), well documented in the former IPCC reports, disappeared from this hockey stick curve, as did the earlier Roman Warm Period (200 B.C. to 600 A.D.), the Holocene Warm Period (8,000 to 5,000 years before the present), and the deep cooling of the Little Ice Age (the years 1350 to 1850)—Figure 6.

The fraudulence of this hockey stick curve was documented by Legates 2002, Legates 2003, McIntyre and McKittrick 2003, Soon 2003, Soon and Baliunas 2003, and Soon et al. 2003. But criticism of the IPCC 2001 hockey stick curve of temperature appeared to be a mine field: The six editors of the journal



Climate Research who dared to publish the Soon and Baliunas 2003 paper were fired by the publisher. In the “Summary for Policymakers” 2007 report, the IPCC truncated its original 1,000-year-long hockey stick temperature curve by a factor of 10, starting it at 1850, exactly at the time when the Earth’s climate began to recover by natural forces from the Little Ice Age, when the emissions of CO₂ had been 135 times lower than they are now (Marland et al. 2006).

This natural recovery from the Little Ice Age is interpreted by the IPCC as a man-made calamity; the IPCC regards the last 50 years as the warmest in the past 1,300 years because of fossil fuel burning. This monothematic line of thinking does not take into account the astronomical evidence that these last 50 years have had the highest solar activity of the past several thousand years. There has not been an equally high activity of the Sun since more than 8,000 years ago (Figure 7), and the Sun has been the dominant cause of the strong warming during the past three decades (Solanki et al. 2004).

Cosmoclimatology: Cosmic Rays and the Sun Rule the Climate

For about the past 15 years, we have had a rapid development of a new scientific field: cosmo-climatology. It was started by a seminal paper by Friis-Christensen and Lassen in 1991, in which they documented a close relationship between solar activity and the surface temperature of the Earth. (This development was reviewed by Svensmark in 2007.) Later studies demonstrated that the main mechanism by which cosmic factors regulate our weather are cosmic rays penetrating the Earth’s atmosphere. Their flux is determined by fluctuations of magnetic fields of the Sun and by the Solar System migration

over the varying environments of the Milky Way, with different concentration of dust and activity of novae.

The variations of cosmic-ray flux are an order of magnitude greater than those caused by the Sun. Cosmic rays rule the climate by producing an ionization of air molecules at the rate required to have a measurable impact on climate. Ionization helps to create condensation nuclei in the troposphere, needed for cloud formation. At low solar activity (or in some parts of Milky Way), more cosmic radiation penetrates into the troposphere, and more clouds are formed, which act as an umbrella to protect the Earth against irradiance by the Sun.

Recently, experimental evidence was provided for a mechanism by which cosmic rays can affect the cloud cover (Svensmark 2007). This cover exerts a strong cooling effect, which offers a mechanism for solar-driven climate change that is much more powerful than the small 0.1 percent variations in the solar irradiance.

According to Khilyuk and Chilingar (2006), the total anthropogenic CO₂ emission throughout human history constitutes less than 0.00022 percent of the total CO₂ amount naturally degassed from the mantle of the Earth during geological history. Anthropogenic CO₂ emission is negligible in any energy-matter transformation processes changing the Earth’s climate. The forces of nature that are driving the climate (solar irradiation, fluctuating along with solar activity and orbital deviations, outgassing, and microbial activities) are 4 to 5 orders of magnitude greater than the corresponding anthropogenic impacts on the Earth’s climate (such as heating and emission of greenhouse gases), even without accounting for the cosmic ray influences.

Human beings may be responsible for less than 0.01°C of

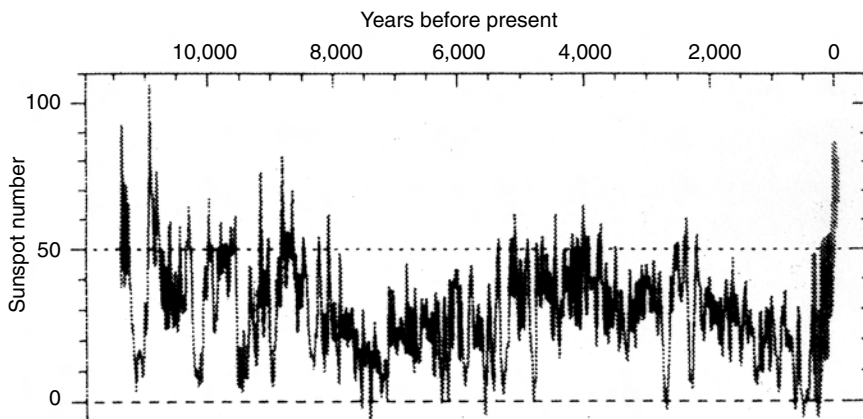


Figure 7
SOLAR ACTIVITY REPRESENTED BY SUNSPOT NUMBER
DURING THE PAST 11,400 YEARS

The solar activity represented by sunspot number reconstructed from carbon-14 data for the years 11,000 before the present, and from telescopic observations since the year 1610. The level of solar activity during the past 70 years is exceptionally high. The previous high activity occurred more than 8,000 years ago.

Fluctuations of solar activity are followed by cosmic ray flux, the lower energy fraction of which is presently 40 percent lower than in 1900. There is a general similarity between the Sunspot number and temperature fluctuations: Both show a slowly decreasing trend just prior to 1900, followed by a steep rise that is unprecedented during the last millennium. See, for example, Usoskin et al. 2003.

Source: Sunspot data from Solanki et al. 2004.

warming during the last century; the hypothesis that the currently observed “Modern Warming” is a result of anthropogenic CO₂, and of other greenhouse gas emissions, is a myth.

The cosmoclimatic factors account for climate fluctuations on the decadal, centennial, and millennial timescales. During the Little Ice Age (1350 to 1850) the exceptionally weak solar magnetic field of the Sun, reflected by an extremely low sunspot number during the Maunder Minimum (1645 to 1715), coincided with its coldest phase. Another sunspot minimum, the Dalton Minimum of the early 19th Century, was associated with another cold phase.

On the other hand, the Medieval Warm and the Modern Warm periods showed excellent matches with the low cosmic ray intensities, governed by solar cycles. During the past several 10,000s to 6,000 years, temperature events corresponded well to solar perturbations, suggesting that the driving force of the Holocene temperature fluctuations

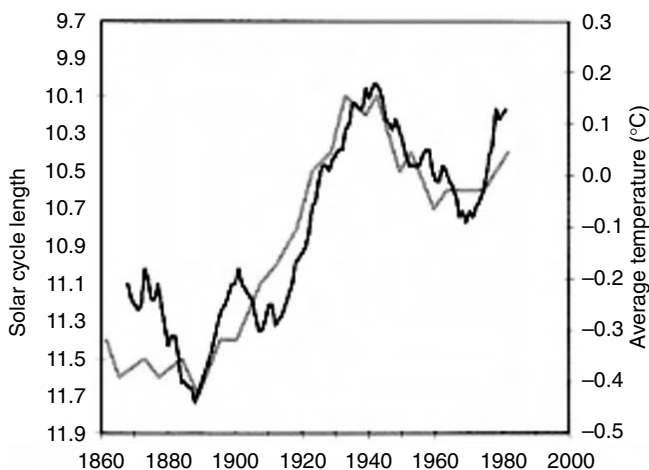


Figure 8
AVERAGE NORTHERN HEMISPHERE TEMPERATURE

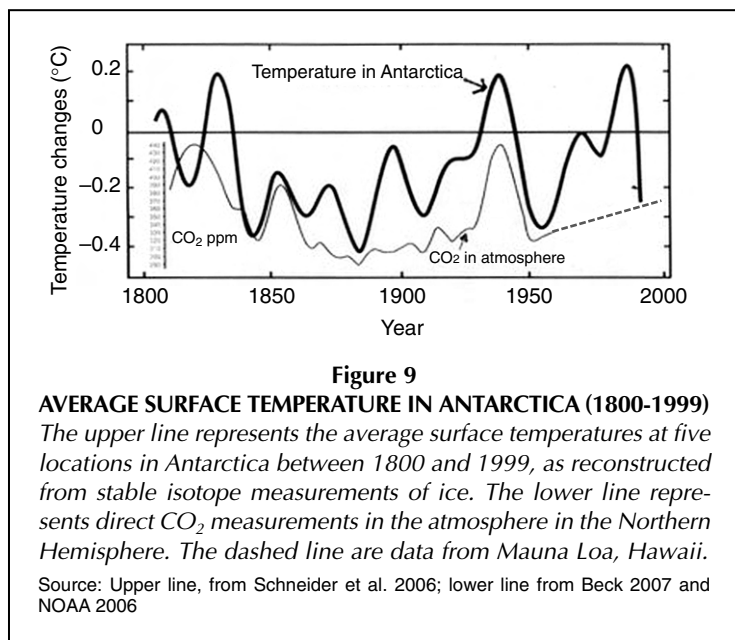
The average Northern Hemisphere temperature (gray line) follows almost exactly the solar activity reflected by the length of the sunspot cycle (black line).

Source: After Friis-Christensen and Lassen 1991

was caused by solar activity, and related to this, by cosmic ray flux (Bashkirtsev and Mashnich 2003, Dergachev and Rasporov 2000, Friis-Christensen and Lassen 1991, Marsh and Svensmark 2000, Svensmark and Friis-Christensen 1997, Xu et al. 2005, Xu et al. 2006, Bago and Buttler 2000, and Soon et al. 2000), rather than by CO₂ changes, which lag behind the temperature changes, and appear to be an effect, not the cause of temperature variations (Figure 8).

Over the past 750,000 years, the rate of change of global ice volume was fluctuating in exact agreement with the summertime insolation at the northern high latitudes, in agreement with the Milankovitch theory (Roe 2006). In this study it was also found that variations in melting precede variations in atmospheric CO₂, suggesting that CO₂ variations play a relatively weak role in driving changes in global ice volume, compared to solar influence.

Over the longer intervals, the changing galactic environment of the Solar System had dramatic consequences in the past, including “Snowball Earth” episodes (2,300 million and 700 million years ago), when all the Earth was frozen. The climate fluctuated rather regularly throughout the past 3 billion years of the Earth’s history, evolving gradually towards cooling and the increased frequency, duration, and scale of



glaciation (Chumakov 2004). Periodic climatic changes, recognizable by geological methods, can be divided into five categories: (1) super-long fluctuations (approximately 150 million years); (2) long fluctuations (a few to 15 million years); (3) middle fluctuations (1 million to about 10 million years); (4) short fluctuations (few tens to hundreds of thousands of years); and (5) ultra-short fluctuations (millennial, centennial, and shorter).

During the Phanerozoic Era (the past 545 million years) the Earth passed through four super-long climate cycles, probably related to the cosmic ray flux changes, caused by passages of the Solar System through various environments of the spiral arms of the Milky Way (Shaviv and Veizer 2003).

The temperature fluctuations during the Phanerozoic varied in accordance with the cosmic ray flux, but revealed no relationship to CO₂ content in the atmosphere. Two long and extensive glaciations occurred in this period, at the time of CO₂ minima, at about 300 million years before the present, and were interpreted as an indication that the CO₂ atmospheric greenhouse effect was a principal control of climate over geologic time (Berner 1998).

However, long and extensive glaciations also existed twice, between 353 and 444 million years ago, when the CO₂ level in the atmosphere was up to 7 and 17 times higher than today (Chumakov 2004). The paleogeographic studies provided proxy data on global climatic gradients in the Phanerozoic (Berner 1997), which show no relationship with the CO₂ atmospheric concentration estimated by Boucot et al. in 2004. Assigning a long-term principal control of climate to trace concentrations of a single agent, the CO₂ gas, which currently contributes about 2 percent to the total greenhouse effect (Lindzen 1991), and neglecting the 98 percent contribution of water, and the contribution from the other factors listed below, conflicts with the cosmoclimatic data.

The temperature fluctuations in five Antarctic regions, reconstructed from the ice core stable isotope records

between 1800 and 1999, are similar to the CO₂ fluctuations measured directly in the atmosphere since 1812 (Figure 9). According to the IPCC, the highest rise of temperature caused by the emission of anthropogenic greenhouse gases, should occur in Antarctica and the Arctic. These predictions do not fit the temperature data in Figure 9, which, according to Schneider et al. 2006, are also representative for the whole Southern Hemisphere. In Antarctica, the temperature in the 1990s was lower than during many decades in the past two centuries, and much lower than the mean for 1961 to 1990, represented by the zero line.

In the northern part of the Earth, direct temperature measurements in the boreholes at the Summit and Dye sites in Greenland (Figure 10) demonstrated that during the last 8,000 years, the temperature in the Arctic fluctuated similarly as the proxy global temperature reconstructed in the IPCC 1990 report (Figure 6), and that at the end of 20th Century, the temperature in the Arctic was lower than during the Medieval and Holocene Warmings. The proxy temperature reconstruction spanning nearly 2,500 years at Taimyr Peninsula in Russia (poleward of 70° N) revealed also the Holocene, Medieval, and Modern Warmings, with the first two warmer than the 20th Century one, in which the temperature peak appeared around 1940 (Naurzabayev et al. 2002).

Instrumental measurements of surface air temperature in the Arctic were started in 1874 in Greenland, followed by stations at Spitsbergen, Canada, and Russia. Since that year, until about 2000, the highest temperature at 37 Arctic and 6 sub-Arctic stations was observed in the 1930s, and was higher by about 2 to 5°C than those occurring prior to the 1920s. Even in the 1950s, the temperature in the Arctic was higher than in the 1990s. In Greenland, the level of temperature in the 1980s and in the 1990s was similar to that observed in the 19th Century (Przybylak 2000).

Other instrumental records covering the last 100 years demonstrate similar temperature fluctuations in the Arctic. According to Chylek et al. (2004), instrumental temperature measurements in Greenland show that the highest temperature there occurred in the 1920s, when in less than 10 years it increased by 2 to 4°C, and at some stations even by 6°C. At that time, the anthropogenic emissions of CO₂ were nine times lower than now (Marland et al. 2006).

Since 1940, however, the Greenland coastal data have predominantly undergone cooling. At the summit of the Greenland ice sheet, the summer average temperature has decreased at a rate of 2.2°C per decade, since the beginning of measurements in 1987. Similar results are reported for Arctic temperature measurements carried out between 1875 and 2000 (Polyakov et al. 2003). This is against all the predictions of climate models.

The disparity between the tropospheric and surface temperature trends measured by balloons and satellites, and the greenhouse models' predictions, was recently discussed by S. Fred Singer in a letter rejected by *Nature*, and published on Feb. 13, 2007 on http://blogs.nature.com/news/blog/2007/02/climate_report.html. As stated by Singer, "Greenhouse models indicate that the

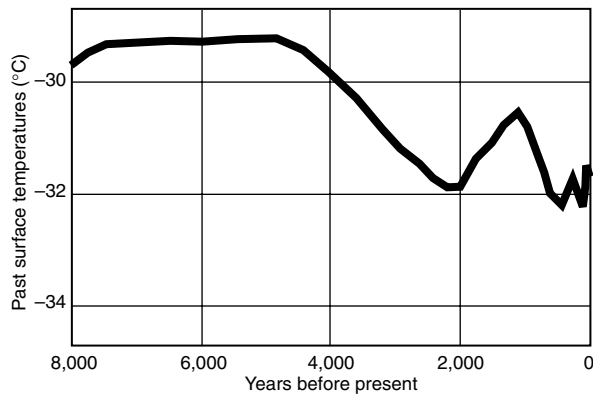


Figure 10
DIRECT TEMPERATURES IN GREENLAND
BORE HOLE FOR LAST 10,000 YEARS

These are direct temperatures measured in a bore hole in the Greenland ice sheet, over the last 8,000 years. Ice conducts heat very badly, and its original temperature is retained for thousands of years. Visible are the Holocene warming (3,500-7,000 years ago), and in our epoch, the Middle Ages warming (900-1,100 years ago), and the Little Ice Age (1350 to 1880). The temperature 1,000 years ago was higher there than today by 1 degree C.

Source: After Dahl-Jensen et al. 1998

tropics provide the most sensitive location for their validation: trends there [should] increase strongly with altitude, peaking at around 10 kilometers. Actual observations, however, show the opposite: flat or even decreasing tropospheric trend." This comparison of models with balloon and satellite data, contradicts the most important conclusion of IPCC that the current warming is "very likely" the result of human activities.

The Specter of Floods

The most trendy adverse effect of climate warming is the melting of the polar ice sheets, which, it is claimed, will cause catastrophic flooding of vast areas. From among a host of recent papers presenting evidence against these gloomy prophecies, I will refer only to a paper by my friend H. Jay Zwally, from NASA Goddard Space Flight Center, who for decades has used satellite techniques to measure the mass of the polar ice sheets. In his paper (Zwally et al. 2005), he presents the study of changes in ice mass derived from 10.5 years (Greenland) and 9 years (Antarctica) of satellite radar altimetry data.

Zwally et al. show that the Greenland ice sheet is thinning at the margins (-42 Gt per year) and growing inland (+53 Gt per year). This corresponds to a sea level decrease of

-0.03 mm per year. In West Antarctica, the ice sheet is losing mass (at -47 Gt per year), and in East Antarctica, it is gaining mass (+16 Gt per year). The combined net change of -31 Gt, corresponds to +0.08 mm per year of sea level rise. Hence, they report, "the contribution of the three ice sheets to sea level is +0.05 mm per year."

During the period studied, the Antarctic Western Ice Shelf changed its mass by -95 Gt per year, and the Eastern one changed by +142 Gt per year (together their mass increased by 47 Gt per year). The contribution of polar ice of 0.05 mm per year to sea level rise is small, in comparison to the real sea level rise observed from satellite altimetry of 2.8 mm per year. The ice sheets' contribution would take 1,000 years to raise global sea level by just 5 cm, and it would take 20,000 years to raise it 1 meter.

People are frustrated by the prospect of flooding the Pacific and Indian Ocean islands by our sinful activity. A good example of the futility of such fears is the beautiful archipelago of the Maldives in the central Indian Ocean, which consists of some 1,200 individual islands, grouped in about 20 larger atolls. They rise from a depth of about 2,500 meters, and consist of coral reefs, coral reef debris, and coral sand. Their elevation is only 1 to 2 meters. Hence, they have been condemned to disappear in the sea in the near future (IPCC 2001).

Multiple geomorphological and sedimentological investigations, and satellite altimetry measurements by Morner et al. (2004) contradict this dire hypothesis. The islands existed prior to the last glaciation maximum, and have been inhabited for at least 1,500 years before the present. During this period, at around 1,000 to 800 years before the present, that is, during the Medieval Warming, the inhabitants survived a sea level that was some 50 to 60 cm higher than it is now (Figure 11).

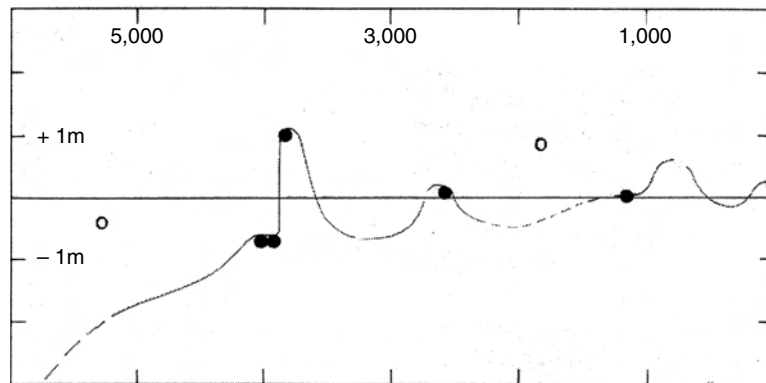


Figure 11
SEA LEVEL CHANGES IN MALDIVES

Shown are the sea level changes in the Maldivian Islands during the past 5,000 years. The sea level was above the present one at 3,900 years before the present (about 1 meter), at 2,700 years before the present (about 0.1 to 0.2 meter), at 1,000 (about 0.5 meter), and most recently between the years 1900 and 1970 (about 0.2 to 0.3 meter). During the last 30 years, the sea level fell by about 30 cm.

Source: After Morner et al. 2004

During the past decades, both the satellite altimetry and gauge records do not record any significant rise in sea level at the Maldives. Some 100 to 30 years ago, the sea level was 20 to 30 cm higher than it is today. There is firm evidence that the sea level fell there by 20 to 30 cm in the last 30 years, contrary to IPCC expectations.

The Near Future

During the past 1 million years, there have been some 10 Ice Ages, each lasting about 100,000 years, interspersed with warm interglacials, the duration of which was only about 10,000 years. The last Ice Age came to its end about 10,500 years ago; thus, our present interglacial seems to be a bit longer than average. The new Ice Age looms in waiting, and whether it comes in decades, centuries, or even a millennium, is a matter of speculation. It seems that its inescapable advent will be induced by natural cosmic factors rather than by terrestrial ones. The hypothesis, in vogue in the 1970s, stating that emissions of industrial dust will soon induce the new Ice Age, seem now to be a conceited anthropocentric exaggeration, bringing into discredit the science of that time. The same fate awaits the present CO₂ folly.

Using a novel multi-timescale analysis method to diagnose the variation of the annual mean global Northern Hemisphere and Chinese temperature data from 1881 to 2002, Zhen-Shan and Xian (2007) found four different quasi-periodic oscillations, among which the 60-year timescale oscillation of temperature was the most prominent. Despite the increasing trend in the atmospheric CO₂ concentration, the pattern of the 60-year temperature oscillation is in a descent. The authors concluded that the atmospheric CO₂ concentration is not the key determinant of periodic variation of the global temperature, that the CO₂ greenhouse effect has been excessively exaggerated, and that it is high time to reconsider the trend of global climate changes. Their analysis suggests that the global climate will be cooling in the next 20 years.

This conclusion is in agreement with the projections of Russian astronomers from the Institute of Solar-Terrestrial Physics in Irkutsk, who, from an analysis of the sunspot cycles for the period 1882-2000, deduced that the minimum of the secular cycle of solar activity will fall in the next cycle, in 2021-2026, which will result in the minimum global temperature of the surface air (Bashkirtsev and Mashnich 2003). They found also that the temperature response of the air lags behind the sunspot cycles by about three years in Irkutsk, and by two years over the entire globe.

A similar projection, based on observations of the cyclic activity of the Sun, was announced from the Pulkovo Observatory, near St. Petersburg, Russia. The head of the Space Research Laboratory of the Observatory, Prof. Habibullo I. Abdussamatov, stated that instead of professed global warming, the Earth will be facing a slow decrease in temperatures in 2012-2015. The gradual cooling will reach its maximum by 2040, and lead to a deep freeze around 2050 to 2060. This period of global freeze will last some 50 years, and will be comparable to the cooling that took place during the Little Ice Age in 1645-1715, when the temperature decreased

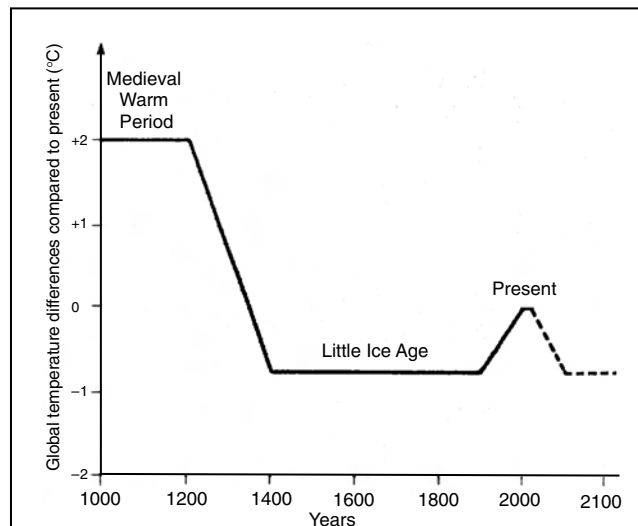


Figure 12
ATMOSPHERIC TEMPERATURE CHANGE
OVER LAST 1,000 YEARS

This is a simplified graph of global atmospheric temperature change over the last 1,000 years, using data from Khilyuk and Chilingar 2006. The temperature projection until 2100, dotted lined line, is based on data in this author's paper.

by 1 to 2°C (Abdussamatov 2004, Abdussamatov 2005, and Abdussamatov 2006).

A similar impending cooling, with two new Little Ice Ages around 2100 and 2200, was envisaged by the late Prof. Theodor Landscheidt, founder of the Schroeter Institute for Research in Cycles of Solar Activity in Germany (Landscheidt 1995 and Landscheidt 2003).

During the past 3,000 years, one can observe a clear cooling trend in the Earth's climate (Keigwin et al. 1994, and Khilyuk and Chilingar 2006). During this period, the global temperature deviations were 3°C, with a trend of decreasing global temperature of about 2°C. As Khilyuk and Chilingar stated: "This cooling tendency will probably last in the future. We live in the cooling geologic period and the global warming observed during the last approximately 150 years is just a short episode in the geologic history." This is reflected in Figure 12.

Not man, but nature rules the climate. The Kyoto Protocol and the IPCC reports, tuned by Malthusian ideas, may surely make a lot of noise and cause enormous harm for the global economy and for the well-being of billions of people. But they can do nothing for the climate. This we shall learn in the near future.

Zbigniew Jaworowski is a multidisciplinary scientist, now a senior advisor at the Central Laboratory for Radiological Protection in Warsaw. In the winter of 1957-1958, he measured the concentration of CO₂ in the atmospheric air at Spitsbergen. From 1972 to 1991, he investigated the history of the pollution of the global atmosphere, measuring the dust

preserved in 17 glaciers: in the Tatra Mountains in Poland, in the Arctic, Antarctic, Alaska, Norway, the Alps, the Himalayas, the Ruwenzori Mountains in Uganda, and the Peruvian Andes. He has published many papers on climate, most of them concerning the CO₂ measurements in ice cores. Two of his papers on climate appear on the website of 21st Century Science & Technology magazine, www.21stcenturysciencetech.com.

This is an expanded version of his article first published in EIR, March 16, 2007.

Notes

1. Private communication by Prof. Maciej Sadowski, Dec. 7, 2006.
2. Leaf surfaces have stomata, or small pores, which allow carbon dioxide to enter the leaf and oxygen to escape in the process of photosynthesis.

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Mankind Is Going Back To the Moon!

by Marsha Freeman



NASA

Astronaut Buzz Aldrin descends the Lunar Module ladder as he prepares to walk on the Moon in the 1969 Apollo 11 mission. The photo was taken by Astronaut Neil Armstrong.

China, Russia, India, Japan, and newer spacefaring nations are planning multigenerational great projects to go to the Moon and beyond. Will the United States join them?

Space visionary Krafft Ehrlicke was well known for his maxim: "It has been said, 'If God had wanted man to fly, He would have given man wings.' Today we can say, 'If God wanted man to become a spacefaring species, He would have given man a Moon.'"

Fifty years ago, Earth's atmospheric barrier was crossed when the Soviet Union orbited Sputnik. During the 1960s, the Soviet Union crossed cislunar space, and visited the Moon with spacecraft, and the United States followed with machines, and then men.

Over these intervening decades, new nations have joined the two first space powers in the ability to launch craft into

space. These spacefaring nations are now ready to “break the bonds of Earth-orbit” and send their first probes into deep space. As Krafft Ehrlicke noted, the natural destination of such an endeavor is the Moon.

The ability to so clearly see the Moon with the naked eye, and its proximity as compared to any other orb in the sky, has inspired men to discover its nature, and eventually to go there, since ancient times.

Not only the nearness and the beauty of the Moon make it a preferred destination. Our natural satellite is the depository of billions of years of history of the Solar System. Minerals and materials there are of potential value on Earth. The Moon is a unique venue for making astronomical discoveries, and it will be the proving ground and stepping-stone to Mars and even farther destinations.

Since the 1960s Apollo program, it has been a widely held American belief that if we could master the science and technology required to go to the Moon, we should be able to solve any of the other problems we face on Earth. Today it can be said that if men can learn to live on the Moon, it should be possible to live elsewhere in our planetary neighborhood, not only in terms of the development of the technology, but through the success of a multi-decade, generational commitment to such an inspiring and great project.

The next step in the intensive study of the Moon is being prepared for liftoff this Spring, with the launch of the Chinese Chang’e mission. India, the United States, Japan, and Russia are also preparing unmanned missions to the Moon, during 2007-2008. By the end of the next decade of this century, men



William Jones/EIRNS

Sun Laiyan, head of China's National Space Administration: "If we each exchange an apple, we each still have only one apple. But if we exchange ideas, we each have two ideas."

should be returning to the Moon, to begin an exploration effort that will continue for decades.

A Goddess to the Moon

In 2007, China will take its first step into deep space. The Chang’e spacecraft, named after a goddess who flew to the Moon in a Chinese fairy tale, will be launched to observe the Moon for one year. China’s lunar program actually began in 1978, when the United States presented the Chinese government with 1 gram of a lunar sample brought back from the Moon by the Apollo astronauts. After many years of preparation, in 2004, the government of China approved a three-phase lunar exploration program, which is that nation’s first foray beyond Earth orbit.

The Chang’e spacecraft will be placed in a 200-kilometer polar orbit. Its scientific objectives include creating a three-dimensional “portrait” of the Moon, especially in the polar regions; analyzing 14 minerals on the surface, to determine the Moon’s chemical composition; and studying the cislunar environment, between the Earth and the Moon. A suite of five scientific instruments will carry out these experiments.

According to lunar program chief scientist Academician Ouyang Ziyuan, China will also focus on improving the understanding of the Moon’s reserves of helium-3, an isotope not available in abundance on Earth, but resident in the soil of the Moon. In the future, helium-3 will be needed as a fuel for fusion power plants. “The current estimate is between 1 million and 5 million tons [of helium-3 in the lunar soil], and we will try to improve [that estimate] a little,” he told *China Daily* last Summer. Were fusion energy to be used to meet global energy demands, he explained, “each year three Space Shuttle missions could bring enough fuel for all human beings across the world.”

In order for the lunar program to have the widest impact upon its scientific community, China has established an “expert committee” on the scientific applications of the Chang’e program. Up to 100 universities and institutes will participate, and carry out research using the lunar data sent back from the spacecraft. The committee is to decide on the distribution of research and ensure a wide participation among educational institutions. It has been proposed that scientists from other countries will join the data analysis.

China has had to create a deep-space network to be able to communicate with Chang’e. Large-diameter radio antennae to send commands to, and receive data from, the spacecraft are being built around the country, and China has several monitoring stations in Pakistan, Namibia, and Kenya. In addition, the European Very Long Baseline Interferometry network will join China’s deep-space monitoring, during the Chang’e mission. During the European Space Agency’s SMART 1 lunar mission, China’s antennae contributed to monitoring that spacecraft.

Responding to criticism of China’s expenditure of \$175 million for its lunar program, Ouyang reported that, compared



China's lunar mission is named after the mythical goddess Chang'e, who flew to the Moon. China's first mission beyond Earth-orbit is scheduled for launch this year. Inset is the logo for the Chang'e mission.



People's Republic of China

Krafft Ehricke's Plan for Industrializing the Moon

Space visionary Krafft Ehricke (1917-1984) developed a detailed five-stage plan for industrializing the Moon and utilizing its vast resources to enrich the Earth's economy and enable a high quality of life for 11 to 12 billion people. Ehricke designed the necessary vehicles, habitats, and industrial processing systems for the Moon's biosphere, and calculated the resources available.

In stage one, simple landers and orbiters would observe, explore, and map the Moon, identifying resources. In stage two, a circumlunar space station would be established, to train and house personnel, develop transportation systems, and experiment with lunar samples. Stage three is the first production phase, with a first-generation Central Lunar Processing Complex and crews that would begin surface mining and drilling, agriculture, and monitoring robotic equipment for construction activities. In this stage, transportation arrangements would be developed for travel between the lunar surface and cislunar space.

In stage four, feeder stations would be established at places where raw materials were found to be abundant. These would be collected and brought to a central processing complex. The lunar population would increase in this stage and become more urbanized. Stage five would see the development of Selenopolis, the capital city of lunar civilization and the lunar biosphere. Ehricke designed the huge enclosures for the city with different climates and climate cycles, a monorail, and fusion energy plants to power the industrial enterprise.

As Ehricke wrote, "After stage five ... the new world is launched and grows into the future according to its own laws."

A collection of six articles by and about Krafft Ehricke is available on the 21st Century website for \$30: <https://www.21stcenturysciencetech.com/Merchant2/merchant.mv?>

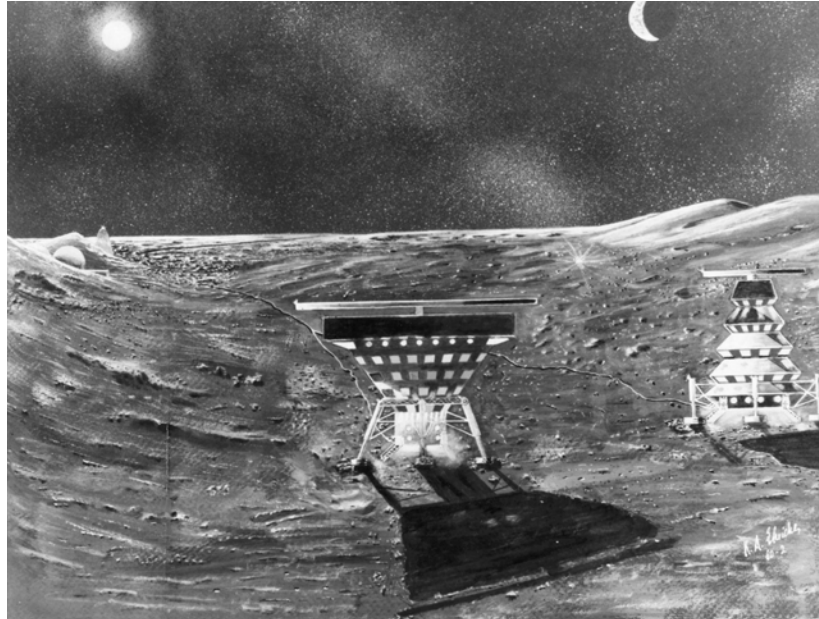


Illustration by Krafft Ehricke

Two laboratory/habitat modules (with more to follow) are placed on the lunar surface, along with a nuclear power station to serve them (its conical radiator surface is visible in the upper left). The inverse converging shape of the modules maximizes shielding against corpuscular radiation, optimizes temperature control for placement in equatorial regions, and serves as an umbrella to provide shade near the module.



Illustration by Krafft Ehricke

Ehricke's illustration of the nuclear-powered sweeper, shown here preparing a runaway for the lunar slide lander, a vehicle designed to touch down at extremely high velocities, transferring its momentum to the lunar dust ocean.

with the huge potential benefits of the lunar program, the same amount of money builds 3 kilometers of subway in Beijing. Last year, Ouyang told a Chinese audience that “the lunar exploration program will have an incalculably valuable effect on the spirit and motivation [of the Chinese people], and I ask you, how much is that worth?”

Answering questions from students at a presentation on China’s space program, Ouyang Ziyuan, who has lobbied the government to begin the effort since the late 1990s, explained that China cannot be left out of the enterprise

that advances great nations.

The second phase of China’s lunar program will center on a soft landing on the Moon of a rover in 2012, to do an *in situ* survey near its landing site. At the Sixth China International Aviation and Aerospace Exhibition in November 2006, visitors saw an initial concept of a six-wheeled vehicle being developed by the Chinese Academy of Space Technology. The third phase, by the end of the second decade of the century, is slated to be a robotic mission that will return samples of lunar rocks and soil to Earth.

The Real Reasons for Space Exploration

On Jan. 19, 2007, NASA Administrator Mike Griffin spoke before the Bay Area Houston Economic Partnership, about the “Real Reasons” versus the “Acceptable Reasons” for space exploration. Excerpts follow.

I’ve reached the point where I am completely convinced that if NASA were to disappear tomorrow, if the American space program were to disappear tomorrow, if we never put up another Hubble, never put another human being in space, people would be profoundly distraught. Americans would feel less than themselves. They would feel that our best days are behind us. They would feel that we have lost something, something that matters. And yet they would not know why.

If you ask why we’re going back to the Moon, and later, beyond, you can get a variety of answers ... for the purpose of scientific discovery, economic benefit, and national security ... to bring the Solar System within mankind’s sphere of economic influence.

These reasons have in common the fact that they can be discussed within circles of public policy making. They can be debated on their merits, on logical principles. They can be justified. They are what I am going to call tonight “Acceptable Reasons.”

But who talks like that? If anybody asked Lindberg why he crossed the Atlantic—and many did—he never indicated that he personally flew the Atlantic to win the Orteig prize.... When Sir George Mallory was asked why he wanted to climb Mount Everest, he said, “Because it is there.” He didn’t say that it was for economic gain. We



NASA

NASA Administrator Mike Griffin: “If we didn’t have a space program, we Americans would feel less than ourselves. We can never allow that to happen.”

know these reasons, and tonight I will call them “Real Reasons.” Real Reasons are intuitive and compelling to all of us, but they’re not immediately logical. They’re exactly the opposite of Acceptable Reasons, which are eminently logical but neither intuitive nor emotionally compelling.

As to curiosity, who among us does not know the wonder and mystery and awe and magic of seeing something, even on television, never seen before, an experience brought back to us by a robotic space mission? And how much grander when one of our own, a representative of other human beings, is there to see if for herself? Who doesn’t know that feeling?

We like to do what I’ll call monument building. We want to leave something behind for the next generation, or the

generations after that, to show them that we were here, to show them what we did with our time here. This is the impulse behind cathedrals and pyramids and many, many other things. We could have done a lot of different things to honor George Washington. But what was done, was that in the early 1800s people started to work on a 550-foot high obelisk to honor him. But it is not only George Washington whom the monument honors; it says fully as much about the people who built it.... It is my observation that when we do things for Real Reasons as opposed to Acceptable Reasons, we produce our highest achievements.

The cultural ethos in America today requires us to have Acceptable Reasons for what we do. We must have reasons that pass analytical muster, that offer a favorable cost-benefit ratio that can be logically defended. We tend to dismiss out of hand reasons that are emotional, or are value-driven in ways that we can’t capture on a spreadsheet.

When I arrived here tonight, I was told that this very lectern from which I am speaking is the one from which John Kennedy gave the speech you saw earlier ... the JFK quote about space that I love more than anything in the world, because it evokes exactly the things I’m talking about here tonight, was the one he gave from this lectern at Rice University in September 1962, when he said, “We choose to go to the Moon, and to do the other things, not because they are easy, but because they are hard.”

The cathedral builders knew that reason. They were doing something that required a far greater percentage of their gross domestic product than we

An International Effort

Unlike the lunar programs of decades past, the missions that are in preparation by India, China, Japan, the United States, and Russia will benefit from shared technology, scientific instruments, and data.

Last July, the eighth conference of the International Lunar Exploration Working Group (ILEWG), was held in Beijing, China. Representatives of 18 nations signed the "Lunar Beijing Declaration," which commits them to coordinate the operation and scientific results of the missions that will be launched

over the next two years to the Moon.

The upcoming international exploratory assault on the Moon will take place in three stages. First, a series of four unmanned orbiters will be launched in 2007 and 2008. The Lunar Beijing Declaration proposes that the data from each mission be cross-correlated with the others, especially where more than one spacecraft will be carrying similar instruments. It recommends that common standards be used for spacecraft communications, so they can "talk" to the same Earth-tracking stations, and to each other.

will ever put into the space business.... We look back across 600 or 800 years of time, and we are still awed by what they did.... To me, the irony is that when we do hard things for the right reasons—for the Real Reasons—we end up actually satisfying all the goals of the Acceptable Reasons. And we can see that, too, in the cathedrals, if we look for it.

What did the cathedral builders get? They began to develop civil engineering, the core discipline for any society if it wishes to have anything more than thatched huts. They learned how to build high walls and to have them stand up straight. They learned how to put a roof across a long span. They learned which material would work, and which ones would not ... they created the incentive to solve those problems, so that they could build things beyond cathedrals, so that they could, fundamentally, build Western civilization.

They learned to embrace deferred gratification ... on a societal level.... The people who started the cathedrals didn't live to finish them; such projects required decades. The society as a whole had to be dedicated to the completion of those projects.... We owe Western civilization as we know it today to that kind of thinking—to have a constancy of purpose across years and decades.

It is my contention that the products of our space program are today's cathedrals. The space program addresses the Real Reasons why humans do things ... in the practical sense, space really is about spin-offs, as many have



NASA

President John Kennedy, September 1962: "We choose to go to the Moon, and to do the other things, not because they are easy, but because they are hard."

argued. But it's not about spin-offs like Teflon and Tang and Velcro as the public is so often told—and which in fact did not come from the space program.... The real spin-offs are a higher level.

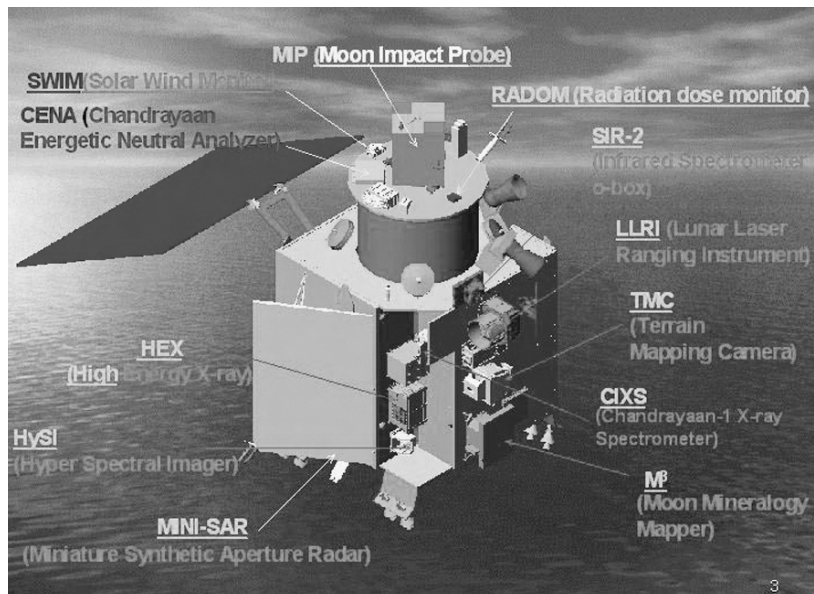
What is the scientific value of discovering the origins of our universe? What is the value of [that kind of] knowledge...? I cannot begin to guess.... Let's think for a moment about national security. What is the value to the United States of being involved in enterprises which lift up human hearts everywhere when we do

them?... I would submit that the highest possible form of national security, well above having better guns and bombs than everyone else, well above being so strong that no one wants to fight with us, is the security which comes from being a nation which does the kinds of things that make others want to work with us to do them. What security could we ever ask that would be better than that, and what gives more of that to us than the space program?

What do you have to do, and how do you have to behave, to do space projects? You have to value hard work. You have to live by excellence, or die from the lack of it. You have to understand and practice both leadership and followership.... You have to build partnerships.... You have to be willing to defer gratification, and to spend years doing what we do, and then stand back and see if it works. We learn how to leave a legacy, because we work on things that all of us will not live to see—and we know it. And we learn about accepting the

challenges of the unknown, where we might fail, and to do so not without fear or apprehension, but to master it and to control it, and to go anyway.

These are the values that the space program brings. This is why it must be supported. And this is why, although we don't acknowledge it, we don't admit it, and most of us don't understand it, this is why if we didn't have a space program, we Americans would feel less than ourselves. We can never allow that to happen.



India's Chandrayaan-1, its first lunar mission, will be international, carrying European and U.S. instruments, in addition to its own imaging instruments.

For the next phase, early in the next decade, which will include unmanned landers, rovers, impactors, and penetrators, the experts suggest that there be coordination in choosing targets for landers, and that the groundwork begin to be laid for the long-term development of the Moon. They recommend that infrastructure be developed jointly for relaying data back to Earth, to aid in navigation around and on the Moon, and to establish a lunar Internet. The Declaration recommends that there be an international scientific working group established to define the common standard for future lunar networks of other instruments.

The Chinese are hopeful that the goal of the Beijing Lunar Declaration, for a coordinated global approach to studying and exploring the Moon, will be implemented. To explain his view of international cooperation, Sun Laiyan, the head of China's National Space Administration, recounted an old Chinese saying at the Beijing conference, which, in paraphrase, counsels: "If there are two of us and we each exchange an apple, we each still have only one apple. But if we exchange ideas, we each have two ideas."

India's International Lunar Mission

Navenda Bhandari, from the Indian Space Research Organization (ISRO), observed at the Beijing lunar conference that "despite one half a century" of space exploration, "we know very little about the Moon. It is the most mysterious and important body in the Solar System." The Moon's historical "link to the solar nebula is the key to understanding the early evolution of the Earth," he said. Over the coming decade, there will be a "continuous presence" of spacecraft at the Moon, and the international scientific community should "debate the priorities and problems."

Chandrayaan-1, which means "Moon-craft" in Sanskrit, will be launched in the first quarter of 2008. It is India's first deep space mission, and was proposed by the Indian scientific community in 1993.

Some of the questions Indian scientists would like to

address, according to J.N. Goswami, a planetary geologist from ISRO, include whether there was a magma ocean on the Moon, the Moon's bulk chemistry, the cause and nature of the asymmetry of the near and far sides of the Moon, and how water and other volatiles have been transported throughout the Moon's history.

From the beginning, India decided that its first lunar mission would be international in scope. Chandrayaan-1 will carry three instruments contributed by the European Space Agency, and one from the Space Laboratory of Bulgaria, in addition to those from India. And during the visit of NASA Administrator Mike Griffin to India in May 2006, he and ISRO chairman Madhavan Nair signed Memoranda of Understanding, to allow two American-built instruments to also fly on India's Moon-craft.

The American instruments that will fly to the Moon on Chandrayaan-1 are a Mini Synthetic Aperture Radar, being developed by Johns Hopkins University's Applied Physics Laboratory; and a Moon Mineralogy Mapper, being built by Brown University and NASA's Jet Propulsion Laboratory. These were selected from 16 proposals that had been submitted to ISRO from all over the world.

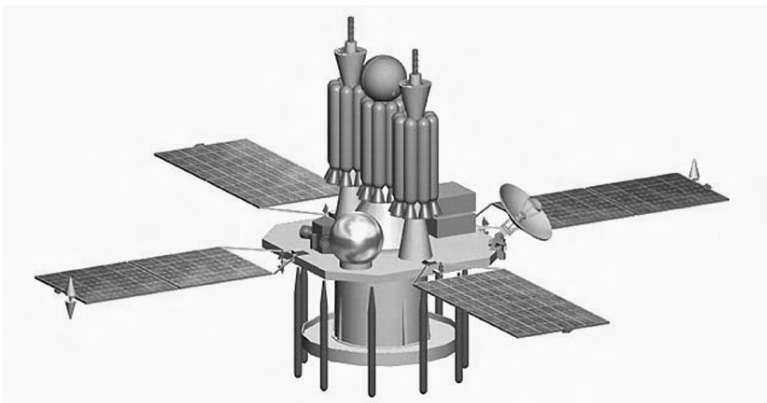
The American instruments, in complementarity with those from India and Europe, will produce composition maps of the surface, and the radar instrument will focus on the poles, examining the bottoms of deep craters, where it is hoped caches of water ice exist.

India's Chandrayaan-1 spacecraft will be in a polar orbit of the Moon at a low, 100-kilometer altitude. The mission is projected to last two years, and carry out high-resolution mineralogical and chemical imaging of the polar regions and of lunar rocks, and mapping of the topography and other features of the lunar landscape.

The spacecraft will also be carrying a small, 29-kilogram impactor, which will be dropped to the lunar surface from the orbiter. During its 100-kilometer, 18-minute fall to the surface, three instruments on board the small probe will take measurements of the Moon's tenuous atmosphere, instantaneous altitude, and video-imaging. The orbiter will observe the dust that is kicked up from the crash upon impact. The impactor is also designed to qualify some of the technologies that will be needed in the future for soft landings on the Moon.

India is already designing a follow-on Chandrayaan-2 mission, which would land a motorized rover on the Moon, in 2010 or 2011. According to a report in *The Hindu* on Jan. 4, 2007, the 30- to 100-kg rover would have an operational lifetime of a month. It would be able to do *in situ* chemical analysis on lunar soil samples, and send the data from the results to the orbiting mother spacecraft, which would then transmit the data back to Earth. To operate for a longer period, it would include a battery backpack that could be recharged.

ISRO Chairman Madhavan Nair told the *Press Trust of India* on Feb. 5, 2007, that Chandrayaan-2 will be undertaken by



Russia's Lunar-Glob may be ready before its planned launch in 2012. It will robotically explore the Moon with an orbiter and send penetrators to the lunar surface.

2010. "It will have a lander which would touch down on the lunar surface and pick up samples," he said.

Looking further into the future, Indian scientists are planning to join Russia, the United States, and China, in the capability of launching Earth-orbital manned missions. In September 2006, ISRO Chairman Nair told a conference in Bangalore that an Indian human space mission "is on the top of the agenda of the long-term space program of the country, as space will be the next frontier for human beings." In the Feb. 5 interview, Nair reported that the Government had given the go-ahead for ISRO to prepare a report on the manned space mission. The "study project has been cleared," he said. "By the end of the year, we will be submitting a firm project report to the Government."

India is already making progress on the array of technologies required to put people into space. On Jan. 10, India launched its Space-Capsule Recovery Experiment (SRE-1). On Jan. 22, the 1,213-pound (551-kg) spacecraft splashed down in the Bay of Bengal, becoming the first Indian spacecraft ever recovered after a mission in orbit.

The purpose of the experiment was to test a thermal protection heat shield that would protect a crew inside through the heat of reentry; an onboard propulsion system, that must ignite to bring a craft out of orbit and back to Earth; a guidance, control, and navigation system to guide the capsule to a precise landing; and a recovery system for land or sea. Reports so far indicate all of these critical systems operated as designed.

As data come back from the Indian and other lunar craft, and progress is made on the technologies required for manned space flight, India will be prepared to join the international effort to bring human civilization to the Moon.

Russia to Return to the Moon

In the late 1950s, the Soviet Union took an early lead in lunar exploration. Most of the craters on the far side of the Moon, which is not seen from the Earth, are named for Russian scientists, because the craters were photographed for the first time by the Luna-3 spacecraft. Soviet spacecraft produced stunning results from a series of 20 successful robotic lunar missions through the mid-1970s, which brought back soil and dust samples from the Moon. Over the subsequent three decades, the Soviet Union, and then Russia, concentrated on

missions to Venus and Mars.

Russian scientists have described a new Moon mission called Lunar-Glob, to robotically explore the Moon with an orbiter, and deploy penetrators around the lunar surface. At the conference in Beijing, Academician Erik Galimov, director of the Vernadsky Institute of Geochemistry and Analytical Chemistry, described the Lunar-Glob project, to study the seismology and internal structure of the Moon, which will shed light on its origin. The orbiting spacecraft would deploy 13 high-speed penetrators into the top layer of the lunar surface.

According to the current design, two of the penetrators will be aimed at the Apollo 11 and Apollo 12 landing sites, to retrieve subsurface data complementary to that obtained during the U.S. manned missions, 37 years ago. Another 10 high-speed penetrators are to form a distributed

seismic network. After firing the penetrators, the orbiting mother ship would drop a small lander into a crater at the Moon's south pole, to search for signs of water ice.

Lunar-Glob has been scheduled for launch in 2012. But at the July conference, Academician Galimov said he was delivering a "message": that it is possible the lunar mission will be ready three years earlier. The Russian Phobos-Grunt mission is to be launched to return samples from Phobos, a moon of Mars, in 2009. Because the two spacecraft would be similar, the design and manufacture of the lunar spacecraft should be able to be accelerated.

The isotope helium-3, a fuel for advanced thermonuclear fusion reactions, will be a foundation of the next stage, which is the "economic utilization of the Moon," Dr. Galimov stated. He explained that the concentration of helium-3 in the lunar soil, or regolith, is very low, but "the amount is enormous." To obtain this resource, "billions of tons of lunar soil must be mined." Although he proposed that the "deployment of such a mining industry will take 50-70 years," he emphasized that since we have no choice, "we should get started as early as possible!"

The fusion of helium-3 with deuterium was first observed in 1939. In an advanced fusion reactor, helium-3 would be combined with deuterium, the heavy isotope of hydrogen available in seawater, to produce helium-4 and a high-velocity proton. Electricity can be extracted directly from the fast-moving proton, instead of having to first convert the reaction energy from heat into electricity. As there are no neutrons in the reaction, the breakdown of reactor materials by nuclear transmutations is avoided. The fusion reaction can produce higher temperatures and greater energy-density than its next-best competitor, the nuclear fission reaction, and thus will be the energy source of the future.

Nikolai Sevastyanov, head of Russia's mammoth Energia Rocket and Space Corporation, has been actively promoting the mining of helium-3 on the Moon, to help solve the problems of the shortage of energy resources on Earth. Energia is developing plans for the technology needed to mine the Moon, as well as new vehicles to carry machines, and perhaps men, back to the Moon. "The Moon has vast reserves of helium-3," he said last year, "and this is the closest place to Earth where it can be extracted."

Russian space officials have indicated that international cooperation will be key to their proposed lunar projects.



Japan Aerospace Exploration Agency

Artist's drawing of Japan's Selene mission, which includes an orbiting spacecraft and two small satellites. Selene will relay communications, and create a gravity map of the Moon.

During the 36th Congress of the United Nations Committee on Space Research (COSPAR), held in Beijing in July 2006, Nikolai Sanko from the Russian Federal Space Agency, Roskosmos, reported that Russia and China are holding talks on joint programs for lunar exploration. "It is not ruled out that our devices or means for sampling the lunar surface will be installed on Chinese [spacecraft], and that Chinese devices will be installed on Russian craft," he told Itar-Tass.

In November 2006, the deputy head of the Russian Federal Space Agency, Yuri Nosenko, told a press conference in Beijing that Russia regards China as a "partner" in space exploration. China and Russia are currently cooperating in 38 projects related to space, he said, and regarding a lunar project, "the two countries have different strengths that can supplement and benefit each other." Collaboration on future Mars missions is also under discussion.

At this time, unless economic policies are changed, it is doubtful that Russia would mount a manned mission to the Moon on its own. Partnering with China is one option. In December 2006, Russian space officials also voiced interest in participating in the lunar base project that the U.S. space agency had recently outlined.

Dismissing allegations that there is now a rivalry between the United States and China for the next manned mission to the Moon, Igor Panting, spokesman for Roskosmos, said on Dec. 7, that "space research is a vast field with plenty of room for every nation."

Ambitious Designs on the Moon

In 1990, Japan initiated its lunar exploration program, launching its Hitan spacecraft and becoming the third nation in the world to launch a mission to the Moon.

Japan's space scientists and mission planners have developed a very creative, and highly complex series of lunar missions, and because of very difficult technology challenges, one of its planned lunar missions, Lunar-A, was cancelled on Jan. 15. It was to carry out seismic studies, by slamming a pair of penetrators, to a depth of 10 feet into the lunar soil. But the

penetrator technology still requires development, and will likely be applied to a later mission.

Japan is now in the last stages of readying its Selene spacecraft—Selenological and Engineering Explorer—to be launched to the Moon in 2007. At the International Lunar Exploration Working Group conference in Beijing last July, Dr. Hajime Inoue, from Japan's space agency, JAXA, explained that Selene consists of three spacecraft—a main craft that will be in a 100-kilometer altitude polar orbit, and two small daughter satellites.

One small satellite, called Rstar, will function as a communications relay, to transmit data from the orbiter to Earth when the orbiter is on the far side of the Moon and out of Earth contact.

Dr. T. Iwata from JAXA explained the importance of the second small satellite, Vstar. Estimates of the gravity field on the far side of the Moon have been made indirectly by observing the perturbations in a satellite's orbit as it circles the Moon, he said. But the measurements are not precise. Vstar will do global mapping of the Moon, with a focus on the gravity variations.

Dr. Iwata also reported that using both small satellites in tandem will allow scientists to determine their position within 20 centimeters of accuracy, by establishing a very long baseline interferometry network. These assets, for relay communications and precision navigation, are a forerunner of the kind of permanent infrastructure that will be needed for future exploration of the Moon.

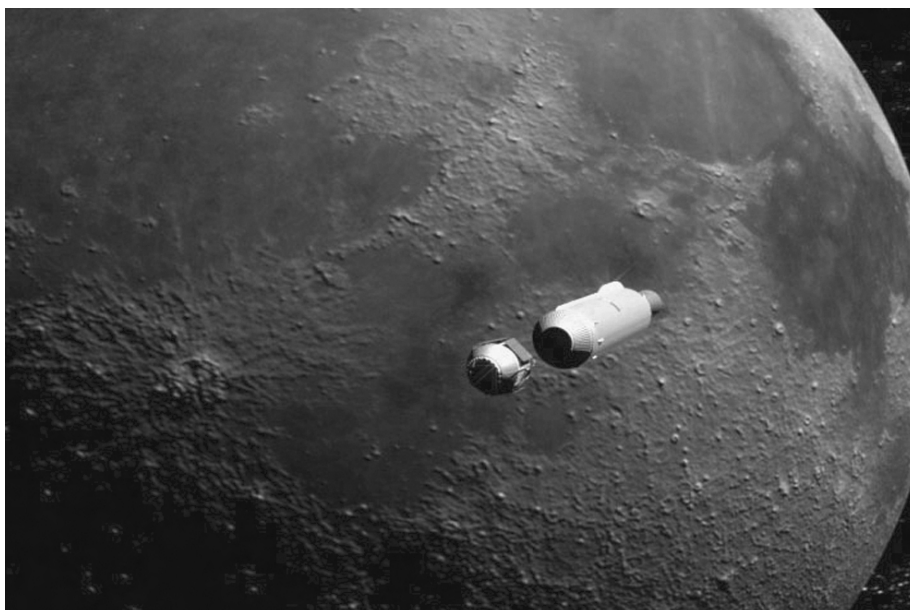
The Selene orbiter will carry an extraordinary complement of 14 scientific instruments, to study the topology, chemistry, magnetic fields, and other characteristics of the Moon and its environment. JAXA also plans to broadcast real-time images from the Moon to the public, to create interest and excitement about the program.

A Crash Landing on the Moon

NASA's contribution to the lunar armada is the Lunar Reconnaissance Orbiter (LRO), slated for launch in October 2008. LRO will orbit the Moon at an average altitude of only about 30 miles (50 kilometers), for at least one year, and image our neighbor with unprecedented resolution. As a precursor mission to future human lunar exploration and settlement, LRO will be using a suite of instruments to try to characterize what are assumed to be deposits of water ice at the lunar poles.

The 50-km orbit is very challenging, and this will be a first attempt at such a low-altitude mission. Close to the lunar surface, the spacecraft's orbit becomes unstable because of the gravity variations of the Moon. Active propulsion onboard the craft will, therefore, be used to keep it in a stable orbit. In addition to all of its scientific objectives, LRO will also image the historic U.S. and Soviet landing sites on the Moon, including NASA's unmanned Ranger and Surveyor probes, and sites where the Apollo astronauts walked. Soviet Lunakhod rovers should also be visible. At such high resolution, even relatively small craters should be able to be imaged, and scientists expect to see hundreds of craters in the 10-meter range, for the first time.

As NASA was developing the LRO spacecraft, an opportunity presented itself to give a piggyback ride to a small companion craft; and in April 2006, the space agency chose the Lunar Crater Observation and Sensing Satellite, or LCROSS, to hitch a ride on LRO. It will take measurements when the upper



NASA/John Frassanito Associates

NASA's Lunar Reconnaissance Orbiter, here in an artist's drawing, will dispatch a small shepherding spacecraft (left) to make observations as the rocket's upper stage impacts the lunar South Pole.

stage of LRO's rocket slams into the hydrogen- and potentially water-rich Shackleton Crater at the south pole of the Moon. About 15 minutes later, after the booster's upper stage makes its impact, the LCROSS probe itself will crash into the crater floor. Scientists hope to be able to verify that the enhanced hydrogen signature that has been previously measured, indicates the presence of water ice.

Man on the Moon

When U.S. President George W. Bush outlined his Vision for Space Exploration in January 2004, the first destination planned beyond Earth orbit, was the Moon. In December 2006, NASA released its lunar architecture—an outline of how NASA will carry out that program. The south polar Shackleton Crater was chosen as the preliminary choice for the base on the Moon, because it is almost permanently sunlit, but is adjacent to a permanently dark region, where it is expected there are caches of water ice, deposited throughout eons by comets.

The first manned missions, to be carried out beginning by the year 2020, is to be a series of seven-day "sortie" missions by a crew of four, on the lunar surface. Each short-duration manned mission, and unmanned cargo flights, will build-up logistics capabilities, equipment, and materiel, aiming for the establishment of a permanently crewed lunar outpost.

But before sending people, NASA had planned a series of unmanned precursor missions, to do further exploratory work, and to test capabilities, such as a new lunar lander, that are critical for manned missions. Since President Bush's announcement of the Vision for Space Exploration, however, the White House has refused to submit a budget to the Congress that is adequate to fund the program. With the accumulated shortfalls in funding, NASA Administrator Mike Griffin has announced that lunar precursor missions to follow the Lunar Reconnaissance Orbiter, will be

delayed, or cancelled.

On March 16, NASA notified the Johns Hopkins University Applied Physics Laboratory that it was allowing its contract to build a robotic lander to expire at the end of the month. The lander, developed under the guidance of NASA's Marshall Space Flight Center's Lunar Precursor and Robotics Program Office, was to launch, unmanned, to the Moon in 2011 to demonstrate advanced descent and landing techniques, and determine whether the lunar poles do contain water ice, before people are sent there. Since there are now no further precursor missions planned, the space agency also indicated that it was going to close the Marshall lunar projects office.

In order to return to the Moon, NASA must develop a new spacecraft and launch system. There are not adequate funds in the budget to develop the new Crew Exploration Vehicle, or Orion, and its Ares

launch vehicle, while completing the International Space Station using the Space Shuttle. If the program continues along the current path, it is inconceivable that the United States will make it back to the Moon.

In a speech to the annual Goddard Space Symposium on March 20, Administrator Griffin stated that because of President Kennedy's 1960s Apollo program, "America has been the leader on the space frontier for the past two generations." Similarly, at a Washington press conference on Dec. 4, 2006, when the lunar outpost architecture was released, Exploration Deputy Associate Administrator Doug Cooke observed that the Apollo missions were "tremendous," and that "most of us are here because we were watching those, at the time, as we grew up."

Where will that inspiration come from, for the next generation?

In June 2006, officials from China's space program made the announcement that following the successful completion of its three-stage robotic exploration of the Moon, China is planning a manned lunar mission, in 2024. Although this led to intense speculation in the western media of a new "race to the Moon," in a replay of the U.S.-Soviet competition of the 1960s, China has gauged the timetable for its manned space program strictly by the progress of the endeavor, and has made it clear that it is anxious to carry out such programs with international partners.

China, Russia, India, Japan, Europe, and newer spacefaring nations are planning their multigenerational great projects for space exploration. There is no better arena for international cooperation than the exploration of the Solar System. The window of opportunity is open.

Marsha Freeman is an associate editor of 21st Century and technology editor of the weekly Executive Intelligence Review. She is preparing a biography of Krafft Ehrlicke, which will include reprints of his extensive work on colonizing the Moon.

INTERNATIONAL CONFERENCE REPORT

Bering Strait Tunnel Back on World Agenda!

by Rachel Douglas

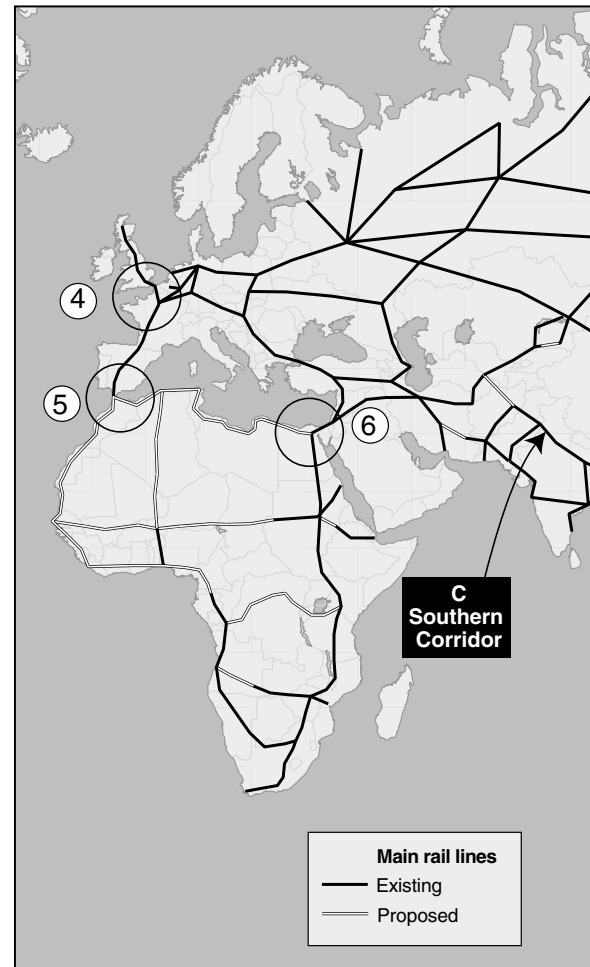
Introduction

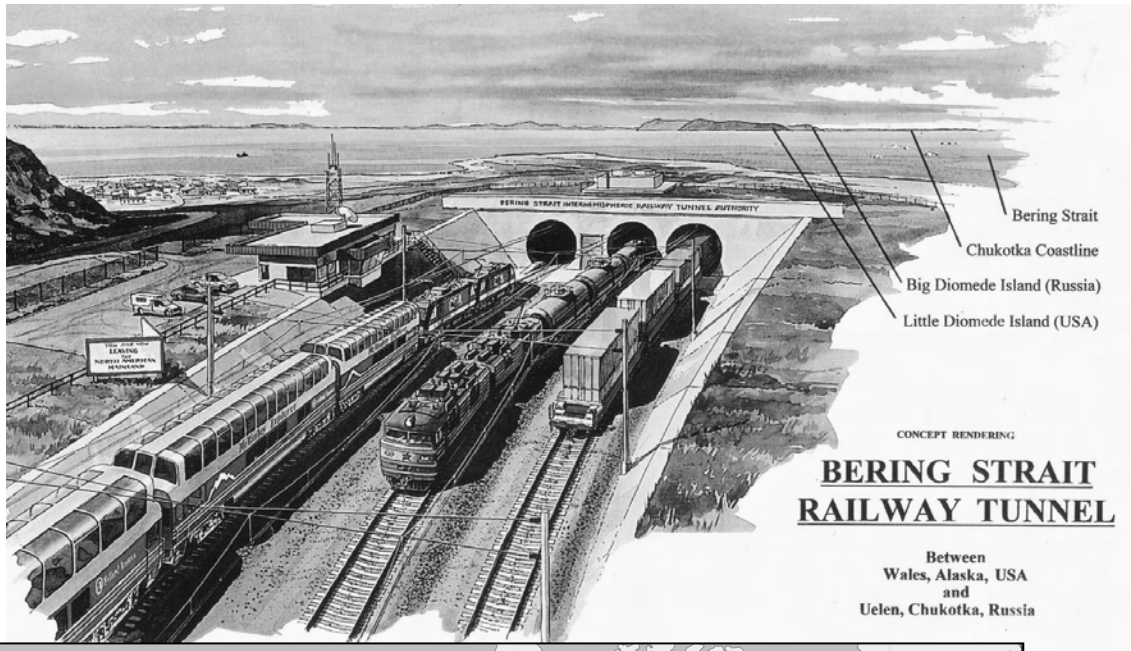
Several hundred people gathered in Moscow on April 24 at a conference called “Megaprojects of Russia’s East: A Transcontinental Eurasia-America Transport Link via the Bering Strait.” News of their discussions touched off a wave of optimistic thinking in many countries, that the time has arrived for one of the greatest of great infrastructure projects: a tunnel beneath the Bering Strait between the U.S. state of Alaska and Russia’s Chukotka Region.

The participants issued an appeal to governments of the Group of Eight member countries, to place the Bering Strait megaproject on the agenda of the G-8 summit in Heiligendamm, Germany, in June (see p. 43). Russia’s Ambassador to Canada Georgi Mamedov told the *Toronto Globe and Mail* that he is now optimistic that the tunnel will be built. Mamedov expects President Vladimir Putin to discuss the Bering Strait project with Canadian Prime Minister Stephen Harper, when they meet in Heiligendamm. “We need Canada aboard,” he said.

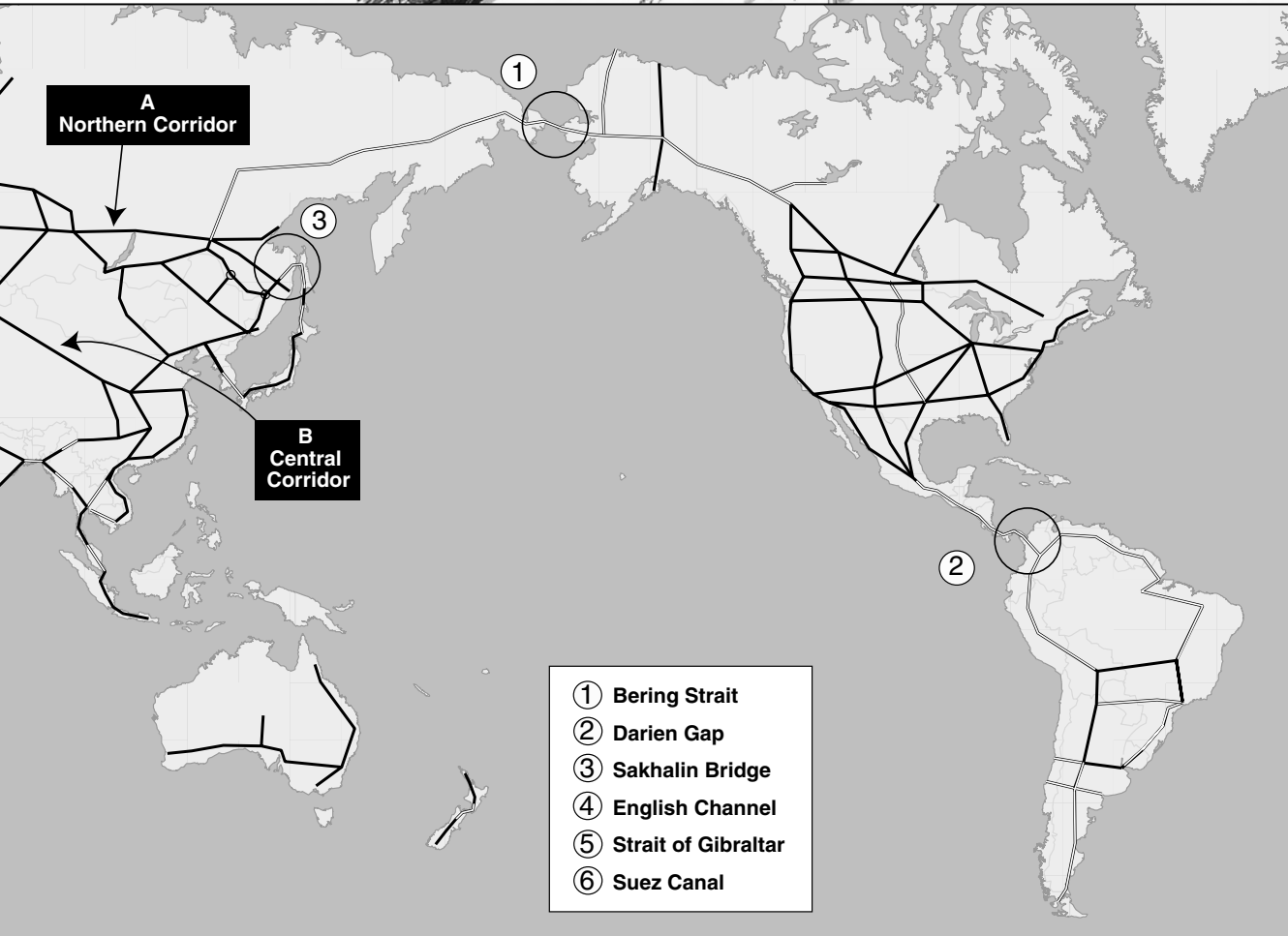
It is fitting that two American participants from the World War II generation put forward the idea that such great development projects are the path leading away from war. They were former U.S. Secretary of the Interior and Governor of Alaska, Walter Hickel, a strong backer of the Bering Strait tunnel project for many years, and economist and *EIR* founder, Lyndon LaRouche.¹ LaRouche, who as early as 1978 called for a Bering Strait bridge-tunnel crossing, wrote a conference presentation, “The World’s Political Map Changes: Mendeleev Would Have Agreed,” in response to a request from conference organizers. His contribution was

The megaproject to link Eurasia and America, as part of the World Land-Bridge, was propelled to center stage by an international conference in Moscow.





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THE PROPOSED WORLD LAND BRIDGE

The proposed Bering Strait connection between Russia's Chukotka Region and Alaska is shown at (1).

Source: EIR



FORUM International

Maxim Bystrov, deputy head of Russia's Federal Agency for the Management of Special Economic Zones, addresses the Moscow conference. The Russian government is giving enthusiastic support to the Bering Strait project.

read to the gathering and will appear in a publication in connection with the event.

The Americans radiated confidence that the Bering Strait project can be done, bringing North America into the Eurasian development perspective that is otherwise being promoted through such agencies as the Shanghai Cooperation Organization. It would be, as LaRouche said in Moscow in 2001, part of "the greatest transformation of the biosphere in history."

High-level Russian specialists from Federal agencies, regional governments, and the Russian Academy of Sciences took part in the Bering Strait meeting, along with specialists from Japan and Korea. It was the first of a "Megaprojects of Russia's East" conference series, organized by the Russian Academy of Sciences Council for the Study of Productive Forces (SOPS), in conjunction with the Russian Ministry of Economic Development and Trade (MERT), the Russian Ministry of Transport, the state-owned company Russian Railroads, and several regional governments in Siberia and the Russian Far East.

Victor Razbegin, who works in the Ministry of Economic Development and Trade's Industrial Research department, gave a press conference on April 18 with other members of the Bering Strait project group, to publicize the forthcoming conference. Their huge map of the Arctic connection, and their enthusiasm for the \$65 billion multi-modal project, with its associated long-distance rail and power lines, grabbed headlines in Russia. More than 60 stories about it appeared in press, web, and other electronic media, including a report on

NTV, Russian national television Channel 2. NTV showed a dynamic map of the projected rail line from Yakutsk in East Siberia, through Nome and Fairbanks, to Fort Nelson in Canada.

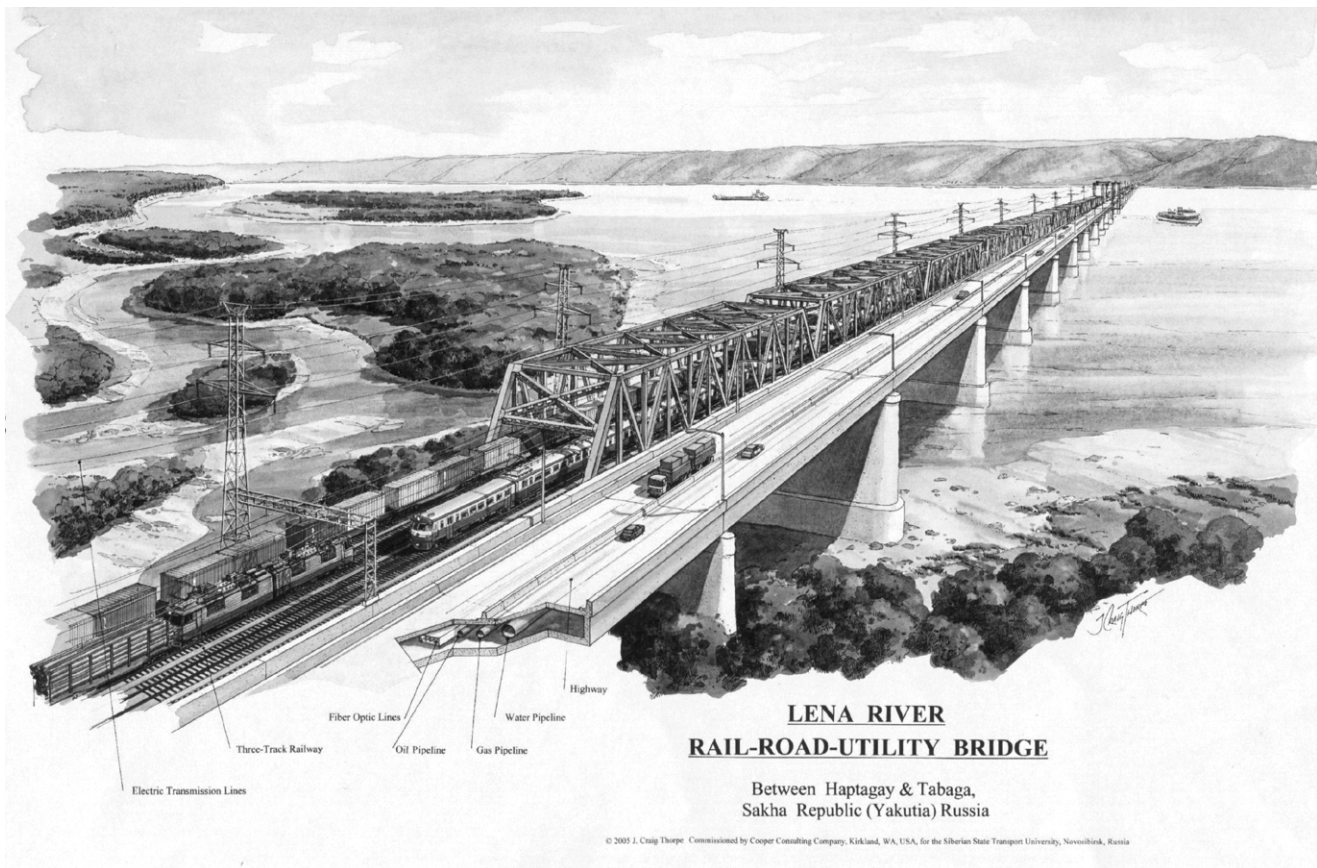
Academician Alexander Granberg, head of the Council for the Study of Productive Forces, described the project's advantages, in an April 16 interview for the economics website OPEC.ru. He said the road, rail, and pipeline connection would handle 3 percent of total world trade in physical goods. It will make it possible to harness more of eastern Russia's hydroelectric potential. It will allow development of previously inaccessible mineral resource deposits. And, said Granberg, the connection of the power systems of Siberia, the Russian Far East, and North America will create economies in electricity supply, worth \$20 billion annually.

Russia's leadership, according to Granberg, now sees the development of transportation infrastructure as essential for uplifting Russia's vast outlying regions. Demonstration of this, he said, was an April 10 presentation by Vladimir Yakunin, head of the state-owned company Russian Railways, at a meeting on rail transport, chaired by Putin. There, Yakunin laid out the construction of a 3,500-km rail line from the Lena River to the Bering Strait, as a high-priority task. The Lena is the easternmost of Siberia's three great river systems, and is the tenth longest river in the world.

Feasibility and Financing

Victor Razbegin, who works in the Ministry of Economic Development and Trade's Industrial Research Department, like Governor Hickel, has been closely involved in efforts to secure action on the Bering Strait project, for more than a decade, as our review of its history shows (see below). Another longtime Bering Strait tunnel enthusiast is the American engineer Hal Cooper, whose overview of the scheme *EIR* published in 1994, and whose detailed work-up of its parameters has recently drawn renewed attention from Russian, as well as American promoters of a Bering Strait crossing. Cooper told *EIR* the week of the Moscow conference, that the push for the project may have reached "a real phase shift" now.

Speaking at the April 24 event, under big banners with maps of the intercontinental project, Academician Granberg said that the next step should be design and feasibility studies for the 6,000-km rail-road-pipeline-power



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This proposed bridge would cross the Lena River near the city of Yakutsk, in Russia's Sakha Republic, creating a rail link that would sweep east to Alaska and south to China.

corridor from Yakutsk to Fort Nelson, including 85-100 km of tunnel under the Bering Strait. There will really be two tunnels, Granberg pointed out, because Big Diomed Island (Russia) and Little Diomed Island (U.S.A.) lie close together in the middle of the strait. Since Japan already has built 50-km underwater tunnels between its islands, Granberg remarked, the technologies involved are proven ones.

Conference participant Louis Cerny of the American Railroad Association also presented the technical feasibility of the Bering Strait crossing, noting that the schedule for the project as a whole could be sped up by simultaneous construction of its different parts.

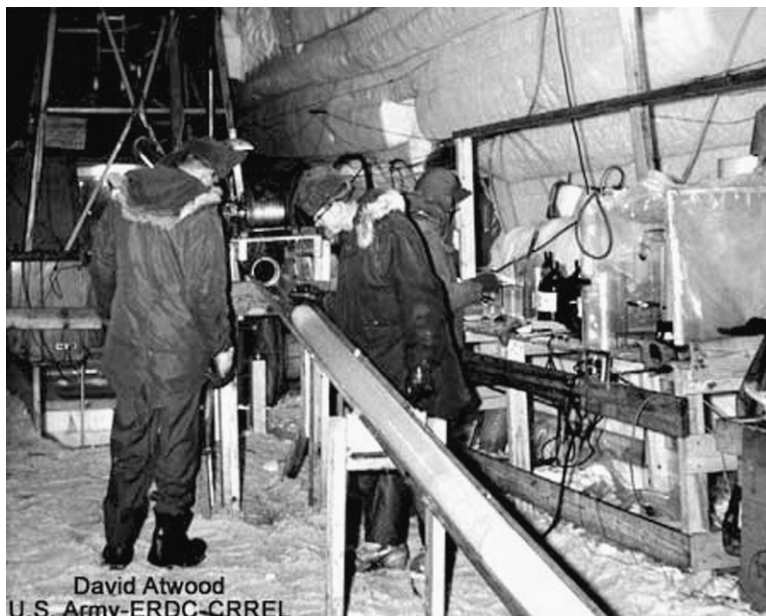
Many of the Russian speakers referred to recent government decisions, which make the Bering Strait project a live option. One of these is the Federal Target Program called "Development of the Far East and Transbaikalian Region" to 2013. Russian Prime Minister Mikhail Fradkov has been active in launching an array of measures to address the underdevelopment and depopulation of these regions.

Dr. Jonathan Tennenbaum, a collaborator of LaRouche for many years, and a member of the *21st Century Scientific Advisory Board*, introduced LaRouche's paper to the conference as the work of the American economist, best known in Russia for his science of physical economy and his advoca-

cy of basic infrastructure projects. LaRouche's discussion of the legacy of chemist and national economist Dmitri Mendeleev, as well as his relating the cooperation of great nations on the Bering Strait project to the tasks of war-avoidance, were received with interest by the Russian participants.

Tennenbaum, who is known in Russia especially as a co-author of *EIR's* 1997 Special Report *The Eurasian Land-Bridge: The 'New Silk Road'—Locomotive for Worldwide Economic Development*, then elaborated the concept of infrastructure corridors, and networks of intersecting such corridors. Building them in the far north is a challenge for the 21st Century, he said, which can be met by building chains of nuclear-powered cities. U.S. work on building the nuclear-powered research town, Camp Century, under the ice in northern Greenland in the 1960s, together with Russia's city-building experience in Siberia, makes this a tailor-made area for U.S.-Russian cooperation, Tennenbaum said.

Maxim Bystrov, deputy head of Russia's Federal Agency for Special Economic Zones, picked up on LaRouche's and Tennenbaum's remarks about the enormous financial bubble that exists today, as against the potential for directing funds into productive investment like these infrastructure projects. Liquidity won't flow into long-term projects on its



David Atwood
U.S. Army-ERDC-CRREL

David Atwood/U.S. Army-ERDC-Cold Regions Research and Engineering Laboratory

The United States has experience working and building in the Arctic temperatures. This photo was taken in 1964 at the nuclear-powered Camp Century, Greenland, which operated for five years. Here, work underground with Arctic ice cores.

own, Bystrov stressed. He said that the Russian government would advocate attracting private concessionaires for the project, rather than rely solely on state funding from the countries involved. At the same time, Bystrov said that his agency was prepared to put up \$120 million for the feasibility studies.

Governor of Yakutia (in the Sakha Republic) Vyacheslav Shtyrov, whose paper was read to the meeting by the region's representative in Moscow, discussed the enormous development potential of that East Siberian region. With a land area equal to half the size of the lower 48 U.S. states, covering three time zones and extending to the Arctic Coast, Yakutia's population is less than that of Rhode Island. Shtyrov noted that "we have all of the elements of Mendeleev's periodic table" in Yakutia, as well as enthusiasm for Mendeleev's ideas about development.

Contagious Optimism

News of the high-level Russian backing for the Bering Strait tunnel project was welcomed across Eurasia, from Sweden to Japan. *Dagens Industrie*, a Swedish business newspaper, reported favorably on it in the April 25 issue. German press coverage cited enthusiastic responses from China, Korea, and Japan, including the view of some Japanese business circles that the tunnel could be built for \$60 million per kilometer, half the price that that was cited in Moscow. Germany's *Spiegel Online* in its coverage added mention of an article on the project, penned by Vladimir Brezhnev, CEO of the Russian construction firm Transstroj, in 2005 in the magazine *Tunneling and Underground Space Technology*. In that article, Brezhnev and co-authors wrote: "Among tunnel experts, there is no doubt that the imple-

mentation of the described tunnels is technically feasible."

In Denmark, where national attention has been focussed on the Schiller Institute's program for magnetic levitation rail infrastructure, Schiller Institute leader Tom Gillesberg pointed out that Vitus Bering, for whom the strait is named, was a Dane in the service of the Russian Navy, during the time of Peter the Great in the early 18th Century.

Publication of a story about the Bering Strait project on the Saudi Arabian news website Elaph.com brought forth contagious optimism. The report said, "The cost of this gigantic transport project, \$65 billion, will be quickly paid back through the revenue, created by the transit of goods between the countries in the region." Comments on the site, from readers in Arab countries, as well as Arab-Americans and Arab-Canadians, urged the Arab states to learn from Russia, Canada, the U.S.A., and Asia, and launch construction of a network of railroads and bridges throughout the Arab world, from the Persian Gulf to North Africa.

In Russia itself, many identify the Bering Strait project with LaRouche. The Bering Strait rail line was shown on maps in *EIR's* 1997 Special Report on the

Eurasian Land-Bridge (see map pp. 38-39). Academician Sergei Rogov of the Institute of the U.S.A. and Canada, and Academician Vladimir Myasnikov, then of the Far East Institute, used reproductions of *EIR's* map, to illustrate their articles on Eurasia's development potential, appearing in major Russian publications in the late 1990s.

On his return from Moscow, Jonathan Tennenbaum reported that the conference was a central event in a very broad-ranging debate in Russia, around the absolute need for great projects. There was extensive debate and discussion at the Moscow event on the problem of financing the Bering Strait tunnel and development corridor. The deputy chairman of Russia's Federal Agency for Special Economic Zones, during his presentation, concurred with Tennenbaum's remarks regarding the need to immediately invest existing liquidity, such as the Russian government's stabilization fund derived from oil and gas revenues, into such big high-technology projects of new infrastructure.

Typical of the Bering Strait project's reputation as LaRouche's idea, and of the growing sense of such ideas' potential to change even the most rigid institutional attitudes, is a Russian blogger's comment, posted April 23. With reference to a recent U.S. State Department report, which pledged support for regime-change in the former Soviet region under the banner of "pro-democracy" movements, the writer commented: "This I must mentally applaud: answering the State Department's latest attack, by proposing a gigantic, joint investment project—the dream of Lyndon LaRouche, who advised the Democrats during the most recent Congressional elections; and this from the Ministry of Economic Development and Trade, no less, though it's headed by one of our dyed-in-the-wool liberals!"

Conference Directs Appeal For Bering Strait Link To G-8 Summit

This communique was issued April 25, as an "Appeal from the participants of the international conference on an Intercontinental Eurasia-America Transport Link via the Bering Strait, to the heads of state and governments of Russia, the U.S.A., Canada, South Korea, Japan, China, and the EU member-states." Along with the Appeal, the participants at the April Moscow conference sent a draft Memorandum of Cooperation, proposing that those nations endorse the project and consider financing feasibility studies for the Bering Strait project at the June 6-8 summit of the G-8 in Heiligendamm, Germany. The studies could be completed by 2010, the communique stated.

Subheads have been added.

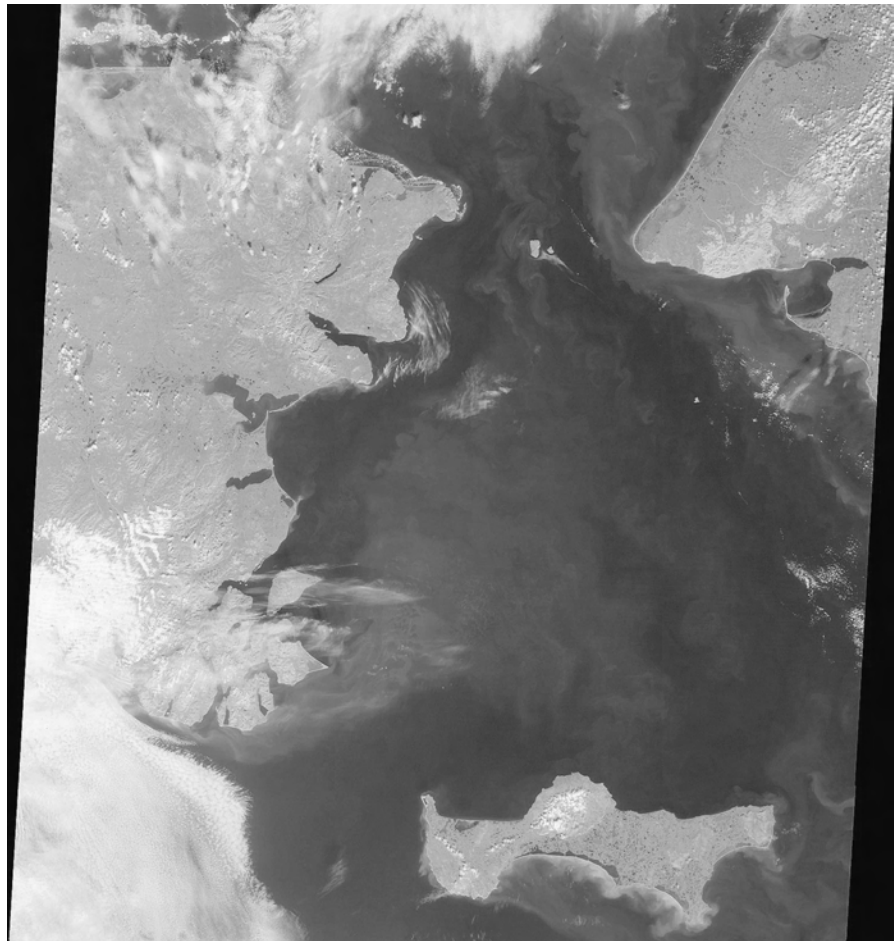
The idea of creation of a global land transportation system connecting four out of six continents (Eurasia, North and South America, and Africa) has occupied the minds of mankind for centuries.

The issues of economic growth and global energy security, strengthening political and trade ties, containing and preventing wars and civil conflicts, and cultural interaction are directly related to the global community's ability to clear the hurdles in the way of solving global problems and ensuring constructive cooperation in all spheres of the world economy.

Today, on the agenda, are expansion and diversification of trade ties between countries, combining their energy, transport, and information resources for developing uncultivated territories and exploiting their natural resources. Now is the time to pay most serious attention to projects aimed at peace and creation; it's time to revisit humankind's great ideas.

Continuing Great Projects

The past 150 years were marked by numerous ambitious projects. These are the 9,000-kilometer-long Trans-Siberian Railroad, the Transcontinental Railroad in the U.S.A., the tunnel between the Japanese islands of Honshu and Hokkaido,



NASA

With the Seward Peninsula of Alaska to the east, and Chukotskiy Poluostrov of Siberia to the west, the Bering Strait separates the United States and the Russian Federation by only 90 kilometers

the Great Belt Fixed Link in Denmark, the Eurotunnel, and many others.

The 21st Century will see the construction of tunnels underneath the Straits of Gibraltar and the Bosphorus, a tunnel under the Yangtze River, tunnels between the Russian mainland, Sakhalin, and Japan, and a tunnel between Newfoundland and Labrador Peninsula in Canada.

The construction of the intercontinental link uniting Eurasia and America, Intercontinental Link (ICL)-World Link, could become a crucial contribution to the creation of the Global Transportation System (GTS) as it pulls together global experience in implementing international projects.

Today, the main deterrent to a multimodal GTS and the actual linking of the two continents is the absence of a connection between Eurasia's and America's transportation and energy systems.

In order to overcome this hurdle, it is necessary to build 6,000 kilometers of railroad from Yakutsk, Russia to the North American railway network via Magadan, Chukotka, the Bering Strait, and Alaska incorporated in a single corridor with a power transmission line and fiber-optic lines.

The project's feasibility has raised no doubts among the international engineering community.

The necessary target investment in the project is estimated at \$65 billion. Providing financing for the project as of 2008 would ensure that the feasibility study is completed by 2010. The approximate cost of the feasibility study, including all necessary research and an ecological assessment, is estimated at \$120 million and may be divided among the countries participating in the project. A major portion of the Russian share of joint financing will be disbursed under the program for development of the Russian railway transportation system, which was approved at a government meeting held on April 10, 2007.

Economic efficiency of the project is ensured by large volumes of cargo to be shipped (400-500 billion tons/kilometers per year), synergies between hydro- and tidal-power generation systems, and the effects of competitive exploitation of the plentiful natural resources in the area covered by the ICL-World Link.

However, the project's geopolitical significance appears to be even greater, as it unites continents and creates conditions for multifaceted and fruitful cooperation among the peoples of many countries.

In just 15 to 20 years, the new multimodal transport artery will change the world. Humankind will gain access to new energy and natural resources. The ICL-World Link will provide access to territories colossal both in physical dimensions and economic potential.

To implement the international research program and coordination of efforts to prepare and realize the project, the international nonprofit organization Interhemispheric Bering Strait Tunnel & Railroad Group (IBSTRG) was created in 1992.

As of today, the basic technical and economic characteristics of the link, and the possibilities and ways of hooking it up to Russia's and America's transport routes, have been defined, and the preliminary analysis of the economic and social effects of the project has been completed.

Creating Economic Potential

We, the participants of the International Conference on an Intercontinental Eurasia-America Link via the Bering Strait, which took place in Moscow on April 24, 2007, having discussed the prerequisites, opportunities and the expected effects of the project, and appreciating:

- the unquestionable economic potential of creating a global transport, energy, and telecommunications system with the key element being a land link between the continents of Eurasia and America;
- the urgency of combining efforts to implement the project;

- the advisability of further research pertaining to the project;
- the necessity for the participants of the project, and members of the political and business communities of all countries involved, to coordinate their activities,

• hereby put forward this proposal to the governments of Russia, the U.S.A., Canada, Japan, China, Korea, and the EU member states:

1. We propose that the countries assess the merits of the project for building the ICL-World Link, at the level of ministries and agencies responsible for this area, and its inclusion in their respective strategies of economic development on the macroeconomic and industry levels.

2. Provided that the construction of the ICL-World Link is deemed advisable, we propose that the governments appoint their representatives for participation in further elaboration of the project, and discussion of different options of the countries' involvement in construction and operation of the ICL-World Link.

3. We propose that the governments consider the financing of feasibility studies for constructing the ICL-World Link at the highest international level in June 2007 within the framework of the G-8 meeting. We propose that they pass a memorandum outlining the governments' positions on developing the global transportation network, and the feasibility of building the ICL-World Link as a key element of providing intercontinental energy and infrastructural ties.

4. We propose that a working group be created for further elaboration and promotion of the project. We think it advisable for the sources and amount of financing to be defined at this stage.

5. We propose that the governments consider the appointment of the international nonprofit organization IBSTRG as the authorized international project coordinator for the duration of the feasibility study of the ICL-World Link. All participating governments will have representation on the IBSTRG Board of Directors.

Signed:

• Alexander Grigoryevich Granberg, chairman of the Council for Studies of Productive Forces at the [Russian] Ministry of Economic Development and Trade and the Academy of Sciences;

• Viktor Nikolayevich Razbegin, deputy chairman of the Council for Studies of Productive Forces at the [Russian] Ministry of Economic Development and Trade and the Academy of Sciences, vice president of the international corporation IBSTRG;

• George Koumal, president of the international corporation IBSTRG;

• Alexander Yuryevich Sergeev, member of the managing board, HydroOGK company;

• Joseph R. Henry, general counsel of the IBSTRG;

• E. Yamaguchi, president of Aikyo International Consultant Co., Ltd.;

• Louis T. Cerny, railroad consultant, track and bridge specialist;

• Craig Burroughs, chairman of BXB Corporation, director and treasurer of the IBSTRG.

The 19th Century Origins of The Bering Strait Project

by Richard Freeman

It was the great railway-building thrust led by President Abraham Lincoln and his economic advisor, Henry C. Carey, that laid the basis for creating a rail network crossing the Bering Strait. In 1869, at Promontory Point, Utah, the Union Pacific and Central Pacific railroads were joined, creating the Transcontinental Railroad, which linked the United States from coast to coast—Lincoln's great vision. At the U.S. Centennial Exhibition in Philadelphia in 1876, exhibits and discussions were held on building rail networks, including by international figures such as the Russian scientist and railway builder Dmitri Mendeleev. In the 1890s, American nationalist networks joined their Russian counterparts in building the Trans-Siberian Railroad.

- William Gilpin (1813-1894), an American System ally of President Lincoln, proposed a railroad line going over the Bering Strait, as part of his idea that all great cities would be linked by railroads. In 1861, Lincoln appointed Gilpin the first Governor of the Colorado Territories.

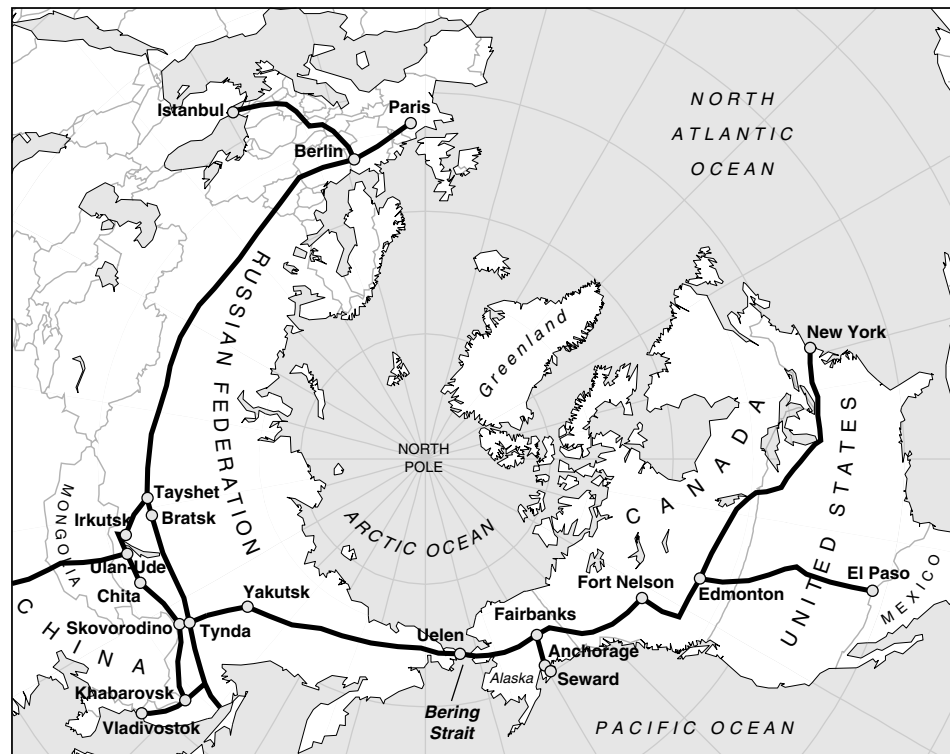
- Toward the end of the 19th Century, the first proposals were made in Russia, for building a railroad between Yakutsk, Russia, and the Bering Strait. Several options were considered for the railroad, which was to head southeast, and connect Yakutsk with the Sea of Okhotsk, and continue along the coast via Magadan to the Strait.

- At the start of the 20th Century, capital was raised to form the Trans-Alaska Siberia Company, which would build a railroad line extending from North Dakota (which was already connected to U.S. rail lines) through Canada to Nome, Alaska, which is within 100 miles of the Bering Strait. There would also be a railroad built from the Chukotka region of Russia (now the Chukotka Autonomous Region), which borders on the Strait, heading southwest, which would connect to Russia's Trans-Siberian Railroad.

Funds were raised to pay for

the initial feasibility studies for the 5,650-mile rail system. The idea was that New York, Moscow, and Paris could all be joined together for world peace. The company was advancing toward raising the \$300 million required in 1907 to complete both the Russian and American railway land components, when British-allied interests halted the railway. The alliances of World War I put a permanent halt to this effort.

In 1902, Loicq de Lobel, the French explorer, approached the Russian Imperial Technical Society with a proposal to explore the length of the future track from Yakutsk to the Bering Strait, and farther to Alaska, up to the point where it would connect with an existing track. Upon receiving the approval of the Russian and French governments, Lobel set up the first committee for promotion of this project, and a second such committee, affiliated with the American Railroad Administration, was created in New York. The explorer delivered several reports on his work at the Paris Geographical Society at the Sorbonne.



FUTURE GLOBAL RAIL CONNECTIONS, AS SEEN FROM NORTH POLE

In the 19th Century, the Bering Strait was part of a plan to link all the great cities by railroads.

Source: Adapted from H.A. Cooper

In **1905**, Tsar Nicholas II proposed building a Bering Strait rail link.

In **October 1906**, a Russian Government Commission on the creation of the Great Northern Route held discussions attended by four American, one French, and one Canadian representative. It was decided to expedite work on the project, putting Lobel and the American engineer James Waddell in charge. Preliminary technical parameters for the track were set. Construction was supposed to be carried out by the New Jersey Construction Company, under a 90-year contract which entitled it to a strip of land 24 kilometers wide. Plots of land on both sides of the track were to be divided in chessboard pattern between Russia and the contractor.

In **March 1907**, the Russian government terminated the contract, having decided that its terms were not favorable.

In **April 1918**, Russian leader Vladimir Lenin addressed the All-Russian Executive Committee on the need to intensify the construction of railroads, first of all in the North, including those reaching the Bering Strait, to expedite exploration of natural resources. Projects for building a track from Yakutsk to the ports Ayan and Eikan, and to Nikolayevsk-on-Amur, reaching the Bering Strait, were again on the agenda.

During the **1930s-1950s**, Josef Stalin put himself in charge of the Polar Track project for building a Northern Siberian railroad from Vorkuta to Anadyr.

In **1942**, During World War II, the Seattle District of the U.S. Army Corps of Engineers conducted a feasibility study to build a proposed railroad line, from Prince George, in British Columbia, Canada, to Fairbanks, Alaska, and thence to Teller, a city in Alaska's Northwest. The Army Corps projected for this project, a capital construction cost of \$87 million for the 1,417-mile route, and a purchase cost for rolling stock of \$24 million.

The initial idea was to ferry wartime supplies needed by Russia, from the Alaskan port of Teller, to the Chukotkan port of Uelen, *until a railway tunnel across the Bering Strait would be built*. Another railroad would then be built, heading westward, from Uelen to Egvekinot, and to a junction, where it could then proceed to one or both of two Russian rail corridors. One rail corridor would go along the south shore of the Arctic Ocean to Vorkuta, to join the newly completed 1,100-mile rail line to Moscow.

President Franklin Roosevelt's personal emissary to Russia, Harry Hopkins, had raised this rail proposal, following a trip to Moscow, and briefed Roosevelt, Secretary of State Cordell Hull, and Roosevelt's uncle, Frederic Delano. Roosevelt's uncle, among others, urged him to fund the Army Corps feasibility study. After the June 1942 U.S. defeat of a Japanese carrier force at Midway Island, the project was deferred.

After the end of World War II, Stalin contacted President Harry S Truman to restart discussions about connecting the Russian and U.S. rail networks, through a tunnel under the Bering Strait. Truman rebuffed Stalin.

In **1991**, the nonprofit corporation Interhemispheric Bering Strait Tunnel and Railroad Group (IBSTRG), known as "Transcontinental," was officially registered in Washington, D.C. The founding members on the American side were the State of Alaska, the American Railroad Association, and several large railroad, construction, consulting, and extraction com-

panies. In Russia, a division of the corporation was set up under director V.N. Razbegin, a vice president of IBSTRG, as well as a Coordination Research and Development Committee, whose first chairman was Academician P.A. Melnikov. Participants on the Russian side included the Railroad Ministry, the Energy and Fuel Ministry, the Committee on the North, the Economics and Finance Ministry, the Construction Ministry, Unified Energy Systems, Transstroj Corporation and the Russian Academy of Sciences. Overall, 40 organizations were involved.

In **1992**, Lyndon LaRouche and Helga Zepp-LaRouche began presenting proposals, later known as the Eurasian Land-Bridge, which would connect Europe, Asia, and ultimately the whole world, through efficient, high-speed rail networks and accompanying development corridors to reconstruct the shattered world economy. The proposals called for either a tunnel or a bridge to connect rail systems across the Bering Strait.

In **1994**, the American Engineering Association held a conference in Fairbanks, Alaska, entitled, "The Bering Strait Tunnel." Participants included V.N. Razbegin, vice president of IBSTRG, and Hal Cooper, a consulting engineer of Cooper Engineering.

In its **April 16, 1994** issue, *Executive Intelligence Review* published an article by engineer Hal Cooper, "Bering Strait Tunnel and Railway Project Will Boost Pacific Development."

From **May 7-9, 1996**, in Beijing, at a conference entitled "International Symposium on Economic Development of the Regions Along the Euro-Asia Continental Bridge," Helga Zepp-LaRouche gave a speech, "Building the Silk-Road Land-Bridge." In the wake of this conference, *EIR* published a Special Report entitled *The Eurasian Land-Bridge, The 'New Silk Road'—Locomotive for Worldwide Economic Development*, which included discussion of worldwide plans for development through infrastructure corridors, and also the physical economic principles upon which such plans are based.

In **March 1998**, a draft resolution was introduced to the Russian government on the necessity to conduct complex research on the possibility of building a polytrack, which was coordinated with the Railroad Ministry, the Construction Ministry, the Committee on the North, the head of the administration of the Chukotka Autonomous Region, and the presidents of Unified Energy Systems and the Transstroj Corporation.

At the end of **2000**, Viktor Razbegin, of the Moscow Regional Transportation Institute, announced a feasibility study of building the connecting rail to the Bering Strait, indicating that it would be very economically feasible, and would benefit freight transport between the interior of Asia and the interior of the United States.

On **Nov. 20-28, 2002**, the 70th Anniversary Conference on the Railroad Transportation Developments in Siberia was convened at the Siberian State Transport University in Novosibirsk, at which the Bering Strait tunnel proposal was raised.

In **July 2006**, IBSTRG president George Koumal addressed U.S. President George W. Bush on this subject.

On **Sept. 28, 2006**, at a meeting at the Federal Agency for Railroad Transport (Roszheldor), the decision was taken to build the Yakutsk-Magadan track with its further extension to the Bering Strait.

The World's Political Map Changes: Mendeleev Would Have Agreed

by Lyndon H. LaRouche, Jr.

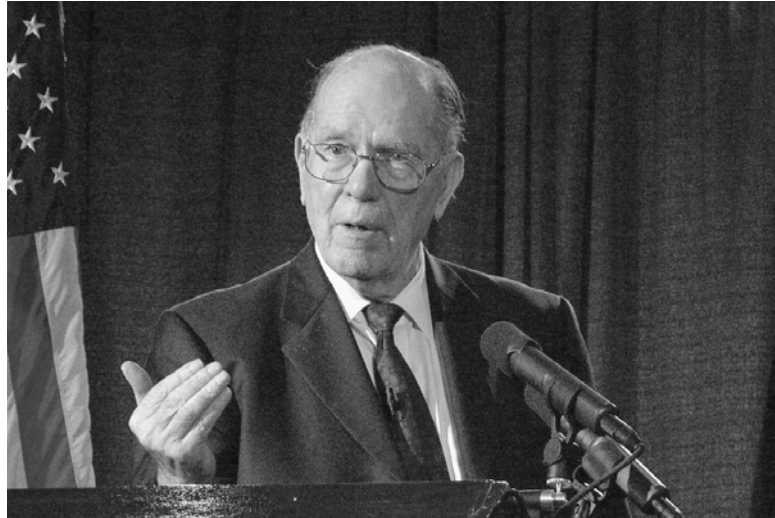
This article was delivered on April 24, by Dr. Jonathan Tennenbaum, to the Moscow conference on "A Transcontinental Eurasia-America Transport Link via the Bering Strait," and will appear in Russian and English in a forthcoming issue of FORUM International. The meeting was sponsored by the Russian Academy of Sciences, State Scientific and Research Organization, Council for the Study of Productive Forces (SOPS), in conjunction with the Russian Ministry of Economic Development and Trade, the Russian Ministry of Transport, Russian Railroads, and regional governments in Siberia and the Far East.

The intention to create a trans-Siberian rail system, implicitly extended, across the Bering Strait, to North America, dates implicitly from the visit of Dmitri Ivanovich Mendeleev to the 1876 U.S. Centennial Exposition in Philadelphia. The defeat of Lord Palmerston's scheme for destroying the United States, by U.S. President Abraham Lincoln's leadership, spread the influence of what was called The American System of political-economy into Russia, as also the Germany reforms under Bismarck, the industrialization of Japan, and elsewhere. These global, so-called geopolitical developments of the post-1865-1876 interval, have been the focal issue of all of the spread of great wars throughout the world from the British orchestration of the first war of Japan against China, in 1894-1895, until the 1945 death of U.S. President Franklin Roosevelt.

Throughout the ebbs and flows of global economic and geopolitical history, up the present day, the realization of Mendeleev's intentions for the development of Russia remains a crucial feature of that continuing history of the post-1865-1876 world to the present moment. The revival of the intention launched by him, now, is presently renewed as a crucial quality and included feature of crucial importance for the world as a whole today.

The same impulse toward new world wars persists in new guises today. At the present moment, the world is gripped by what threatens to be, very soon, the greatest global monetary-financial collapse in the entirety of modern history to date. The spread of warfare and related conflict out of Southwest Asia is nothing other than a reflection of the same, continuing, so-called geo-political impulse which has prompted all of the world's major wars since the 1763 Treaty of Paris, but, more emphatically, the rise of the U.S.A.'s 1865-1876 challenge to the Anglo-Dutch Liberal monetary-system.

This onrushing collapse of the world's presently hyper-inflat-



Stuart Lewis/EIRNS

LaRouche: "The bridging of the Bering Strait becomes now, the navel of a new birth of a new world economy."

ed, disintegrating world monetary-financial system, requires early concerted emergency action by responsible leading nations. A sudden change in U.S. political trends, back to the traditions of President Franklin D. Roosevelt, is urgently needed for this purpose. Such a change in U.S. policy must be realized through emergency cooperation which would be led by a concert of leading world powers. These must include the U.S.A., Russia, China, and India, as the rallying-point for a new, spreading partnership among perfectly sovereign nation-state economies.

In such cooperation, the development of a great network of modern successors to old forms of rail transport, must be spread across continental Eurasia, and across the Bering Strait into the Americas. The economically efficient development of presently barren and otherwise forbidding regions will enter into the urgently needed future development of the planet as a whole.

Such a plan was already crafted, during 1990-1992, under the direction of my wife, Helga Zepp-LaRouche, who remains the principal political and cultural leader among my associates in Europe and beyond. This perspective must now be revived to become a global actuality.

Technologically, the leading thrust of scientific development is located in the succession of the work of such exemplary figures as Mendeleev and Academician V.I. Vernadsky, and the work of the relevant, but too little heralded leader in the same field, the American pioneer William Draper Harkins.

This requires the creation of long-term diplomatic agreements among nations, creating a new system of relatively fixed-exchange-rate treaty-agreements, at very low prime interest-rates, over forward-looking intervals of between a quarter to half century. These present periods cover the economic-financial half-life-span of principal long-term investments in the development of that basic economic infrastructure which the needs of the present and coming generations of the peoples of these nations require.

We have thus entered a time, measured by the clock of nuclear-fission and thermonuclear power's development, when the long history of the domination over the land-masses of the planet by actually or implicitly imperial mar-

itime powers, is no longer an acceptable practical proposition. Instead, the science-driven, capital-intensive mode of development of the basic economic infrastructure and standard of living of the populations, will dominate any successful form of civilized development of relations among the sovereign nations of the planet. To this end, the tundras and deserts of our planet must be conquered by the forces of science-driven technological development of the increased productive powers of labor. Development must now proceed from the Arctic rim, southwards, toward Antarctica.

The bridging of the Bering Strait becomes, thus, now, the navel of a new birth of a new world economy.

Megaprojects As Alternatives to War

by Walter J. Hickel

This is former Alaska Governor Walter Hickel's presentation on April 24 to the Moscow conference on "A Transcontinental Eurasia-American Transport Link via the Bering Strait." The full title of the paper is "The Price of Progress Does Not Have To Be Blood. It Can Be Sweat. Megaprojects With Peaceful Purposes as Alternatives to War."

Hickel served as Governor of Alaska from 1966-1968 and 1990-1994, and as U.S. Secretary of Interior in the Nixon Administration (1969-1970).

The world joins Russia in its sadness over the passing of Boris Yeltsin yesterday. His courage changed a nation.

Bringing Russia and America Together Will Change the World

Congratulations to Academician Granberg, the Council for the Study of Productive Forces, and our other hosts for this important gathering. By initiating this series of International Conferences on Transport Megaprojects of the 21st Century, you are doing a service for all peoples. And Alaska wants to help.

These conferences may prove to be one of the most significant initiatives of this century. And I share your vision.



FORUM International

Former Alaska Governor Walter Hickel addressing the Moscow conference on April 25: "I believe that if we bring Russia and America together, it will change the world."

This Can Be an Alternative to War

In recent years, the clash of cultures in many parts of the world has expanded from misunderstanding and suspicion to hostility and violence. Countries that aspire to becoming cultures of freedom have become cultures of fear.

Having watched the world's conflicts all my life, I have long believed that war rarely solves problems.

Historically, the most cynical political and business leaders



EIRNS

The view from the Trans-Siberian Railroad: here, the town of Vladimirovka. "We in the North understand the power of big projects to change society for the better," Hickel said. "Russia did it with the 10,000-kilometer Trans-Siberian Railway. Alaska did it with the great trans-Alaska oil pipeline. These modern wonders mobilized our people, gave them a challenge, and a goal."

have used it as an economic strategy. Wars can unite and mobilize people. Wars put people to work and give them a purpose. But my question is, why war? Why not big projects? War is just a big project.

The price of progress does not have to be blood. It can be sweat.

Big projects are the alternative to war. This idea is as old as the pyramids of Egypt, the aqueducts of Rome, and the cathedrals of Europe.

In that tradition, let's fulfill the theme of these conferences: Let's create a worldwide transportation infrastructure for the 21st Century.

Why not transport fresh water to where it is dry?

Why not replace coal and diesel fuel with natural gas and electrical power to clean up our smoggy cities?

Why not open Russia's pioneering Northern Sea Route to the world?

Why not explore space for the resources man needs?

All of this is possible. And much more.

When I was elected Governor of Alaska in the late 1960s, I proposed a railroad around the world—a railroad from the continental United States, through Alaska, across the Bering Strait into the Russian Far East, connecting with the Trans-Siberian Railway and on to Europe.

Time magazine had fun with the idea. They labeled it the "Vladivostok, Nome, and the Santa Fe." But they weren't thinking big enough. Imagine boarding that train in London or Paris and riding it to Moscow, then across Siberia to Alaska, and on to the Great Lakes and New York City.

Such a rail link would carry a wealth of ideas, curiosity,

and commerce. It would be one of the great wonders of the world.

'Workers, Unite the World'

For years, philosophers have dreamed of building a new world. My belief is that the way to build a new world is to actually *build* it.

It begins with the optimists and the visionaries, like those gathered here. Then we need leaders who can make decisions. So the engineers can step forward. And the skilled workers. Tens of thousands, even millions, can get involved. It's time to rewrite the old slogan, "Workers of the world unite." It's time to proclaim, "Workers, unite the world."

We have gathered today to discuss the prospects for the creation of a Multi-Modal Transport Corridor via the Bering Strait. On our side, it is still in the visionary stage.

In Alaska our attention is focussed on another big project, a natural gas pipeline from Alaska's North Slope to the tidewater or across Canada. We expect construction of the Alaska gas line to begin as soon as 2010.

A transport corridor to link Europe, Asia, and North America will require leadership both from Alaska and from our President and Congress to permit access across Alaska's Federal and state lands and waters.

This will require the support of the Alaskan and American people. The key to winning that support is the validity of the vision. Here is how I would describe that vision.

As we look at goals for the 21st Century, it's fitting that we bring Russia and America together. There couldn't be a more important symbol.

I have believed for many years that it will happen. And the place to start is the Bering Strait.

Let's build a link between our two great nations—a tunnel to move people, resources, and goods east to west, and west to east.

The world's greatest reserves of natural resources await in Siberia, Alaska, and Northern Canada.

Let's build a rail connection to take that wealth to the world.

Let's build a fiber optic cable link to improve world telecommunications.

Let's build long-distance transmission lines to the 1.6 billion people on Earth who have no electricity.

Show me any area in the world where there is a lack of energy, and I'll show you basic poverty. There is a direct tie-in between energy and poverty, energy and war, energy and peace.

In the 1970s, inventor Buckminster Fuller launched the idea of a Global Energy Network. Existing electrical generators, unused during the nights in the North, can be tapped at the speed of light to bring poverty-fighting power to the South.

The technology to move electricity very long distances still needs improvement. Let's dedicate some of the world's greatest minds to this task. This can be a vast and visionary undertaking worthy of our generation and the next. And one of the few missing links is across the Bering Strait.

Some ask, "Where will the money come from?" My experience is that money is never the problem. I remember the dark days of the Great Depression in the 1930s. We were struggling to save our farms and keep our families fed. When we asked the politicians for help, they told us there was no money. Then Japan invaded Pearl Harbor, and we had all the money in the world!

Today, there are critics who doubt that a tunnel can be built beneath the Bering Sea. They say, "It can't be done."

When I moved to Alaska as a young man, I argued for a highway from the south 48 states to Alaska. They said it was impossible to build a highway over 2,000 kilometers across some of Alaska and Canada's most remote wilderness. But once World War II began, the U.S. Army built the Alaska Highway in nine months!

The Bottom Line Is Not the Only Line

Other critics of the Bering corridor believe that "small is beautiful" and "wilderness is the world." They say that the rail link will be too expensive or will ruin the environment. They oppose all big projects. But we in the North understand the power of big projects to change society for the better. Russia did it with the 10,000-kilometer (6,500-mile) Trans-Siberian Railway. Alaska did it with the great trans-Alaska oil pipeline. These modern wonders mobilized our people, gave them a challenge, and a goal.

And so will the Eurasia-North America transport corridor. In fact, I believe it will be great for the world environment. Because there will be no answer to pollution until we find an answer to poverty. That truth is as real as the Ten Commandments.

Today, I want to salute Russia for taking the lead in think-

ing about big projects. The fact that this conference is taking place in Moscow is a sign of the new role Russia is playing in the world. I predicted this when I visited here as Governor of Alaska in 1992.

"You will see a new and prosperous Russia," I said. "Not overnight, but in one generation."

Today, you have surpassed even my optimism. You are the world's largest energy exporter. Your major cities are flourishing. And you are now ready to expand your prosperity from the center to your far-flung regions.

This is where Alaska may be helpful. Alaska is a remote region, historically poor, ignored, and exploited, that has found its own road to prosperity. Our solution began with an understanding of the commons.

There are vast, commonly owned lands in Alaska. And it is the government, not the private sector, that controls these assets.

Other than Alaska's indigenous, Native corporations, that own 12 percent of our land, the government owns 99 percent of the rest. Private individuals own less than 1 percent.

The United States and Western Europe have a tradition of private ownership, but that is not true in Alaska. And it is not true in the world as a whole. Eighty-four percent of the world is owned in common, including the oceans.

The United Nations calls these commonly owned lands, waters, and resources the "global commons." So to care for this commons and to use it for the benefit of mankind, we must learn to work together.

How do we do this? Unbridled capitalism may not be the answer. When dealing with the commons, the bottom line is important, but it is not the only line. Without concern for other people, for their needs and wants, activities for strictly private gain become destructive not only to others, but eventually to oneself.

The indigenous people of the North have always lived on the commons. They learned long ago that in a cold, harsh environment, you have to care about others. You waste nothing. You care for the total. You share to survive. Every hunter shares his whale, walrus, or caribou with others, especially the very old and the very young.

These same principles are enshrined in the Alaska Constitution. What we own in common in Alaska must be managed not in the interest of a few but for the "maximum benefit" of all. The obligation rests with government both to care for the land and to make it productive. That's why I call Alaska the "Owner State."

In conclusion, I believe that if we bring Russia and America together, it will change the world.

First, we can create a new generation of hope, and a lessening of tension.

Second, a transport corridor will greatly improve communications and commerce.

And third, Russia and Alaska can offer a model for both conservation and development to other nations around the world that are owned in common.

The result can be a truly better world. Let's do it!

In closing, let me say, right out of the blue, our hearts are with the Russians, too.

Thank you.



RAIL EXPERT HAL COOPER

Bering Strait Conference Marked 'Major Phase Shift'

Hal Cooper, Ph.D., is a Seattle-based transportation consultant and a longtime advocate for an intercontinental railroad connection across the Bering Strait, as well as development corridors on key routes in the Americas and worldwide. His article "How to Revolutionize American Transport" by building 42,000 miles of electric rail and maglev appeared in the Summer 2005 21st Century.

Dr. Cooper was interviewed by Richard Freeman in the Executive Intelligence Review on May 1, for his views on the

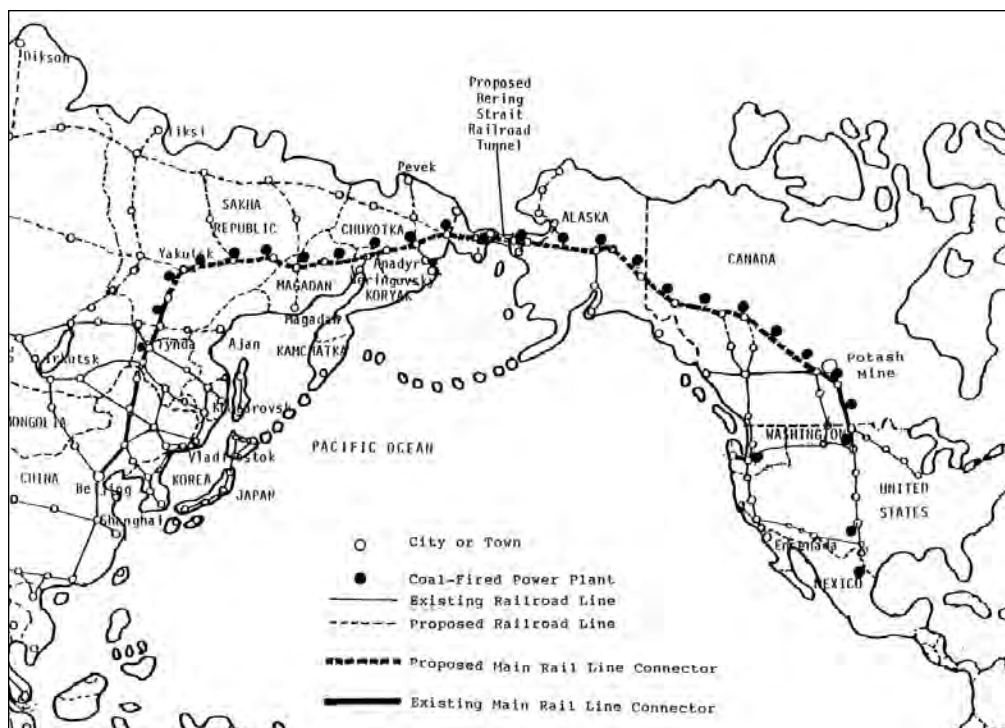
Bering Strait project and the Moscow conference. Here is an excerpt from the interview.

"I think what has happened in Moscow is the indicator of a major phase shift in the world. The old-time forces that have been in control in this country and this world for so long, are beginning to be removed, and no small amount of the credit for that happening belongs, of course, to the Lyndon LaRouche organization, in which you and I have both played

a part.

And I think that in Russia, they have basically decided to adopt the LaRouche infrastructure development policy, with emphasis on nuclear energy, the emphasis on railroads, the emphasis on economic development and employment creation, which are so contrary to so much of the thinking in the United States today. I think the people in Russia and many of the countries of the world do not have this obsession with political correctness that we have developed in this country, that has prevented us from being responsive to the need for economic development, and for our own national self-interest throughout the world....

"You're going to have to actually build about 5,000 to 6,000 miles of railroad to connect everything. And you would be connecting, on the east side of the Lena River, near the city of Yakutsk, in the Sakha Republic. You don't actually have to go into



PROPOSED ROUTE FOR INTERCONTINENTAL RAIL LINE BETWEEN ASIA AND AMERICA (including power plants and transmission lines)

This sketch map was part of a paper by Hal B.H. Cooper, Jr. (Cooper Consulting Co.) and J. David Broadbent, president of the Canadian Arctic Railway Co. (British Columbia), for presentation to the 70th Anniversary Conference on "Railroad Transportation Developments in Siberia." The conference took place at the Siberian State Transport University at Novosibirsk, Nov. 20-28, 2002.

The coal plant sites are shown to indicate the importance of power for both electrified rail and regional economic activity along the corridor, which would be powered by nuclear energy for the most advanced development.

Yakutsk, but it would be helpful to do that, because it's the largest city in that region. I was there in 1996.

You would come out through the Magadan region, and through the Koryak region, into the Chukotka region in Russia, and then a place called Egvekinot, which is a gold-mining place. It would be a junction for a future connection of lines going to the west, to Vorkuta, far in the west of Russia, 1,100 miles northeast of Moscow, which was originally laid out under the direction of Josef Stalin, prior to World War II, as well as the line going to the southwest, to Yakutsk, which ultimately would go to China over a 3,000-mile route.

"The railroad would then go through the Tenkany Mountains in the eastern part of the Chukotka Peninsula, and then go into a tunnel which would be about 65 miles long, west of the town which is called Uelen, right at the edge of the Bering Strait, on the Chukotka side. And then it would go through a tunnel....

"[I]t would go under the Bering Strait. Actually the water there is 180-200 feet deep; it's relatively stable limestone chalk, there are no major rock fissures or earthquake faults, or anything like that. There are two islands in the middle: There's Big Diomedes Island, which is about two miles by four miles wide (that's in Russia), and then there's Little Diomedes Island on the U.S. side, which is about three miles away; it's about one mile by two miles. It is an inhabited island, there

are some native people who live there; whereas on the Russian side, I believe there is only a weather station, military facilities.

"Each of the islands is about 20 miles away from the shore. On the U.S. side, you would come to Wales, and then to the edge of the Brooks Mountains, and then through, ultimately, a place called Galena, and you would parallel the north side of the Yukon River, and ultimately cross the Yukon River, and go into Fairbanks."

How Much Time and Money?

When asked how long the Bering Strait project would take to build, and how much it would cost, Cooper replied:

"The minimum would be 10 years. If you got serious, you could get it built in 10 years. It could be as long as 20 years. Actually, what I think is going to happen is it can be built in increments.... I noticed my cost projections, if you built just from Yakutsk to Fort Nelson, they were looking at \$65 billion, with a double-track system. And the tunnel cost was about \$15 billion, which is about the same as the cost of the English Channel tunnel—a shorter link, but more complicated.

"My assessment was, if you build a double-track tunnel, it's about \$15 billion, but I think you're going to need three tracks, and my estimate is, it's \$25 billion. And my estimate is probably \$75 billion for the same distance, instead of \$65 billion."

The Eurasian Land-Bridge

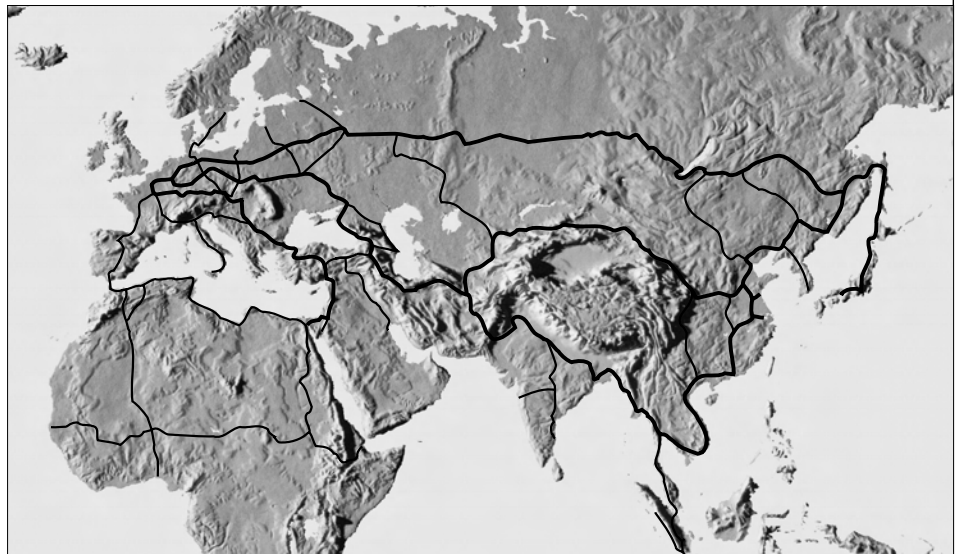
The 'New Silk Road'—
locomotive for worldwide
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FIRST ENGLISH TRANSLATION OF WEBER 1846 TREATISE

The Ampère Angular Force And the Newton Hoax

by Laurence Hecht

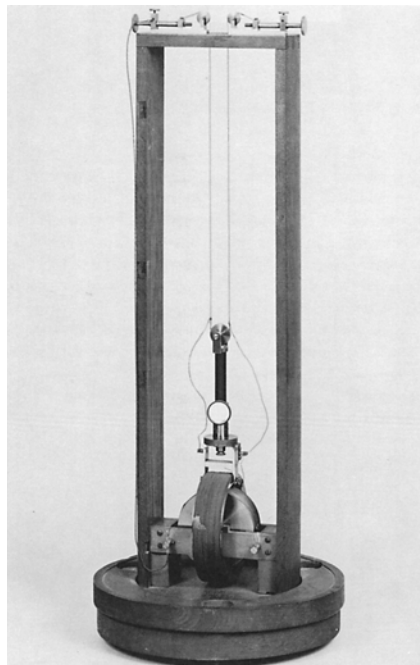
The Internet posting by *21st Century Science & Technology* of the first English translation of Wilhelm Weber's historic 1846 treatise on electrodynamics,¹ raises anew the crucial question which could not be effectively addressed by any of the principal characters in a scientific battle that raged nearly two centuries ago. No true appreciation of the fundamental laws which lie at the basis of our modern physical science can be had, without first recognizing the manifold ways in which the imposition of the Anglo-Dutch financial institution's hoax, known as Isaac Newton, has infected modern science.

Achieving clarity on this question is of urgent importance. For example, the currently fashionable package of environmental frauds, including Al Gore's climate hoax, and the injection of statistical methods into science generally, could never have been taken seriously by any scientist trained in classical methods.

The importance of Weber's work in electrodynamics was first brought to our attention by Manhattan Project physicist and physical chemist Dr. Robert J. Moon, designer of the Chicago cyclotron and a crucial figure in the development of the first atomic pile and the first plutonium reactor at the Hanford reservation. The implications of Weber's work for the present include the discovery of far more efficient paths to nuclear fusion, utilizing least action pathways determined by the nuclear geometry. Hence the several-fold importance of the appearance of this translation at this time.

The Weber, or more properly, Gauss-

Weber electrodynamic, arose as an attempt to establish the validity of a crucial discovery of fundamental principle by France's André-Marie Ampère over the period of 1820-26. To appreciate the significance of Ampère's breakthrough, and the subsequent work of Germany's Carl Friedrich Gauss and Wilhelm Weber, a certain deeply embedded misconcep-



Historical Collection of Göttingen University I. Physical Institute

The electrodynamicometer which Wilhelm Weber used in the final determination of the validity of Ampère's electrodynamics. It consists of two perpendicular electrical coils. The outer coil is suspended in such a way that its rotation, under the influence of the inner coil, can be precisely determined by observing the deflection of the mirror image of a meter stick in a telescope, as in the Gauss-designed magnetometer. The inner coil can be removed and placed at various distances.

tion resulting from the widespread promotion of the Newton hoax must be briefly addressed. Contrary to popular myths regarding the history of science, all competent fundamental investigation in modern science derives from the unique resolution of the paradox of knowability developed by Cardinal Nicholas of Cusa in his 1440 *On Learned Ignorance*, and the associated reforms in social policy embodied in the Council of Florence, as the case of Johannes Kepler's revolution in astronomy sufficiently illustrates.

Yet, today that proven method of scientific advance has been virtually buried, except as it persists as an inchoate impulse within the actually human spirit. (The rapidly maturing work of the LaRouche Youth Movement's "basement" research teams is the happy exception which holds the promise of reversing that otherwise civilization-destroying trend.)

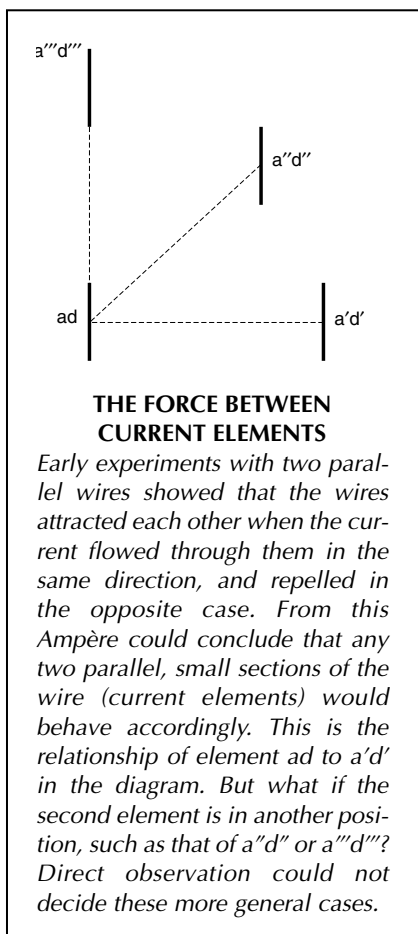
We owe this destruction of the scientific method to the success of Fra Paolo Sarpi's (1552-1623) New Venetian Party operation, in finding a way to permit a limited progress in science, for reasons of state, while virtually outlawing any examination of the philosophical-epistemological issues on which fundamental discovery in science rests. That method, which became the state policy of the extended Anglo-Dutch financial empire from the late 17th Century onward, is conveniently identified as the Newton hoax, the immediate work product of Venice's Antonio Conti.

By the time of the work in question, a virtual cult of Isaac Newton adulation, including salons and special "ladies' editions" of Newton's philosophy, had overtaken France and was weighing heavily upon the rest of Europe.

The Ampère Revolution

Ampère's revolution in science was completed by 1825 and published in 1826 as his *Memoire sur la théorie math-*

1. Wilhelm Weber, *Determinations of Electrodynamical Measure, Concerning a Universal Law of Electrical Action*, issued at the founding of the Royal Scientific Society of Saxony on the day of the 200th anniversary celebration of Leibniz's birthday, published by the Prince Jablonowski Society, Leipzig 1846. 146 pages in pdf format. Posted March 2007. www.21stcenturysciencetech.com/Articles%202007/Weber_1846.pdf



*ématique des phénomènes électrodynamiques uniquement déduite de l'expérience*² (Memoir on the Mathematical Theory of Electrodynamical Phenomena Uniquely Deduced from Experiment). Ampère showed therein that the restatement of Kepler's discovery of the principle of universal gravitation, as associated with the name of Newton, could not possibly apply as a universal law, once the newly discovered phenomena of galvanic currents (persisting direct current, as opposed to the static discharge investigated by Franklin) were taken into account.

Specifically, Ampère showed that the attempt to reduce the laws of nature to an interaction of self-evident particles obeying an inverse square law of attraction could not hold in respect to electrical currents. In that case, taking the infinitesimal element of current as the

2. In A.M. Ampère, *Electrodynamiques, uniquement déduite de l'expérience* (Paris: A. Hermann, 1883). A partial English translation appears in R.A.R. Tricker, *Early Electrodynamics: The First Law of Circulation* (New York: Pergamon, 1965), pp. 155-200.

presumed self-evident existent, it turns out that the laws of interaction must be modified to take into consideration the angular direction of the current flow.

Thus, the simple inverse square law gives way to a term embodying the sine and cosine of the angles which each member of a pair of infinitesimal current elements make with the line connecting their centers (See Figure 1).

While Ampère's discovery might appear today as a merely mathematical artifact, it must be understood that Ampère had presented his discovery within the prevailing formalism of "laws of force" with the obvious intention of challenging the Newtonian orthodoxy. The Newtonians of his day were not mistaken in their visceral dislike for Ampère's innovation. While Jean-Baptiste Biot and most of the physics establishment in France rejected the work, as a member of the Academy, Ampère was nonetheless officially honored for his discovery. Yet, within several years, under the reign of Louis Philippe, demotion and assignment to a strenuous position as inspector of schools, under conditions of ill health, hastened his early death at the age of 62.

Elsewhere, Ampère's work was also under attack. Even before his 1826 publication, an anonymous pamphlet (later attributed to England's Michael Faraday) had circulated at a Paris physics conference, attacking the Ampère-Fresnel conception of the *magnetic molecule*. This was the hypothesis, widely accepted today, that magnetism is the result of the motion of microscopic electrical currents within the particles of matter.

In Germany, Hermann Grassmann argued the impossibility of so "complicated" a phenomenon as the angular force. Hermann Helmholtz found it offensive that anyone should propose that nature might work on the basis of anything more complex than attraction and repulsion of elementary particles according to the inverse square law.

In James Clerk Maxwell's revision of electrostatics, which was codified in an 1873 textbook, which is widely accepted today as the classic work on the subject, the Ampère angular force had disappeared. Maxwell accepts the argument that, as electrical currents only appear in complete circuits, any dependence of the force exerted by the individual current element upon the angular direction is

eliminated in the totality, when the vector sum of all the elements within the circuit are taken. By such means, all subtleties may be removed from Nature and Life—the "bottom line" for all thus becomes the proverbial "six-foot under."

Gauss's Intervention

What rescued 19th Century physics from irrelevance respecting such matters, was Carl Friedrich Gauss's recognition of the extraordinary significance of Ampère's discovery. Even more than Ampère, Gauss suffered the oppression of the Sarpi-Newton cult, a condition which was exacerbated by his dependency since childhood upon the charity of the Duke of Brunswick and Hanoverian nobility. Gauss nonetheless resolved, by no later than 1828, to make the experimental proof of the Ampère angular force a central point of concentration.

At the Assembly of the Society of German Scientists and Physicians, which took place in the Fall of 1828 in Berlin, Gauss was introduced to the young physicist Wilhelm Eduard Weber, a disciple of Ernst Chladni who had already distinguished himself through highly original studies in wave behavior and acoustics. Weber was awarded a professorship at Göttingen University in 1831, where an intense experimental collaboration with Gauss began.

As Weber reports the work in the 1846 treatise, in order to prove Ampère's hypothesis, it was first necessary to find a means of positively measuring the effect of one current-carrying conductor upon another. All of Ampère's deductions derived from experiments in which no force was produced, sometimes called equilibrium, or *null* experiments. As Weber noted, it was possible that subtle forces were acting, which were masked by frictional or other effects within the apparatus.

However, in order to positively measure the sometimes small external forces exerted by the conductors, it was first necessary to discount the effects of the constantly varying magnetism of the Earth. A means of determining the absolute measure of the Earth's magnetic strength was thus required. Hence, the first collaboration, which bore fruit in less than two years, was directed to the design and construction of the bifilar magnetometer, an instrument which could resolve the ambiguities left by the previous measuring techniques.

The paper reporting on this achieve-



E. Scott Barr Collection, American Institute of Physics Emilio Segrè Visual Archives

Wilhelm Eduard Weber
(1804-1891)



Courtesy of the Museum of Electricity at Polymieux

André-Marie Ampère
(1775-1836)



Lithograph by Siegfried Bendixen, courtesy of Historical Collection of the Göttingen University I. Physical Institute

Carl Friedrich Gauss
(1777-1855)

ment is one of the landmarks in the history of experimental physics, which includes among its achievements, the first statement of a universal system of physical units known as the Gaussian system, and a preliminary formulation of what was to become known as Dirichlet's Principle.³

In 1837, a crisis was provoked at Göttingen by the accession of Queen Victoria to the British throne, and the appointment, under Salic Law, of a male ruler of the Hanover territory formerly under direct British rule. Wilhelm Weber was among a group of professors known as the Göttingen Seven who were dismissed for their principled refusal to sign a loyalty oath to the new King Ernst Augustus. The famed philologists Jacob and Wilhelm Grimm, and Gauss's son-in-law, the orientalist Heinrich Ewald, were also in the group.

Weber was able to continue his collaboration with Gauss from off campus for several years, by the help of an aid society established for the dismissed professors. By that time, the experimental work establishing the validity of the Ampère angular force had been largely completed.⁴

Weber's Results

The chief apparatus, known as the electro-dynamometer, was an adaptation

of the bifilar magnetometer, employing two electrical coils in place of two bar magnets. Both apparatuses employed the precision angle-measuring technique, conceived by Gauss, in which angular deflection is observed by noting the image of a meter stick, placed atop a terrestrial telescope, which has been reflected through a small mirror attached to the rotatable part of the apparatus.

Owing to his dislocation and reappointment to a professorship at Leipzig, it was not until 1845 that Weber was able to undertake a written presentation of the extended experimental collaboration with Gauss. As the preserved correspondence establishes, Weber was first inclined to give way to the prevailing academic climate and omit discussion of the angular force. A letter of reply from Gauss caused him to return to the original intention of their collaboration.⁵

As with Ampère, Weber chose to present the results in the mathematical format of a force law, in this case as the force between pairs of electrical particles. On the suggestion of Gustav Fechner, the epistemological psychologist and student of the Zend Avesta who was later to influence Bernhard Riemann, Weber chose to represent current flow in a wire as the motion in opposite directions of oppositely charged electrical particles.

By analysis of their relative velocities and accelerations, the anomaly expressed

by Ampère as an angular term now appeared as a diminution in the force of attraction or repulsion due to relative motion. Taking into account the laws of induction, unknown to Ampère in 1826, Weber developed a universal expression for the electrical action, in which the static electric (Coulomb) forces were merely the degenerate case in which the relative motion has gone to zero.

Weber's results meant that there was some relative velocity at which the force of repulsion between oppositely charged electrical particles

would fall to zero. Mathematically, this took the form of a constant within his expression for the force, and for the potential, between the particle pairs. That value was known throughout most of the 19th Century as the *Weber constant*.

In a remarkable series of experiments which he carried out in 1855 upon his return to Göttingen University, the value of the Weber constant was found to be the product of the velocity of light times the square root of 2. The experiments, at which Riemann was an observer and sometime assistant, were conducted with Rudolf Kohlrausch.

That determination of a universal "speed limit," usually associated with Einstein's 1905 formulation of Special Relativity, was already implicit in entries in Gauss's notebooks dating to 1833, where Gauss had proposed the relativistic formulation of the electrodynamic law. Einstein's later formulation derived from his unique conception of the *relativity of simultaneity*, but unfortunately was formulated as an attempt to save the appearances of the Maxwellian formulation. Maxwell's rejection of the Ampère-Gauss-Weber work had by then become codified within the teaching of physics in Germany, thanks largely to the undermining efforts of Helmholtz.

The replacement of the Ampère-Gauss-Weber electrodynamics by the Maxwell formulations, is usually justified on the ground that it permitted the unification of electrical with optical phenomena, under the concept of electromagnetic waves. However, an examination

Continued on page 71

3. Carl Friedrich Gauss, "The Intensity of the Earth's Magnetic Force Reduced to Absolute Measurement," translated from German by Susan Parmacek Johnson, July 1995, www.21stcenturysciencetech.com/Translations/gaussMagnetic.pdf

4. Laurence Hecht, "The Atomic Science Textbooks Don't Teach: The Significance of the 1845 Gauss-Weber Correspondence," *21st Century Science & Technology*, Fall 1996, www.21stcenturysciencetech.com/articles/Atomic_Science.pdf

5. "Text of the Gauss-Weber Correspondence," translated by Susan Parmacek Johnson, *21st Century Science & Technology*, Fall 1996, www.21stcenturysciencetech.com/articles/Atomic_Science.pdf, pp. 22-24 of pdf file.

Low-dose Irradiation Therapy Cures Gas Gangrene Infections

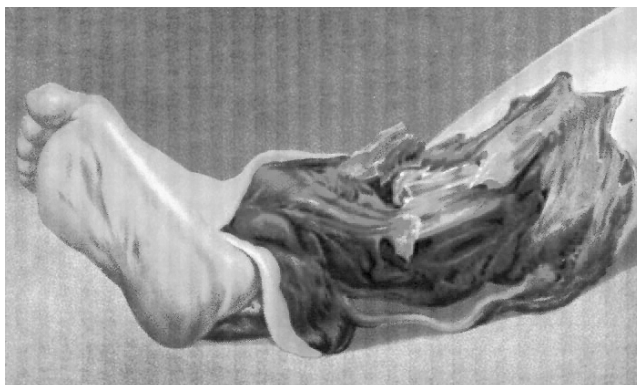
by Jerry M. Cuttler

Infection with clostridium bacteria, which live in the soil, is most often associated with war wounds, car accidents, complicated abortions, and so on. The incidence is highest in areas with poor access to proper wound care. Such infections lead to gas gangrene, a deadly disease that spreads very quickly in the body and causes rapid death. Present-day treatment consists of administering antibiotics and surgical removal of dead, damaged and infected tissue. Amputation is usually necessary to control the spread of the infection, which, once established, generally advances at the rate of six inches per hour. From the late 1920s until the early 1940s, this disease was treated successfully with low doses (approximately 50 rad), of radiation from X-rays in the area of infection.

A review of 364 cases treated in this manner, from 1928 until 1940, indicated that patient mortality would be reduced from 50 percent (or higher) to approximately 5 percent if patients were treated *before* severe progression of the disease and with the correct technique. X-ray therapy stopped the infection without the need for amputation to control its spread. Furthermore, low-dose irradiation (LDI) therapy, given immediately, acted as a prophylaxis to prevent the onset of gas gangrene.

This is but one example of the extensive use of radiation treatment of many types of infections, before the advent of antibiotics. Low doses are not adequate to kill invading bacteria directly, but they will increase the activity of a patient's damage-control biosystem to destroy the infection. The observed beneficial effects are consistent with the large amount of

Seventy years ago, low-level radiation successfully cured gangrene and other lethal infections, without requiring amputation. It should be reinstated as a treatment.



A drawing of grapeshot wounds to the lower leg during the Civil War, from The Medical and Surgical History of the War of the Rebellion by the Government Printing Office, 1870-1888. These were the sorts of wounds where quick surgery was once the only hope to thwart massive infection and rapid death.

scientific evidence of radiation hormesis—the stimulation by low doses of radiation of an organism's own defenses to destroy invaders and heal wounds.

In view of the ineffectiveness of antibiotics in many cases and the evolution of antibiotic-resistant strains of bacteria, current use of LDI therapy is needed, and many patients would benefit greatly.

The Radiation Question

Low doses of radiation are rarely used today for treating infections because most people (and physicians also) believe that radiation in any amount is a significant cause of cancer. But this linear-no-threshold (LNT) model of radiation carcinogenesis is invalid. As this author and others have shown, low doses of ionizing radia-

tion to the entire body will prevent and cure several types of cancer.¹ And for cancers that were not cured, the author pointed out that this low-dose irradiation therapy, which has no symptomatic adverse side effects, would likely give patients extra years of quality life.

The evidence did not consist of mere “anecdotal cases” but facts—many real people—organisms of 10 to 100 trillion living cells, struggling against the formidable attack of a relentless enemy.

Here I focus not on cancer but on another aggressive disease that is often fatal—gas gangrene—and a simple but very effective treatment to cure it: low doses of X-ray irradiation. It was first employed for this infection more than 70 years ago and was used with great success for about 12 years.

It began to be discarded after the mid-1930s—about the time that sulpha drugs and, later, antibiotics started

showing dramatic success in a variety of applications (leading to the burgeoning growth of the highly profitable pharmaceutical industry). While “miracle pills” made other medicines seem outmoded, radiation treatment was discredited for political reasons: All radiation was associated with the destruction caused by the nuclear bombs used on Hiroshima and Nagasaki. The theory was put forward that no amount of radiation was safe, and that exposure to any amount of radiation would cause cancer.

Before antibiotics and before the bomb, radiation was used extensively for the treatment of many types of infections, as documented by the historical review by Berk and Hodes.² Many radiation



Lt. A.N.C. Juanita Redmond (from her 1943 book: *I Served on Bataan*)

A military doctor is on duty in the gas gangrene ward at Bataan Hospital during World War II.

therapists of that era published substantial and consistent clinical evidence that demonstrated the ability of LDI, in the range of 75 to 300 rad, to cure a wide variety of infections; however, physicians were largely unaware of this, and the mechanism of action was unclear. One rationale held that the effect was caused by stimulation of the immune system by low level radiation damage, another that it was caused by the increase in local inflammation with resultant increase of blood flow. It was known, however, that these low doses did not significantly destroy bacteria directly.

More recently, Calabrese and Baldwin have defined hormesis as an adaptive response of biological organisms to low levels of stress or damage—a modest overcompensation to a disruption—resulting in improved fitness.³ They point out that observation of this reproducible phenomenon has a long history (since the 1880s), and it has been widely reported in the scientific biomedical and toxicological literature. These scientists screened 20,285 papers that suggested a chemical hormesis effect and they extracted hundreds of dose-response relationships that met their special a priori criteria—the requirements for rigorous evidence of hormesis. They also carried out a review of the history of radiation stimulation on plants, as well studies on insects, bird eggs, salamanders, and so on.⁴

Their review includes a description of the clinical verification and application

of the concept of “low-dose stimulation, high-dose inhibition” in the early decades of the 20th Century, in the treatment of human diseases and other conditions. Within one year of Roentgen’s discovery of X-rays in 1895, 1,000 papers were published on their application.³ The first therapeutic application reported (in 1897) the disappearance of inflammatory symptoms following treatment. Radiotherapy was then widely employed for the successful treatment of many inflammatory conditions and infections, including pneumonia. The magnitude of the clinical literature is substantial. It is interesting to note that the term hormesis was not coined until 1943.

Gangrene: What Is It?

Gangrene, which occurs in dry, moist, and a gas form, is the death (necrosis) of localized soft-tissue from prolonged blood-supply blockage.⁵ It can occur in arteriosclerosis, diabetes, or decubitus ulcer, and after severe burns or frostbite.

In dry gangrene, gradual blood-supply decrease turns the part discolored and cold, then dark and dry. Treatment requires improving blood flow.

Moist gangrene comes from a sudden blood-supply cutoff: bacterial infection causes swelling, discoloration, and then a foul smell. To stop its spread, which can be fatal, requires antibiotics and possible tissue removal.

Gas gangrene, the most virulent form, is named for the gas bubbles under the skin produced by a highly lethal toxin

from clostridium bacteria. The wound oozes brownish, smelly pus. Infection spreads rapidly, causing death. Treatment requires that all dead and diseased tissue must be removed and antibiotics given; an antitoxin can also be used.

In dry gangrene, healing usually takes place naturally at the junction between the living and dead tissue. In moist gangrene, some cells stay alive while surrounding cells begin to quickly die and leak fluid—an environment in which bacteria flourish.

Gas gangrene, the most deadly form, occurs in wounds that are affected by bacteria that live in low-oxygen environments and release gas and poisons into the body. Its incidence is highest in areas with poor access to proper wound care.

According to the National Institutes of Health, clostridium bacteria produce many different toxins, four of which (alpha, beta, epsilon, iota) can cause potentially fatal syndromes.⁶ In addition, they cause tissue death (necrosis), destruction of blood (haemolysis) local decrease in circulation (vasoconstriction) and leaking of the blood (increased vascular permeability). These toxins are responsible for both the local symptoms—tissue destruction—and the systemic symptoms (those that occur throughout the body)—sweating, fever, and anxiety.

If gas gangrene is untreated, the person develops a shock-like syndrome with decreased blood pressure, renal failure, coma, and finally death. To prevent the disease, one must clean any skin injury thoroughly and watch for signs of infection: redness, discoloration, and puffiness. If the symptoms occur, medical care must be obtained promptly. The treatment consists of prompt surgical removal of dead, damaged and infected tissue (debridement); amputation may be necessary to control the spread of infection. Antibiotics, preferably of the penicillin type, should be given—initially intravenously. Analgesics may be required to control pain.

The complications include: disfiguring or disabling permanent tissue damage, jaundice with liver damage, kidney failure, spread of infection systemically through the body, shock, stupor, delirium, and coma. The infection progresses so rapidly that patients may die before any immunity could develop.

Since gas gangrene or clostridial myonecrosis is caused by a family of bac-

teria that live under low-oxygen (anaerobic) conditions in the soil, hyperbaric oxygen treatment has been employed to kill the bacteria, with varying degrees of success. The action of hyperbaric oxygen is based on the formation of oxygen free radicals. An oxygen pressure of 250 mm Hg is employed to stop alpha-toxin production and inhibit bacterial growth locally, thus enabling the body to utilize its own host defense mechanisms.

The onset of gas gangrene may occur within six to eight hours after injury, and presents itself with severe and sudden pain in the infected area. A delay in recognition or treatment may be fatal. Since the acute problem is the rapidly advancing phlegmon caused by alpha toxin in infected but still viable tissue, it is essential to stop alpha toxin production as soon as possible. Recent clinical studies indicate that the lowest morbidity and mortality are achieved with initial conservative surgery and rapid initiation of hyperbaric oxygen therapy.

The infection can advance through healthy muscle and destroy it at the rate of several inches per hour in spite of antibiotic treatment. Even with modern medical advances and intensive care, amputation is often the only choice and even then, 40 to 70 percent of victims will die. Research is now under way in Idaho, using an enzyme to fight gangrene "that would rely on the body's own immune system and reduce the need for amputation."

Case Studies of Low Dose Irradiation

In a remarkable presentation before the Radiological Society of North America in 1931, Dr. James Kelly of Omaha, Nebraska, reported his three-year experience in the treatment of a group of eight cases of gas gangrene using low doses of X-rays.⁷ The mortality rate for this disease up to that time had been 50 percent or higher, but in his group it was only 25 percent. No additional tissue was removed in any case, after radiation therapy was begun. In six cases involving the limbs, improvement followed immediately after the

first X-ray treatment; amputations were unnecessary in three cases. The two patients who died had involvement of the trunk. For the treatment of such cases, Kelly advised that a higher X-ray voltage be used to increase the penetration. He reported that St. Catherine's Hospital in Omaha, Nebraska, started to use this method of treatment, in addition to other measures, on all gas gangrene cases.

Kelly urged other physicians to use this form of treatment for gas gangrene because everyone had access to X-ray apparatus and no special knowledge was required for applying the mild doses he employed. He pointed out that "[R]oentgen treatment of many localized infectious processes, due to other types of organisms, has been so definitely beneficial in the past that to neglect its use in gas bacilli infection may truly be considered poor judgment. In fact, X-ray treatment of these localized infections has been so successful and the results so widely published for the past twenty-five years or more that it seems unnecessary to make a plea for its use in such a fulminating and serious infection as gas gangrene usually proves to be. However, the use of the X-ray as an aid in the treatment of localized infections seems to have escaped the attention of many sincere practitioners."

Although there had as yet been no animal experimentation completed,

Kelly advised that, in the treatment of a serious infection, any simple measure which did not interfere with other indicated measures, was not inherently dangerous, and appeared to be beneficial on all occasions, should be employed regularly, regardless of possible lack of confirmation from the laboratory.

With a mobile 80-kV X-ray unit (and a filter to prevent skin burns), Kelly described how he had applied a local dose of 50 rad (0.5 Gy) over a three-minute period. Most patients received this dose twice on the first day, twice on the second day, once on the third day, and once again on the fourth day. All tissues suspected of involvement were irradiated by moving the X-ray tube as needed, with overlapping on the areas.

Kelly said that he did not understand the action, but he mentioned some useful characteristics of X-rays, among them, their ability to penetrate, cause chemical change, and stimulate defensive powers of living cells or destroy them, depending on the amount of radiation received. The power to penetrate is very important, because he was attempting to reach an infection situated deeply in the muscles. He pointed out that a radiologist recommending the application of X-rays would often encounter objections from a surgeon, who would state that X-rays have no action—they

could not destroy any organisms. The same physician would then explain to patients that X-rays would cause a burn. Kelly stated that the ability of radiation to exert a stimulating or destructive action on living cells, depending on the dose, was a scientific and clinical fact, beyond any possibility of question.

The discussion that followed this presentation mentioned other applications of X-ray therapy for inflammatory diseases—severe arthritis, which was identified in 1906 and diphtheria, identified in 1920. Progress in applying this treatment had been very, very slow because of the lack of scientific proof of the action of the X-rays in the



U.S. Army

Although X-ray treatment was not used to treat gas gangrene cases during World War II, the technology was certainly available, as can be seen in this photograph of a mobile X-ray unit operating in an evacuation hospital in France.

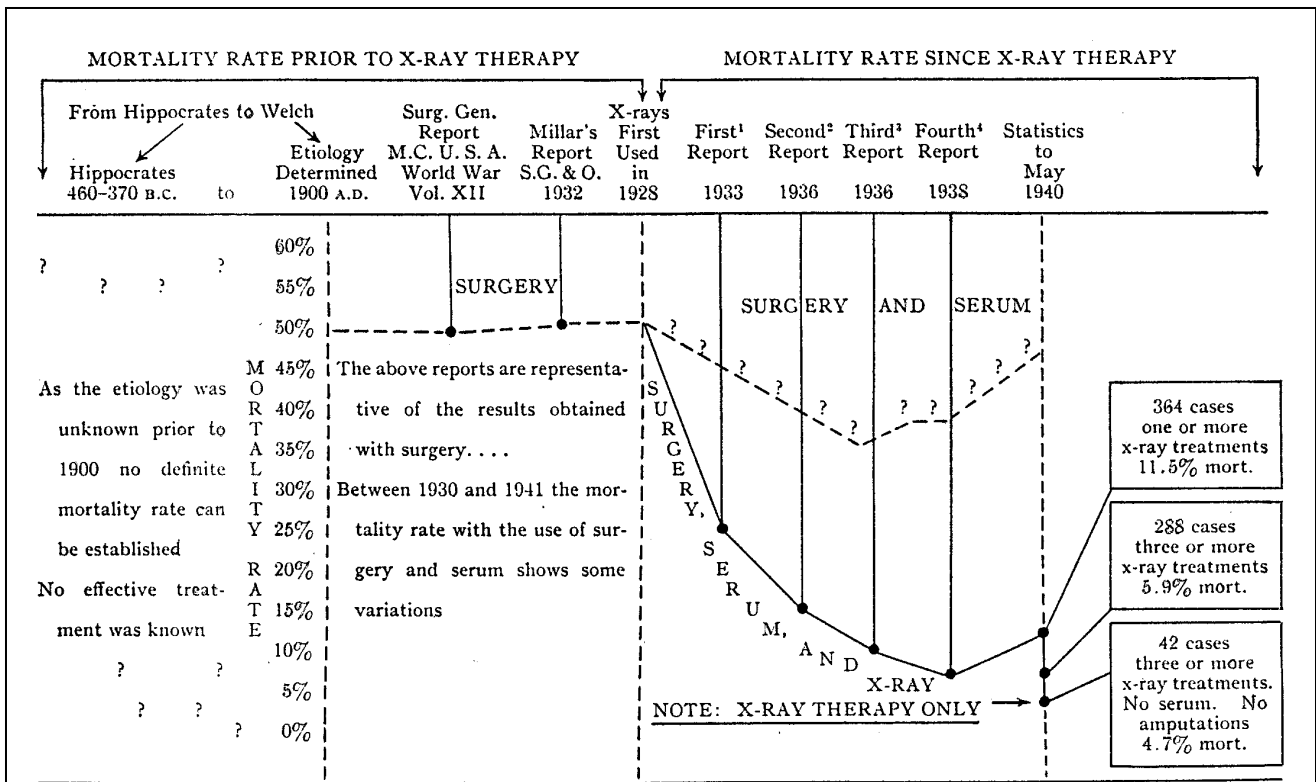


Figure 1
LOW-DOSE IRRADIATION THERAPY TO CURE GAS GANGRENE INFECTIONS

The original caption⁸ stated: End of gas gangrene as a serious infection (if X-ray therapy is used). From Hippocrates' time (460-370 B.C.) to 1900 A.D., the aetiology of gas bacillus infection was unknown and as a result the mortality rate during that period cannot be accurately determined. Between 1900 and 1928, the mortality rate was 50 percent. Since 1928, the mortality has been reduced to 5 percent by the use of X-ray therapy without serum or radical surgical measures. X-ray therapy will prevent or cure the disease.

inflammatory tissue. One success that survived criticism, Kelly said, was the treatment of acne and boils.

Radiation Therapy Success, 1928-1940

The mortality rate for gas gangrene up to 1928 had been 50 percent or higher, and that figure was attained only by the sacrifice of many arms and legs.⁸ The reduced mortality of 25 percent in the first group of eight cases, reported by Kelly in the 1931 meeting, led many radiologists, a number of surgeons, and a few practitioners in the other specialties to try this therapy. Kelly and Dowell presented the data from a total of 364 cases, during the period 1928 to 1940, before the Radiological Society in 1941.

Figure 1 shows the drop in the mortality rate. It indicated, "gas gangrene need no longer be regarded as a serious disease. The X-ray has definitely removed gas gangrene from that group of diseases

in which experimental therapy is any longer justifiable."

Kelly stated that chemotherapy had failed in well-developed cases because there was definite interference in the circulation to the infected area, and consequently the chemical did not reach the diseased tissue. The X-ray, however, had no difficulty in effectively reaching all cells and fluids in any infected area. Other ways of treating gas gangrene might be developed, he said, but there could be no question as to the status of the X-ray in the prevention and treatment of this serious infection. Since the mortality rate in cases treated with radiation was so much lower (4.7 to 11.5 percent) than that obtained by any other methods employed up to that time, Kelly suggested that those who refused to use irradiation should feel called upon to offer some explanation.

Kelly also noted that in the use of X-ray

treatment for patients with acute spreading peritonitis (inflammation of the membrane lining the abdominal cavity), the response of patients was as prompt and convincing as it was in gas gangrene.

All but 1 of the 21 published reports on the roentgen treatment of gas gangrene that had appeared in the literature up until 1941 were favorable to the use of radiation, both as a preventative and as a therapeutic measure. The unfavorable publication reported 10 deaths in 14 cases, but no details of the cases were given. Based on his assessment of the 364 cases, Kelly stated that the mortality rate in the post-traumatic cases should not be in excess of 10 percent. "Any patient, no matter how far his disease has advanced, is entitled to a trial of X-ray therapy. Patients treated reasonably early and with the correct technique will respond favorably in most instances," he said.

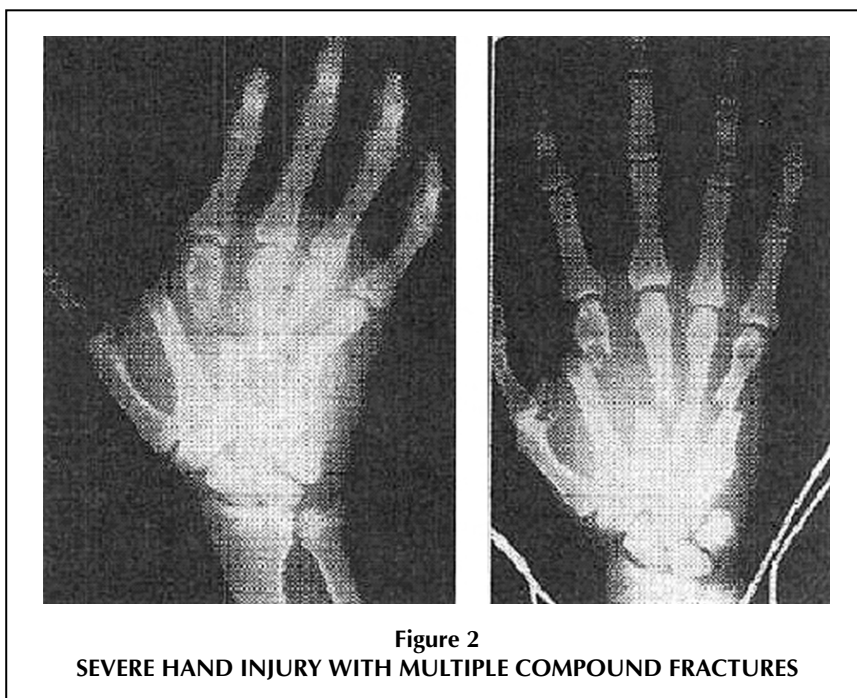
Kelly gave more details of the treatment. The incubation, after injury, of gas gangrene in 134 available cases occurred in 15 percent of the cases within 24 hours—the incidence peaking between the 48th and the 72nd hour. X-rays were used successfully by several workers to prevent the onset of gas gangrene, and it was observed that the incidence of other infections also—osteomyelitis after compound fracture in particular—seemed lessened by the use of X-rays.

Kelly did not suggest a reason for the action of radiation in preventing osteomyelitis, but if the rapidly growing organisms, such as the gas formers and the streptococci, can be kept from establishing an infection immediately after the injury, it was possible that the more stubborn, slowly growing secondary invaders would never have an opportunity to develop, as the wound might be well on the way to recovery before the usual period of incubation has been completed. The effect is prophylaxis in the same sense that cleansing the wound is prophylaxis.

Figure 2 shows a severe hand injury case, with multiple fractures and some gas in tissues (left X-ray). The same hand a few days after prophylactic irradiation (right X-ray) shows no gas in the tissue—no infection—with the hand on the way to complete recovery. The patient received antitetanus and antigas serum, but no sulphanilamide.

For treatment, Dr. Kelly and his colleagues gave 150 rad per day in two doses of 75 rad or three doses of 50 rad to the area they believed to be infected. For prophylaxis, they gave 75 rad daily in one dose. The voltage varied from 90 to 130 kV, depending on the thickness of the body part. Filtration to prevent burns increased with voltage.

In Kelly's opinion, amputation during the acute toxic phase of gas bacillus infection that is receiving adequate and proper radiation therapy has never benefited any patient in the least. Whatever surgery is indicated because of the injury should be performed, he said, but there should be no extensive removal of muscle groups or other major surgery for the infection itself during the acute toxic phase. With radiation therapy, the tissue that is destroyed during the invasive stage becomes demarcated as the disease regresses, and the dead tissue, if there be any, may be removed after the



acute toxic stage has passed.

In Kelly's judgment, there should not be more than 1 or 2 percent mortality because of deferred amputation and about the same mortality from the infection itself. In essence, he advocated a simple and effective measure to replace drastic measures that were ineffective. Previously, there had been no treatment for the infected part in gas gangrene, since amputation, or elimination of the infective area by surgical measures, can hardly be considered treatment. The area was not treated; it was simply removed. With radiation therapy, the infected part is actually treated and is removed only if it does not recover. X-ray therapy was far superior to any other method when it was available. Questionable and experimental measures of whatever character should not be substituted.

Sulphanilamide Should Not Be Used

The records of some deaths, particularly among diabetic patients, suggested that the use of "serum" (sulphanilamide, the early form of the "sulpha drugs"—the first use of the chemical antibiotics) might have been an important factor in the fatal outcome. The many instances in which serum had failed to prevent or cure the disease, while radiation therapy had been followed by prompt improvement, gave the impression that if radiation therapy was available, serum was

unnecessary. Large doses of serum after the toxin of a gas infection had damaged the kidneys appeared to be more than some patients could withstand, and urinary suppression and death ensued. The mortality rate in 65 cases without serum was lower than in 248 cases with serum.

Kelly (and others) determined that sulphanilamide and radiation therapy could not be used simultaneously with good effect. Little was known about the interaction of these two agents, but it was clear that they should not be given at the same time. Serum was not effective in stopping the gas gangrene infection and, when used simultaneously with irradiation, completely degraded the effectiveness of the radiation therapy. In fact, it seemed that the destruction of tissue was accelerated.

What Turned Success into Failure?

The experience of Dr. Kelly and others shows that ionizing radiation provides a certain and definite means of prevention and treatment of gas gangrene that should have removed it from the class of acute diseases having high mortality and morbidity. His 12-year study should have been an important basis for the promotion of the general use of X-ray therapy for inflammatory disease at the bedside, with an apparatus of adequate voltage. The curative action of the X-ray in gas gangrene should have established beyond any doubt the fact that irradiation is of value in

treating infections, because the gas infections are uniformly resistant to other treatments, but responded consistently to LDI therapy. The antitoxic effect of radiation in acute infections was amply demonstrated in treating gas gangrene, acute spreading peritonitis, surgical mumps, erysipelas (local febrile disease), and other toxic acute infections. This general reaction as well as the favorable local effect was evident to many clinicians, years before gas gangrene was treated with radiation. So why was LDI therapy ignored and discarded after the mid-1940s?

Calabrese and Baldwin addressed this question in a 2000 paper.⁹ The most critical factor was the lack of agreement over how to define the concept of hormesis and quantitatively describe its dose-response features. If radiation hormesis had been defined as a modest overcompensation to a disruption in homeostasis, as would have been consistent with the prevailing notion in the area of chemical hormesis, this would have provided the theoretical and practical means to blunt the criticism of this hypothesis.

The second critical factor pointed out by Calabrese and Baldwin was the total unawareness by radiation scientists of the concept of chemical hormesis, which had been more advanced, substantiated, and generalized than in the radiation domain.

The third factor was the major scientific criticism of low-dose stimulatory response that occurred when the United States was organizing a national research agenda on radiation that generally excluded the hormetic hypothesis. On top of this came the criticisms by the leading scientists of the 1930s, followed by the Linear No-Threshold (LNT) hypothesis of the late 1950s, which undermined the concept of radiation hormesis. These criticisms, limited in scope and highly flawed, were perpetuated over the decades by other "prestigious" experts, who appeared to simply accept the earlier reports.

These factors were then linked to a growing fear of radiation as a cause of birth defects, mutations, and cancer—factors all reinforced by later concerns over the atomic bomb. Findings on hormetic effects by Soviet scientists were either not available in the United States or disregarded.

Even in the 1940s, there were many physicians who had never heard of the X-ray as a means of prevention or treat-

ment of gas gangrene, and others who insisted that there were not yet a sufficient number of cases in the literature to establish its true status. Today, with penicillin and more advanced antibiotics, it is easy to regard the 70-year-old LDI technology as primitive.

However, the current status of gas gangrene, as outlined at the beginning of this paper, is not encouraging. Even advanced antibiotics will not reach areas where there is no circulation, and antibiotic-resistant bacteria continue to evolve and proliferate. Hyperbaric oxygen is useful, but it cannot reach deep-seated regions of infection, and the availability of oxygen chambers is severely restricted. And when we consider the enormous influence of the pharmaceutical industry and the pervasive preference for chemotherapy solutions, it is not surprising that there is still no mention at all of LDI therapy.

How Does Low-Dose Radiation Work?

How are low doses (50 to 75 rad) able to destroy invading bacteria in a living organism? (For sterilization, radiation exposure in the range 10 to 50 kGy (1,000 to 5,000 kilorad) is necessary.) Like hyperbaric oxygen therapy, ionizing radiation creates oxygen free radicals. LDI delays the cell cycle, allowing the immune kill rate to exceed the bacterial proliferation rate. But the large amount of evidence in support of the radiation hormesis hypothesis provides a very high degree of confidence that the principal action of LDI therapy is to stimulate the patient's own defenses to destroy infections and mend wounds. The likelihood of delayed cancers resulting from such small radiation doses is negligible compared with the likelihood of cancer caused by normal metabolic processes.^{1,10}

The ethics case in support of providing LDI therapy for gas gangrene can be understood by comparing it with the ethics case for local radiation treatment for cancer. Typically, a tumor volume is given 200 rad (2 Gy) per day, five days per week, for five to six weeks, and this is a universally accepted treatment; that is, the benefit/risk ratio is judged to be highly favorable. The doses in LDI therapy are much lower, and so the risk of causing a new cancer (some 20 years later) is much lower.

Moreover, while high-dose radiation decreases damage-control biosystem activity, low-dose radiation increases biosystem activity, causing lower than normal cancer mortality.^{10,11} So, in addi-

tion to curing the infection, LDI therapy reduces the risk of cancer.

The potential benefits of using low-dose irradiation therapy on gas gangrene patients are enormous. When will physicians start again to provide such treatments—and save lives and limbs?

Dr. Cuttler retired from AECL (Atomic Energy of Canada) in July 2000, and is now President of Cuttler & Associates Inc., providing consulting services. He served on the Council of the Canadian Nuclear Society (CNS) for 10 years and was its president in 1995/1996.

For the past 12 years, Dr. Cuttler has been assessing the effects of ionizing radiation on health and has drawn widespread attention in Canada and abroad to the beneficial effects of low doses. A previous article "The Significant Health Benefits of Nuclear Radiation" appeared in the Fall 2001 issue of 21st Century.

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IT'S STILL MOONSHINE

Smell of Gigantic Hoax in Government Ethanol Promotion

by Laurence Hecht

The warning signs of a gigantic hoax in the promotion of ethanol as a substitute for gasoline came into sharp focus earlier this year, as a result of investigations into the claims by government agencies about the efficiency of biofuels. The evidence is not yet conclusive, but sufficiently suggestive to warrant prompt Congressional investigation into what might be one of the greatest and most costly hoaxes perpetrated by the Cheney-Bush Administration since the selling of the Iraq War.

The leading beneficiaries of this false promotion are the major grain cartels, the large hedge fund operators, who have moved in on the boondoggle, and at a higher level, those policy interests who would take us back to an agricultural society on the imperial model. The big losers will be the American public, including those farmers and farm-state businessmen who have been suckered into one of the greatest investment swindles since John Law's Mississippi land bubble.

The entry point for uncovering this hoax were the claims by officers of the U.S. Departments of Agriculture (USDA) and Energy (DOE) that production of ethanol from corn shows a positive net energy balance of 30,528 Btu per gallon,¹ or 67 percent more than the energy required to grow, transport, and distill it, and that cellulosic ethanol (derived from switchgrass or other inputs) could provide even higher net energy returns. But deeper investigation showed that while some independent analyses, most of them of recent vintage, show a slight positive energy balance, the figures promoted by government agencies (the USDA Office of the Chief Economist, in particular) appear wildly inflated.



PRNewsFoto/Broin Companies

The Voyager Ethanol plant in Emmetsburg, Iowa. Congress should investigate the Cheney-Bush Administration's ethanol hoax.

A huge energy giveback credit is allocated for the by-products of ethanol production, the data appear selectively chosen to make the case, and the claims have been inflating over the years.

If, as the preliminary evidence suggests, the bottom line has been goosed up to make the case, the source of such probable corruption is not far to find. As one Federal official with experience in energy and pollution was quoted in the

January 2007 *Scientific American*, referring to the 51-cents-per gallon tax break for ethanol, "Congress didn't do a life-cycle analysis; it did an ADM analysis." ADM is Archer Daniels Midland, the largest of the five grain cartel giants, which has been pushing corn ethanol for more than two decades, and whose influence over the USDA is no secret.

The hoax, however, goes much deep-

er than the debatable claims for a positive net energy balance for ethanol production. No competent evaluation of the efficacy of biofuels can be carried out apart from a consideration of the overall thermodynamic efficiency of the national economy. On this matter, deliberations by Congress and government agencies have been either nonexistent or grossly lacking in competence. An observer from another Solar System, looking down on the past decades' transformations in industrial and land-use patterns of the United States, might well conclude that its inhabitants had been inhaling an excess of the vapors of that substance which the intelligent aliens would have identified in their molecular rotation spectroscopes as C_2H_5OH , or ethanol.

The expansion of the biofuels boondoggle to *cellulosics*, a leading feature of the President's 2007 State of the Union message, is now about to push us one step deeper into the "red ink" of negative net product of physical economic output. This latest bio-foolery has the added feature of driving us backward in time, toward that condition of agricultural and raw materials-based production which the American Revolution was intended to redress. We must warn the reader who would wish to simplify the issue, that the usual accountant's measures of net profitability have nothing to do with a competent analysis of the subject.

The outstanding weakness among the better-intentioned dupes of the biofuels mania has been an over-readiness to accept the narrowly defined premises of a problem, which, by its nature, cannot be solved without going beyond those self-imposed boundaries. For example, the ethanol question addresses a very limited part of the overall efficiency of our national economy—the production of a fuel for motor vehicle transportation.

In a modern, nuclear energy-based economy, the best candidates for a portable motor vehicle fuel are electricity and hydrogen: the one to recharge the batteries of plug-in electric or hybrid electric-powered vehicles; the other to power fuel cells, or to feed the combustion chambers of high-temperature ceramic turbines capable of burning hydrogen at efficiencies twice or greater



EIRNS

A Larouche Youth Movement organizer from Colombia explains why nuclear energy, not ethanol, is needed for an industrial society.

than that we can achieve with the best gasoline engines. As an interim measure, synthetically produced liquid hydrocarbons, including ethanol and methanol, may be generated by combining the nuclear-generated hydrogen (from electrolysis or catalytic cracking of water) with carbon from coal and other sources, even including a small amount of agricultural waste.

The cheapness and overall efficiency of the nuclear fuel cycle, not the energy input-output balance of the fuel produced, dictates the suitable replacement fuel for the gasoline which, by any calculation, will be in shortening supply over the next century. From a strictly thermodynamic standpoint, the energy cost of any synthetically produced fuel is always greater than the return.

That goes for all the electricity that has been generated in the past hundred years, as well as for the nuclear-generated hydrogen which will make up an important part of our future fuel mix. The efficiency of electricity, which was the most important component of the advance of physical economic productivity in the 20th Century, lay in the new *qualities* of productive capability which it brought to farm, factory, and home. That paradox should help the reader to

see the necessity of redefining the meaning of thermodynamic efficiency in physical economic rather than purely mechanical terms.

Food and Scientific Principle

As a first step, let us view this matter from a standpoint often emphasized by physical economist Lyndon LaRouche, making use of the terminology of the great Ukrainian-Russian founder of biogeochemistry, Vladimir Vernadsky (1863-1945). Let us conceive the universe in which we live as consisting of three great domains: the non-living, encompassing all that which the chemist sometimes refers to as the inorganic; the living matter, including all life and its products (the Biosphere); and finally, that unique domain, relatively new on the scale of geologic time, of the products, both material and spiritual, of the human mind (the Noosphere). Further, let us try to keep in our mind, a moving process conception of the interaction of these domains over time, from the period of the Earth's history when life existed as an unexpressed potentiality, to the development and rapid spreading of life over the whole envelope of the Biosphere, taking over the inorganic domain for its own purposes, to the emergence of the third and now dominating domain, cognitive humanity.

The negative energy balance findings for production of ethanol from corn are consistent with fundamental principles of science and physical economy, proceeding from this standpoint. For such principled reasons, even if ethanol, or some other biofuel, could be shown to exhibit a positive net energy balance from a strictly thermodynamic standpoint, it would be foolhardy to convert large portions of our agricultural economy to biofuel production, as the interested beneficiaries of this great hoax propose. Much of the confusion on this matter stems from a failure to understand the fundamental distinction between *energy* and *power* (not *power* as defined in mechanics, as work divided by time, but in the Classical sense of transformative ability: *dynamis*).

The concept of energy, as used in thermodynamics, is based on the mechanical theory of heat, the presumption that a given quantity of heat may be equated to a definite quantity of motion. Its usefulness lies in the fact that the work of all types of machines—mechanical, electrical, chemical, and heat engines—may be compared. Thermodynamics fails, however, when it comes to evaluating systems of human or natural economy. Power, in the Classical sense of the term, such as that invoked by Plato in the *Theaetetus* dialogue, means something quite different. For example, which is more powerful: an atomic bomb, or the human mind? Which, or who, created which?

In evaluating so-called biofuels, it is thus necessary to distinguish between energy and *power*. The useful *power* contained in a kernel of corn is not to be measured by the number of kilocalories or Btu's of heat that can be generated by burning either the whole kernel, or its less-energetic ethanol derivate. Thus, we come to a second paradox: In terms of raw heat energy, there is several million times more available energy in a gram of slightly enriched uranium than in a kernel of corn. Yet the corn kernel contains more *power*, because it represents a far higher degree of organization of matter. Its power to support human or animal metabolism is not only greater, but immeasurably so. (Just imagine eating one or the other, and the point may be grasped immediately.)



Brett Hampton/USDA

Switchgrass, under study here by geneticist Ken Vogel, is touted as the magical non-food substance that can produce ethanol fuel for our cars. But this, like corn ethanol, is a fantasy. It would take 13 percent of the land area of the United States to use switchgrass to supply 50 percent of current gas consumption.

Such a view helps us to fix our feet more firmly on the ground, that we may more readily grasp some basic principles which, until a few decades ago, were the common intellectual property of most our fellow citizens:

(1) The purpose of agricultural land, and its accompanying infrastructure, is to produce food. The living matter associated with the chlorophyll in the green part of plants permits the conversion of the extremely low-intensity energy flux of the Sun into this substance we cannot live without. The maintenance and improvement of this land area, its proper supply with water, power, transportation, and all the products of human invention, permit us to use this finite surface area to feed a human population of approximately 6.5 billion.

(2) Modern industrial processes require the application of power at high levels of energy flux density, in such forms as electricity, light, and process heat. For the supply of this input, we turn to nonliving processes, particularly to the atomic and subatomic regions. Here, by harnessing the work of millions of particles of extremely low mass and high velocity (or, alternatively of tiny wave packets of extremely

high frequency), we are able to produce work in the form of heat, or directly as electricity, at densities millions of times greater than the received solar energy.

The Cellulosic Fantasy

Domestic ethanol production jumped 50 percent in 2006 to approximately 5 billion gallons. Nonetheless, this made up less than 4 percent of the 140 billion gallons of gasoline consumed. Almost all of that ethanol came from corn. Already, at that level of production, the pressure is being felt on the price and supply of corn, which makes up a major part of poultry and livestock feed. In a world in which nearly 4 billion people are malnourished, the conversion of corn and cereal grain production capability to production of alcohol for burning in cars is thus clearly both immoral and insane.

The amount of agricultural land is finite. According to a calculation by University of Connecticut emeritus physics professor Howard Hayden, replacing the entire U.S. motor vehicle fuel consumption with corn ethanol would require 51 percent of the land area of the United States.

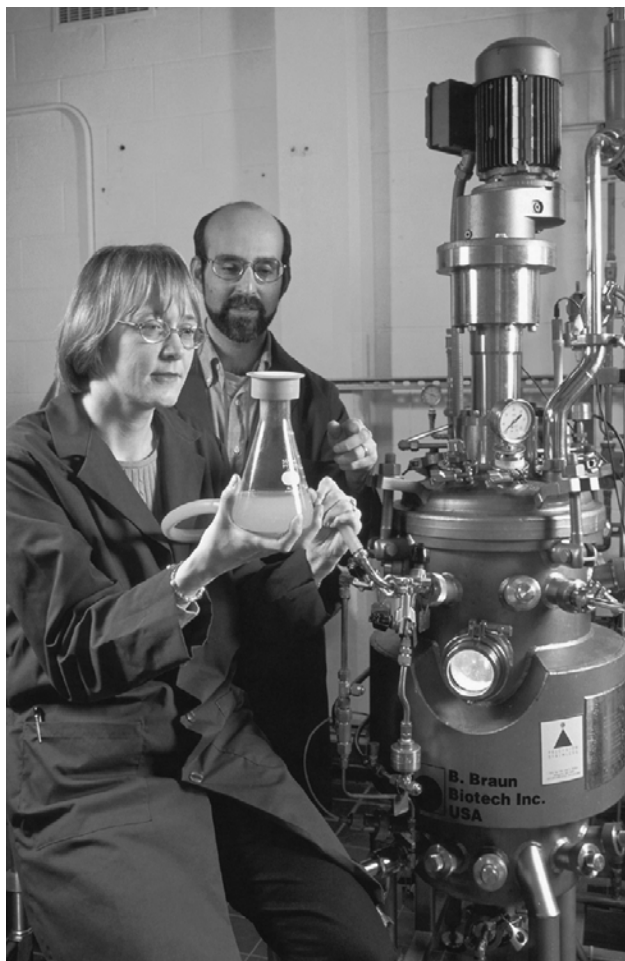
The latest fantasy among the biofools, and the just plain fooled, is that

cellulosic ethanol—ethanol distilled from non-food crops, such as switchgrass or southern pine, or from waste paper—can fill the gap. Detailed studies of such subjects as the collocation of corn ethanol and cellulosic feedstock production have been produced by the USDA and DOE.²

In one study, the optimum collection distance for production of ethanol from corn stover and from switchgrass are compared.³ The vision is of ethanol stills dotting the rural land area, drawing on the labor of hardworking peasants in a production radius of 25-30 miles for corn stover, and up to 60 miles for plants using switchgrass as a feedstock. It is the primitive agricultural dream world of John Ruskin and his pre-Raphaelites. To see more clearly why it can only bring us closer to economic destruction, let us step back and take a quick overview of the production of ethanol from a biochemical standpoint.

Ethanol, or ethyl alcohol, the same substance found in beer, wine, and spirits, is produced by the fermentation of simple sugars under the action of tiny yeast organisms. In the production of wine or apple cider, the fruit sugars are acted on by yeasts found in the air or introduced by the vintner.

To ferment corn or grain requires first breaking down the vegetable starch, known as amylose, which makes up most of the nutritional value of the grains, into the simple sugars of which they are composed. A starch is a type of complex molecule known as a polymer, a straight or partially branched chain of sugar molecules numbering in the hundreds or even thousands. In the human digestive system, the starch contained in cereal grains and other foods is acted on by two slightly different enzymes, generically known as amylase, present in the saliva and in intestinal fluids. By acting on the chemical bonds which join the molecules of



Scott Bauer/USDA

Microbiologist Nancy Nichols and biochemical engineer Bruce Dien add yeast to a bioreactor to begin ethanol fermentation from corn. Despite the propaganda and millions of research dollars, corn ethanol has a negative net energy balance of -29 percent.

the starch together, the enzymes break the polymer down into its simpler component sugars, which can then be metabolized.

Amylase, first purified from malt in 1835 by Anselme Payen and Jean Persoz, has long been used in the industrial fermentation of grains. The two types of amylase employed in producing ethanol from corn add about 4 to 5 cents per gallon to the cost.

Cellulose, which makes up most of the fibrous, structural part of plants and trees, is very similar in its components to starch, and shares the same empirical formula, $(C_6H_{10}O_5)_n$. Cellulose is the most abundant organic compound in the biosphere, containing more than half of all the organic carbon. But breaking

down the cellulose into its component sugars, which can then be fermented into ethanol, is not such an easy matter.

Only a few mammals, the ruminants and the beavers among them, can digest cellulose, and they do so not by their own devices, but by hosting bacteria which can do the digesting. In nature, the job of breaking down the great mass of cellulose fiber so the carbon within it may be reused, is given to certain bacteria, and especially to fungi.

Like starch, cellulose is classified as a polysaccharide, meaning a collection of many simple sugars. However, it is put together quite differently. The structural units are two linked sugars and they link together in chains of hundreds of sugars. Links between the hydrogen atoms of separate chains give the cellulose structure a crystal-like quality. Thousands of polymer strands might be put together in this way.

To compound the problem of getting at the sugars, the cellulose is wrapped in a sheath of hemicellulose, another polysaccharide, and lignin. The hemicellulose is a bit easier to break down but more difficult to ferment than the cellulose.

All in all, the cellulose is doing the job nature intended it for: to keep plants standing rigidly and resistant to outside attack. It is worth considering that, pound for pound, wood is stronger than steel as a structural member. Its strength comes from the ingeniously designed cellulose/lignin structure.

Organic molecules are built around the incredible versatility of tetrahedrally bonding carbon atoms in joining up, in chains, rings, spirals, and the more complex topologies of living structures. What life builds up, man's ingenuity can break down. But at what cost, and for what good purpose?

Corn ethanol gets by with its 51-cents-per-gallon Federal subsidy. To qualify cellulosic ethanol production

for this level of welfare subsidy, still requires solving a lot of problems. Heat and acid pretreatment are required to remove the lignin from the cellulose. Once freed, the cellulose must then be treated with strong acid and higher temperatures.

The dream of the cellulosic ethanol proponents is that new ways of producing cellulase enzymes might be developed. So far, it remains only a dream. Several years ago, the DOE's National Renewable Energy Laboratory subcontracted the two largest enzyme companies to try to bring down the cost of producing cellulase. In the first phase, a cost reduction of about 10- to 12-fold was achieved. But this left the price of the enzyme, optimistically calculated, in the range of 30 to 40 cents per gallon. The goal has been to bring that price down to 10 cents or less, but that has proved much more difficult.

According to Matthew Wald, writing in the January 2007 *Scientific American*, "at a seminar at the House of Representatives last September, companies complained that they could not convince a design firm to guarantee to a bank that the finished [cellulosic] plant would work."

Leading candidates for the feedstock of choice in cellulosic ethanol production include switchgrass (the native species of the North American tall grass prairies); *Miscanthus*, a tall grass of Asian origin which has gone through many trials in Europe; and fast-growing trees, such as the southern pine. Proponents argue that these species will not compete with food crops, as corn ethanol does. However, the land, infrastructure, and labor requirements for growing and harvesting don't go away.

On the R-Squared Energy blog, Robert Rapier, who studied cellulosic ethanol production at Texas A&M University, calculates that a mid-sized cellulosic ethanol facility of 50 million gallons-per-year capacity would require 860,585 Douglas firs *per year* to stay in operation. At the best possible yields of switchgrass, he calculates that the replacement of 50 percent of our current annual gasoline consumption, would require 13 percent of the land area of the United States. This is assuming that a cellulosic ethanol production plant

HOW THE USDA GOOSES ITS ETHANOL DATA

Energy use and net energy value per gallon of corn ethanol, before and after "coproduct energy credit" give-back.

Production Process	Without Give-Back	With Give-Back
	(Btu per Gallon)	
Corn production	18,713	12,350
Corn transport	2,120	1,399
Ethanol conversion	49,733	30,586
Ethanol distribution	1,487	1,467
Total energy used	72,052	45,802
Net energy value	4,278	30,528
Energy ratio	1.06	1.67

Note: Figures are weighted average of dry and wet milling process. Energy value of ethanol is taken as 76,330 Btu per gallon.

Source: Hosein Shapouri, James Duffield, and Andrew McAloon (USDA); Michael Wang (DOE), "The 2001 Net Energy Balance of Corn Ethanol" (2004).

could ever be made remotely efficient. His figure is in the same general ballpark as the one cited earlier in the article for corn ethanol. But such quantities of arable and accessible land are simply not available.

The Truth about Net Energy

For more than 25 years, competent scientific studies had shown that, when all the inputs were taken into account, it takes considerably more energy to produce a gallon of ethanol than can be derived from it. In 1980 and 1981, two panel studies by the U.S. DOE reported a negative energy return from corn ethanol production.⁴

These reports were reviewed by 26 independent scientific experts. The findings that the net energy balance from conversion of corn into ethanol was negative, were unanimously approved. Numerous investigations in the intervening decades have confirmed those results. In the most extensive study carried out recently by Dr. David Pimentel of Cornell University's College of Agriculture and Life Sciences, corn ethanol showed a negative net energy balance of -29 percent.⁵

However, according to Hosein Shapouri, the leading economist promoting ethanol at the USDA, those ear-

lier studies "are useless, because we didn't know how to make ethanol then." It took 100,000 Btu's per gallon just to process it in the inefficient plants of that time, Shapouri recently told this author.

But, Shapouri's leading opponents in the great debate over net energy balance, Pimentel and Prof. Tad Patzek of Berkeley's Department of Environmental Engineering, do not use the 1981 figures. When their estimates for the steam and electricity required to distill ethanol from corn are converted into units of Btu per gallon,⁶ their figure comes to 53,431.

Shapouri gives a figure for the energy consumed in ethanol conversion of

52,349 for wet milling and 47,116 for the dry milling process, yielding a weighted average of 49,733 Btu per gallon. The difference is hardly enough to account for the enormous discrepancy between -29 percent and +67 percent in their respective estimates of the net energy balance.

Pimentel and Patzek add in other small inputs, including the energy cost of the steel, stainless steel, and cement contained in the plant, which Shapouri has not used, and a small energy cost for treating sewage effluent. But Shapouri factors in a figure of 1,487 Btu per gallon for ethanol distribution. After all is said and done, Pimentel and Patzek have 56,436, and Shapouri 51,220 Btu per gallon for the energy cost attributable to the refining end of ethanol production. Again, the difference is minor.

A much larger discrepancy occurs respecting the energy cost attributed to corn production. Shapouri gives 18,713, while Pimentel and Patzek's data, after conversion of units, yields 37,884 Btu per gallon, more than double Shapouri's figure. The difference is 19,171 Btu, or 26.6 percent of the 72,052 Btu per gallon total energy needed for corn ethanol production, as

calculated by Shapouri.

Shapouri claims that his data are the best available from years of USDA calculations, and that Pimentel is not knowledgeable on many aspects of agricultural production. Pimentel is an entomologist, an insect specialist, Shapouri notes. But Pimentel says that Shapouri has shopped his data. He has taken the corn yields from the best-producing states, and looked for the lowest-value data for such items as the application rate of various fertilizers.

Pimentel also says that Shapouri has omitted assigning an energy value for the farm labor. Shapouri concedes that point, but says that he sees no reasonable way to assign such a cost.

One of the largest energy inputs to corn growing is in the production of nitrogen fertilizer. Almost all nitrogen in fertilizer is derived from ammonia produced by the Haber-Bosch process which takes nitrogen from the atmosphere, using natural gas as a source for hydrogen and heat. Pimentel assigned a value of 11,452 Btu per gallon for the heat energy contained in the nitrogen fertilizer used for corn ethanol production in 2003; he may have lowered the estimate somewhat in subsequent years.

Shapouri's figure from 2002 is 7,344 Btu per gallon. The difference of 4,108 accounts for 22 percent of the 18,713 Btu per gallon total energy cost which Shapouri assigns to corn production. Asked to explain his much lower figure, Shapouri says that the energy cost for nitrogen fertilizer has dropped considerably in recent years, owing in large part to the closing down of older, inefficient plants in the United States.

Shapouri says that much of the ammonia and other nitrogen compounds are now imported from newer plants in such locations as Trinidad and Tobago, where natural gas is cheap. Patzek reports that improvements in the production process have reduced the energy cost of ammonia by about one-third over the past 60 years, but the figure Patzek gives (in 2004) for the specific energy consumption of nitrogen fertilizer is still about 26 percent higher than that of Shapouri et al. in 2002. Shapouri also uses a somewhat lower figure than other authors for the application rate per hectare of the nitrogen.

The Great Give-Back

The really suspect part of the combined USDA and DOE analysis of the ethanol energy cost is yet to come, however. Even after all the differences noted so far, Shapouri's analysis results in what he calls an *energy ratio* of 1.06, that is a +6 percent net energy balance. How does that become +67 percent?

One part of the answer is to be found in an accounting program, technically known as a process simulation program, called ASPEN Plus. It was adapted by a USDA employee by the name of Andrew McAloon to apply to the corn ethanol calculation, according to Shapouri. The gist of the adjustment lies in what Shapouri et al. call the *coproduct energy credits*.

There are certain by-products of the ethanol production process, principally a substance known as distillers dried grains (DDG), and smaller quantities of corn gluten feed (CGF), and corn gluten meal (CGM). The DDG by-products have some value in preparation of animal feeds for ruminants, although they are of limited value for feeding hogs and chickens, according to Pimentel and Patzek. In any case, their preparation by other means, if they had been produced, would have taken a certain amount of energy. The argument is, thus, that an energy credit should be assigned them.

Patzek believes their energy value is zero or less, because the costs of their production, including restoration of the soil, are greater than they are worth. Soybeans, which require no nitrogen fertilizer, make a much more effective animal feed, he points out. Pimentel has generously assigned an energy credit of 6,684 Btu per gallon to the DDG by-product.

However, Shapouri et al., by means of ASPEN-Plus, have given to the by-products an energy credit of 19,167 Btu per gallon, or 26.6 percent of the total energy they had calculated for the entire ethanol production cycle!

But that's not all. Another 7,084 Btu per gallon of coproduct energy credit is allocated to the corn production and transport process. The argument is that ethanol is derived from the starchy part of the corn, and corn consists of only 66 percent starch by weight. Therefore, only 66 percent of the energy cost of corn production and of corn

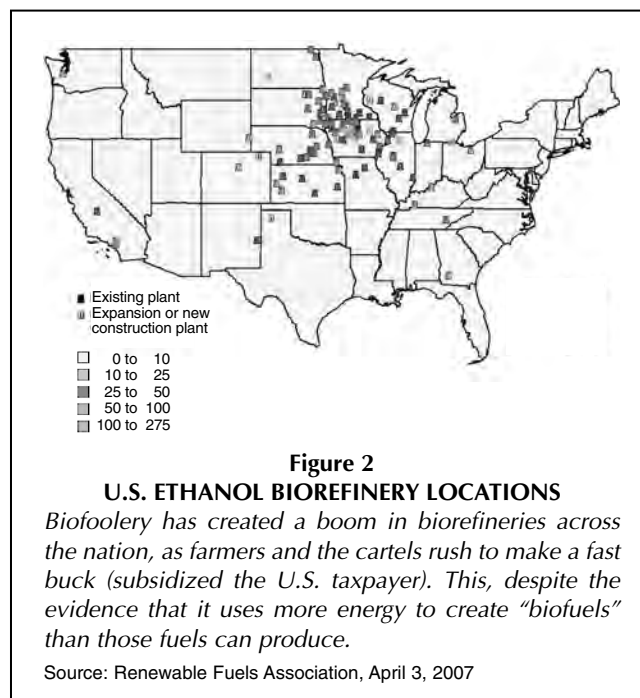
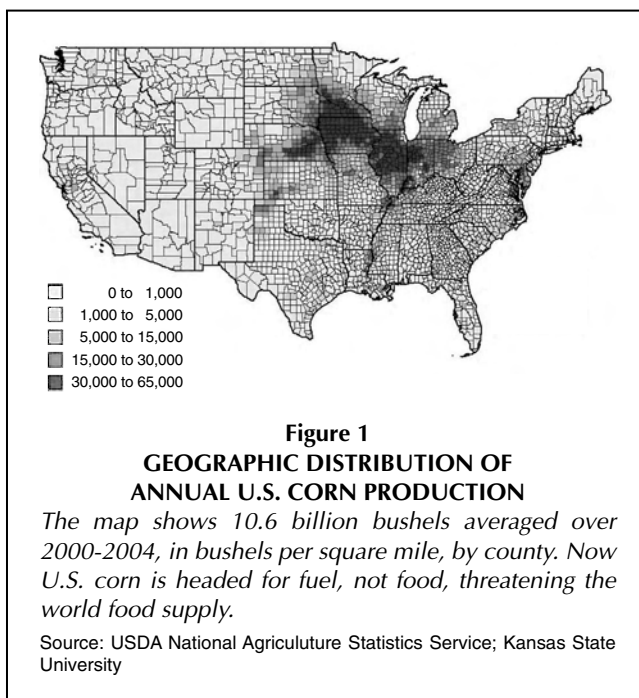
transport should be assigned to ethanol production.

It would be as if a refiner of ore with a 5 percent useful metal content were to say that 95 percent of the cost of mining and hauling the ore should be discounted. Taking into account this additional gift, Shapouri et al. achieve a total *coproduct energy credit* of 26,250 Btu per gallon. The total energy consumed in ethanol production thus miraculously shrinks to 45,802 Btu per gallon. The energy value from burning a gallon of ethanol has been measured as 76,330 Btu per gallon, and thus a net energy value of 30,528 Btu per gallon, or +67 percent is achieved!

It is already past time for our new Congress to open vigorous investigations into this giant hoax.

Notes

1. Hosein Shapouri, U.S. Department of Agriculture, Office of the Chief Economist; James Duffield, USDA/OCE; Andrew McAloon, USDA/Agricultural Research Service; and Michael Wang, U.S. Department of Energy Center for Transportation Research, Energy Systems Division, Argonne, National Laboratory, "The 2001 Net Energy Balance of Corn-Ethanol," (2004).
2. Robert Wallace, Kelly Ibsen (National Renewable Energy Laboratory, National Bioenergy Center); Andrew McAloon, Winnie Yee (U.S. Department of Agriculture, Eastern Regional Research Center Agricultural Research Service), "Feasibility Study for Co-Locating and Integrating Ethanol Production Plants from Corn Starch and Lignocellulosic Feedstocks," A Joint Study Sponsored by: U.S. Department of Agriculture and U.S. Department of Energy, NREL/TP-510-37092, USDA-ARS 1935-41000-055-00D (revised January 2005).
3. Robert Wooley, Mark Ruth, John Sheehan, Kelly Ibsen (National Renewable Energy Laboratory); Henry Majdeski, Adrian Galvez (Delta-T Corporation), "Lignocellulosic Biomass to Ethanol Process Design and Economics Utilizing Co-Current Dilute Acid Prehydrolysis and Enzymatic Hydrolysis Current and Futuristic Scenarios," NREL/TP-580-26157 (July 1999).
4. Gasohol: Report of the Energy Research Advisory Board, U.S. Department of Energy, Washington, D.C., 1980; Biomass Energy: Report of the Energy Research Advisory Board Panel on Biomass, November 1981.
5. David Pimentel and Tad W. Patzek, "Ethanol Production Using Corn, Switchgrass, and Wood; Biodiesel Production Using Soybean and Sunflower," *Natural Resources Research*, March 2005.
6. A British Thermal Unit (Btu) is the quantity of heat required to raise the temperature of 1 pound of water by 1° when the water is at its temperature of maximum density (39.1°F). A kilocalorie, the unit used in Pimentel's studies, is the quantity of heat required to raise the temperature of 1 kilogram of water by 1°C, at a temperature of 15°C. There are 3.97 kilocalories (the unit used to measure nutritional value of food, also known as the Calorie) in 1 Btu.



Biofuels Are a Policy of Famine

by Marcia Merry Baker

As of the Spring 2007 planting in the northern latitudes, the disastrous impact of the global bio-energy craze could be seen in the huge expansion of U.S. corn acreage, the plunge of world grain stocks, and price shocks all along the food chain internationally. Transportation systems, water supply, and other infrastructure are strained to the breaking point. At the same time, speculation in grain futures—"paper bushels"—on the Chicago Board of Trade, is setting records. That's the point.

The "Great Biofuels Bubble" is a swindle, and is causing vast harm. All the rhetoric about energy independence, aiding the environment, or "reviving" dying farm regions, is the come-on. Before looking at the dimensions of the damage, consider the origins of what amounts to a *policy of famine*.

To begin with, energy from biomass is far below the energy density possible and required for modern society. (An industrial economy requires nuclear energy.) Despite widespread blindness on this point, the truth is that the "energy in" is more than the "energy out" for bio-ener-

gy. This has been thoroughly documented for all kinds of biomass, from Brazilian gasohol, to Illinois corn ethanol, to the pie-in-the-sky visions of cellulosic sources. (See accompanying article.)

In the United States, during 1960-1990, a certain number of ethanol operations were kept going by the two major corn processors, Archer Daniels Midland (ADM) and Cargill, plus a few farmer-owned ventures and others, under government per-gallon subsidies for blending ethanol into gasoline. Prior to the late 1990s, less than 3 percent of U.S. corn production went into ethanol.

Then, in the 2000s, the Biofuels Bubble was launched. Under heavy pressure from certain private financial interests, and institutional corruption, governments mandated national biofuels-usage quotas. For example, in September 2005, France mandated a government quota for having 5.75 percent of fuel come from biofuels in 2008, 7 percent by 2010, and 10 percent in 2015.

In the United States, the 2005 "EPAct"—the Energy Policy Act of 2005—decreed what are called the annual

Renewable Fuel Standards for the volume and make-up of biofuel that must be blended into gasoline. EPA Acting Assistant Administrator William Wehrum summarized the facts at a Senate hearing in September 2006: "The renewable volume [to be blended into gasoline] begins at 4 billion gallons in 2006, and increases to 4.7 billion gallons in 2007, 5.4 billion gallons in 2008, and continues to scale up to 7.5 billion gallons in 2012...."

On Sept. 7, 2006, EPA issued its new rules for 2007, which introduced a new feature: a "marketplace" for buying and selling under- and over-used allotments among the entities involved in meeting the Renewable Fuel Standards.

To reemphasize the swindle nature of the national mandate process: The 2006 U.S. output of nearly 5 billion gallons of ethanol, exceeding the Renewable Fuel Standards, amounts to barely 3 percent of the gasoline used nationally, but in bio-bubblenomics, size doesn't matter. What matters, in Wall Street lingo, is that there are the necessary laws to guarantee the climate for "market reliability" and "investor security," so that biofuels

can become a safe bet for speculators and the cartel players in the game. From Australia to Britain, national biofuels usage mandates have been set.

Biofools Rush In

Thus, a huge biofuels financial bubble is now aloft, with hedge funds, equity partnerships, and banks involved, as well as the long-time ADM, Cargill, Monsanto, and DuPont agro-cartel giants, plus a few local farmer-owned ventures. Morgan Stanley owns the second biggest private ethanol company in the world, Aventine Renewable Energy Holdings, LLC. U.S. state budgets have been throwing scarce revenues into the biofuels mania as well.

In 2006, U.S. corn went as feedstock into some 115 operating ethanol distilleries, in 20 states; an additional 79 facilities are now being planned, or under construction. Iowa and neighboring Minnesota, Nebraska, and Illinois are home to the leading corn counties of the nation, and lead also in number of ethanol facilities. But new projects are talked about for many of the outlying states. Five are actively proposed right now for Pennsylvania, for example.

ADM and Cargill still lead the pack, together controlling 34 percent of U.S. ethanol capacity in 2006. As of 1995, before the boom, 73 percent of a much smaller U.S. ethanol capacity was under ADM and Cargill, but now more players are in the game and ADM and Cargill are bigger than ever. ADM and Cargill are also leading the charge for biodiesel worldwide.

In Spring 2006, a Vice President from Chevron, Patricia Woertz, became the new CEO for ADM, proclaiming that she intends to use the "oil company approach" for biofuels.

Attack on the World Food Supply

Among the most prominent shocks to the food system to date is the corn-for-tortillas crisis in Mexico, where as of December 2006, prices had spiked 60 percent! In the United States and elsewhere, prices are soaring for livestock feed—cattle, chickens, and pigs. World food relief agencies are trying to deal with the problem of skyrocketing prices for supplies. Nevertheless, at the present rate of U.S. ethanol expansion, *half* of the U.S. corn crop could be siphoned off into ethanol during 2008!

Iowa State University economist Robert Wisner calculates that if all the present and planned biorefineries in his



Corn tortillas, the Mexican food staple, went up in price 60 percent, because of the biofools grab of corn for fuel.

state come on line, 2.7 billion bushels of corn will be needed for ethanol in-state. But Iowa, the lead corn state in the nation, harvests "only" 2.2 billion bushels in a good year. Then what?

In 2000, about 6 percent of U.S. corn production went into ethanol. In 2005, this had jumped up to 14 percent of the corn crop for biofuels. In 2006, 20 percent was converted into motor ethanol, the same percentage of production that typically has gone into U.S. corn exports in recent years.

For 2007, the latest U.S. Department of Agriculture projection is that 27 percent of U.S. corn production will go to ethanol, and corn exports will decline to 19 percent. Given that the United States has accounted for some 40 percent of all corn traded worldwide, this decline automatically constitutes a major grain supply problem internationally.

The U.S. crop projections were released in the May 11 "World Agricultural Supply and Demand Estimates," the first such USDA report of the year. (In July, these reports are issued monthly, after the wheat harvest, and during the growing season for other crops). The May 11 USDA report estimates that U.S. corn acreage planted will hit 90.454 million acres this year, a jump of 13 percent over last year's 78.45 million acres, and back to the acreage of 1944, when corn yields per acre were far lower than today. Corn seed shortages

showed up regionally.

Some of this corn acreage is taking land out of soybean and wheat plantings. The USDA estimates that U.S. soybean production this year might drop by 14 percent from last year, given the switch over to corn in some states, plus other factors. Moreover, with the increase in soybeans going into biodiesel, the USDA projects that the U.S. ending stocks for soybeans at the close of the 2007 crop year, will drop by nearly half from the last period, falling from 610 million bushels down to 320 million bushels.

The plunge in ending stocks is one way to summarize the increased vulnerability of the world food supply. The May 11 USDA report projected that worldwide grain ending stocks of all kinds (wheat, rice, corn) for the 2007/2008 crop year will fall to 305.08 million metric tons, significantly below 319.79 mmt in the 2006/2007 crop year, and far below the 390.14 million metric tons for 2005/2006 ending stocks. Grain stocks per capita are at danger ratios.

The same kind of biofuels trade-offs reported here for corn and soybeans is hitting other crops and livestock around the globe. Only the particulars differ.

For example, Indonesia and Malaysia are in the throes of a mad rush to supply palm-oil biodiesel to Europe. In recent years, these two countries accounted for 85 percent of the world's supply of crude

palm oil—a key part of which met the edible oil component of the Asian diet. But now, there is a diversion to biodiesel.

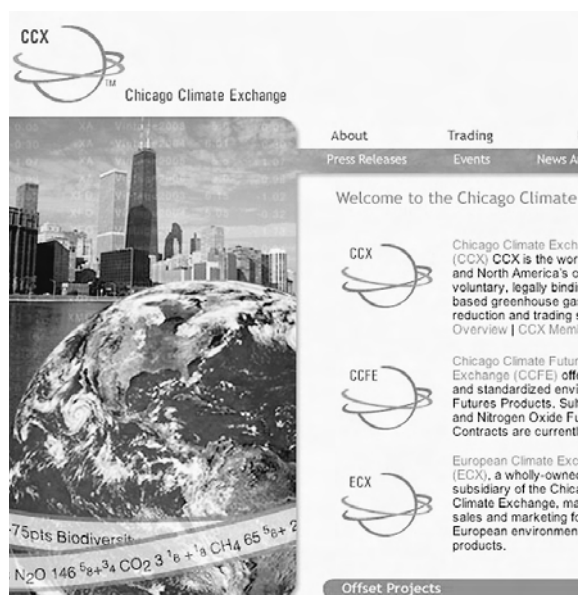
Malaysia has undergone so much deforestation for new palm oil plantations, that the nation is considered to have reached its land area limit for cultivated palm. So much new land in Indonesia is going into oil palms, or other biofuel related crops (sugar cane, jatropha), and so much of that is peatland, that gigantic clouds of smoke are created as the land is cleared and burned in preparation for palm planting.

Famine Threats

On May 8, the United Nations released a report warning of the harmful impact of the biofuel craze on the food supply, and on the poor generally. The document, "Sustainable Energy: A Framework for Decisionmakers," quantified the sweeping increases under way in bio-energy crop plantings of various kinds—palm oil, corn, sugar cane and oil seeds—dislocating local practices, and taking over new land areas. While otherwise towing the U.N. line supporting "alternative" energy for a "sustainable environment," the report states: "Use of large-scale mono-cropping could lead to significant biodiversity loss, soil erosion and nutrient leaching. Even varied crops could have negative impacts if they replace wild forests or grasslands."

Given the radical biofuel crop shifts, and low food reserves, a famine is set to happen if a bad weather episode or crop disease hits one of the world's breadbasket areas. The Australian wheat crop was cut by more than half from drought during the 2006-2007 crop season.

On the disease front, an outbreak long dreaded by wheat experts has occurred. Wheat stem rust, *Puccinia graminis*, has shown up in East Africa, first appearing in Uganda in 1999. Dubbed Ug99, the disease has since spread to Kenya and Ethiopia, and as of late 2006 into Yemen, heading into south Asia. At least 25 percent of the world's wheat lies in the spread path of the fungus.



A page from the fantasy land of the Chicago Climate Exchange (CSX) where you can buy and sell dispensations for climate emissions.

Scientists have known for decades that such a disease might occur, once some mutant microbe infected the formerly rust-resistant wheat varieties grown the world over for the past 40 years. These varieties were produced by breeding breakthroughs in the Green Revolution research centers, set up on the initiative of FDR's Henry Wallace, Vice President and Agriculture Secretary.

If monitoring and germ plasm contingency plans had been pursued, the Ug99 appearance would not spell such danger. But under the past four decades of globalization and control by agro-cartels, funding has been drastically cut for plant and animal diseases. The International Maize and Wheat Improvement Center (CIMMYT) in Mexico, home of the Green Revolution, has a chronic budget crisis. Its founder, Dr. Norman Borlaug, Nobel Prize-winning creator of the Green Revolution, has issued warnings repeatedly: "If we fail to contain Ug99, it could bring calamity to tens of millions of farmers and hundreds of millions of consumers."

Gulliver's Travels and Carbon Farming

On top of this food supply vulnerability, comes the havoc in agriculture capacity caused by the lunatic proposals for "carbon farming" and buying and selling carbon "allowances." Even Gulliver, with all his Travels, would be amazed.

The Agriculture Department, the National Farmers Union, and other institutions that should know better, are getting on board the Al Gore/Arnold Schwarzenegger bandwagon, that calls for government capping of CO₂ emissions and a system where privateers are allowed to buy and sell CO₂ "allowances."

The name of the game is "cap-and-trade." Behind it, and the Al and Arnie frontmen, are the very same financial networks that push the biofuels bubble.

The Chicago Climate Exchange (CCX) was set up in 2003 as the U.S. CO₂ trading venue, run in connection with the London-based InterContinental Exchange Inc. (ICE), whose subsidiary is the International Petroleum Exchange, infamous as the speculative venue for running up the cost of oil, by an estimated 25 percent per barrel.

The CCX/ICE in turn is connected to the European Climate Exchange (ECX). The CCX CEO is Richard L. Sandor, former head of the Chicago Board of Trade, and pioneer of all kinds of wild speculative instruments, including weather futures, and the infamous CMOs—collateralized mortgage obligations, now exploding. Among the major financial interests involved in CCX, is Goldman Sachs, a principal owner, that also in 2004 set up Al Gore's very own hedge fund in London, Generation Investment Management.

The participating members of the CCX, which is running as a pilot project for being a full-scale CO₂ exchange include the Iowa Farm Bureau and Kentucky Corn Growers Association, approved to verify farm carbon "offsets" for trading. The USDA explains how the carbon trade works for farmers in its promotional brochure, "Growing Carbon: A New Crop That Helps Agricultural Producers and the Climate Too." It states that credits can be given "to agricultural producers who increase their stores of carbon in the soil or in trees. Producers can then save the credits or sell them to others (for example, to electric power companies) that want them in order to offset their own greenhouse gas emissions."

Why would farmers, most of whom know better, go for the green claptrap on CO₂, or biofuels? For the green. The USDA brochure says outright of carbon trade, "It could also create opportunities for farmers to supplement their income."

Relative to their costs of production,

farmers everywhere have been consistently *underpaid* for their output for decades, by the cartels dominating “free” (rigged) trade. Even the much publicized 2007 run-up in the futures price of U.S. corn to \$4 per bushel, double the price of 18 months ago, doesn’t cover the farmer’s cost of production, for which a parity price of \$7-8 is required.

Yet, for the family farmer who produces livestock, and gets underpaid for his meat, \$4 a bushel feed-corn is a killer. This typifies the interconnectedness throughout the farm/food situation, which has been undermined by years of policies serving low-cost globalization, not the interests of national food security. “Ag-flation” is not the cause of rising prices for food and other costs-of-living. Today’s hyperinflation is across the board, associated with the blowout of the financial system.

If the biofoolery policies are allowed to continue, the swindles, the science hoaxes, and the physical economic effects add up to a *policy of famine*.

Marcia Merry Baker is economics editor of Executive Intelligence Review.

Ampère

Continued from page 55

of the 1845 Gauss-Weber correspondence shows that Gauss had already entertained the idea of electrical waves in the ether, but rejected it only on the grounds that a “constructible representation” of the phenomena was lacking.

Riemann recognized the deep significance of the 1855 Weber-Kohlrausch experiments, and in an 1858 paper, “A Contribution to Electrodynamics,”⁶ whose publication was suppressed by Rudolf Clausius, Riemann formulated a relativistic wave theory, based on a concept of retarded propagation of potential.

Whoever should suppose that Maxwell’s cleverness of physical-geometric insight surpassed Gauss and Riemann in this respect would surely be unserious. The problem lay not in formulating a geometric picture of wave propagation, but in resolving the underlying epistemological and ontological paradoxes, which had

6. Bernhard Riemann, *Collected Papers*, translated from the 1892 edition by R. Baker, C. Christenson, and H. Orde (Heber City, Utah: Kendrick Press, 2004), pp. 273-278.

been buried by the promoters of the Newton hoax. These were to erupt again as the crises in physics around the paradox of wave versus particle, the imposition of an acausal, statistical interpretation of atomic phenomena, and its extension into the nuclear and subnuclear domain. The solution to such problems lies outside the realm of mathematical physics *per se*, at least as so narrowly conceived today.

A rebirth of the spirit of Nicholas of Cusa, Johannes Kepler, and Gottfried Leibniz, the founders of all modern science, accompanied by a conscious, joyful, and determined overturning of the Sarpi-Newton hoax will accomplish that task.

The treatise, which now appears for the first time in English, was first published in Leipzig in 1846 on the 200th anniversary celebration of the birth of Gottfried Leibniz. The translation is the result of an 1996-97 collaboration of the late Susan P. Johnson and Laurence Hecht. Prof. Andre Koch Torres de Assis of the State University of Campinas in Brazil recently completed the work of equation editing and reviewing the entire manuscript.

21st CENTURY SCIENCE & TECHNOLOGY

- Jerry M. Cuttler, “The Significant Health Benefits of Nuclear Radiation,” Fall 2001
- James Muckerheide, “It’s Time to Tell the Truth about the Health Benefits of Low-Dose Radiation,” Summer 2000
- Dr. Theodore Rockwell, “Radiation Protection Policy: A Primer,” Summer 1999
- Zbigniew Jaworowski, “A Realistic Assessment of Chernobyl’s Health Effects,” Spring 1998
- Jim Muckerheide and Ted Rockwell, “The Hazards of U.S. Policy on

Low-level Radiation,” Fall 1997
Radiation experts argue that current U.S. policy of a “linear no-threshold” approach to radiation damage has no science behind it and is wasting billions of government dollars in clean-up that could be spent on real health benefits.

- Sadao Hattori (interview), “Using Low-dose Radiation for Cancer Suppression and Revitalization,” Summer 1997

A discussion of Japan’s wide-ranging program of research into the health effects of low-dose radiation.

- T.D. Luckey, “The Evidence for

ARTICLES ON RADIATION and HORMESIS

Radiation Hormesis,” Fall 1996

A comprehensive review of the evidence of the beneficial effects on health of low-dose radiation.

- Zbigniew Jaworowski, “Hormesis: The Beneficial Effects of Radiation,” Fall 1994

In 1994, the United Nations Scientific Committee on the Effects of Atomic Radiation, after 12 years of deliberation, published a report on radiation hormesis, dispelling the notion that even the smallest dose of radiation is harmful.

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Resurgent Tuberculosis: Deadly Disease of Globalization

by Christine Craig

Two epidemiological reports released in the last few months on the extent of extensively drug resistant tuberculosis (XDR-TB) in South Africa, are critical warnings of the global threat of this virtually incurable disease, especially in conjunction with its “companion” ailment, HIV/AIDS.

TB in any form is not some rare, exotic ailment, but an illness whose onset and transmissibility have long been understood. With decent infrastructure and living conditions, TB could have been contained and driven back to almost nil incidence. However, with the last three decades of international decline in economic conditions, affecting concentrations of people in Africa and Asia, and in localized areas in the Americas and Europe, the resurgence of TB, with its deadly mutations, was predictable.¹

On Sept. 16, 2006, the Department of Health for South Africa issued a horrifying report on the presence of XDR-TB,² including the situation in KwaZulu-Natal. Certain patients at the Church of Scotland Hospital in Tugela Ferry were found, in the Fall of 2005, to be infected with a strain of TB not responding to any treatment. A survey over the following 12 months, turned up 53 patients, almost all co-infected with HIV, who were suffering from untreatable TB which, in the immune-compromised patients, was quickly fatal. All but one of the 53 died within three weeks of diagnosis. Those 53 victims represented 16 percent of all confirmed cases of XDR-TB globally during 2006.

This bombshell report conjured up images of a catastrophe in the making in the AIDS-wracked areas of South Africa, precipitating a flurry of meetings among international health professionals, and leading to the creation of the World Health Organization (WHO) Global



Pieter Brueghel's "The Triumph of Death" (detail, 1560), shows the toll of the White Plague (what we call today tuberculosis) in Europe.

XDR-TB Task Force, which convened in October to address the threat of untreatable TB in the age of HIV.

The Global XDR-TB Task Force found, to its horror (but no great surprise) that, in the renewed war against a strengthening foe, the ammunition was low, and the supply lines were cut. Although warnings had been out since the early 1990s that multi-drug resistant (MDR) TB was a rising threat, as evidenced by the well-documented outbreaks in the United States and in Eastern Europe during the late 1980s, no agencies had really taken it seriously as a global danger at the time.

XDR-TB is now considered endemic in the KwaZulu-Natal province of South Africa. In the January 2007 issue of *PLoS Medicine*, J.A. Singh et al. presented a truly frightening view of the situation.

More than 30 new cases are detected each month, with a total of more than 300 cases, and the disease has been reported in 39 hospitals, plus other areas of the province. And that is just the official tally, which most certainly understates the case, as many of the poor never seek medical help.

The authors note: "In recognition of the global threat posed by these factors, on September 9, 2006, WHO urged a response to the outbreak akin to recent global efforts to control severe acute respiratory syndrome (SARS) and the bird flu...."

Europe's White Plague

That the Western world would be so shocked and surprised by this turn of events is remarkable in itself, considering that, just two centuries ago, tuberculosis was so virulent in Europe that many

feared it would destroy Western civilization. The list of artists, philosophers, and scientists who suffered or died from TB is endless, including Friedrich Schiller, Percy Shelley, Bernhard Riemann, John Keats, and Vladimir Vernadsky.

It is estimated that in 1800, the death rate per year from tuberculosis in Western Europe (and in urban North America) was 1 percent. At the peak of the long epidemic, perhaps 25 percent of Western Europeans died of tuberculosis. There was no cure for the disease, nor was the causative agent known at that time.

And yet, over the next two centuries, “consumption” (as it was known) lost its grip on the European continent, slowly and steadily receding, even in the absence of any satisfactory medical treatments for the disease. Those with active disease were still very likely to die, but fewer were getting active disease.

It has been just 125 years since the famed bacteriologist and Göttingen-trained physician Robert Koch identified and characterized the minuscule tuberculosis bacillus in his home laboratory in Berlin, in 1881, proving it to be the source of the disease, and giving hope that the TB leviathan then devouring the European populace, could be brought down by science.

It has been almost 100 years since the discovery of the only vaccine ever developed against tuberculosis—the Bacille Calmette Guèrin (BCG) vaccine, based on a highly attenuated *Mycobacterium bovis* strain—a vaccine found to give some protection to children against the gruesome childhood killers, miliary tuberculosis and tubercular meningitis.

It has been only some 60 years since the development of the first effective antibiotics against tuberculosis: streptomycin and para-amino salicylic acid (PAS), discovered by Selman Waksman and Jorgen Lehmann, respectively, around the end of World War II.



Robert Koch (1843-1910) discovered the tuberculosis bacillus using a novel staining procedure. He then proved it to be the infective agent in tuberculosis using now-classic animal and bacterial culture experiments.

By 1960, a team led by Dr. John Crofton of Edinburgh, had successfully tackled the recalcitrant tuberculosis problem in Scotland with a remarkable protocol using triple-antibiotic therapy in an 18-month-long treatment regimen, which could successfully cure even advanced pulmonary tuberculosis cases caused by drug-resistant strains. And, under the joint control of the British Medical Research Council and the WHO, trials of Crofton’s methods had been carried out in Madras, India among the poor—with astounding success.

Policy makers, including scientists, began to believe that TB could be tackled by drug technology alone, even without costly investments in economic development and public health infrastructure!

A mere five years later, tuberculosis had already been dropped from courses at the Harvard School of Public Health,

a disease deemed no longer important in the training of future health-care professionals. Science had won, and tuberculosis, long the scourge of Europe and the U.S., receded from the consciousness of the populace (Figure 1).

The world didn’t really take notice of tuberculosis again as a global problem until the second half of the 1980s, when the long trend of TB incidence-decrease in developed countries was shattered by a sudden upward tick in notifications, noted most strongly in the United States and in post-Soviet Eastern Europe. The situation was documented in great detail in the United States by outraged public health professionals, especially in New York City, where most of the increase was occurring (Figure 2).³

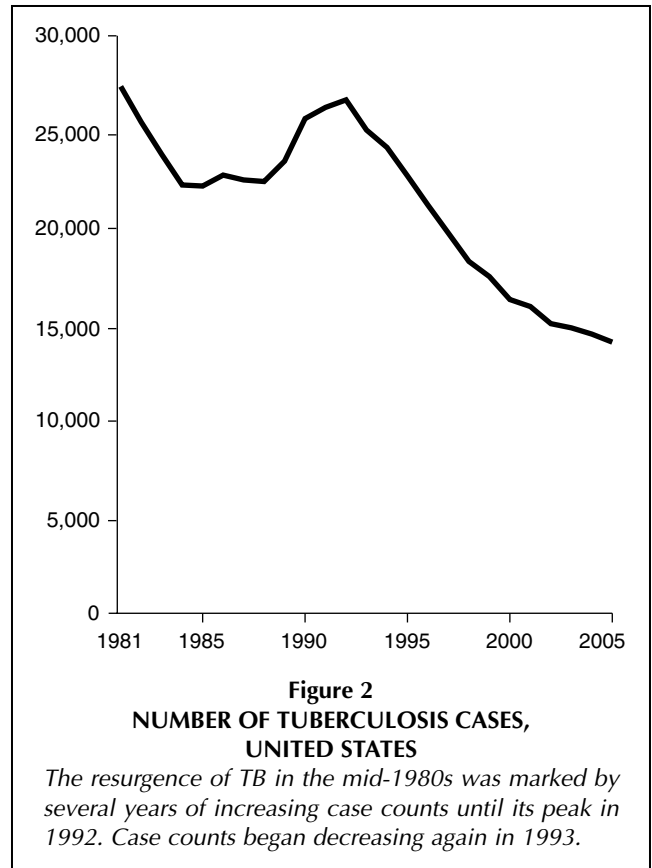
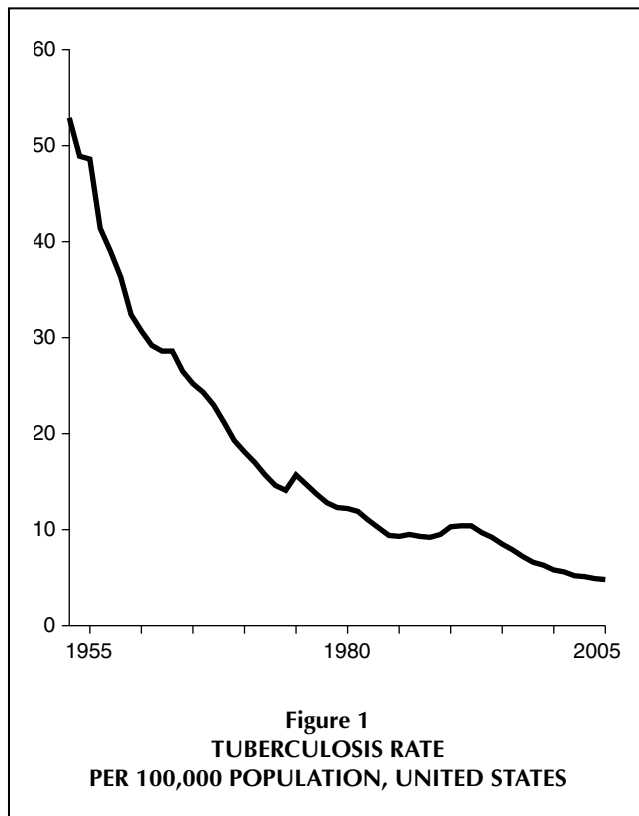
The Nature of the Beast

Tuberculosis is usually caused by *Mycobacterium tuberculosis*, an ingenious and insidious organism: a minuscule bacterium hardly bigger than a virus, surrounded by an impervious waxy coat. In many of its features within the host

body it acts similarly to the Human Immunodeficiency Virus (HIV), secreting itself within immune cells called phagocytes, the very cells that would otherwise seek it out and destroy it.

Within the phagocyte, the tubercular bacillus hides in the central vacuole, protected from chemical destruction by its waxy coat. Here it grows and reproduces very slowly, and is spread with the phagocytes throughout the lymphatic system. Most often, the disease affects adults in its pulmonary form. Children are often afflicted with primary infections affecting the lymphatic system or other organs, including a rapidly fatal systemic form called miliary tuberculosis.

During the host’s first (primary) infection with TB, a battle with the immune system ensues, and, almost always, the immune system wins, at least in the short term. The infection becomes “latent.”



Only 5 percent of primary infections go on to become active diseases within five years, while the lifetime risk of active infection developing is 10 percent *on average*. Unlike some other disease-causing organisms, however, the immune system's reaction to the TB germ does not necessarily confer a lasting immunity on its host. A primary infection which has gone latent does not preclude a reinfection with another TB organism at a later date.

The latent infection is a time-bomb within the host. Under adverse conditions leading to a weakening of the immune system, a latent infection can and does break out into active disease. Undernourishment, stress, injury, coinfection with other diseases, age, drug or alcohol abuse, lung silicosis—any of these bodily insults can tip the scales in favor of the TB bacterium, leading to a potentially fatal and highly infectious illness.

Each active infection (which can persist for years if untreated, especially in the pulmonary form) provides many opportunities to spread the disease.

One active TB case under conditions of overcrowding and poor ventilation, can infect whole families, school classes, military platoons, homeless shelters, prison cell blocks, and hospital wards.

Such active pulmonary disease must be detected by microscopic examination of sputum samples, followed by drug sensitivity testing of cultures, a procedure which, at present, can take many weeks.

It has been estimated that perhaps one-third of humans on the planet have been infected with TB. That's over 2 billion human souls carrying little time-bombs around in their bodies ready to explode into action when the scales tip in the balance of power. It is this complex and long-lasting interaction between host, invader, and physical and social environment, that determines the imprint of tuberculosis on any human society. In fact, the burden of tuberculosis within any human social group could be considered a rough measure of the social health of that grouping.

Problem of Microbial Resistance

"It is a sad reflection on society's incompetence that, more than 30 years after the methods for cure and prevention were evolved and before the advent of the HIV epidemic, there were already more patients with active TB in the world than there had been in the 1950's."

This was the comment of Dr. John Crofton, in the forward to his 1994 medical monograph, *Clinical Tuberculosis*.

We are presented with a paradox: On the one hand, even before the advent of antibiotic treatments or vaccination for TB, the disease was steadily declining in previously devastated areas of the world. On the other hand, decades after the advent of effective treatment strategies for tuberculosis, there are alarms sounding that TB might be getting out of control. There are several reasons for this, some more complex than others. On the surface, the easy answer is microbial resistance, a phenomenon as old as antibiotics themselves.

Briefly, resistance to antibiotics and

similar agents comes about analogously to the way humans become biologically resistant to diseases. Just as tuberculosis or bubonic plague will kill off susceptible individuals, leaving a population more resistant to the diseases, so do antibiotics. Just as some of these resistance factors in humans are inheritable, and passed on to offspring, so too with microbes within the body.

When we attack a disease by administering antibiotics, the very susceptible microbes are soon dead, leaving an altered population of microbes less affected. These are the microbes now reproducing. With continued treatment, most of these can also be killed, leaving the immune system to mop up the stragglers. If, however, treatment is removed early, a large population of more resistant microbes remains in the body. These can be spread to others who, if treated with the same antibiotic, might not be cured. And so the cycle goes.

Microbes have many ways to accumulate resistance factors, including mutations and horizontal gene transfer among various organisms. The almost inevitable end result is: Antibiotics become less effective over time, and must be replaced. Resistance to penicillin is a familiar example.

The problem is much worse with tuberculosis, because TB is much harder to kill within the body. One drug alone is ineffective in most cases, as was found early on with streptomycin, one of the early "miracle drugs" for tuberculosis. Streptomycin would knock the disease down, but it would come back, and was then untreatable with streptomycin.

Clinicians found out the hard way that it took three different drugs, administered religiously over 18 months, to cure tuberculosis. This regimen, developed in the late 1950s in Scotland, became the foundation for early WHO tuberculosis control. The rationale for using three drugs was: Organisms resist-



P. Viro/WHO

A tuberculosis patient in Delhi, India, undergoing a World Health Organization-approved treatment.

ant to one or two of the drugs would still be killed by the third. Furthermore, one drug worked better early in the infection, whereas another worked best later on.

Inappropriate Treatment

This approach was highly effective in treating individual patients, and was successful in certain areas on a population level. Hence, the complaint, quoted above by Dr. Crofton, one of the developers of triple-antibiotic therapy. Why was tuberculosis still such a big problem in the world, given a highly effective therapy capable of curing almost all tuberculosis? The short answer is inappropriate treatment, which hides a host of sins.

Drug resistance in tuberculosis strains is basically caused by poor implementation of TB control programs. This can include poor drug supplies or quality, poor record-keeping, inadequate treatment regimens, and non-compliance by patients. It can also include poor infection-control protocols in hospitals, and lack of laboratory testing facilities capable of identifying resistant strains in a timely manner. The problem boils down, in other words, to lack of an effective health-care infrastructure.

The gold standard of treatment, developed by 1960, included triple-antibiotic therapy for 18 months. Later research led to fine-tuning the therapy to intermittent

regimens for six months using four drugs. Directly observed treatment was an important part of that strategy, to ensure compliance by patients. Treatment would be done on an outpatient basis, because poor families could not be without breadwinners for such long periods. Hospitalization was impractical.

In several test programs in Asia and Africa, it was shown by the British Medical Research Council tuberculosis group that, with proper drugs and well-designed, well-implemented programs, managed rigorously by out-

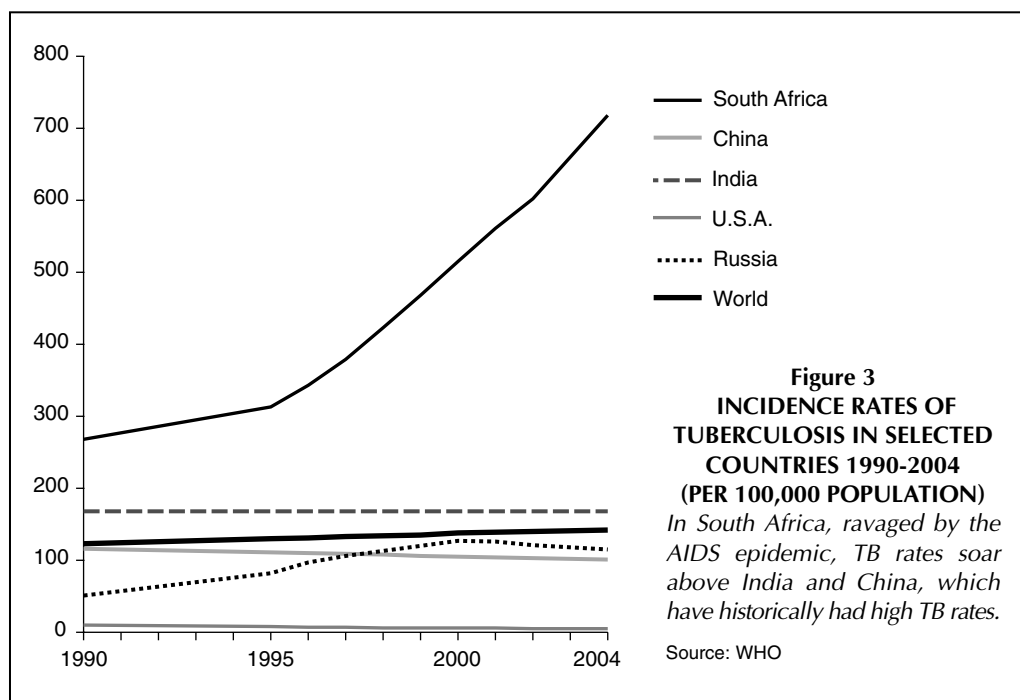
side agencies such as themselves, even poor countries could control TB.

Within a decade, however, WHO was not only slashing its own TB program budget and programs, but was trimming away at the treatment methodologies which it had helped develop. It was found much cheaper to give just one drug, isoniazid, for a shorter period. This worked for many people with relatively uncomplicated tuberculosis, but its frequent failure led to widespread isoniazid resistance. Meanwhile, Britain's premier BMRC tuberculosis unit itself was shut down by 1986, a victim of Prime Minister Margaret Thatcher's cost-cutting measures.

The developed world basically turned away from the poor countries, leaving them to their own devices. The inevitable result was that tuberculosis programs became a shambles. During that era of indifference, the heavy-hitter in the tuberculosis comeback quietly joined the fray in Africa. Human Immunodeficiency Virus, or AIDS, began, largely unnoticed, to spread throughout sub-Saharan Africa, and rising tuberculosis cases mirrored its rise.

TB: Into Africa

Tuberculosis has exacted a stiff toll in South Africa over the last 125 years. Before the advent of European settlers, and later, Asian workers, the population groups appeared to have had little experience with TB. Then came the



positive patients in the region die, not of AIDS, but of tuberculosis, and the prevalence of HIV in incident TB cases (in South Africa) is as high as 60 percent (Figure 3).

An example of the synergy between HIV and tuberculosis can be seen in TB incidence in the South African gold mines. According to mine statistics, TB incidence in the mines was stable at about 1 percent per year up until 1990, whereupon incidence rates began to rise in conjunction with numbers of HIV-positive workers. It has now reached over 4 percent—a fourfold increase in just over a decade.

When you add to the

discovery of diamonds in Kimberley, and later, gold on the Witwatersrand. To work the mines required cheap labor.

Young African men were recruited not only from South Africa, but from populations even up into the Tropical zone. These disparate groups were brought together into a few, very concentrated locations run by European managers and foremen, and packed like sardines into dorm compounds, where they lived for months with deficient diets, deficient wages, and exhausting labor, with little exposure to the Sun, under dangerously primitive mining conditions.

These workers had no families with them. After a few months they presented with scurvy, syphilis, and tuberculosis, whereupon the mine managers mandated that all sick “natives” should be sent back whence they had come, to die or heal. This constant stream of migrations to and from the mines efficiently spread all the communicable diseases incubated in the mining environment to all the home villages of the laborers, infecting wives, families, neighbors, and so on.

Such policies remained in place until a few decades ago. The endless flow of recruited black Africans were, in effect, used up like coal, to stoke the engines of the mines—a primitive accumulation of

human resources. These were the very circumstances upon which tuberculosis thrives.

Tuberculosis, having been seeded throughout an entire region of the continent, the far-flung populations began that dance so well known to 18th Century Europeans: The disease ebbed and flowed with the circumstances of the people, advancing with famine and war; receding with peace and plenty; but always reseeded with returning migrants from the mine or manufacturing that built up around the mining industry.

TB in the Era of HIV

If the WHO had not mothballed most of its TB program throughout a good part of the 1970s and 1980s, including its regional surveillance programs, it would have noticed the ominous increase in TB incidence in certain areas of Africa, and probably caught on earlier to the new disease that was behind its increase—HIV.

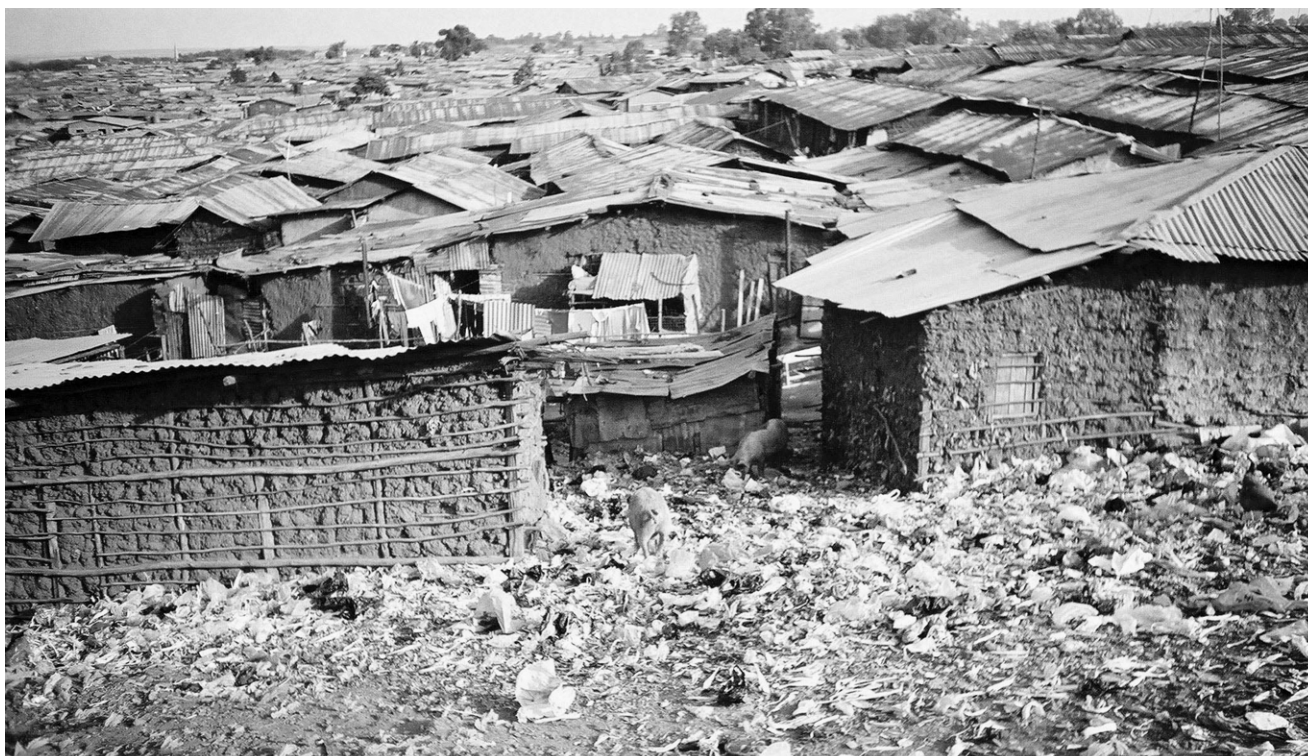
By the time WHO began to pay attention, HIV had gained a strong foothold in sub-Saharan Africa, which has now become a stranglehold. Because TB had earlier been spread widely throughout sub-Saharan Africa as the result of colonial labor policies, there was a large reservoir of smoldering latent infection ready to flame into active disease when HIV invaded the body’s immune system. In fact, more than 40 percent of HIV

mix the poverty, economic underdevelopment, and lack of health-care infrastructure in the high-HIV-burden countries of Africa, it is not hard to imagine that attempts to treat tuberculosis in HIV-positive patients (a much more complicated task than simple pulmonary tuberculosis), would lead to the development of resistant strains which could be easily spread in primitive hospital settings.

The existence of supplies of second-line tuberculosis drugs in areas of South Africa has led to their use to treat tuberculosis cases resistant to first-line drugs. Failure to cure with these drugs has led inevitably to the XDR-TB upsurge among the HIV-positive populace.

Drug-Resistant TB in Russian Prisons

One of the other main locales for re-emerging tuberculosis has been the Russian Federation. With the post-1991 fragmentation of the Soviet Union, and the dismantling of the Soviet system in favor of looting of the public coffers by private corporations, the huge public-health system was looted and dismantled as well. What medical treatment capability remained was put on a pay-to-play footing, at the same time that the populace, long used to guaranteed employment of some sort, was left with rising unemployment and falling wages, and dismal prospects for the future.⁴



Marie Huchzermeyer, WHO

One billion people worldwide live in urban slums often lacking even basic water and sanitation requirements.

Much of the increase in tuberculosis in Russia since the fall of the Soviet Union, can be attributed to the very efficient spreading mechanism provided by the Russian penal system. Russia has the highest rate of incarcerations in the world (the United States is second), with 630 prisoners per 100,000 population. This comes to more than 1 million prisoners total—and one-tenth of them are infected with TB, according to a 2002 study by the Swiss Tropical Institute, titled, “Sentenced to Die? Tuberculosis Control in Prisons with a Focus on the Republics of the Former Soviet Union.”

TB rates in the prison system are estimated to be 40-50 times those experienced in the civilian population. And at least 20 percent of prison TB cases are multi-drug-resistant-TB—two to four times the civilian rates. Fully 80 percent of detainees are estimated to harbor latent TB, and perhaps 80 percent of prison deaths can be attributed to the disease.

Russian prisons are notoriously underfunded and overcrowded, with poor food quality, poor ventilation, and primitive health services. Most of the incarcerated are young males, many of whom

become infected while awaiting trial, even before being convicted of a crime. They are unlikely to be eligible for treatment until and unless they are convicted. These unfortunates are warehoused in incredibly cramped pre-trial detention centers, often for many months.

Each year some 300,000 prisoners are released into the general population, and perhaps 30,000 have active tuberculosis. More than 6,000 have MDR-TB. These people will take their diseases back to their towns and families, seeding the countryside with forms of tuberculosis unresponsive to most of the drugs available or affordable within the Russian Federation.

According to a 1999 report produced by the Harvard Medical School, “The Global Impact of Drug-Resistant Tuberculosis,” the breeding of multi-drug-resistant strains by the prison system is caused by both the high burden of primary and reactivated TB in the prisons, plus poor and incomplete treatment of the infected prisoners, including those released uncured into the general population. The result is many thousands of cases of TB which remain sputum-smear positive and infectious

long after initiation of therapy with first-line drugs.

Only highly supervised and expensive second-line drugs would cure these cases, and those aren't generally available, especially for the poor and unemployed.

Meanwhile, waiting in the wings is the specter of HIV, spreading quickly among the growing population of intravenous drug-users, and beginning to spread to the general population through sexual contacts. The rate of increase of HIV in the Russian Federation is one of the highest in the world, although the percentage of people affected is still small (see Figure 4). If HIV moves significantly into the prison system, the deadly synergy of HIV plus TB will be catastrophic.

To get an idea of the power of that synergy, one need only look back on the New York City multi-drug-resistant-TB epidemic of the mid-1980s, which was partially spawned in the prison system. It took more than \$1 billion and several years to stamp out the small epidemic of a few thousand cases in one major city—the wages of the sins of deliberately taking down the health-care system in the city, and dismantling social services in

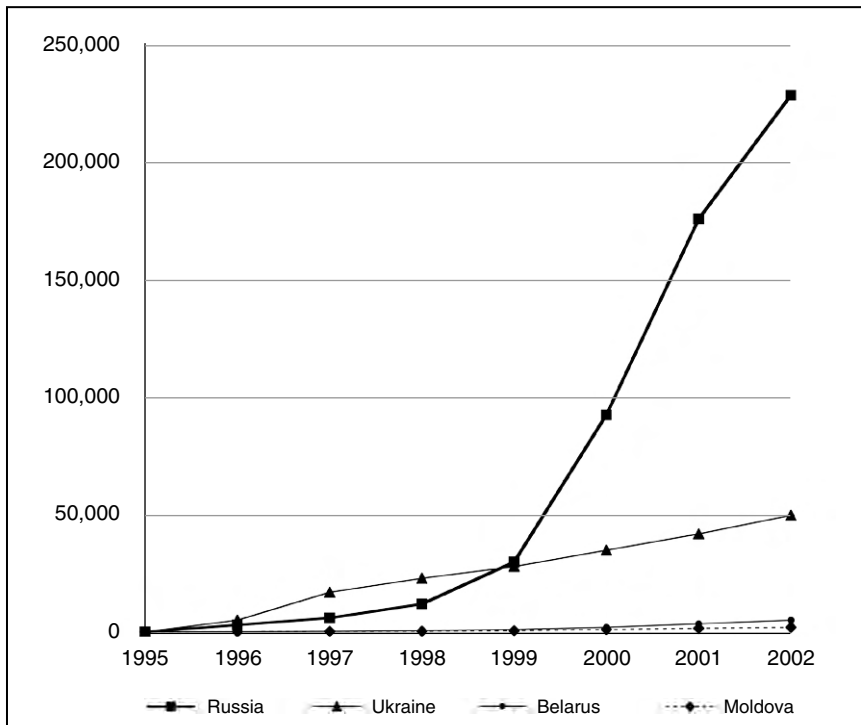


Figure 4
CUMULATIVE HIV CASES IN RUSSIA, UKRAINE, BELARUS, AND MOLDOVA, 1995-2002

Cumulative cases of HIV in Russia have far outstripped those of other former members of the Soviet bloc. As in Africa, this situation is a powderkeg which could ignite an explosion of untreatable TB cases.

Source: U.N. Development Program

general, in the name of fiscal austerity.

In March 2006, a thorough historical epidemiological study was published by the *American Journal of Public Health*, carried out by New York City disease experts, of the dramatic increase in death rates from TB and other afflictions (AIDS, hepatitis, syphilis, and drug abuse, from 1979 to 1993). The study showed that the increase in deaths was a direct result of the 1975 austerity initiated by what was called Big MAC (Municipal Assistance Corporation). This banker-dictated plan drastically reduced funds for hospitals and public health.

Given the present state of the Russian economy, with the major loss of the public-health sector already accomplished, whence would come the enormous resources necessary to quell a major multi-drug-resistant-TB flare-up in the Russian prison system radiating out to the country at large? And how far beyond the borders of the Russian Federation would the epidemic radiate?

Prospects for the Future

For HIV-positive people exposed to XDR-TB, the future is grim: death within weeks, millions at risk. There are no new drugs ready to roll out, no vaccines we can fly in to save the day. The last new class of drugs with useful anti-tubercular activity was discovered decades ago. The only vaccine is almost 100 years old.

However, many HIV patients can be

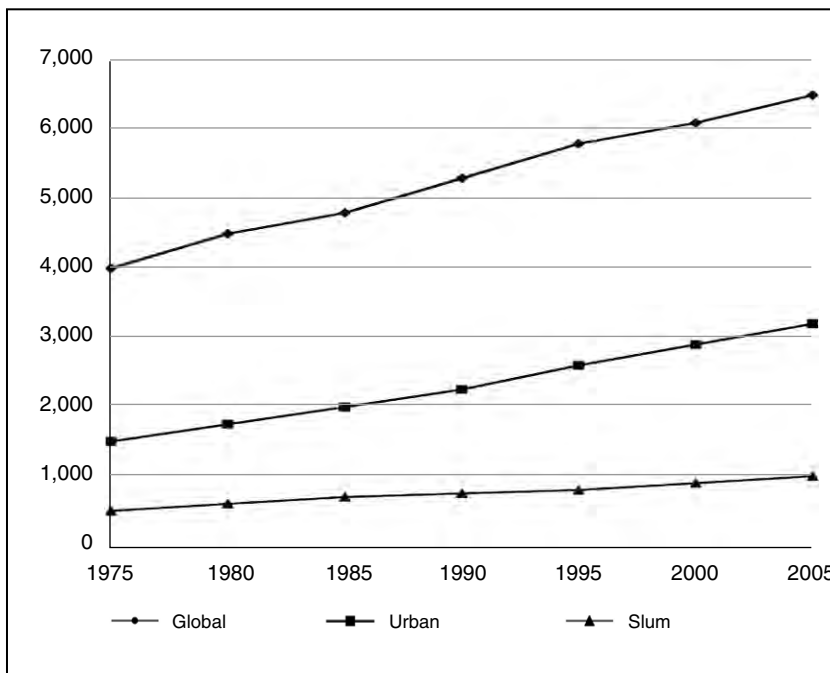


Figure 5
GLOBAL, URBAN, AND SLUM POPULATION GROWTH, 1975-2005.

Approximately half of the global population—more than 3 billion people—now live in cities, with most of the urban growth coming from developing countries. One third of these city dwellers—more than 1 billion—reside in squalid, overcrowded slums where significant numbers of people are without clean water or sanitary facilities, and under-nourishment is common. Tuberculosis thrives in this environment.

Source: Global Urban and Slum Growth. Data from UN-Habitat.; US. Census Bureau, International Database

successfully cured of the garden-variety of tuberculosis, with rigorous techniques using the best treatment regimens. The obvious answer is, don't create XDR-TB. Bad treatment is worse than no treatment at all, when it comes to development of resistance.

The next, and even more obvious answer is, if XDR-TB has the potential to kill millions, governments need to step in to encourage drug-research and stimulate vaccine companies to develop the new classes of tuberculosis drugs and vaccines necessary to keep ahead of the resistance phenomenon.

These could give the world time to do what really needs to be done. The Great White Plague of Europe was largely reversed, not by drugs and treatments, but by the development of public health as part of the economic and scientific development of Europe. Its decline went hand-in-hand with learning the science of managing large industrial cities so as to make them fit for human beings to thrive.

The TB epidemic in Africa, Asia, and other countries with high HIV burdens is not yet nearly as bad as that in Europe and North America in 1800. But it is moving in that direction. Every year a larger percentage of previously rural people move into expanding slums in the cities of the developing world (see Figure 5). These slums are lacking in the basic needs of the new urban underclass, making it the ideal breeding ground for HIV, tuberculosis, and the water-borne diseases which kill so many of the very young.⁵

To keep the epidemic from expanding, governments cannot simply throw a perpetually evolving group of drugs at billions of the poor and starving people, who are crowded into growing slums throughout the developing and undeveloped world. That is a stop-gap measure.

And the paradox is, given the well-known natural history of the tuberculosis disease, developing the capability to carry out the arduous and long-term effective drug and vaccine interventions required in the high-burden TB/HIV countries, would require developing sophisticated health, manufacturing, and education infrastructure within those countries, even should such drugs become available in the near future (see Figure 6).

The long-term solution to the problem of tuberculosis lies in economic

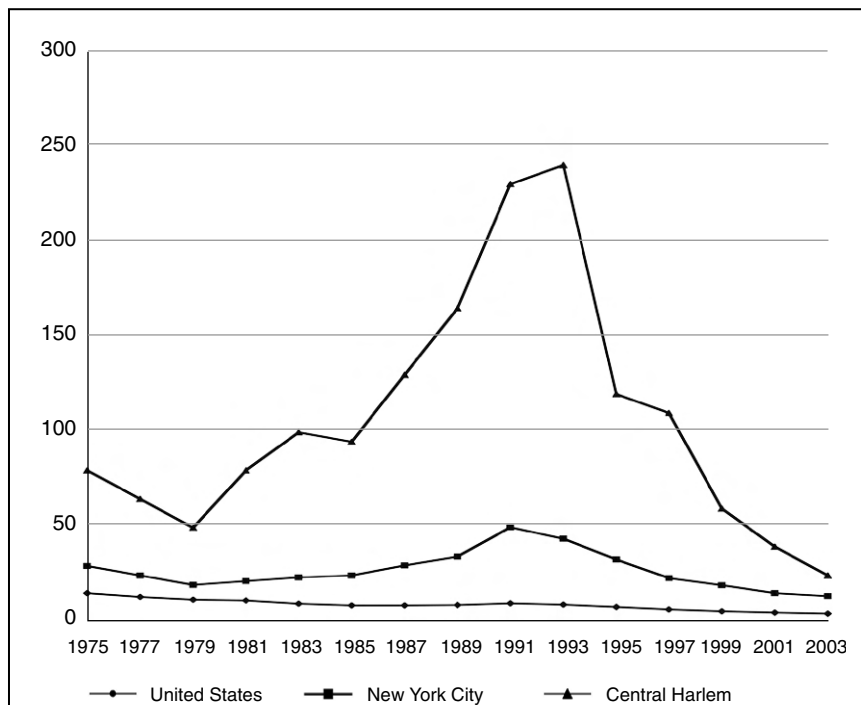


Figure 6
TUBERCULOSIS CASE RATES CENTRAL HARLEM, NEW YORK CITY FROM 1975-2003.

Tuberculosis does not strike randomly. While the resurgence of TB in the U.S. was barely a blip beginning in the late 1980s, the poorest, areas of NYC—with the worst health-care infrastructure and the most crowding—such as Central Harlem, saw dramatic increases as early as 1979, and reached levels approaching Third World rates per 100,000 population.

Source: Data from New York City Department of Health and Centers for Disease Control

development: clean cities with room to breathe, clean water, modern sewage treatment plants, productive economies running on nuclear energy technologies, plenty of nutritious food from productive farms, and a modern public health system in every nation. Tuberculosis could not long thrive under those conditions.

Notes

1. This TB situation is exactly what Lyndon LaRouche warned about in 1974, when he commissioned a research effort called the Biological Holocaust Taskforce, to project what the likely results would be in the physical economy, if the anti-infrastructure, anti-development economic programs proposed at that time, called "post-industrialism"/free trade, were carried through. In 1986, an *EIR* Special Report was issued, "An Emergency War Plan to Fight AIDS and Other Pandemics," stressing the need to reverse the downgrading of living and working conditions, and to build up medical and public health infrastructure. Instead, the populations became even more impoverished, and infrastructure ratios—water, housing, and medical care—declined. Today, intervention is needed

on an emergency basis.

2. Revised definition for XDR-TB: Resistance to at least the first-line drugs rifampicin and isoniazid (MDR-TB definition), plus resistance to the second-line drug fluoroquinolone, plus resistance to at least one of the second-line injectable drugs, such as kanamycin, amikacin, and capreomycin. First-line drugs available for treatment: isoniazid, rifampicin, pyrazinamide, ethambutol, streptomycin. Second-line drugs available for treatment: kanamycin/amikacin, fluoroquinolones, cycloserine, ethionamide, capreomycin, para-amino salicylic acid.
3. For a recent look at the New York City situation as it affected public health, see "Impact of NYC's 1975 Fiscal Crisis on TB, HIV, and Homicide," *EIR*, Aug. 25, 2006. Banker Felix Rohatyn was the author of Big MAC. The article in the March 2006 issue of the *American Journal of Public Health* is, "The Impact of New York City's 1975 Fiscal Crisis on the Tuberculosis, HIV, and Homicide Syndemic."
4. For a perspective on the post-Soviet economic policies behind the Eastern European resurgence of TB, read Sergei Glazyev, *Genocide: Russia and the New World Order*, *EIR* News Service, 1999.
5. UN-Habitat report for 2006, *The State of the World's Cities*, 2006/7.

Azerbaijan: Country of Mud Volcanoes

by Said Huseynov

Of the 800 or so mud volcanoes discovered throughout the world to date, more than 300 of them are located in Azerbaijan. Mud volcanoes, which are related to the more common magmatic volcanoes, are found in more than 26 countries, including Colombia, Italy, Romania, Russia, Ukraine, Iran, Pakistan, and Malaysia. But Azerbaijan's mud volcanoes differ from those in other countries in their frequency, morphological properties, high activity, and beauty.

Dr. Adil Aliyev, the leading specialist on mud volcanism in Azerbaijan, and head of the of the Mud Volcanism section at the Geology Institute of the Azerbaijan National Academy of Sciences (GIA), reports that most of Azerbaijan's mud volcanoes are in active phase, with the heights of some of these marvels of nature reaching 400 meters.

There are also some inactive, buried, submarine, and island mud volcanoes in the country. Furthermore, 21 percent of the mud volcanoes located on land produce oil. For all these peculiarities, Azerbaijan—known as the “land of flames” because of its burning hillsides, as gas seeps through fissures in the earth—has also been named “the country of mud volcanoes.”

Mud volcanoes play a great role for science. While studying mud volcanoes, geologists can explore deep layers of the Earth and deep geological settings: geochemical processes, mineral deposits, and especially oil accumulation at depth. There are dense connections between mud volcanoes and oil structures, so mud volcanoes are natural exploratory wells, created without any capital expenditure. These wells are the most suitable objects of research for estimating the oil and gas potential of the areas in which the volcanoes are located, also giving matchless information on mineral resources.



Courtesy of Geology Institute, Azerbaijan

Toragay, one of the largest mud volcanos in Azerbaijan, is more than 400 meters high.

Generally, mud volcanoes are an uncommon, sporadic, and amazing phenomenon of nature, but researchers have found many correlations between mud volcanism and seismology—earthquakes. As a result of such research in Azerbaijan, it has been discovered that mud volcanoes become more active in pre-earthquake periods. The amounts of some components in gaseous fluids overflowing from mud volcanoes increase strongly; for instance, the helium and carbon dioxide content of gas; boron; and, in some cases, the chloride and sulphate content of volcanic fluids.

Such eruptions mainly occur after powerful earthquakes.

At the moment, the activity level of Azerbaijan's mud volcanoes is quite high. Formerly, there were an average of 3 to 4 eruptions a year. But in the 21st Century, this pattern has been broken. For instance, 17 eruptions occurred on land and underwater in 2001. (One vol-

cano in Spring 2001, under the Caspian Sea, created a new island off the Azeri coast.)

The activity decreased a little in 2000-2003, and there were only 6 eruptions in 2004, and only 3 eruptions in 2005. Dr. Aliyev notes, however, that more eruptions are expected in the near term.

Let me emphasize that more eruptions are expected in the future as a result of increased human activities. It is very dangerous to carry out building, construction, and excavation activities around mud volcanoes, because such processes can cause eruptions. [See photo of Lusi]. This has happened in Azerbaijan in the past.

Although in general mud volcanoes are dangerous for human life, the increased mud volcano activity has been a boon to science. It has helped researchers to understand mud volcanoes more profoundly, and to develop



Courtesy of Geology Institute, Azerbaijan

A gryphon (short, steep-sided cone oozing mud) from the Dashgil mud volcano in Azerbaijan.



Courtesy of Geology Institute, Azerbaijan

A large mud flow from the Dashgil mud volcano.

The mud volcano Lusi, in East Java, Indonesia, most probably caused by faulty procedures while drilling for natural gas.



Anders Nermoen/University of Oslo

the tools to forecast future eruptions.

Useful Characteristics

Mud volcanoes have many other useful characteristics. They produce, for example, many products that can be used in construction, chemistry, and medicine. Volcanic breccia is a mineral source, and volcanic clay is a profitable primary ceramic material which is used widely, especially in brick production. Volcanic water consists of boron, bromine, and iodine, while breccia is enriched in many essential microelements—boron, manganese, lithium, and other minerals.

Volcanic mud assumes great importance in medicine, too. Various diseases—digestive, nervous, gynecological, urological, and dermatological—may be treated by means of such muds, including rheumatic fever, radiculitis, and quinsy (an abscess between the back of the tonsil and the wall of the throat).

Mud volcanism is one of the main topics in the foreign relations of the Geology Institute in Azerbaijan. Many research seminars in Baku are held each year in the framework of international joint projects, under the leadership of Academician Akif Alizadeh, Director of the Geology Institute. Many foreign scientists in various areas of science focus on the mud volcanoes of Azerbaijan, and explore them when they visit the country. That is why geologists the world over call Azerbaijan a “natural laboratory.”

Said Huseynov is press secretary of the Geology Institute at The Azerbaijan Academy of Sciences.

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Let's Keep Pluto a Planet!

by Charles E. Hughes

Is Pluto a Planet?

by David A. Weintraub
Princeton, N.J. : Princeton University
Press, 2007.
Hardcover, 266 pp., \$ 27.95.

Is Pluto a planet? To paraphrase an old and vulgar expression, "Is the Pope Catholic?"

David Weintraub, a professor of astronomy at Vanderbilt University, deals with this question in great detail in a well-illustrated book. He concludes that Pluto should not be downgraded from a planet to a member of some new and special category—Plutinos, or suchlike.

Weintraub describes the discovery of a swarm of objects beyond the orbit of Pluto, mostly smaller than Pluto, over the last 30 years or so. Yes, Pluto is a planet, he says, and not some strange beast.

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In the ancient world through the Middle Ages, Ptolemaic astronomy taught that there were seven planets: the Sun, the Moon, Mercury, Venus, Mars, Jupiter, and Saturn. The Earth was not a planet, but the center of the Universe.

With the revival and elaboration of the Sun-centered system of Aristarchus, the Sun was demoted from planethood and the Earth was promoted to planet status. There were doubts about the Moon and the newly discovered satellites of Jupiter, and later Saturn. The discovery of the asteroid Ceres in 1801, and then the asteroids Pallas and Vesta, followed by the discovery of many more such bodies, orbiting between Mars and Jupiter, again strained the old system. These so-called asteroids were all very small compared to the major planets like Mars. The largest of them, Ceres, is exactly 920 kilometers in diameter.

Weintraub quotes Kepler as saying that satellites of planets should not be counted as additional planets, and notes that Kepler did not wish to suffer the fate of Bruno by advocating infinite worlds in the universe. Unfortunately, Weintraub does not give a reference for this interesting quote.

William Herschel (1738-1822) discovered planet number seven, Uranus, in 1781. The next planet, discovered in 1846 by Urbain-Jean-Joseph Le Verrier, gave the Solar System eight planets.

Pluto vs. the Empiricists

Pluto was discovered in 1930 by Clyde Tombaugh of Lowell Observatory in Flagstaff, Arizona. The discovery was the end result of a seven-year search for a Planet X, believed to be disturbing the orbit of Neptune. Tombaugh's discovery involved the inspection of thousands of photographic plates of the ecliptic, the

path in the heavens of the planets, and perhaps about a million star images on these photographic plates.

Pluto was a big disappointment to astronomers, because it was so very small, whereas the predictions for the expected Planet X were for a body of major size. Pluto's diameter was eventually determined to be 2,300 kilometers,

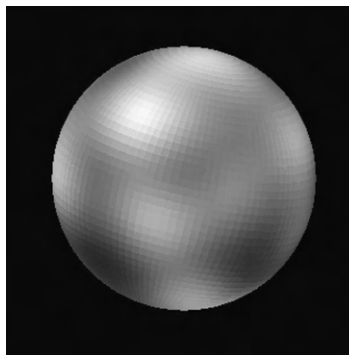
smaller than the Moon. Its orbit was so unusual that it would come closer to the Sun than Neptune does. And Pluto has its own small moon, Charon.

Weintraub says yes, Pluto is a planet, and he provides us with the characteristics of a true planet: A planet should orbit a star

such as the Sun, and not orbit another planet. It should not produce its own heat energy by means of thermonuclear fusion reactions. The true planet should be round in shape, not like a potato.

Pluto fits these criteria and is therefore a planet, Weintraub says. I hope that his verdict prevails, for it pains me to think of poor Clyde Tombaugh spending endless evenings at the Lowell Observatory looking at millions of star images only to have his discovery and its fame obliterated by the categorical empiricist crowd, who wish to break the universe down into more categories so as to more easily ignore singularities.

I recommend this book. It describes the latest planetary discoveries and is enjoyable and well-illustrated.



Was the Great Pyramid Plan Derived From Flatland, or from Sphaerics?

by Pierre Beaudry

The Great Pyramid: Ancient Egypt Revisited

by John Romer
New York: Cambridge University Press,
2007
Hardcover, 557 pp., \$40.00

This review intends to show how I came to decide not to recommend this book. The advertisement for the publication stated something promising: “The builders of the Pyramid worked from a single construction plan—a plan whose existence has long been doubted by many scholars.... The process of the Great Pyramid’s construction was integral to its design.”

Anyone who has seriously studied the architecture of the Great Pyramid of Egypt suspects that there must have been some sort of a plan for its construction and will immediately be excited in the prospect of someone having discovered it. So, I rushed to take a peek at Chapters 4 and 5, as author and archaeologist John Romer recommended at the beginning of his book, in order to see what his method and plan were.

Romer admitted, flatly, that his discovery of the Pyramid’s original plan was expressed by the idea of doubling of the square, which he located at the end of the ascending corridor of the Great Pyramid. He wrote:

“I’d started my pyramidological perambulations innocently enough, with a ruler, a pair of compasses and a plan, trying to work out how on earth the ancient Egyptians had managed to set a mysterious block of limestone that lies in one of the Great Pyramid’s interior corridors exactly at the height at which the area of the base of the pyramid above the block is precisely half of the area of the base of the entire pyramid.... And then, perhaps, once I had solved that strange conundrum, I would discover why these ancient people had set such specific mathematics within the tomb of Pharaoh.”

This attracted my curiosity, especially because I was hoping that this question of doubling the square might have led

Romer to the rediscovery of the Egyptian method of *Sphaerics*, which Lyndon LaRouche has recommended to serious researchers.¹

The precalculated position of this single block of limestone, located at the end of the Grand Gallery, might be a crucial clue in relationship to the *complex geometric center* of the Great Pyramid situated at the apex of the Queen’s Chamber vault. This led me to think that Romer might have rediscovered the ancient Egyptian-Greek method for solving the famous problem of the doubling of the cube. So, I looked at his construction with doubled interest.

First, and true to the reality of the flat platform located at the 50th layer of the Pyramid, when the monument is viewed from above, Romer was right in identifying that the diagonal of the truncated square base, at that level, represented the side of the ground level base of the entire Pyramid. Thus, he located the ratio of the two square surfaces as being 2/1.

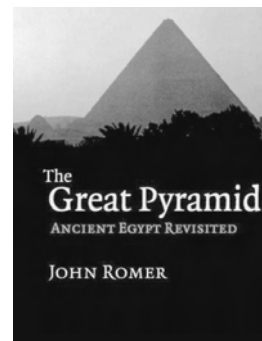
A Flatland View

Richard Anthony Proctor had already established this, during the 19th Century² However, the problem with Romer’s approach, up to this point, was that he did not push the investigation further into the domain of solids. After all, the Great Pyramid is a solid. To my amazement, Romer was looking at the Great Pyramid strictly with the eyes of *Flatland*!

In reality, the genius that constructed that Pyramid was not merely dealing with the single mean proportionality of the *surface domain*, but with the double mean proportionality of the higher *solid domain*.

So, simply from the standpoint of the geometric conception of this great historical monument, Romer was off by a Riemannian degree of magnitude, and had made the fundamental error of omitting the fact that the Egyptians had initiated and educated Greeks like Thales, Pythagoras, Archytas, and Plato in the solid domain of *Sphaerics*.

Unfortunately, Romer ignored the dif-



ferences of dimensionality among the line, the surface, and the solid. However, I did not consider this to be a sufficient reason not to read his book. Not everyone knows about the existence of epistemological differences between those geometrical domains. So I kept on reading.

Second, Romer made several errors of calculation and judgment in the presentation of the known angular measurements of the Ascending Corridor, which is the most important feature inside of the Great Pyramid. He wrote:

“He [Petrie] also found that the Ascending Corridor rises not at a perfect 30 degrees, which is the required angle of the diagonal of two squares, but at 26°13’ degrees, which, if uncorrected, would give rise to an error of more than 10 per cent. And yet, despite all that, remarkably enough, the huge block of the Great Step still stands upon the Pyramid’s upper six square grid within 0.01 percent of mathematical perfection....”

Where the Monkey Sleeps

Now, this sort of statement shows you how to discover where the monkey sleeps. Romer gets blinded by the *mathematical perfection* of the Pyramid while he, himself, makes the error of stating that the diagonal of two squares is 30 degrees. Obviously, he should have verified that measurement before he wrote that chapter and he would have discovered that this was not the case.

That, however, can be easily corrected. But Romer also attributed to the Egyptians “an error of more than 10 percent” in determining the angular measurement of the Ascending Corridor, which is at precisely 26°17’ degrees, as opposed to 30 degrees.

This is a more serious error on the part

of Romer, because it comes from the underlying wrong assumption that the corridor angle should correspond to the latitude of Giza, which is 30 degrees.

Here, Romer implicitly blames the Egyptian builder for not having chosen today's standard of Polaris and, instead, for having chosen the angle corresponding to the North Star, Alpha Draconis, which was a bright star that appeared at less than 4 degrees south of the North Pole at midnight, in the approximate period of 3400 B.C., as was calculated by Proctor.

This is what explains the angular determination of the descending and ascending corridors at 26°13' degrees. Thus, for Romer to admit this error would mean revising the British oligarchy's calendar, for which he established the date of construction of the Pyramid at about 2478 B.C. This "error of 10 per cent" would therefore represent a miscalculation of 922 years! Such an error might set all of the British establishment clocks into uncontrollable gyrations.

Romer preferred to blur the whole thing by blaming that inconsistency on the Egyptian builders. That is not very honest.

Pragmatism

The most serious error, however, is Romer's reductionist approach to the Pyramid from the vantage point of British pragmatism and utilitarianism. Romer ignores the power of ideas and rejects entirely the complex function of the Pyramid as a great astrophysical observatory, as well as a pedagogical experiment in the simultaneity of eternity.

Romer reduces the Pyramid, as most British authors do, to a burial monument, and in doing so, he reinforces the Freemasonic Cult of the Dead. Even though no dead Pharaoh was ever found in any of the Egyptian pyramids, Romer persists in perpetuating the spirit of the tomb and the myth of the dead.

As a result of his not understanding the *Sphaerics* function of the Great Pyramid, Romer used the North Star alignment merely for the positioning of the horizontal surface of casing stones, and neglected to explain the North Star alignment for the vertically descending and ascending corridors, which call for the presence of a North Star at an elevation of 26°13' degrees. That North Star would come a long way in explaining Romer's error of 10 percent.

As a result of flattening everything and of ignoring the significance of the vertical dimensionality, Romer, therefore, adjusted the casing alignment to conveniently fit the date he wished to establish for the construction of the Pyramid—that is, 2478 B.C.

If you cannot move the casing blocks, then, you must move the stars around, and that is precisely what Romer did. Romer flattened everything to fit his methodology, and in the same manner, excluded from his study of the Pyramid the power to elevate the human mind to the required level of a discovery of universal physical principle.

For instance, in his section on "Stars," Romer wrote:

"As we have already noticed, however ... the odd cubit fraction produced by the six-partite division of 440 cubits suggests that rather than employing abstract mathematics and measuring out its product on the ground, the dimension of the six-square grid was set with builder's tools working pragmatically at 1 to 1, directly on the pyramid's fine stone pavement.

"At this same time, our modern plan informs us ... a number of basic decisions must have already been taken about the architecture of this pyramid. First was, the basic geometrical design of the Pyramid's interior, set from two crossed lines set on the diagonals of four grid squares, would be represented in the hard stone of the Pyramid at the level of its floors, so as to allow that elegant design to remain intact and so permit, it would transpire, the master builders the freedom to construct an interior architecture over and around this basic framework as circumstance required."

The fact that Romer would have found a tracing mark in the masonry next to the Pyramid that would serve as a guide to the workman, is an interesting find, but to elevate this guiding practicality to the level of *the plan* of the Pyramid is a reductionist fantasy. The discovery of the carpenter's square does not tell anything about the idea and the design of the Renaissance dresser that it was used for.

The Shadow Reckoning Method

However, Romer might have a better chance to reach out to the true idea of a universal physical principle hidden in the discovery of that design, if he inquired about the shadow reckoning



Interior of the Grand Gallery (about one quarter of its length), showing how it could have been used to observe the stars circling in the southern sky. The illustration shows the southern section of the meridian.

Source: From an illustration by Richard Anthony Proctor in Peter Tompkins, *Secrets of the Great Pyramid* (New York: Harper Colophon Books, 1971)

method of angular measurement that the Egyptians used in their astronomy as well as in their architecture.

But, the reductionist approach to practicality in the building of such a masterpiece as the Great Pyramid is a deadly blow to the creative process of anyone who is seeking the truth about the whole matter. The plan of the Great Pyramid is a powerful idea reflecting a universal principle, not simply a practical grid required by the circumstance in the building process.

This problem of pragmatism is reflected directly in Romer's reduction of the Pyramid plan to a surveying six-squared grid that the ancient Egyptians have used in lining up their brick laying. And that became the "single construction plan" that was publicized for selling the book.

Such a grid was surely used to keep the blocks lined up, but that does not qualify the instrument as a *single construction plan*. Furthermore, Romer had to admit that he was not so sure about that grid either, and that "the designers of King Khufu's Pyramid did not employ this six-squared grid consistently.... [O]nly selected parts of the pyramid's interior are fixed upon it, other elements of its plan having no immediate connection with it."

Well, I guess that, after all, everybody is entitled to change plans and possibly several grid-plans were used.

Regardless of this deadly British pragmatism, I still kept on reading patiently and, as I came back to Chapter 5, Romer stated:

"Yet it was not mere capriciousness that fixed the positions of those other elements of this design, but the consistent use of what might be called the Great Pyramid's double helix. For the Pyramid's architecture is governed not by a single grid of squares but by two staggered grids of equal size set on the same vertical planes, the upper being the one described above, the lower being set some 15 feet (4.6 m) beneath it at the level of the Pyramid's baselines."

At this point, I had had enough. Here, it became clear to me that Romer has no real understanding of the physical geometry problem that he was wrestling with. He was blindly poking at different parts without seeing the entire elephant. Romer may have produced excellent results as an archaeologist, I have no

doubt, but from the standpoint of geometry, he simply did not know what he was talking about.

As I was about to close the book, I discovered that Romer admitted his shortcoming. He wrote:

"My diagrams of the Pyramid's plan, for instance, are set upon a modern type of drawing, specifically a cross-section, which was only named as such two centuries ago. So, whilst these modern tools provide us with a useful window through which to view the ancient Pyramid's design we must always bear in mind that its ancient builders worked without such plans, just as they also worked without the surveying equipment that enabled such drawings, along with their accompanying specifications, to be realized as they are today. The discovery of this ancient pattern in our modern plans, therefore, is but a shadow of a lost reality."

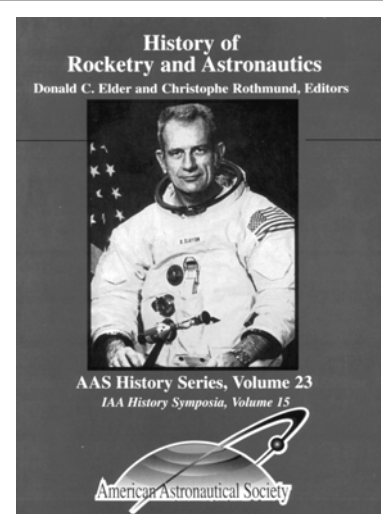
Here, I could not agree with Romer more. This, at least, was an honest statement, but then why write a book to say that all you were doing was chasing the "shadow of a lost reality"? And why did the news release of Romer's book claim that he had discovered the "single construction plan" of the Great Pyramid? This was a completely false representation.

Finally, it turns out that Romer was not attempting to discover the plan for the construction of the Great Pyramid at all. He was merely attempting to find a practical alignment mechanism for brick laying and make the Great Pyramid fit onto it. He had caught the Newtonian disease of making the universe fit his mathematics: pragmatism.

This is how I discovered that I had been reading a book pertaining to the domain of British *Flatland*, the horrifying consequences of which can be found in Edwin A. Abbott, *Flatland, A Romance of Many Dimensions* (New York: Dover Thrift Edition, 1992). After discovering so many errors of calculation and judgment, it became clear that John Romer had not written a serious book, and that I could not recommend it.

Notes

1. For example, see Lyndon H. LaRouche, Jr., "Man & the Skies Above," *EIR*, June 1, 2007.
2. For more on Richard Anthony Proctor, and a review of Pyramid geometry, see my article "Pythagorean Spherics: The Missing Link Between Egypt and Greece" in *21st Century*, Summer 2004.



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An Invitation from the LaRouche Youth Movement

Welcome Adventurer!



You have now arrived at the threshold of the third stage of an ongoing investigation, commissioned by economist and statesman Lyndon LaRouche, and conducted by teams from the LaRouche Youth Movement (LYM), into the most crucial breakthroughs made in scientific method. If you have not already reviewed and/or worked through the first two phases of the project, namely, an interactive pedagogy covering Johannes Kepler's investigation of the principle which governs the motion of heavenly bodies in his *Astronomia Nova* (New Astronomy), and secondly, a similar exposition of Kepler's other main work developing the universal quality of this principle in his *Harmonices Mundi* (The Harmony of the World), it is necessary that you do so, in order to situate the contents of the following report. (www.wlym.com/~animations)

In a time-period reminiscent of the extended moment of ambiguity felt when watching a coin spinning across a surface and wondering how it will fall, the significance and sheer

necessity of this scientific and epistemological undertaking is hopefully not lost upon the reader: U.S. defense systems are at this moment pointed at Russia and China, the President of Vice continues to rabidly press for war in Iran, and the present world financial architecture creaks and groans underneath a monstrous weight of speculation. On the other hand, conferences are being held around the world on the subject of national and international breakthrough infrastructure project proposals, such as the April 24 Moscow conference hosting thousands of delegates to deliberate over the Bering Strait tunnel project. Thus, we are not left to merely wonder, heads, or tails?, but rather, are beings of free will, capable of ourselves determining the tide of times.

That is the intention of the third team embarking upon the third phase of the LYM's investigation: a leap from the discoveries of Johannes Kepler, across a chasm of nearly two centuries, to Carl F. Gauss's determination of the orbit of the first asteroid ever sighted by man, Ceres. The challenge posed to this team, is to recreate the method applied by Gauss in order to achieve this feat, which contrasted with the utterly erroneous attempts of the narrow-minded empirical thinking of his contemporary mathematicians and astronomers, and which leads to the foundations of all competent modern scientific method, including economic forecasting. The first dilemma encountered was Gauss's own explicit obfuscation of his method. Thus, over the course of our recent-months investigations, we have set about our mission on several fronts: building up a grounding in the

aforementioned works of Kepler, as well as his predecessor, Nicholas of Cusa, digging up the history and battle of ideas developed in the intervening period of Kepler to Gauss, especially the key mind of the 18th Century and teacher of Gauss, Abraham G. Kästner. The fruits of our labor thus far are here presented to the reader with the intention of providing an interim report of our work, which will hopefully serve to whet the appetites of some, and stave off the hungry appetites of others, until we produce the final report.

Let it be said, in conclusion, that the significance of this work for the immediate and extended future of mankind is evidenced by the current state of our national economy, as reflected by our space program. From man's first strides on the moon in the 1960s, a great leap backwards has been made in not only the physical capability of our space program, but also in the scientific-cognitive capability to put it to good use. Indicative of this is the fact that in a few weeks the Dawn Mission, a NASA/JPL project, will be launched, heading for Vesta, and then Ceres—the two largest asteroids found in the asteroid belt. Soon, a vast amount of information will be available concerning their water and mineral content, and nature of the formation of the asteroids in general. However, without the method of discovery and knowledge of principle yielded by the investigations of the LYM into the roots of scientific method, all of the data, photographs, and statistics in the world will not produce the discoveries which are required for the furtherance of our current civilization, or of mankind as a whole.

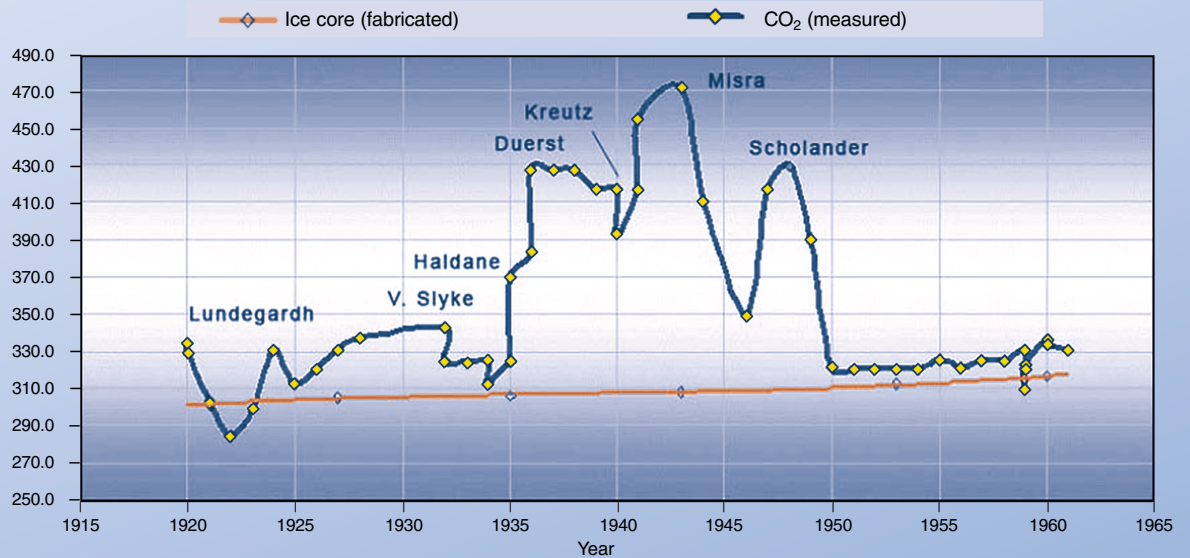
Happy Adventuring!

The Current LYM "Basement" Team, a small group of researchers operating from the basement of a farm in Northern Virginia, (www.wlym.com/~animations)

In This Issue

Real CO₂ Measurements vs. Global Warmers' Fabrications

Actual historical measurements of CO₂ (top line) versus the IPCC's values concocted from ice cores--a fable to convince you that atmospheric CO₂ levels are rising because of human activity.



Source: Dipl. Biol. Ernst-Georg Beck, Merian Schule, Freiburg, Aug. 2006

CO₂: THE GREATEST SCIENTIFIC SCANDAL OF THE CENTURY

In a review of the latest climate propaganda by the IPCC, Zbigniew Jaworowski, atmospheric scientist and veteran of 11 expeditions to 17 glaciers, debunks the lies and presents the real science of climate.



BACK TO THE MOON!

China, Russia, India, Japan, and newer spacefaring nations are planning multigenerational great projects to go to the Moon and beyond, as Marsha Freeman reports. Will the United States join them?

"Christmas in Selenopolis," one of space visionary Krafft Ehrlicke's depictions of life in a thriving Moon city. Now many countries are planning to get there.