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The Cosmic Ray Project

• The Malthusian War Against DDT

21st CENTURY SCIENCE & TECHNOLOGY

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Features

Laurence Hecht

Peter Martinson, one of the Basement team of the La-Rouche Youth Movement working on the Cosmic Ray Project. His article appears on p. 18.

ON THE COVER: At 2,750 meters in the Celebes Sea: an odd transparent sea cucumber, Enypniastes, creeping forward on its many tentacles at about 2 cm per minute, while sweeping detritus-rich sediment into its mouth. Photo courtesy of Larry Madin, Woods Hole Oceanographic institution; cover design by Alan Yue.

News

Departments

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The Nuclear Option Against British Sabotage In Our Gulf

June 13—It appears increasingly likely that recourse to use of a peaceful nuclear explosive (PNE), may become the only available option to seal the damaged BP well in the Gulf of Mexico, 41 miles off our coast.

Such a measure can be carried out with virtually zero danger of radioactive release, according to experts, including Milo Nordyke, a former chief scientist on the U.S. Operation Plowshare program for peaceful use of nuclear explosives.

A 10- to 15-kiloton nuclear device would be placed within 20 to 30 feet of the well bore, at a depth below 6,000 feet, where no danger of wave formation from deformation of the sea floor could occur. The explosion would produce a shock wave that would push rock horizontally against the well bore, sealing it shut. That would close the hole, well below the probable cracks that may exist in the upper 1,200-foot layer of mud and soft rock. In a worst-case scenario in which the well failed to seal, the minimal amount of radioactive material that might escape up the well would be so diluted upon mixing with seawater as to render it harmless.

Smaller nuclear devices, carried by projectiles of a classified nature which could be injected directly down the well bore, are also possible.

Whether or not it becomes necessary to use such a device, it is urgent that preparations be made now for such an eventuality. There is growing evidence that the well is releasing oil at a rate of

Petty Officer First Class John Masson/USCG

Black smoke from a controlled burn over Deepwater Horizon, billows into the atmosphere, over the Gulf of Mexico. We need to prepare now for a nuclear option to seal the well.

90,000 barrels per day or greater, while the likelihood of success of the relief wells has been called into question. Stratigraphic studies, design and building of the device, and preparations for deployment all take time, time which has been lost by the Administration policy of denial. Expertise in these matters resides among specialists at the Lawrence Livermore and Los Alamos national laboratories.

Such a program can be carried out only under U.S. government authority. The urgent need for preparing the nuclear option thus provides one more reason why BP must be expropriated under national security emergency measures, its records seized, and its top executives jailed and held for trial on crimes including the criminally negligent homicide in the death of 11 oil rig workers. That will require the removal of the British tool presently occupying the master bedroom at 1600 Pennsylvania Avenue.

A greater challenge might arise, if BP actually drilled to 30,000 feet, or below, and is tapping into a deep formation at very high pressures—another reason why we must take over, and gain control of the situation.

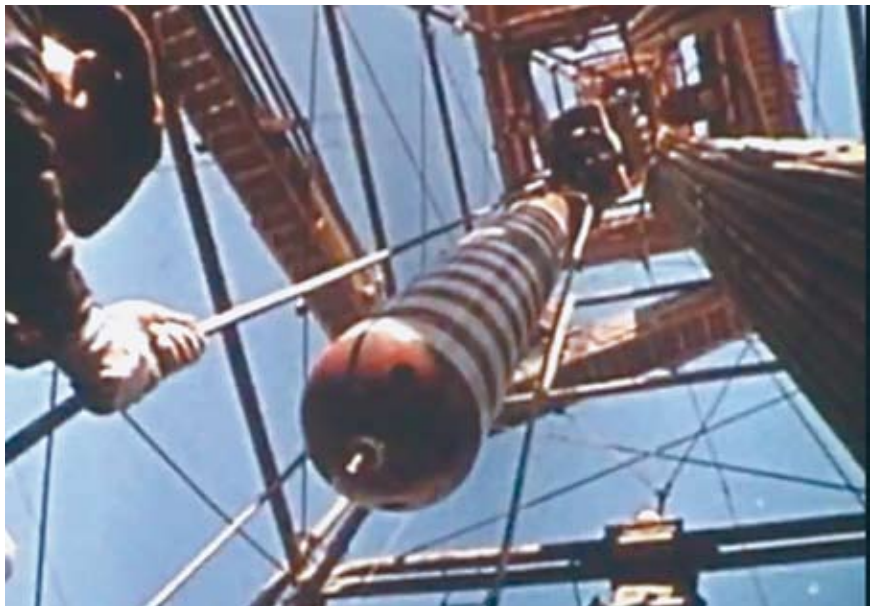
The Other Nuclear

Apart from such immediately required measures, the unfolding crisis in the Gulf brings to the fore a more far-reaching, yet most urgent necessity.

The underlying cause of the Gulf Oil Crisis has been our failure to go nuclear. Supporting the present world population of 6.8 billion persons at a decently human living standard cannot be accomplished with the present mix of energy and raw-material-extraction technologies.

The widespread introduction of high *energy-flux-density* power sources, starting now with nuclear power, and moving on to controlled thermonuclear fusion, and later, to matter-antimatter reactions, is essential to ensuring our future survival.

For now, nuclear power is the key to replacing our present dependence upon fossil-based fuels. The energy contained in 1.86 grams (0.07 ounces) of processed uranium is equal to 1,260 gallons of petroleum and 6.15 tons of coal. Comparing these ratios of energy output, per weight of fuel, provides an approximate



Video grab of a bomb being positioned near a burning Soviet gas well in 1966, to stop the fire and seal the site. This was the first use of a PNE for this purpose. The video can be seen here: http://atomicnewsreview.org/2010/05/31/ an-atomic-bomb-will-stop-the-gulf-oil-leak/

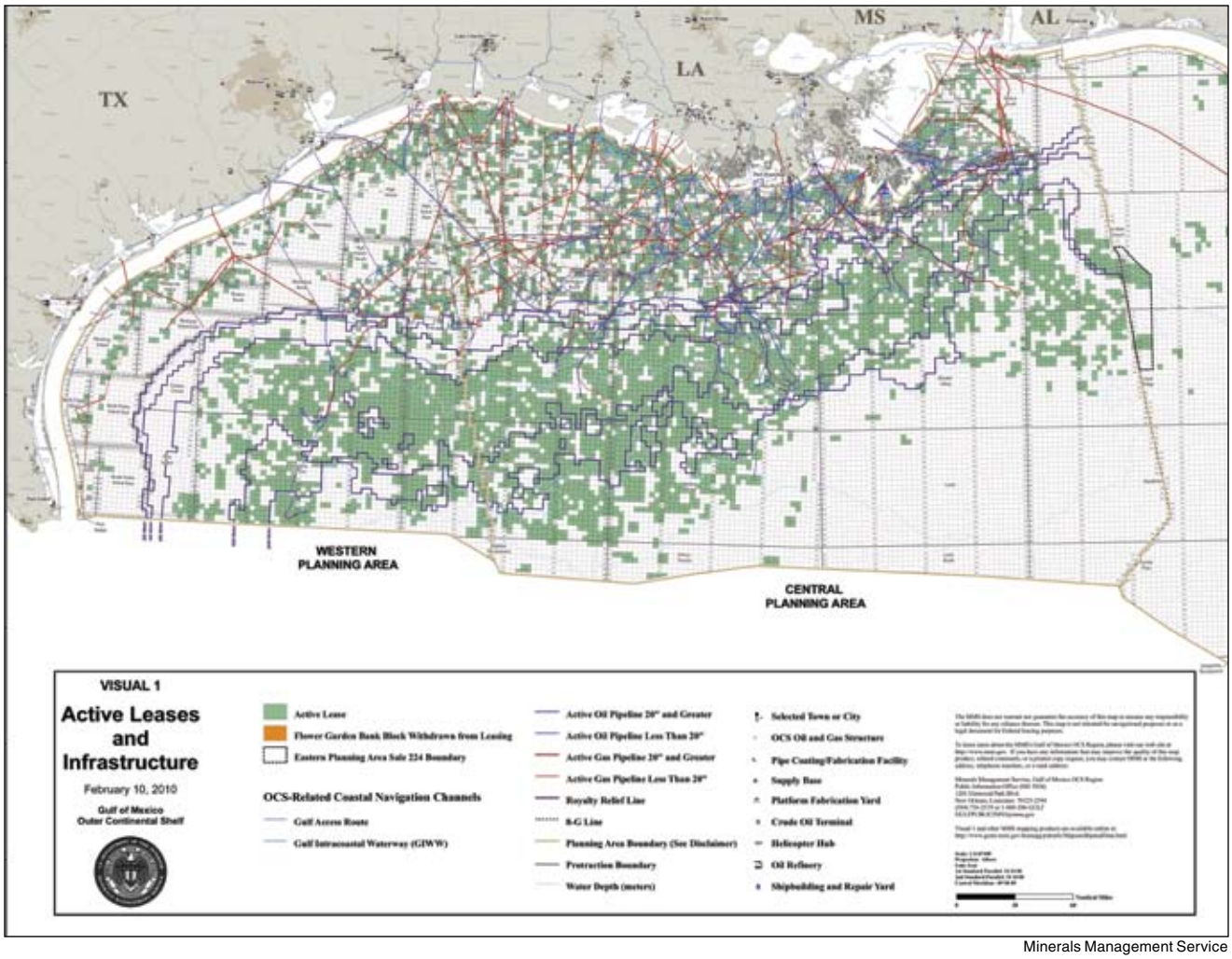
sort of measure for the concept of energy flux-density. By such measure, the advantage of nuclear comes to 2.16 million to 1, as compared to oil, and 2.98 million to 1, as compared to coal. Mastery of the thermonuclear fusion reaction will allow us to raise those ratios by several orders of magnitude, and make manned interplanetary space flight a reality for coming generations.

The temperature and energy flux-density of the nuclear fission reaction permits the production of cheap electrical power, and of industrial process heat needed for processing ore and the desalination of seawater.

Nuclear power can also replace fossil fuels in transportation, eliminating completely the dependence upon imported oil and deep offshore drilling. The temperature and high energy-flux of a nuclear reaction permits us to economically separate water into its constituent atoms. The hydrogen so produced can be burned as a fuel, either directly, or by recombination in fuel cells. Synthetic hydrocarbon fuels and various types of hydrogen carriers, such as ammonia, may also be produced to supply specialized needs for liquid fuels. The abundant electricity produced by nuclear power will supply battery-powered vehicles, and more important, provide the power to a nationwide grid of magnetically levitated high-speed rail.

To bring the present world population up to acceptable standards of living will require the production of at least 6,000 new nuclear power plants within the next generation. Wind and solar energy installations not only cannot meet that need, but cost more, in actual physical economic measure, than they contribute to an economy.

A more precise definition of *energy flux-density* is transformative power. Beyond the already cited advantages, a nuclear reaction produces a change in the structure of the atomic nucleus such as will never occur in a windmill, solar cell, or oil-, gas-, or coal-fired power plant. The next phase of our economic development, the isotope economy, will involve the production of new materials, including those of varied isotopic composition, for use in industry, agriculture, medicine, and space colonization. We will get a start on this through our gear-up for mass serial production of nuclear plants, including new design types, such as the high-temperature gas-cooled reactors, integral fast-flux reactors which breed more new fuel than they consume, and similar proven designs. With the development of thermonuclear fusion reactors, other capa-



Minerals Management Service

There are now more than 4,000 oil rigs in the Gulf of Mexico, plus oil and gas pipelines and other related infrastructure. Click on the link to the get the full map, and to find the site of BP's Deepwater Horizon well on the grid, No. 252 in Mississippi Canyon.

bilities become possible. Mastery of the low-energy nuclear reactions ("cold fusion") will also contribute to the isotope economy, adding new dimensions to our understanding of nuclear transmutations.

The intentional suppression of that just-described economic future has been the central feature of British imperial policy over at least the past half century. The specifically stated intention of leading British figures, including Prince Philip, the late Lord Bertrand Russell, and former H.G. Wells collaborator Julian Huxley, has been to carry out a drastic reduction in human population, to fewer than 2 billion persons.

What Caused the Blowout?

Lacking nuclear power, the push to ever deeper drilling for oil and gas resources was inevitable. Whether the blowout of the Macondo well was due to the greed and utter incompetence of BP officials, or, as also appears possible, it was a willful act of sabotage, such an event was, in any case, inevitable, sooner or later.

It may be that the blown-out BP well is not at the 18,000-foot depth cited in the company's public relations efforts, but at 30,000 feet, or that other deep wells in the vicinity have tapped into formations, known as oil migration channels, at this depth. There is evidence that the theory of Russian geologist Vladimir Kutcherov, according to which oil is continuously formed deep within the Earth's crust, at depths of 30,000 feet or greater, may have been secretly adopted by the oil cartel, at the same time that the theory was publicly discredited and dismissed.

Under this theory, drilling on the cracks between continental plates, or in such formations as are found in much of the Gulf of Mexico, would tap into these rich reserves. Soviet oil and gas production may have already exploited such deep faults, possibly below 30,000 feet. Kutcherov, in collaboration with scientists from the Russian of Academy of Sciences, experimentally demonstrated the production of methane, and heavier hydrocarbons of the alkane series, from a mixture of calcium carbonate, iron oxide, and water, maintained at extremely high pressures and temperatures, such as are found deep within the Earth. The origin of deep oil would thus be abiogenic, confirming the earlier hypotheses of Alexander von Humboldt, Dmitri Mendeleyev, and Marcelin Berthelot. The biological signature found in oil is a

result of dissolved organic matter in the abiogenic petroleum, according to the Russian-Ukrainian theory. The action of deep-dwelling life forms upon the already produced hydrocarbons may also play a part.

The Soviet use of peaceful nuclear explosives for oil and gas exploration may have been operating on this view. This was the same program which pioneered the technique for sealing runaway gas-well fires, using small nuclear charges placed in slant wells which intersected the runaway well several thousand feet down. That program was successful in all its attempts, closing five wells and reducing pressure in a sixth, according to a report, published in 2000, by Milo Nordyke of Lawrence Livermore National Laboratory.

There is some indication that advanced thermal imaging techniques, using satellites, may have been carried out by U.S. government agencies, beginning in the 1980s, in an attempt to map these formations in the Gulf. It is possible that BP obtained access to that classified data for use in its Gulf exploration campaign.

There is also indication that BP is presenting to the public a Hollywood-like scenario of its operations on the sea floor. Engineering experts point out that the Cameron Blowout Preventer, the five-story tower which sits, or once sat, on the sea floor at the well outlet, was designed for a maximum pressure of 15,000 pounds per square inch (psi), while the explosion appears to trained observers to have produced pressures in excess of 30,000 psi. In that case, the blowout preventer would have been damaged beyond functionality. The device we see in the live video streams may be a second blowout preventer, which is getting its oil by piping from the main well, or a nearby production facility. The main well may be completely open, according to some industry insiders.

Thus the Macondo blowout may be the result of having struck into extremely high-pressure migration channels of deep oil. Or, there may be an element of willful sabotage in creating the disaster, directed by British interests against the United States. In either case, the time for expropriation, and preparation of the nuclear option, is now.

—Laurence Hecht

Another Radiation Scam: Expansion of RECA

To the Editor:

Companion bills in the House and the Senate would expand the Radiation Exposure Compensation Act (RECA) to Idaho, Montana, Colorado, New Mexico, and to areas in Utah, Nevada, and Arizona that are not now covered. Also, the bill would increase the payment from $50,000 to $150,000 to any person exposed to fallout from atmospheric nuclear tests conducted at the Nevada test site, who has been or will be a victim of cancers covered by RECA.

For example, my father, who died of heart failure at the age of 94, also had colon cancer at the time of his death, and, therefore, his heirs would qualify for the $150,000 payment.

The new bill is linked to the 1997 National Cancer Institute (NCI) crude estimates of the radioiodine doses to individuals residing in 3,053 U.S. counties. These estimates almost immediately caused politicians in Idaho and Montana to demand expansion of RECA to their states. [rex.nci.nih.gov/massmedia/statebystate/statelisting.html.]

The NCI estimates were based on historical measurements of the amounts of radioactivity deposited, daily local rainfall, and assumptions about patterns of milk consumption. The number of monitoring stations across the United States varied with time, but never exceeded 100.

The radioiodine dose averages of the 11 counties of Nevada, the 10 counties of Arizona, and all counties in New Mexico not currently covered are 0.11 rads, 0.22 rads, and 1.5 rads, respectively. For perspective, estimates for parts of Washington County in Utah and several counties in Idaho and Montana exceed 10 rads; Iron County of Utah currently covered (1.6 rads) and New York County not covered (2.3 rads).

If the proposed bill becomes law, what

(Continued on p. 9)

Marjorie Mazel Hecht

Donald Roberts (at podium) and Richard Tren. The Excellent Powder *demolishes the familiar scare stories about DDT: DDT did not wipe out robins, eagles, or peregrine falcons; it has never been shown to cause human harm; and it works even if mosquitoes are resistant to DDT.*

MILLIONS HAVE DIED BECAUSE OF DDT BAN, NEW BOOK DOCUMENTS

Dr. Donald Roberts, the entomologist whose malaria research confimed that the pesticide DDT works chiefly by repelling mosquitoes, launched his long-awaited book in a Washington, D.C. press conference April 21: *The Excellent Powder: DDT's Political and Scientific History*. He and co-author Richard Tren, an economist from South Africa and chairman of Africa Fighting Malaria, summarized the book's main points for an audience that included several distinguished malaria researchers.

"Millions have died" and poor people have suffered "severe and grievous harm" as a result of the anti-scientific attacks on DDT, Roberts said. He emphasized three points: we have to hold the anti-DDT groups accountable for this harm; we have to rescind the World Health Organization resolution that stopped DDT use in 1997; and we have to remove authority over public health malaria decisions from organizations that prioritize "environmental" protection over protecting the public's health.

When asked by *21st Century* to elaborate on why environmentalists went after DDT, Roberts stressed that the motivation was population control. "Studies were done that showed that where DDT was introduced for malaria control, the effects were dramatic as malaria death rates declined, and survival went up.... There was great alarm that the malaria control programs using DDT were contributing far too much population growth, and that this was a bad thing."

An excerpt from *The Excellent Powder* appears on p. 40, and a book review on p. 52.

CENSUS OF MARINE LIFE INVENTORIES HARD-TO-SEE SPECIES

More than 2,000 scientists from 80+ nations have inventoried and studied the hardest-to-see sea species: tiny microbes, zooplankton, larvae, and burrowers in the sea bed. This is a vast survey. The Census of Marine Life involves microbial cells from 1,200 sites worldwide, which collectively weigh the equivalent of 240 billion African elephants—that's 35 elephants of marine microbes per person. Marine microbes are 50 to 90 percent of all ocean biomass, but until recent technological techniques, like high-throughput DNA sequencing, this world was largely hidden from our view.

More information, and spectacular photos (including the one on this issue's cover), can be found at http://www.coml.org/embargo/hardtosee.

OBAMA COMMISSION INCLUDES EUTHANASIA ADVOCATES

Among the members appointed to the Presidential Commission for the Study of Bioethical Issues is the infamous Peter Singer, the Princeton University professor from Australia, who called for the murder of infants whose disabilities were a burden to their elders, and who in his animal-rights advocacy attacked the "prejudice" of placing any special value on human life. The chair of the Commission in Amy Gutman, now the president of the University of Pennsylvania, who hired Singer when she was at Princeton, and who collaborated with him on publishing *The Lives of Animals*. More details can be found at http://www.larouchepac.com/node/14122.

VAEC

Vietnam's Dalat Nuclear Research Center, which began operations in 1963. Vietnam has set the ambitious goal of supplying 15-20 percent of its power from nuclear by 2030.

VIETNAM PICKS RUSSIA FOR FIRST NUCLEAR PLANT

Vietnam Atomic Energy Institute Director Vuong Huu Tan announced that Russia was chosen as the foreign partner in Vietnam's first nuclear power plant. Tan said that Russia had also agreed to help Vietnam deal with the nuclear waste. Vietnam plans two 1,000-megawatt pressurized water reactors, with the first plant starting construction in 2014, to come on line in 2020.

An article and interview on Vietnam's nuclear program, appear in the Winter 2009-2010 issue of *21st Century.*

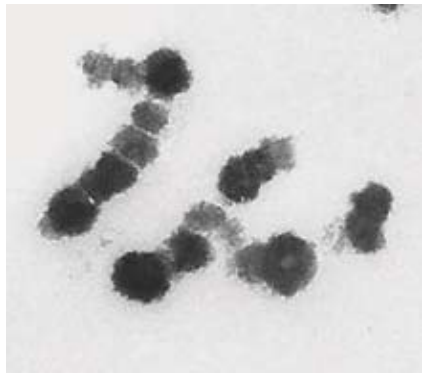
MELANIN NANOPARTICLES CAN PROTECT PATIENTS IN RADIATION THERAPY

The laboratories of Ekaterina Dadachova and Arturo Casadevall at the Albert Einstein School of Medicine in New York have used melanin-coated silica nanoparticles injected into mice to observe the protective effects on bone marrow (the usual dose-limiting tissue for radiation exposure), after the mice have been treated with external gamma radiation or internal radioimmunotherapy with rhenium-188. This research, "Melanin-Covered Nanoparticles for Protection of Bone Marrow During Radiation Therapy of Cancer," was published in the *International Journal for Radiation Oncology, Biology, and Physics, April 26*.

Courtesy of Ekaterina Dadachova

Immunofluorescent image of melanin nanoparticles. Top left shows the image of the particle seen through the light microscope; below left shows the image of the same melanin particle through a fluorescent microscope. The red color on the right comes from the melanin-binding antibody attached to a red fluorescent dye. Below, a tunneling electron micron microsope image of the nanoparticles.

Melanin-coated nanoparticles under 100 nanometers diameter successfully made their way to the bone marrow at 0.3 percent of injected dose per gram, where, even at that low uptake, they had a protective effect. This was measured by a much shallower dip and a faster rebound in the numbers of white blood cells and platelets on days 3-10, after a radiation dose much higher than therapeutic limits in humans. The melanin is hypothesized to intercept high-energy recoil electrons and dissipate their energy so as to minimize secondary ionization events, which cause free radical generation. The melanin coat is also thought to scavenge free radicals that do form. With the addition of chemicals such as pluronic acid, known to increase bone marrow uptake of nanoparticles, a much greater effect might be expected. Sparing bone marrow cells could allow higher-dose targetted treatments of such cancers as non-Hodgkin's lymphoma, where bone marrow suppression now limits the dose to sub-optimal levels for cancer eradication.



Colonies of melanized fungi are known to inhabit the walls of the Chernobyl reactor, and thrive in cooling ponds of functioning nuclear reactors, where the melanin in their cell walls protects the fungi from ionizing radiation that would kill other organisms. This research explores whether humans could tap into that protective effect to allow more effective treatment of cancer or to allow humans to better survive cosmic ray exposure during space travel.

For the work of Dadachova et al. on targetted radioisotope therapy, see "Radioisotopes: The Medical Lifesavers That Congress is Supressing" in the Winter 2009-2010 issue.

IN MEMORIAM: GOV. WALTER HICKEL, CHAMPION OF 'BIG PROJECTS'

Former Alaska governor Walter J. "Wally" Hickel died at age 90 on May 7 in Anchorage. Throughout his 70 years in business, military service, and public office, Hickel championed physical economic development, with what he came to call his "Alaska approach," with the principle that "there is no legitimate reason for poverty on this Earth."

Here are excerpts from the obituary issued by Hickel's office:

"Ever a big thinker, Hickel predicted that the Arctic would become an opportunity for the world. To advance that goal in 1992, he helped found The Northern Forum, and in 1995 established the Institute of the North, an Anchorage-based think-tank dedicated to Alaska strategic issues, including caring for and using the 'commons'—or commonly owned lands and resources—to help the people in the North. . . .

"Hickel sought a transportation corridor to link the East and West across the North. He worked for years to support Russian leaders who favored opening the Northern Sea Route to world commerce. . . .

"As a believer that big projects are a symbol of a civilization, he promoted a tunnel beneath the Bering Strait to connect the United States and Russia and make possible 'a railroad around the world.' His concept for a water pipeline to transport Alaska's abundant water resources to California received both attention and ridicule in the 1960s and 1990s, and he insisted that it would one-day become a reality. As a member of an advisory committee to NASA, he advanced 'big projects' to support exploration of Mars and settlement of the Moon. He was still talking about these projects as of last month. . . ."

FORUM International

The late Walter Hickel told a Moscow conference on the Bering Strait Tunnel Project in 2007: "I believe that if we bring Russia and America together it will change the world." Hickel's speech and a report on the conference can be found in the Spring-Summer 2007 21st Century.

EDWIN E. KINTNER (1920-2010)

A Champion of Fusion and Fission

by Stephen O. Dean

Edwin E. Kintner, former head of the U.S. fusion energy program, died on May 7 in Exeter, New Hampshire, shortly after reaching his 90th birthday. He had a long and varied career in the energy field.

Ed received a B.S. in Electrical Engineering at the U.S. Naval Academy in 1942, and also received masters degrees at MIT in Naval Architecture and Marine Engineering (1946) and in Nuclear Physics (1950). At the time, he was a career naval officer, having served aboard a light cruiser in World War II.

By the early 1950s, Ed had joined Admiral Rickover's team, where he played a key role in the development, demonstration, and deployment of the nuclear reactor that powered the *USS Nautilus,* the first nuclear submarine. This experience profoundly influenced Ed's management philosophy. He recalled that Admiral Rickover rejected advice from the Atomic Energy Commission (AEC) labs that he carry out a lengthy research and development program, before building a conservatively designed nuclear test reactor, and before attempting to design and build a reactor that could fit in a submarine.

LANL

Edwin E. Kintner in 1981.

Instead, Rickover issued orders to his team that the test reactor ("Mark I") would be built immediately and be identical to the one that would power the submarine ("Mark II"). "Mark I equals Mark II," was Rickover's plan, according to Kintner. It worked, and Ed never forgot it.

Ed later retired from the Navy and joined the nuclear fission reactor development program at the AEC. There he was a senior manager overseeing at first the development of advanced light water reactors (which became the workhorse of today's commercial nuclear power industry) and, later, the development of fission breeder reactors.

AEC

Edwin Kinter (center), at the Atomic Energy Commission in 1953, examining a model of the engine section of the Nautilus.

From Fission to Fusion

In the mid 1970s, Bob Hirsch, then head of the U.S. fusion program, hired Ed as his deputy, hoping to instill some Rickover spirit into the fusion program. In 1976, when the Atomic Energy Commission was transformed into the Energy Research and Development Agency (ERDA) and Hirsch was promoted to Assistant Administrator, Kintner assumed the position of head of the U.S. fusion program. Hirsch had commissioned the preparation of a comprehensive fusion development plan that was completed in July 1976 (posted at http://fire.pppl.gov/ us_fusion_plan_1976.pdf).

The Tokamak Fusion Test Reactor (TFTR) was already under construction at Princeton and the plan called for building a series of test facilities in the 1980s and 1990s, culminating in a Fusion Demonstration Power Plant around the year 2000. Kintner believed the plan was sound.

ERDA became the Department of Energy in 1978, and Kintner remained head of fusion, though Hirsch departed to Exxon. Kintner and others testified to a congressional hearing chaired by Rep. Mike McCormack that led to the passage of the Magnetic Fusion Energy Engineering Act of 1980. President Carter signed that Act into law on October 1980 (posted at http://fire.pppl.gov/mfe_act_1980.pdf).

Carter lost the election to Ronald Reagan the following month. The new Administration opposed having the gov-

Rebecca Harrington

Kintner (standing at right) testifying at a Congressional hearing on fusion.

ernment build large energy "flagship" facilities or demonstration plants. The private sector would develop any needed new energy technologies was their view. Still, Kintner spent the next year trying to convince the Administration to implement the fusion plan. He believed that construction of new test facilities had to be the "strategic backbone" of any commercially successful fusion effort.

It soon became clear that the plan would not be implemented and, a year later, Ed resigned. In his letter of resignation he said he felt the Administration was making "a national error for which a price far greater than present savings will be paid at some future date."

He said, "There is little more that I can do except to make clear by my leaving that I am not a party to that decision." (See Fusion Power Associates Executive Newsletter, January 1982). Ed felt that the "strategic backbone" of the fusion program had been removed. He often reminded his staff of another of Admiral Rickover's favorite mottoes: "Where there is no vision, the people perish."

Back to Fission

In April 1979, one of the two nuclear fission power plants at Three Mile Island in Pennsylvania had had a meltdown, and the cleanup was not going well. Shortly after Ed left the DOE, the owners of Three Mile Island, GPU Nuclear in New Jersey, hired Ed to be executive vice president and put him in charge of finishing the cleanup at Three Mile Island. He held that position until his retirement nine years later.

Ed, and his wife Alice, then moved to a beautiful house on the side of a mountain at the border of Vermont and New Hampshire, overlooking the Dartmouth University campus. For several years Ed gave seminars at Dartmouth. The Kintners later moved to The Ridge, a retirement home in Exeter, N.H.

Ed received the Secretary of the Navy Commendation Medal in 1959, the Fusion Power Associates Leadership Award in 1981, and was elected to the National Academy of Engineering in 1990. He also received other commendations, too numerous to list.

Ed had an outgoing and friendly personality that endeared him to all, even when he was taking a hard line on a tough management issue. Many will miss him greatly.

His wife, Alice, three sons, Eric, John and Peter, a daughter, Mary, and four grandchildren survive him. Condolences can be sent to Alice at eandakintner@comcast.net and to Eric at Ekintner@aol.com There will be a memorial service June 12, in Exeter.

Dr. Stephen Dean is the director of Fusion Power Associates.

Letters

(Continued from p. 5)

is to stop the 37 other states not included in the proposed expansion but which have county dose averages greater than those of New Mexico to demand coverage? Illinois, for example, has a county dose average of 3.9 rads. The combined population of these 37 states was over 150 million in 1960. You can be sure that once these "downwinders" or their heirs become aware that they are more deserving than even New Mexico downwinders, they will demand coverage .

Of these 150 million, at least 30 million have had or will have cancers covered by RECA. Multiplying $150,000 per cancer victim by 30 million yields a cost to the government of $4.5 trillion—-that's six times the cost of the recently passed Health Care bill.

It will likely cost between $100 billion and $200 billion to cover the 7 million downwinders in the seven states included in the current bill (only about 150,000 downwinders are currently covered by RECA).

As is made clear in my book, *The Phantom Fallout: Induced Cancer Epidemic in Southwestern Utah* [See *21st Century,* Summer 2009, for excerpts] the original RECA law was not warranted; the downwinders' cancer rates in Utah have been more than 30 percent below nationwide rates. The original RECA bill clearly had unintended consequences that could cost the taxpapers hundreds of billions of dollars.

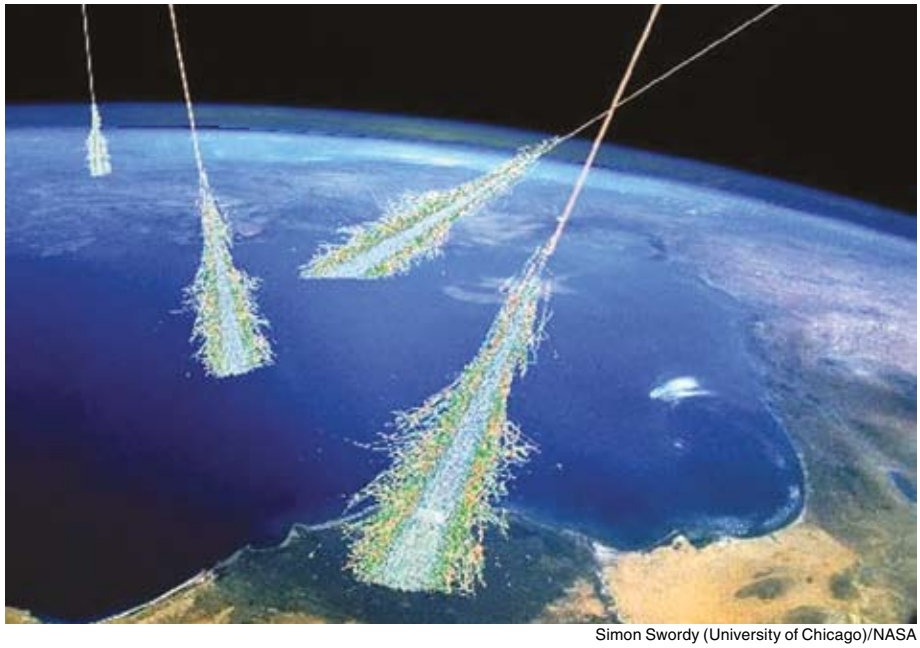
Daniel W. Miles
Washington, Utah

Lance Endersbee Would Be Proud

To the Editor:

I thought *21st Century* readers would like to know that Australia's hated emissions trading scheme did not pass, and, in fact, failed spectacularly in December 2009. This was a resounding defeat to which the recently deceased Lance Endersbee directly contributed. [An obituary for engineer Endersbee and excerpts from an interview with him appeared in the Winter 2009/2010 issue of *21st Century*.]

Robert Barwick
Citizen's Electoral Commission,
Australia



Simon Swordy (University of Chicago)/NASA

An artist's depiction of showers of high energy particles, which occur when energetic cosmic rays strike the top of the Earth's atmosphere. Understanding the biological role of this cosmic ray flow is crucial for the Moon-Mars colonization project, and also for our ability to grasp the truly intergalactic nature of the development of life on Earth, as well as its future in Man's hands, beyond the bounds of that same Earth.

Kesha Rogers's Victory Signals Rebirth of a Mars Colonization Policy!

by Sky Shields

March 11, 2010

The election victory of Kesha Rogers March 2 in the Texas 22nd Congressional District represents a turning point in world history. The voters have demonstrated their refusal to accept the policy of physical-economic austerity which President Obama and his controllers have sought to impose through unconstitutional bank bailouts, a murderous health-care policy, and general inaction on the crucial issues of the existential crisis which now faces the American population and the world. Most notably, they have refused to accept Obama's recent, treasonous decision to scrap the last vestiges of our nation's manned presence in space. They have voted, instead, for a future—a future organized around the intensive physical economic progress that can only be brought about by the scientific advancements connected with an expansion of Man's presence in space.

Rogers's victory provides the oppor-

EIRNS

LaRouche Democrat Kesha Rogers won the Democratic Congressional primary March 2 in Texas (22nd district) with the campaign slogan "Save NASA, Impeach Obama, Vote Kesha." Kesha, who received more votes than both her opponents combined, campaigned on a platform of reorganizing the global economy to replace the current gambling casino of free trade with a policy of physical economic science, to ensure a future for our children and grandchildren. For more on her campaign, see http://keshaforcongress.com/

What will continuous 1-g acceleration of manned spacecraft to Mars tell us of the hidden link of life on Earth to the broader cosmos?

Symbiosis in motion: A scene from a video of Elysia chlorotica*, a sea slug, in a three-way symbiosis with a virus and an algae. The virus contains material that allows chloroplasts, stolen from digested algae, to continue working while inside the body of the slug, so that the slug has to eat only once in its lifetime. This is an illustration in the small of the evolution of entire systems, rather than individual organisms, with organic "particles," such as viruses, playing a crucial role. The video, made by scientist M.E. Rumphro, is featured in* New Scientist.

tunity to address the urgent question of accomplishing the economic development of the Solar System: the first steps of lunar industrialization, and the undertaking of a successful manned mission to Mars. Connected with this mission, is the task of finally establishing a very different conception of the organization of the Solar System and beyond. Specifically, the planned presence of human beings in locations very far from the surface of our Earth will require the development of a much more in-depth understanding of the action of cosmic and other forms of radiation on and within living systems. Not only will this expanded view of the role of energetic phenomena in living matter make extended stays off-planet possible, it also promises to revolutionize medical technology here on Earth, as well as provide a deeper understanding of the nature of living processes, evolution, and morphogenesis than would ever be possible under the existing policy of atomization and under-funding of such scientific investigations.

We will now have the opportunity to tackle the challenge of producing the types of artificial environment required for mankind to leave its "womb" here on Earth. What, from the Biosphere, will we need to carry with us? What will be the role of electromagnetic phenomena and cosmic radiation in that environment? It will perhaps be advisable to simulate Earth's gravitational environment by accelerating ships through interplanetary space at 1 Earth gravity (1g), but this will be the first time that such a willful act of constant acceleration has occurred anywhere in the universe. It will represent the first artificial creation of a sustained gravitational field which, if maintained for long periods, will quickly result in relativistic velocities. What will be the effect of this sort of travel on a crew? What will be its effect on the physical universe more generally? These questions lead us to further unexplored aspects of the Biosphere immediately surrounding us, before leading us deep into Man's future in interstellar space.

What Is Life?

Lyndon LaRouche recently posed a provocative question for our research team: How do you determine to which of V.I. Vernadsky's three phase spaces—the non-living, the living, or the cognitive—a given process belongs? The answer is: *resonance*. No object exists independently as an object. All objects are defined by dynamics—by the process in which they exist. Vernadsky states that therefore biology, qua biology, is an abstract science, like geometry, because it artificially seeks to separate the study of the individual organism from the study of the entire process in which it participates.[1] In reality, there are no distinct organisms; there is only the organism in its context in the entire Biosphere. This is evidenced by the pervasive role of symbiosis in every aspect of the function and evolutionary development of the Biosphere. The evolution of the Biosphere is an evolution of relationships, not of individual organisms. Therefore, it is more advantageous to consider the Biosphere and its evolution as a single system, in which the individual organism exists as a singularity. This nature of the individual organism as singularity and not as object is described in vivid terms by Vernadsky in his concept of the biogenic migration of atoms.[2]

1. Vladimir I. Vernadsky, *The Biosphere* (New York: Springer, 1998).

2. Vernadsky, "Scientific Thought as a Planetary Phenomenon," Nongovernmental Ecological V.I. Vernadsky Foundation, 1997.

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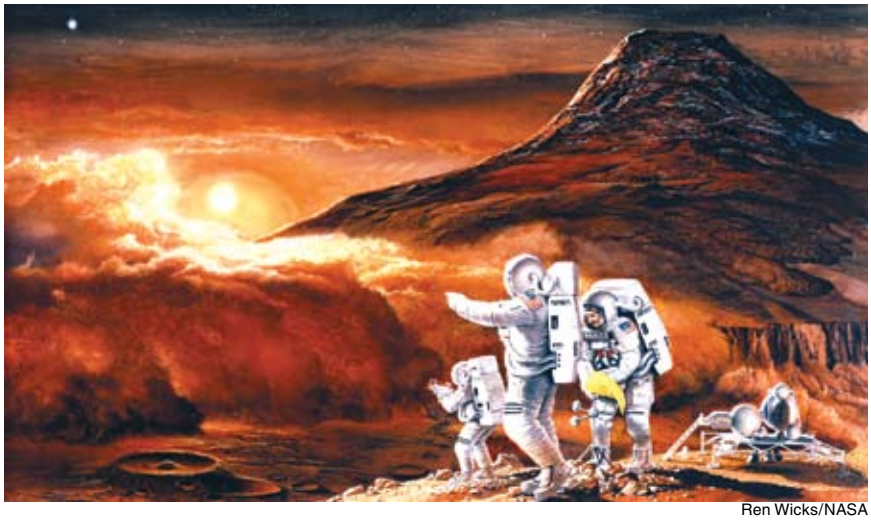
Bog iron: an example of Vernadsky's concept of the biogenic migration of atoms. Bog iron is produced in several stages by the action of the Biosphere, culminating with the creation of iron oxides by the oxidizing action of iron bacteria. In this way, life in the universe acts as an organizing force: the Biosphere, which is in turn organized to higher and higher degrees by the action of Man, in developing the Noösphere.



Ren Wicks/NASA

An orientation toward a successful mission to Mars, using an industrialized Moon as a launch pad, will form the basis for exiting the current world economic crisis. This is mankind's expansion of what Vernadsky called the Noösphere—aiding the Universe in its continuing anti-entropic development. Here, an artist's concept of a Mars landing with the Martian moons of Phobos and Deimos visible in the twilight.

Specifically, organisms do not have permanent structures, like machines. Every portion of a living organism is in a constant state of flux, which is expressed as a continuous exchange of matter and energy, such that the distinction between the organism and its outside environment is not a material one. The same material participates in both processes, much as the same water flows into and out of a whirlpool. The difference lies in the process, not in the material. The obvious difference in the two cases, the living organism and the whirlpool, is that, upon completing its migration through the processes defined as the organism, the processed matter produced in the form of fossil material exists at a higher state of physical organization than before its participation in the organism.

Thus, viewed as a whole, the envelope of life on Earth, the Biosphere, can be viewed as a process of constant organization of the formerly abiotic physical substrate to higher and higher states of organization. In this way, we see the steady development of concentrations of various types of ores and other mineral deposits on Earth. These represent a more concentrated form of organization than that which existed in the previously dispersed state of materials, as initially derived from stellar matter; a state which is still visible in the relatively homogenous distribution of elements as found in, say, lunar regolith.

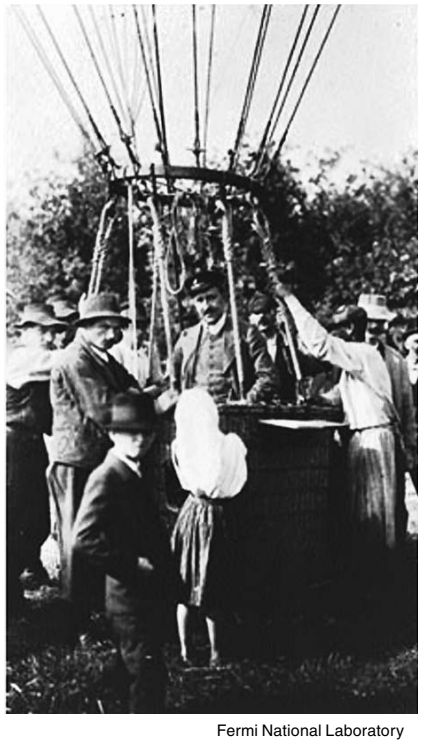
This biogenic migration represents a continuous process extending well outside of the atmosphere of the Earth itself. For instance: The beginning of the most important material cycles within the Biosphere is marked by the action of photosynthesis. In this process, dispersed, low-energy-flux-density radiation from the Sun is captured across large land areas by the action of photosynthetic plants, and organized into the carbohydrate-dense structure of those plants. They literally compose themselves from the incident sunlight which reaches the Earth.

These energy-dense carbohydrates are then consumed by more complex animal life and, via the process of digestion, are incorporated into the structure of these higher organisms, ultimately passing back out into the environment in the form of residual biological fossil materials such as soils, mineral deposits, and even Earth's atmosphere.[3] These fossil materials are then again processed by the geological force of human economic activity—becoming noetic fossils.[4] Thus, the Biosphere and Noösphere can be viewed, in terms of both the scale of the space occupied and the nature of their activity, as a singularity in an otherwise continuous process, marking the shift of matter and energy to qualitatively higher states of organization and concentration.

This continuous process extends to the Sun, in the form of solar energy absorbed by plants (and animals, in the case of vitamin D synthesis), but also much farther, as is evidenced by the steady flow of *cosmic radiation* into and out of the Biosphere. This is a steady flux,

3. Vernadsky, *The Biosphere*, See note 1.

4. Lyndon H. LaRouche, Jr., "The Astrophysics of Gurwitsch Radiation," *21st Century Science & Technology* (Fall 1998); *The Economics of the Noösphere*, (Washington, D.C.: EIR News Service, 2001); "Vernadsky and Dirichlet's Principle," *EIR*, June, 3, 2005; and Vernadsky, "Some Words About the Noösphere," *21st Century Science & Technology*, Spring 2005).



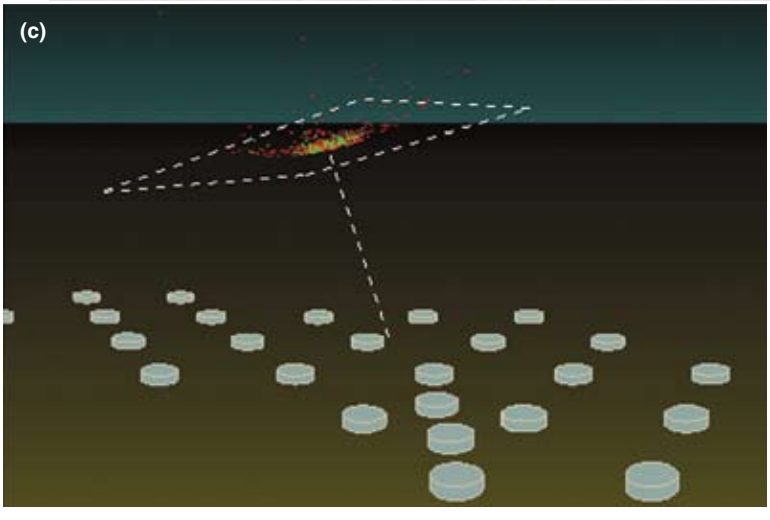
Fermi National Laboratory

Victor Hess, the father of cosmic ray research, in the balloon in 1912 in which at 5,000 feet, he discovered "pentrating radiation" coming from space, what later became known as cosmic rays.

a) A single cosmic ray detector in a Utah field.

b) An aerial view of the CASA air shower array (composed of detectors like the one above) in Utah.

c) Animation of the development and detection of an extensive air shower in the Pierre Auger Cosmic Ray Observatory Engineering Array. The moving rectangle is the "shower plane" that is tangent to the shower front at the shower axis. The green dots represent electrons and positrons. Red dots represent muons. The light detected in a water tank station depends on its distance from the shower axis. The tank closest to the core gets a much stronger signal than those that are far from the axis. The arrival direction is calculated from the shower front arrival times at the different water tank detectors.



Courtesy of Pierre Auger Observatory

much like the flow of solar energy into the Biosphere, though its role in biological processes is largely unexplored. Understanding the biological role of this steady flow of cosmic material has a crucial significance for an expanded Moon-Mars colonization project.

The Biogenic Migration of Cosmic Rays

This is a complete cycle, like the other biogenic migratory cycles such as food consumption and photosynthesis. There is a steady flow of ionized particles in and out of Earth and its atmosphere. Those among them of the highest energy pass directly through all matter, biological and otherwise, seemingly unaffected by that passage. But it is also these particles, capable of bypassing all types of shielding, which are potentially implicated in regulating the circadian rhythms of various organisms maintained in otherwise shielded environments.[5] Other, lower energy particles are involved in col-

5. Frank Brown, "Living Clocks," *Science*, No. 130 (1959).

lisions at different levels of the Earth's atmosphere, producing cascades of secondary particles which are involved in changing isotope ratios at the Earth's surface, and likely effecting radical changes in Earth's climate. It is these particles, for instance, which likely play the dominant role in cycles of glaciation, global warming, and the cyclical passage through ice ages.[6]

This interaction of cosmic rays with the atmosphere, creating cloud cover and shifting Earth's climate in and out of ice ages, is to be considered a very specific type of interaction with the Earth's Biosphere, because, as Vernadsky points out,[7] the Earth's atmosphere is entirely a creation of living matter on the planet. Thus, the cascades produced by cosmic radiation upon entering the atmosphere, as well as the highly energetic activity occurring in the ionosphere, interacting with the solar wind, and producing phenomena such as the aurora, are all properly recognized as products of the Biosphere. The role of cosmic rays on an abiotic environment, such as the Moon, is entirely different, as the peculiar composition of lunar soil attests.

Also, on the level of the individual organism: Shielding living creatures from radiation produces a change in metabolic rate similar to the changes in metabolism which result from removing nutrients, warmth, oxygen (in the case of organisms possessing mitochondria), or sunlight (in the case of organisms possessing chloroplasts). This is a further indication that cosmic rays play a crucial role in the biogenic migration of material through the Biosphere.

Centers for Ocean Sciences Education Excellence

Glacial Grooves State Memorial on an island in Lake Erie is a source of hundreds of fossils. Inset is a closeup of fossils under examination by students on a field trip. There are clear cycles of fossil biodiversity corresponding to variations in cosmic ray influx as the Earth passes through the spiral arms of the galaxy.

The Role of Cosmic Radiation In Evolutionary Processes

What We Know from the Fossil Record. British science writer Nigel Calder and Danish scientist Henrik Svensmark describe a creative role for cosmic rays in the early development of the Solar System, fueling chemical reactions, and promoting the formation of complex molecules.[8] The role of cosmic rays in the evolution of matter does not stop with development of the abiotic material in the Solar System, however. The most telling example of the role of cosmic radiation in biological processes is in long-term evolutionary cycles. The very fact of the role they play in global warming and glaciation is enough to have a significant effect on biological life on Earth, but there is much evidence for a much more direct role for cosmic ray radiation in evolutionary processes. Most of this connection is recognized only in the form of observed resonances between various cycles in the Biosphere, and related cycles elsewhere in interstellar space. Causal connections, and the processes of mediation have not yet been established, although potential candidates will be hypothesized below, starting from the work of the Russian biologist Alexander Gurwitsch.

Outside of what we will discuss here, no attempt has yet been made to account for the anti-entropic, creative nature of this entire process, which links life on Earth to the broader cosmos. A comparison of the cycles, which indicates a clear resonance among astronomical, biological, and geological cycles, is, however, of great interest for beginning the correct investigation.

Clear cycles of increase and decrease in fossil biodiversity (the number of distinct species living on the planet at any given moment) have been discovered, of 62 and 140 million years.[9]

6. Nir Shaviv, "Cosmic ray diffusion from the galactic spiral arms, iron meteorites, and a possible climactic connection," *Phys. Rev. Lett.*, Vol. 89 (2002); Henrik Svensmark, "Cosmoclimatology: A New Theory Emerges," *Astronomy and Geophysics*, No. 48 (2007).

7. Vernadsky, *The Biosphere*, see Note 1.

8. Henrik Svensmark and Nigel Calder, *The Chilling Stars: A New Theory of Climate Change*, (New York: Totem Books, 2008).

9. Robert A. Rohde and Richard A. Muller, "Cycles in fossil diversity," *Nature*, No. 434 (2005).

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Characteristic sandstone layers inside Lower Antelope Canyon, the most-visited canyon in the American Southwest, located on Navajo land near Page, Arizona. The sandstone layering is formed by water flow and erosion.

John Charlton/Kansas Geological Survey

Chalk Badlands in the Smoky Hills of western Kansas, with outcroppings of several types of stone. The region is mostly relatively flat, making the scattered locations, where Niobrara Chalk and Dakota Sandstone are exposed, more dramatic.

The 140-million-year cycle corresponds to the variations in cosmic ray influx predicted to occur from the Earth's passage through our galaxy's spiral arms. This predicted, periodic change in incident cosmic radiation has also been verified in examining the changing potassium 40/41 isotope ratios observed in iron meteorites, and thus, to the frosty "snowball Earth" periods, which correspond to the quantity of incident cosmic radiation.[10]

Examining the age of deposits of igneous rock shows that volcanic activity is on the same, roughly 60-million-year cycle, showing an as yet unexplained connection to geological/tectonic phenomena.[11] But, more to our point here, this cycle is also of the same period as that predicted for the regular passage of our Solar System in and out of the plane of the galaxy, if we take into account the likelihood that the density of cosmic radiation differs from one side of the galactic plane to the other.[12] A component of the sea-level fluctuation measured by Exxon researchers is consistent in period and phase with the shorter fossil biodiversity cycle. The ratio of the strontium 87/86 isotopes, which is related to the amount of dry land left unexposed as water levels change, also matches the period and (inverted) phase of the 62-million-year period,[13] which again points to a relationship between tectonic changes and astronomical cycles (cf. the cycle in volcanic activity identified by Rohde and Muller in footnote 9).

Thus, in general, we see much evidence for a sort of astrobiogeochemical resonance, which leads us to begin to conceive of the idea of the Biosphere as a participant in an organized system whose scale extends to the farthest known sources of cosmic radiation. The impression that astronomical processes are separated by vast reaches of empty space is shown to be incorrect; the Biosphere is connected functionally to the farthest reaches of the physical universe by an incredibly active process, invisible to the naked eye. Space is far from empty, but rather full, dynamic, and complex—organizable, like Earth itself, into the interacting phase-spaces of the abiotic, the Biosphere, and the Noösphere, where the last indicates the potential for mankind's active economic development and reorganization of this complex system. This is the proper context in which to understand discussions of lunar industrialization, Solar System colonization, and the economic organization of interplanetary, interstellar, and intergalactic space.

This leads us to the major problem with all of these cyclical

10. Shaviv, "Cosmic ray diffusion," Note 6; Svensmark, "Cosmoclimatology," See Note 8.

11. Rohde, See Note 9.

12. Mikhail V. Medvedev and Adrian L. Melott, "Do Extragalactic Cosmic Rays Induce Cycles in Fossil Diversity?" *The Astrophysical Journal,* Vol. 664 (2007).

13. Medvedev and Melott, Note 12.

comparisons, but also potentially the source of the greatest possible number of new lines of research: the fact that the actual "chart" of evolutionary development, particularly after the emergence of Man and the Noösphere, is not cyclical. It is a continuous upward development to ever higher levels of organization and energy-flux-density, as measured and defined by the physical economist LaRouche.

So now we return to the question posed by LaRouche at the outset: To which of Vernadsky's three phase spaces does this flow of cosmic rays belong? If they and the cycles with which they resonate, are part of the development of the Biosphere, then, the Biosphere's anti-entropic development must be a character of the entire system of material-energetic flows which participate in the development of that Biosphere. Connected to this, is the necessity of developing means to recognize more qualitative, and not merely quantitative differences in cosmic ray interaction with the Biosphere. Life, as we will see below from the work of Gurwitsch, is sensitive to such qualitative differences in electromagnetic and other radiation, as the above-mentioned studies have not yet taken into account.

Possible Modes of Activity Within the Living Organism

What Are the Natural Processes of the Living Organism that Utilize These Types of Radiation? Regarding quantity versus quality of radiation, and the sensitivity of life to these qualitative differences (where the current generation of measuring instruments lacks equal precision; cf. the work of Gurwitsch),[14] life's interaction with, and usage of, coherent electromagnetic radiation is far superior to the types of abiotic phenomena which are frequently attributed to it in theoretical, rather than experimental, considerations. Knowledge of the complexity of this normal functioning of different types of radiation within living organisms will shed light on what effects are to be expected from exposure to atypical forms of radiation.

Currently, lack of precision in our knowledge of the role of different types of radiation in living phenomena limits us to describing the destructive effects of large amounts of relatively disorganized radiation, such as that which is utilized with varied results in the treatment of various types of cancers. What sort of precise medical applications of radiation could we de-

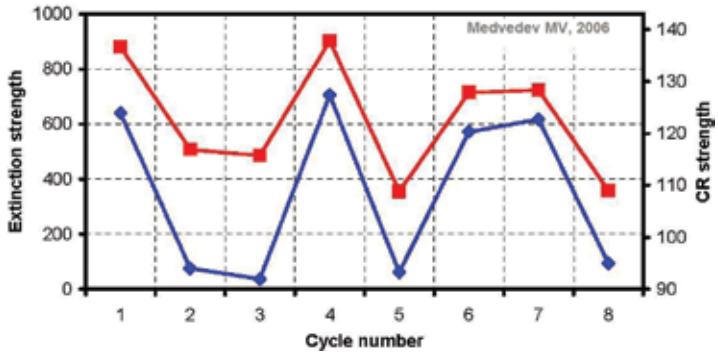


Figure 1
THE MEDVEDEV MODEL OF SPECIES EXTINCTION

The near-perfect agreement between so-called "extinction strength" (blue, lower line) and the intensity of cosmic rays (red, upper line) as predicted from Medvedev's model. Extinction strength here means the amount of change in fossil biodiversity during each 62-million-year cyle of the Solar System in and out of the galactic plane. The cosmic ray (CR) strength predicted by Medvedev's model differs at each bob, because of the irregular distribution of matter throughout our galaxy.

Source: Mikhail V. Medvedev and Adrian L. Melott, "Do Extragalactic Cosmic Rays Induce Cycles in Fossil Diversity?" *The Astrophysical Journal*, Vol. 664 (2007).

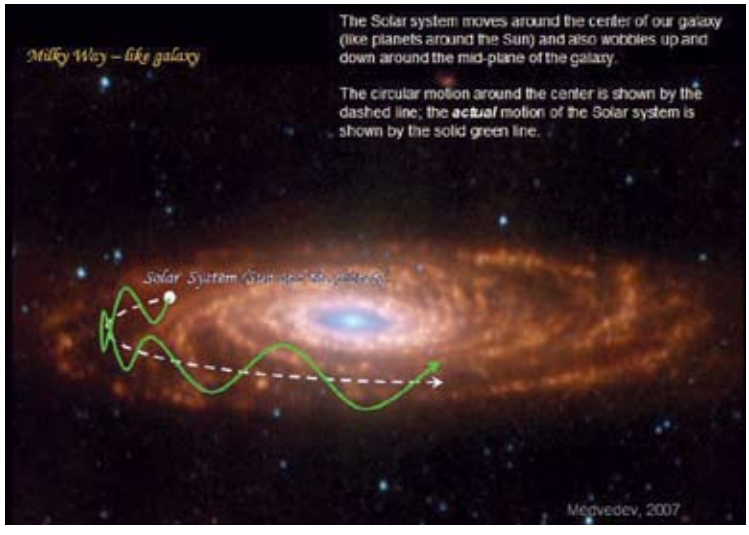


Figure 2
IMAGE OF SOLAR SYSTEM MOTION AROUND OUR GALAXY

Cosmic radiation is more intense as we pass through the bright areas of the spiral arms, because the matter which produced them is denser there. This correlates to a 140-million-year cycle of "icehouse" events on Earth, as cosmic radiation interacts with the Earth's atmosphere to increase cloud cover. As the Solar System orbits the galaxy's center, however, it also bobs up and down on a cycle of about 60 million years (the green wavy line). By Medvedev's model of shock-front cosmic-ray production (see Figure 3), the intensity of cosmic-ray production is greater on one side of the galactic disk than on the other.

Source: Mikhail V. Medvedev and Adrian L. Melott, "Do Extragalactic Cosmic Rays Induce Cycles in Fossil Diversity?" *The Astrophysical Journal*, Vol. 664 (2007).

14. M. Lipkind, "Alexander Gurwitsch and the Concept of the Biological Field," Part 1; *21st Century Science & Technology* (Summer 1998); and Part 2, *21st Century Science & Technology* (Fall 1998).

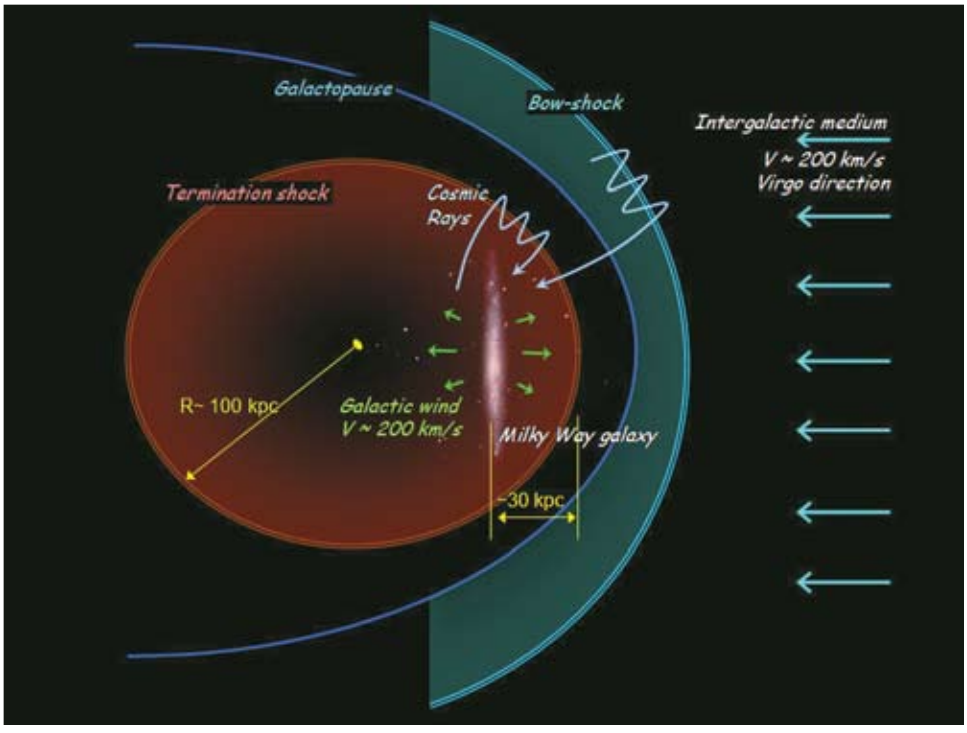


Figure 3
MEDVEDEV'S SHOCK FRONT MODEL

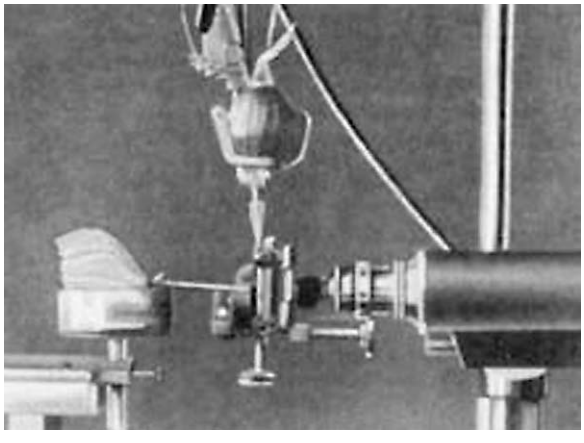
Medvedev's illustration of the shock front that ought to be produced as a result of the face-on motion of our galaxy through the intergalactic medium in the direction of the Virgo cluster. High-energy cosmic rays are produced in the shock front, heavily irradiating one side of the galaxy.

Source: Mikhail V. Medvedev and Adrian L. Melott, "Do Extragalactic Cosmic Rays Induce Cycles in Fossil Diversity?" *The Astrophysical Journal*, Vol. 664 (2007).

velop with a more detailed knowledge of the role of radiation in the normal functioning of living processes?

We know of photosynthesis as one clear interaction of living organisms with the electromagnetic spectrum. Likewise, in mammals, we have the sunlight-mediated synthesis of cholecalciferol. Also, however, Gurwitsch and his followers have demonstrated that coherent ultraviolet radiation plays a very important regulatory role in processes of cell mitosis, the most important function in the gestalt properties of the organism: morphogenesis and regulation.[15] Incorrect functioning of this ultraviolet "mitogenic" radiation has been connected to the development of cancers. The radiation which occurs in these organic processes differs qualitatively from that produced by artificial sources. One notable factor in the biological case is its coherence.

The work of Wood's Hole Marine Biological Laboratory comparative physiologist Frank Brown implies that cosmic rays may play an important role in the regulation of animal metabolisms: The metabolic functions of various organisms are related to various astronomical cycles which tend to be roughly on the order of a day or month. These cycles are reflected in the metabolism of the organism, even when the organism is removed from direct visual cues such as the Sun and Moon. Brown has shown that this regulation continues when the only influences that have not been isolated are cosmic rays, and the various penetrating electric, magnetic, and gravitational field effects produced by the Earth itself. Many animals are known to possess the ability to orient to the Earth's



Alexander Gurwitsch's famous onion stem experiment, where he demonstrated that processes of cell mitosis, which govern the growth and morphogenesis of the organism, depend on low-intensity ultraviolet radiation, which he called mitogenetic radiation.

Alexander Gavrilovich Gurwitsch (1874-1954).

15. See Note 14.

Dr. Frank A. Brown's research showed that some sort of exogenous cycle (cosmic rays, or electric, magnetic, and gravitational field effects produced by the Earth) influenced the metabolism of organisms. For example, oysters that had been transported by train in a light-sealed box from New Haven harbor to Evanston, Illinois, after a two-week adjustment period, began to open again at the time of "high tide" over Evanston. They were maintained in a pressure and temperature-controlled aquarium, sealed from any visual cues from the Sun or Moon.

Chesapeake-Bay.org

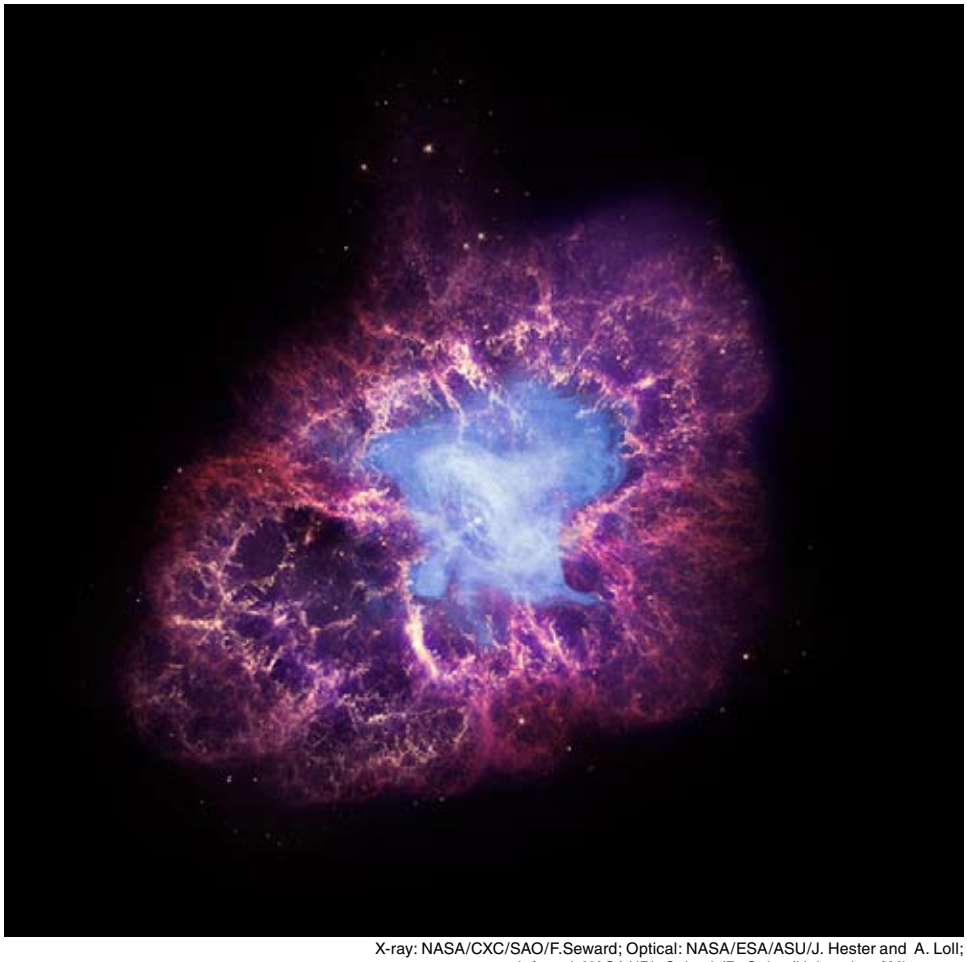
magnetic field. Birds have recently been demonstrated to navigate by actually visually perceiving the magnetic field of the Earth.

As a final point, connected to the work of Gurwitsch, we know that nucleic acids are extremely sensitive to (resonant with) ultraviolet radiation, to the extent that certain viruses are "turned on/off" (enter and exit their lytic or cancer-inducing phase), based on interaction with ultraviolet radiation in laboratory conditions.

What We Know About The Sources of These Fluxes

Crab Nebula, Pulsars, Super/Hypernovae. Our first indication of the fundamentally creative nature of even the "abiotic" universe, is to be found in our recognition of its character as a dynamic, developing system, constantly coming into creation. Relevant to our topic of discussion here, is the constant creation of new sources of cosmic radiation in the form of supernovae, hypernovae, pulsar stars, and the like. While most of what is claimed about them at present is pure speculation, simply extrapolated from existing physical knowledge here on Earth, what is clear is that their constant rate of creation gives us a sense of a moving, directed, rather than cyclical, process which more closely resembles that which characterizes the development of the Biosphere and the Noösphere, each in their respective degree. Therefore, understanding their resonance with life on Earth will give us more insight into their as-yet-unexplored creative characteristics.

A 1-g trip to Mars will represent Man's creation of new relativistic phenomena. It is significant that the known, major sources of cosmic radiation here on Earth, such as the Crab Nebula, are all connected to phenomena which seem paradoxical from the standpoint of relativity theory. This points to a type of causality which lies outside of the simple, kinematic chains of cause and effect, and leads us towards a more gestalt-like, systems approach to causality: *dynamics*. A more certain assessment of the nature of these processes demands a closer inspection,



X-ray: NASA/CXC/SAO/F.Seward; Optical: NASA/ESA/ASU/J. Hester and A. Loll; Infrared: NASA/JPL-Caltech/R. Gehrz/University of Minnesota

The Crab Nebula: A composite image using data from three of NASA's Great Observatories. The Chandra X-ray image is shown in blue, the Hubble Space Telescope optical images are in yellow and red, and the Spitzer Space Telescope's infrared image is in purple. The X-ray image is thought to be smaller than the others because extremely energetic electrons emitting X-rays radiate away their energy more quickly than the lower-energy electrons emitting optical and infrared light.

and begs the question: What physical boundaries do we begin to push, at the moment we institute trips at an acceleration of 1 Earth gravity over long distances?

Experimental Proposals

The first experimental investigations will obviously require a more detailed study of the environment to be faced by our interplanetary travellers. Probes carrying several different types of instrumentation will need to be accelerated at 1-g for an extended period of time, in order to gauge what unexpected physical effects might result from this process.

The economic questions connected to this expanded investigation is more than a question of "local jobs." What this type of political orientation means, and what Kesha Rogers and LaRouche represent, is an orientation towards the future of the human species as a whole. Ensuring mankind's future in this form is the only way to ensure the existence of health care, meaningful employment, and a cultural sense of mission not only for this nation, but for the world. Real patriots, policymakers, scientists, engineers, and average citizens will rally around the vision that this mission represents, defeat the financial controllers of the current Obama Administration, and help make this policy a reality. In a world desperate for real leadership, the future, and our survival, is in our hands.

Pat Rawlings/NASA

Artist's depiction of exploring fossils on Mars—and continuing the expansion of Man and the Noösphere into interstellar space.

Sky Shields is a member of the LaRouche Youth Movement's "basement" research team. sky.jason.shields@gmail.com

Vernadsky on Cosmic Radiation

Vladimir Ivanovich Vernadsky (1863-1945)

Radiation from the cosmos throws an eternally and continually powerful stream of energy onto the face of the Earth, conferring quite a peculiar and novel character on the parts of the planet bordering cosmic space. Due to cosmic radiation, the biosphere acquires characteristics that are novel, unusual, and unfamiliar to the Earth's matter—the face of the Earth reflected in its cosmic environment shows a new picture of the Earth's surface as it is transformed by cosmic forces.

As a result of these radiations the substance of the biosphere is penetrated by energy—it becomes active, it gathers and distributes the energy received in the form of radiation and eventually turns it in terrestrial organisms into free energy capable of performing work.... The external envelope of the Earth formed from this living substance can therefore not be regarded as a domain of sheer substance—it is the domain of energy, the site of transformation of the planet by external cosmic forces.

The face of the Earth is transformed by these forces and to a great extent molded by them. Not only is it a reflection of our planet, a feature characteristic of its substance and energy, but at the same time it is a creation of the external forces of the cosmos. The history of the biosphere is therefore sharply distinguished from that of the rest of the planet, and the role it plays in the planetary mechanism is quite exceptional. It is as much, or even more, the creation of the Sun as it is a manifestation of terrestrial processes.

—*from V.I. Vernadsky, Geochemistry and the Biosphere,* Ed., Frank Salisbury (Santa Fe, N.M.: Synergetic Press, 2006)

References

Frank Brown, "An Exogenous Reference-Clock for Persistent, Temperature-Independent, Labile, Biological Rhythms," *Biological Bulletin*, No. 115 (1958).

Colin Lowry, "Gurwitsch's Non-Reductionist Biology," *21st Century Science & Technology* (Fall 1998).

Adrian L. Melott and Richard K. Bambach, "An ubiquitous 62 Myr periodic fluctuation superimposed on general trends in fossil biodiversity," Parts I and II (unpublished manuscript).

Alexander S. Presman, *Electromagnetic Fields and Life* (New York: Plenum Press, 1970).

Towards a New Periodic Table Of Cosmic Radiation

by Peter Martinson

NOAA

Northern lights over Alaska. The aurora borealis results from the collision and ionization of solar wind particles as they are accelerated along the Earth's magnetic field lines. The aurora colors are determined by whether oxygen or nitrogen atoms are involved.

True knowledge comes from the human mind, not sense perceptions, and it is this creative process that will lead us to an understanding of cosmic radiation and life processes.

Max Planck began his series of lectures on thermodynamics in 1909 by asserting that science is the systematic investigation of sense perceptions. Our concepts of basic principles, like force, come from those senses. The task of science "consists only in the relating of sense perceptions, in accordance with experience, to fixed laws." Those laws were, themselves, always brought closer and closer into line with experience.

But, this description was only a trap for the unsuspecting, for Planck then made an about-face, and asserted, "Ladies and gentlemen, this view has never contributed to any advance in physics." Relating the sense perceptions to one another with mathematics, and pulling logical derivations out of those relations, can be quite interesting, but this could never, in itself, derive a new discovery of principle. The generation of new knowledge about the universe comes from a world different from that of sense perception, but one to which the human mind has access.

Planck's target in these speeches was the so-called "positivist" movement. Since the time he hypothesized the existence of the quantum of action, these anti-reason "brownshirts" asserted that all knowledge must come only from that which is measurable. Further, if some process were not proven to be measurable, then that process could not even exist. Therefore, that world Planck referenced, as the domain of human creativity, could not exist.

The debate about the existence of such principles which guide physical phenomena, and their knowability, has raged until the present day, with the positivists seemingly gaining the upper hand.[1] However, there is now brewing a revolution in science, led by Lyndon H. LaRouche, Jr., which will sweep this mental infection away.

This revolution is classed under the broad name of Cosmic Radiation, which is the investigation of the relationship between what Russian Academician Vladimir I. Vernadsky called "living matter," and that energetic cosmic phenomenon today known under the broad name of cosmic radiation. If our national travesty, the British agent called President Obama, is removed from office before he and

1. For example, although the experiments that can now be performed with CERN's Large Hadron Collider will produce extremely valuable data, the scientists analyzing it will be crippled if they assume a positivist viewpoint.

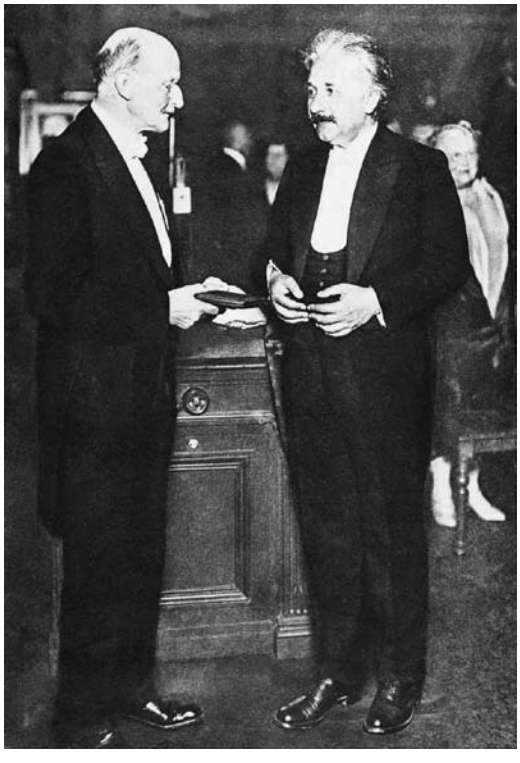
Pat Rawlings/NASA

A first stop in interplanetary travel will be the Moon, from where the future journeys to Mars will be launched. But before the Mars mission, we must learn more about cosmic radiation. Here, an artist's drawing of a Moon colony, with a lunar mining facility that harvests oxygen from the resource-rich volcanic soil of the eastern Mare Serenitatis.

his controllers can dismantle America's last foothold on true, immortal science, the American manned space program, we will soon be presented with the challenges of a manned mission to Mars, embarking from the surface of a soon-to-be-industrialized Moon.

As LaRouche has emphasized, along with others who know what they're talking about, this requires the consideration of accelerated paths between these two bodies, within Solar space. The senses of the positivists say that this intervening space is empty. The travellers on that fusion-powered, accelerating flotilla will say that that space is, indeed, anything but empty. It is as empty as the open ocean, upon which human navigators have mapped out shipping routes outside of which it is either dangerous, or even impossible, to travel. What makes up this open ocean of interplanetary space, and how will it manifest itself to our accelerating descendants?

Positivists, and kindred opponents of reason, beware! The study of cosmic radiation will soon render you an historic kidney stone, passed, on humanity's mission to the stars!



Max Planck (left) presents Albert Einstein with the Max-Planck medal, Berlin, in 1929. Planck established a professorship for Einstein in 1914, when Planck was dean of the University of Berlin, and the two anti-positivist scientists played music together.

In this brief report, I will define cosmic radiation in terms of the problems posed by Planck, Einstein, and their collaborators, and then describe some of the areas of clear research opportunities, and some potential experiments to be carried out.

A milestone reached in this new field of research, will be the enhancement and elaboration of a new periodic system of the universe. In the second half of the 19th Century, Dmitri Mendeleyev applied his genius to the construction of a Periodic Table, which allowed him to forecast the existence of then undiscovered, but potential elements. Since his death, that table has been expanded, but has always remained valid. In the same way, Johann Sebastian Bach's well-tempered system of counterpoint has remained the standard, up through the compositions of Johannes Brahms and Robert Schumann, in a way that opened up a whole world of possible modes of communication in music. Instead of throwing Mendeleyev's Periodic Table away, it is now time to see it as being subsumed by a larger system, called Cosmic Radiation, with which the present state of human understanding is pregnant.

What Is Cosmic Radiation?

First, let's get a summary of what we mean by "cosmic radiation."

As a starting point, Vernadsky divides the universe into material phenomena and energetic phenomena. Energetic phenomena, themselves, are generally invisible to the senses, although their effects are very sensible. They include the various fields—the electric, magnetic, and gravitational fields found in the Solar System and elsewhere—and also the electromagnetic radiations, covering the entire spectrum of frequencies. Material phenomena include what happens when you run into a tree. Also, the elaboration of crystal structure, and the chemical properties of the general phases of

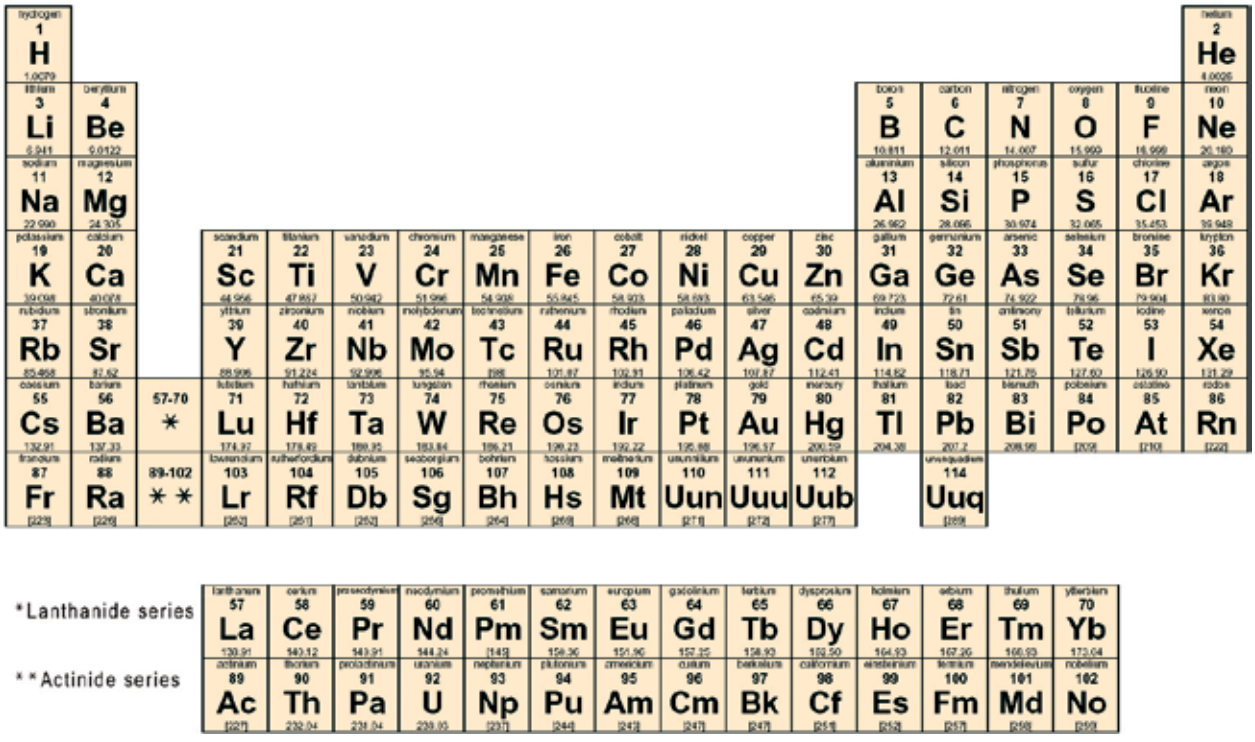
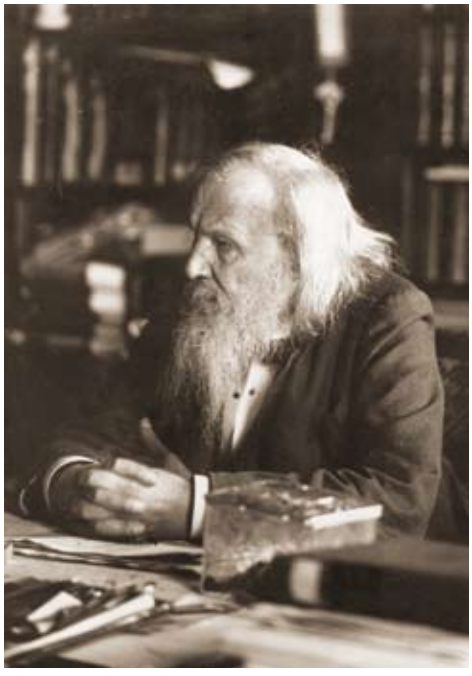


FIGURE 1
The Periodic Table of the Elements
Each column of this modern Periodic Table contains elements that have similar chemical properties. This amazingly insightful construction will be subsumed, soon, by a more comprehensive table, which will include the living and cognitive domains.

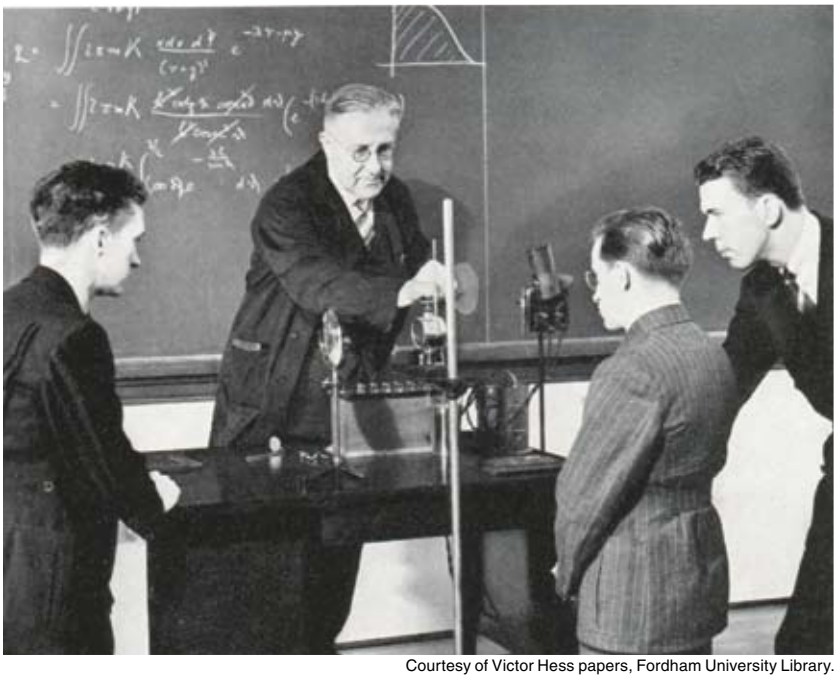


Dmitri Mendeleyev in 1897. His genius created the Periodic Table of the Elements, which remains valid today.

matter, constitute material phenomena. Thus, the cosmic rays discovered by Victor Hess, being the high-velocity nuclei of all the atoms on the Periodic Table, would be classed as material phenomena.

Our own biological sense apparatus is designed to be sensitive to the interaction between the material and energetic. For example, as you read this page, which is a material body, light is reflecting off of the page into your eyes. Your eyes do not, themselves, perceive light, but perceive a page with words written on it. The light transmits a signal from the page, to receptors in your eyes, which then convert the signal into a different form, which can then be transported to your brain. There, your mind has the opportunity to interpret the signal—which itself probably bears little optical resemblance to what you think this page looks like! But, the energetic light signal, which cannot itself be seen,

Vernadsky's tomb at the Novodiévitchi Cemetery near Moscow, where many famous Russian figures are buried.



Courtesy of Victor Hess papers, Fordham University Library.

The discoverer of cosmic radiation, Victor Hess (center) demonstrating his cosmic ray apparatus to students at Fordham University, where he was a professor of physics from 1938 to his death in 1964.

registers the existence of the material object before you, to the material object of your biological senses.

The concepts "material" and "energetic" are thus well defined. Material is the stuff you can sense, and energetic is why you can sense it. Energetic phenomena are generally continuous, while material phenomena are generally discrete. Who would mistake the light emitted from a light bulb, for the light bulb itself?

But, are these two concepts really so well defined?

The fundamental, and most studied, of the so-called energetic phenomena, is light. Such scientists as Christiaan Huygens, Thomas Young, and Augustin-Jean Fresnel established that light is not composed of particles shooting in straight lines, but represents a wave motion. This was profoundly demonstrated in experiments on the interference of the light waves (see box, p.24). This concept required (and still does, in this author's opinion) a material substrate in which the waves can become manifest, in much the way that water waves necessitate the existence of water. Without the water, what would be waving? Hence, light spreads as a space-filling wave structure, and is thus continuous in space, never having a specific location. Any "points" of light represent an event of constructive interference among waves.

But, when Max Planck decided to work out the laws governing the types of radiation that are emitted by a heated body, the frequency of which depends upon its temperature, he had to give this supposedly continuous phenomenon of light a discrete form. He showed that, in the transformation of the action of material oscillation into that of electromagnetic radiation, there was a smallest amount of action that could be thus transformed, which he called the quantum. It is as if, when you press the accelerator of your car, you have to press down until you're giving enough gas to go 1 mile per hour, and your car instantaneously achieves that speed, never having gone a half mile per hour! The smallest amount of energy that could be transferred by the

Portrait by Bernard Vaillant

Christiaan Huygens (1629-1695)

Painting by Sir Thomas Lawrence

Thomas Young (1773-1829)

Engraving by Ambroise Tardieu

Augustin-Jean Fresnel (1788-1827)

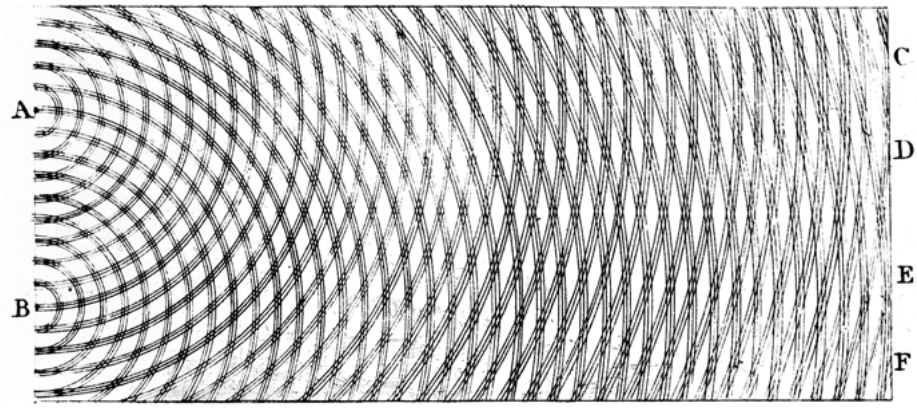
Huygens, Young, and Fresnel established that light is not composed of particles in straight lines, but represents a wave motion (see box, p. 24).

radiation was proportional to its frequency. Hence, at very small scales, light, and all other energetic phenomena, had the properties of a discrete part—the continuity of this supposed wave phenomenon had broken down.

Although there was an attempt to ignore Planck's hypothesis, experiments around the world began to result in paradoxes of exactly the form he forecast. Finally, Einstein broke the standoff in 1905, when he demonstrated that the photoelectric effect could be efficiently explained, if it were assumed that light transfered energy to the ejected electrons in the form of quantum packets. As the intensity of the light was increased, no increase in the kinetic energy of the ejected electrons was observed. Hence, each electron was given a specific amount of kick, which coincided with an individual quantum transfer. That amount of kick would only change if the frequency of the light were changed.

So, here was one example of an energetic phenomenon, acting as a discrete object.

What about matter? A similar category of paradox was popping up all over the study of atomic phenomena, specifically in the spectra of the elements and their isotopes and ions. Louis de Broglie took from Planck the hypothesis that the universe is harmonically organized, and determined a wave structure for elementary particles, such as the electron. He forecast that a beam of electrons focussed on a thin crystal—the distance between whose atom-points was comparable to the "wavelength" of the



Thomas Young's sketch of wave interference. Each series of curves represents a wave peak, and where wave peaks cross is a high point of constructive interference.

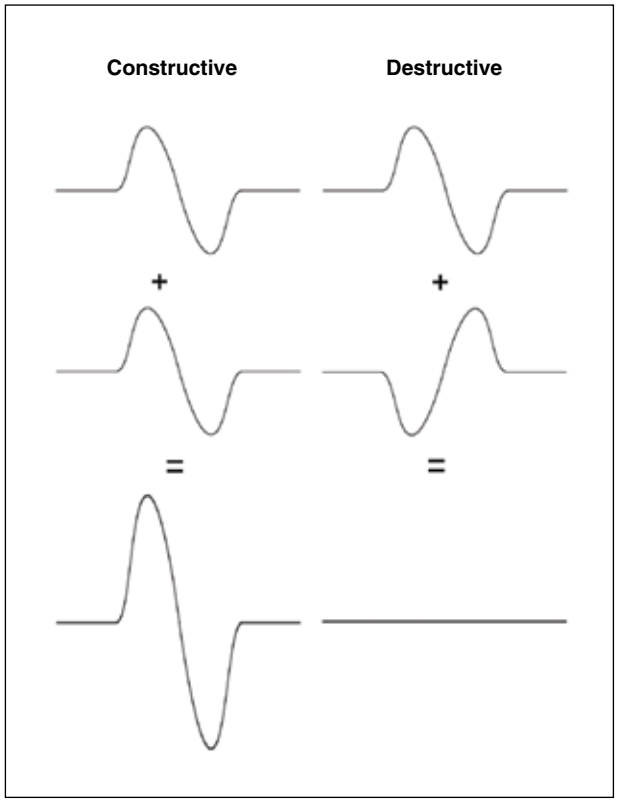
Two-Slit Interference

Wave phenomena are characterized by what is called "interference." Transverse waves, such as those produced on the surface of water, are composed of both peaks and troughs. If two waves cross each other, the heights of the waves "add" to each other, in such a way that two peaks crossing will produce a wave whose height is enhanced, while a peak crossing a trough will produce one whose height is diminished. If one wave encounters a barrier with two holes, each hole will become the source of a new set of waves, and thus two wave sets will propagate on the other side of the barrier. If a screen is set up farther on that side, the waves will produce an interference pattern.

In the image shown here, drawn by Thomas Young, two sets of water waves emanate from the slits at *A* and *B*. Each of the circles drawn represents a peak of a circular wave. At the far end is a screen. Between points *D* and *E* is the tallest wave, between *C-D* and *E-F* are shorter tall waves, and so forth. But, at points *C, D, E,* and *F*, the waves completely cancel each other.

A beam of light passed through two thin slits will also produce such a pattern on a screen. Thus, it was hypothesized that the light must have the same wave characteristics as water. This opened up the question, though, as to what, exactly, was waving?

—Peter Martinson



electron beam—would produce an interference pattern on the other side, analogous to light interference, and then he calculated the characteristics of that pattern. The experiment was performed with such a beam of electrons, and exactly the result forecast by de Broglie was obtained. Thus, all matter, including the lowly electron, has wave characteristics, just like light and all other energetic phenomena.

If electrons, supposedly tiny particles, can be induced to act like non-localized wave phenomena, then what exactly are they? Indeed, what is matter itself, and how is it different from energetic phenomena? If both material and energetic phenomena have the characteristics of both corpuscles and space-filling wave functions, then how can it be said that the space between planets, which is filled with an enormous variety of radiation, is empty? It is as empty as your typical university physics professor's head!

Louis de Broglie (1892-1987) took Planck's hypothesis that the universe is harmonically organized, and determined a wave structure for elementary particles.

The New Periodic Table

This consideration must take the form of a central theme in the investigation of cosmic radiation, and its interaction with life. Organisms on our Earth are not opportunistic, hyperactive combinations of dead chemicals. They represent the organized expression of a universal phase of physical space-time, within which matter functions differently than in the abiotic phase. Does such living matter also have an opportunity to manifest both field and corpuscular characteristics? Or must living matter take a back seat to the quantum paradoxes that have tortured the positivists for the past hundred years? I think that would be very insulting to an entire phase of the Creator's universe!

At the same time, the process of photosynthesis is only one, albeit a very important one, of many aspects of the interaction between living matter and cosmic radiation. Areas of investigation will be described below, which demonstrate that this interaction is perhaps the dominant expression of life in the universe. Indeed, it may turn out to be incorrect to discuss "the interaction of life and cosmic radiation," instead of, simply, "cosmic life processes." Instead of viewing the Biosphere as some separate entity which interacts with cosmic phenomena, it very well might be more accurate to view cosmic radiation, generally and universally, as an aspect of life in the universe, and thus life on Earth is itself inseparable from these radiations. As one of my collaborators recently expressed it, investigating life by shielding it from various radiations, could be like investigating a whirlpool by shielding it from water.

Cosmic radiation can be divided into categories, such as the various fields (electric, magnetic, gravitational, morphogenetic, etc.), the domains of the electromagnetic spectrum (radio, microwave, infrared, visible, ultraviolet, X-ray, gamma ray, etc.), and so-called energetic particles (cosmic rays, radioactive decay products, etc.). It is also necessary to subsume each of these categories by the domain of action, in terms of Vernadsky's three phase spaces: the abiotic, the Biosphere, and the Noösphere. For example, ultraviolet light (UV) is active on a purely chemical basis, in the breaking of chemical bonds; but it is also active in living processes, such as in the vision of many insects; and it is also used by man in his study of various organic systems, like chlorophyll, through UV fluorescence experiments. These three types of events must be classed as different phases, although of the same wavelength ranges.

Starting from here, we can begin to build up harmonies among sets of elements. In the tradition of Mendeleyev's notecard method, we can begin amassing properties of the catalog of radiations, including their relations to both living and cognitive phases of space-time. Mendeleyev created a table of elements, arranging their ascending masses according to the characteristic properties they exhibit in chemistry.

His table was incomplete, as Mendeleyev himself would readily point out were he alive today. For example, there is no convenient way to represent the expanding armada of isotopes in this table; much less is there a way of showing how each element or isotope came into being. The American physical chemist William Draper Harkins took issue with this in 1917, by not-

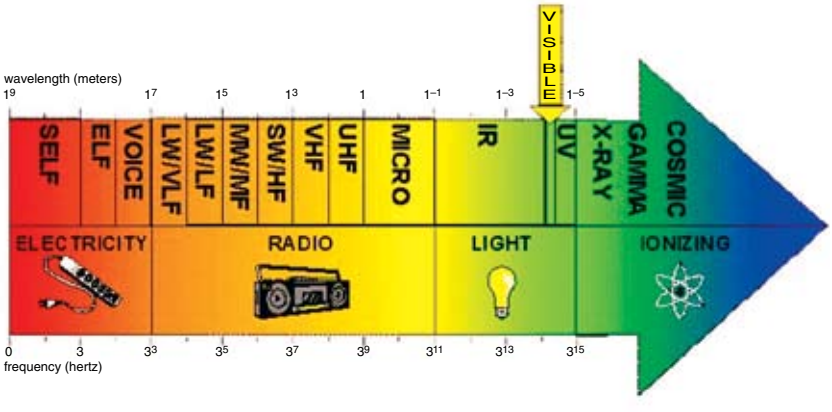


FIGURE 2
The Electromagnetic Spectrum
Life responds to all wavelengths of the electromagnetic spectrum.

William Draper Harkins (1873-1951), a physical chemist at the University of Chicago, noted that the cosmic abundances of the elements vary such that the even-numbered elements are far more abundant than the odd-numbered ones.

AVERAGE COMPOSITION OF THE LITHOSPHERE

	Igneous (95 per cent).	Shale (4 per cent).	Sandstone (0.75 per cent).	Limestone (0.25 per cent).	Weighted average.
SiO_2	59.93	58.10	78.33	5.19	59.85
Al_2O_3	14.97	15.40	4.77	.81	14.87
Fe_2O_3	2.58	4.02	1.07	.54	2.63
FeO	3.42	2.45	.30	.....	3.35
MgO	3.85	2.44	1.16	7.89	3.77
CaO	4.78	3.11	5.50	42.57	4.81
Na_2O	3.40	1.30	.45	.05	3.29
K_2O	2.99	3.24	1.31	.33	3.02
H_2O	1.94	5.00	1.63	.77	2.05
TiO_2	.74	.65	.25	.06	.73
ZrO_2	.03	.....	.....	.....	.03
CO_2	.48	2.63	5.03	41.54	.70
P_2O_5	.26	.17	.08	.04	.25
S	.11	.....	.....	.09	.10
SO_3	.....	.64	.07	.05	.02
Cl	.06	.....	.....	.02	.06
F	.10	.....	.....	.....	.10
BaO	.11	.05	.05	.....	.10
SrO	.04	.....	.....	.....	.04
MnO	.10	.....	.....	.05	.09
NiO	.03	.....	.....	.....	.03
Cr_2O_3	.05	.....	.....	.....	.05
V_2O_3	.02	.....	.....	.....	.02
Li_2O	.01	.....	.....	.....	.01
C	.....	.80	.....	.....	.03
	100.00	100.00	100.00	100.00	100.00

Source: Source: Frank Wigglesworth Clarke, *The Data of Geochemistry,* (Washington, D.C.: The U.S. Geological Survey, 1911), p. 32.

One of Frank Wigglesworth Clarke's tables of geochemistry.

ing that the cosmic abundances of the elements vary in such a way that the even-numbered elements are far more abundant than the odd. He concluded, rightly, that the abundances are not determined by mass, but by "factors involved in the formation and disintegration of the atoms." Thus, there is no representation in Mendeleyev's table yet, of the evolution of isotopes, through the stages of sundry radioactive decay series.

Mendeleyev's student, Vernadsky, hypothesized that a new system of organizing the elements could be developed, if the distribution of minerals in the Earth's crust by living processes were taken as a crucial property. Vernadsky criticized American geochemist Frank Wigglesworth Clarke's wonderful tables of geochemistry for exactly this omission, and for assuming that the distributions were merely geochemical, instead of biogeochemical.[2] This strategy was enhanced by the recognition that organisms in the Biosphere actively select specific isotopes of the elements, which implies the ability of life to select on the basis of some criteria other than simply chemical. A new table must thus reflect the dominant role that living processes play in the motions and transformations of all matter.

We go a step further. All living processes depend, fundamentally, on the catalog of cosmic radiation, as demonstrated profoundly by photosynthesis. Therefore, the Periodic Table itself can and will be reorganized into a new system, which takes as crucial elements those effects of the transformation of cosmic radiation within the three phase spaces of the universe—the abiotic, living, and willful cognition. Mendeleyev's work was extremely important, but was necessarily bounded by the contemporary state of experimental work. More than one century later, we are now poised to include what seems like the rest of the universe. In this way, as LaRouche has described it, we can now begin to get this universe organized.

The Shape of Life

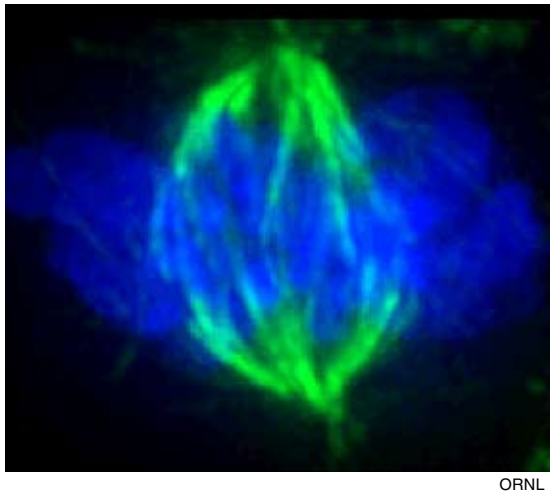
To conclude, let us look at one example of "Cosmic Life Processes," with the promise that there will be a lot more to come in the advancing weeks and months.

Russian molecular biologist Alexander Gurwitsch demonstrated that mitosis in cells, during the developmental stage of the organism, can be induced through interaction with other cells in active mitosis phases. He discovered that this effect is caused by the emission of radiation from one cell to another, the wavelength of which he found to be that of ultraviolet light. He named this phenomenon mitogenetic radiation ("M-rays"). Later, he went on to demonstrate that the mitosis of cells was affected, spatially, by the other mitosing cells in the environment. He carried out these experiments under the hypothesis that there existed a morphogenetic field, which was analogous to the fields found in physics, but was not any one of them. He proposed that the study of this field, which was uniquely biological, would enlarge our understanding of fields in general.

Gurwitsch's M-rays are bound to very specific wavelengths. Outside that range, there is clear evidence of a more-or-less behavioral influence on living organisms from other categories of cosmic radiation, under the topic of Circadian Rhythms. American biologist Frank Brown's experiments did not neces-

2. Vernadsky also hypothesized that the granite bedrock of continents, which floats atop the denser basalt layers forming ocean bedrock, was generated by living processes. A manned mission to Mars, beginning with industrialization of the Moon, will be necessary to determine whether or not granite even exists on other planetary bodies. As yet, none has been found. See, for example, Rosing, et al. (2006).

Alexander Gurwitsch (1874-1954), a Russian molecular biologist, demonstrated that plant cells in mitosis are affected by other cells in the environment that are undergoing mitosis, an expression of a phenomenon he called mitogenetic radiation.



ORNL

A micrograph showing condensed chromosomes in blue and the mitotic spindle in green during prometaphase of mitosis.

sarily reveal morphological changes, but these rhythms apparently registered all energetic phenomena, including electric and magnetic fields, cosmic rays, and extremes in the electromagnetic spectrum (such as gamma rays). Besides simple behavioral effects, reproductive cycles are also driven by lunar, annual, and other cosmic cycles.

One clear hint at a mode of direct action comes from a description by Russian biologist Vladimir Voeikov of A.A. Kozlov's work, which demonstrated that ionizing radiation could be necessary for the division of cells. Gurwitsch's M-rays are in the ultraviolet range, between about 3 electron volts and 100 electron volts. Kozlov pointed out that, if a beta particle exceeds 263,000 eV in water, it will produce Cerenkov radiation, which is about 4-5 eV—right at the low end, and thus the sweet spot, of mitosis-driving M-rays. Hence, if a gamma ray could enter the cell and trigger a beta decay from one of the atoms there, this would generate potential M-rays, and thus drive a mitosis. The experiment has not yet been carried out, to my knowledge, but it presents a clear avenue down which the development of the Biosphere could be driven, were the Creator of the universe so inclined.

These M-rays could be induced in another way—by cosmic rays. The Pierre Auger Observatory in Argentina detects the air showers caused by cosmic rays in two ways. First, barrels of water provide an environment in which the secondary particles of the air shower can move faster than light, which produces Cerenkov radiation. There is every reason to assume that, inside a cell, these secondaries produce a Cerenkov event, and thus M-rays. Second, the primaries cause nitrogen in the atmosphere to produce sub-ozone layer ultraviolet radiation, which can reach up to 4 watts on the ground. This could also be a potential source of M-rays.[3]

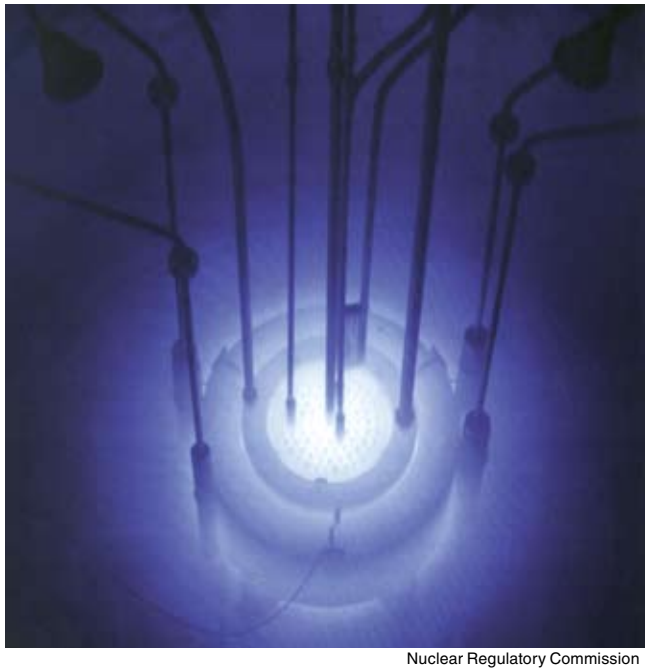
3. This process, specifically, draws again into consideration the importance of the creation and maintenance of the Earth's atmosphere, which has the ability to convert high-energy cosmic rays into forms that are usable by organisms in morphogenesis.

While this is not proof that morphogenesis is driven from outer space, it provides a very important mode of connection between the processes in distant systems, such as the Crab Nebula, with life here on Earth. Here we have a rich territory of experiment to fill out part of our new Periodic Table, under the category of Ultraviolet Radiation in the Biosphere.

A New Understanding of Our Universe

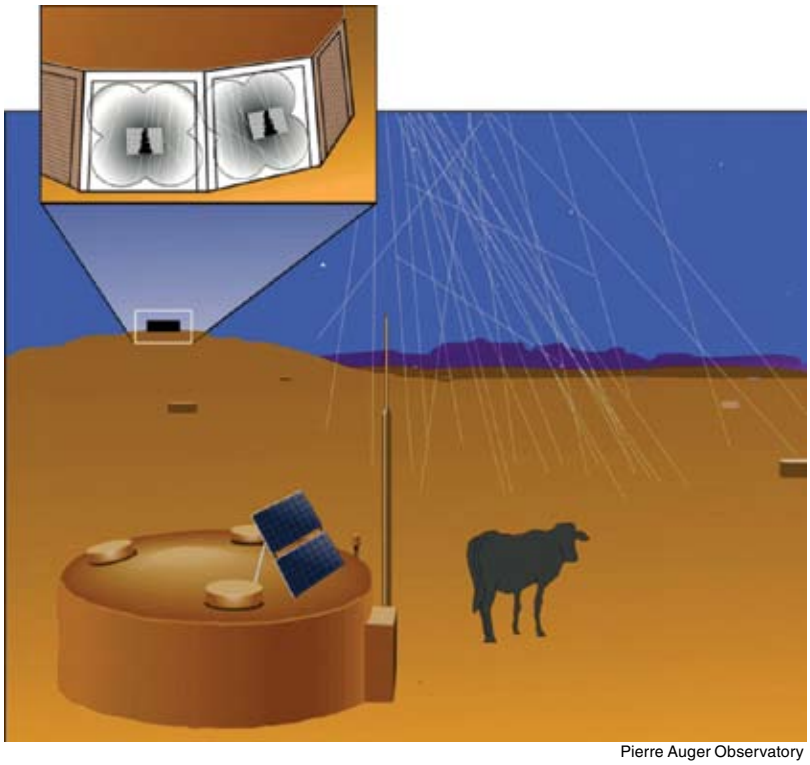
Human civilization is on the brink of a new understanding of its universe. The effects of cosmic radiation will soon be recognized to impact virtually all aspects of scientific work. But, the recognition of this truth requires the overthrow of the now-dominant position that the positivist outlook has held over science. We must return to Planck's polemic against the positivists, that human reason does not lie in the world of sense perceptions, but in a higher, unsensed world.

This concept today sees its most developed state in the ideas of Lyndon LaRouche, who has asserted the primacy of a science of



Nuclear Regulatory Commission

Russian biologist Vladimir Voeikov, who translated Gurwitsch's work and continued his research, reports on the work of A.A. Kozlov and mitogenetic radiation. Kozlov's research demonstrates that Cerenkov radiation, the blue light produced by a beta particle exceeding 263,000 eV in water, posseses just about the same energy in electron volts as mitogenetic radiation, suggesting that beta decay from a gamma ray hitting a cell could drive mitosis. Here, Cerenkov radiation in a research reactor.



Pierre Auger Observatory

Gurwitsch's mitogenetic radiation could also be induced by cosmic rays. The Pierre Auger Observatory detects cosmic rays by using sensitive light sensors to observe the faint fluorescence caused by collisions of cosmic ray showers with air molecules in the atmosphere, as shown in the illustration. The Observatory has 1,600 particle detectors spaced uniformly over 3,000 square kilometers to record cosmic ray showers.

physical economy, over all other physical sciences. It is in the domain of that science, that the properties of human cognition are studied as a willful, causal representation of what can be called cosmic creation. A core of the budding physical economist's curriculum, is the study of the creative processes of a human mind, as represented in specific cases of scientific discovery. It is those processes, which the physical economist must seek to provoke, promote, and defend in the design of public policy.

As such, the earliest lesson in a course of physical economics, is that absolutely no knowledge is derived from sense perceptions, but those perceptions must rather be assumed to be fraudulent—in a very lawful way. True knowledge comes from the human mind, which uses those senses as what LaRouche terms "instrumentation," the paradoxical juxtaposition of which must be deciphered by the creative mind. In the same way, a skillful lawyer will pit two obviously lying witnesses into argument against each other, in order to make obvious where the truth doesn't reside. But, those lying sense perceptions, taken by themselves, can never be used to mathematically predict an as-yet-unknown, causal phenomenon. Only an hypothesis, generated by the creative individual worker, informed through the errors inherent in several sense perceptions, has that predictive quality.

This is the way all future scientists must think, in order to make sense of our growing universe.

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Lyndon LaRouche, who initated the Cosmic Ray Project, puts human creativity at the center of physical economy. Here, a seminar with LaRouche Youth Movement members in Europe.

References

F. Brown, "Living Clocks," *Science*, Vol. 130 (1959).

Alexander Gurwitsch and Lydia Gurwitsch, "Twenty Years of Mitogenetic Radiation: Emergence, Development, and Perspectives," translated by Vladimir Voeikov and Lev Belousov, *21st Century Science & Technology*, Fall 1999, p. 41.

William Draper Harkins, "The Structure of Atoms," *Science*, Vol. 46, No. 1192, p. 419, (1917).

———, "The Structure of Atoms II," *Science*, Vol. 46, No. 1193, p. 443, (1917).

Lyndon LaRouche, "The Escape from Hilbert's 'Zeta' 'X': Mapping the Cosmos," *EIR*, March 19, 2010

Max Planck, *Eight Lectures on Theoretical Physics*, translated by A.P. Wills (New York: Columbia University Press, 1915).

M. Rosing, D. Bird, N. Sleep, W. Glassley, F. Albarede, "The Rise of Continents—an Essay on the Geological Consequences of Photosynthesis," *Palaeogeography, Palaeoclimatology, Palaeoecology*; Vol. 232, p. 99 (2006).

Vladimir Vernadsky, "On Some Fundamental Problems of Biogeochemistry," *21st Century Science & Technology*, Winter 2005-2006, p. 39. http://www.21stcenturysciencetech.com/2006_articles/Biogeochemistry.pdf

_____, "Problems of Biogeochemistry II: On the Fundamental Material-Energetic Distinction Between Living and Nonliving Natural Bodies of the Biosphere," *21st Century Science & Technology*, Winter 2000-01, p. 20. http://www.21stcenturysciencetech.com/translations/ProblemsBiogeochemistry.pdf

_____, "On the States of Physical Space," *21st Century Science & Technology*, Winter 2007-08, p. 10. http://www.21stcenturysciencetech.com/Articles%202008/States_of_Space.pdf

Interview with Prof. Vladimir Voeikov, *21st Century Science & Technology*, Spring 2000, p. 58.

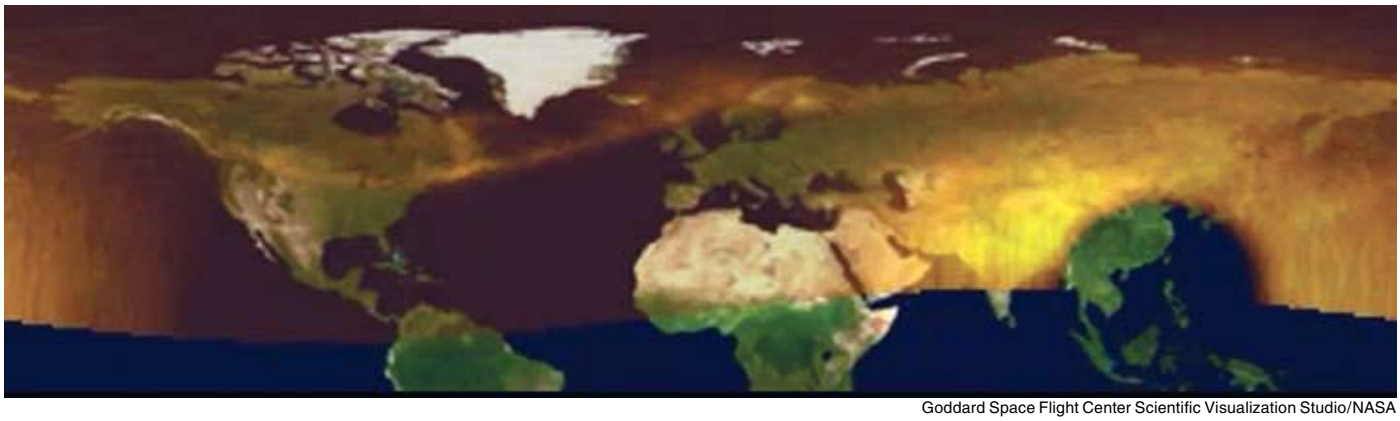
On the Fight Around the Quantum:

Guido Bacciagaluppi, and Antony Valentini, *Quantum Theory at the Crossroads: Reconsidering the 1927 Solvay Conference* (Cambridge: Cambridge University Press, 2009).

Louis de Broglie, "Wave Nature of the Electron," Nobel Prize Lecture, 1929 http://nobelprize.org/nobel_prizes/physics/laureates/1929/index.html

Albert Einstein, "On a Heuristic Point of View about the Creation and Conversion of Light," *Annalen der Physik*, Vol. 17, p. 132 (1905).

Max Planck, "On the Law of Distribution of Energy in the Normal Spectrum," Annalen der Physik, Vol. 4, p. 553 (1901).



Goddard Space Flight Center Scientific Visualization Studio/NASA

Charged particles flowing outward from the Sun and hitting the Earth's magnetic field, emit light when they collide with atmospheric molecules. This visualization of the aurora over the North Pole was taken by the ultraviolet VIS Earth Camera on the POLAR spacecraft, on April 17, 1999.

ONWARD TO MARS

The Triumph of The Weak Forces

by Oyang Teng

Because of the limitations of our sense organs, we are conscious only of a narrow sliver of the electromagnetic spectrum, mostly in the range of visible light and infrared radiation. While other organisms are adapted to sense different regions of the spectrum, we rely on the use of our extended "technological sense organs" to gain access to the full range of radiation penetrating the terrestrial environment from the Sun and more distant cosmic sources, as well as their interaction with the atmosphere and electromagnetic fields of the Earth.

With this expanded sense apparatus provided by instrumentation, we can thus see not merely discrete objects existing in empty space, but an active continuum extending within and between all such seemingly separate objects, composed of both the presumed particles of cosmic rays, as well as the various, intersecting electromagnetic wave-phenomena.

In this way, we continually overcome the very real limitations of our physiology, although we remain susceptible to artificial limitations in our thinking—particularly when we allow a naive interpretation of our basic sense perceptions to dominate our picture of the physical world, whose characteristics in the very large and the very small are revealed by the general phenomena of cosmic radiation.

The Russian biogeochemist Vladimir Vernadsky believed that the pervasive action of the continual range of the unseen cosmic radiations permeating all of space was so significant, that not only the biosphere—including its transformation by human action into the noösphere—but even the distribution and character of the chemical elements in the crust, could only be understood as manifestations of cosmic processes. In *The Biosphere,* he wrote that living organisms are "the fruit of extended, complex processes, and are an essential part of a harmonious cosmic mechanism, in which it is known that fixed laws apply and chance does not exist."

Meeting the challenges of a manned Moon-Mars mission will open the entire electronmagnetic spectrum for human use, redefining cognitive science for the next century.

Like Poe's purloined letter, the evidence for the "harmonious cosmic mechanism" is all around us. The vast experimental data on cosmic radiation and its connection to cycles of climate, biodiversity, and mass extinctions are substantial, albeit preliminary, hints at the effects of biological regulation at an

astrophysical scale.[1] A rich material-energetic connection binds the Earth with the Solar System and the entire galaxy.

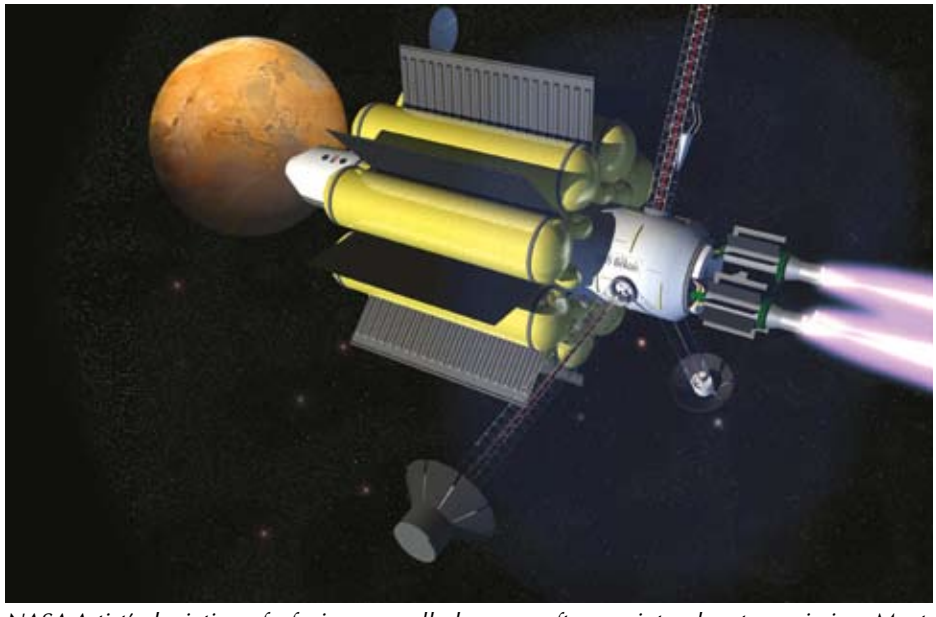
Just as important as this *connection,* is the material-energetic *distinction* manifested among non-living, living, and cognitive processes. As the highest expression of material-energetic transformation, both the biosphere as a whole, as well as individual organisms (the specific expression of what Vernadsky called living matter) provide natural instruments of the most exquisite sensitivity for registering the fundamental properties of material and energetic phenomena. Rather than attempting to build the universe up from its presumed smallest, inorganic parts, we must build downwards from cognitive and living processes. This approach will necessarily lead to, among other things, an expansion of the Periodic Table of the Elements.[2]

Unfortunately, the much-hyped historical division between the mechanistic and vitalistic outlook, has ingrained a false dichotomy in contemporary thought. For example, although the mechanist reduces all processes, including biological ones, to movements of discrete particles of matter, and the vitalist locates causality in some agency acting outside those material parts, typically in some unique form of "energy," both accept the same fundamental assumption regarding the existence of discrete particles of matter as such. Despite the fact that few people today would claim to be either true mechanists or true vitalists, modern science is still shackled by a crude materialism, continued, for example, in the form of the compromise known as the wave-particle duality.

How does scientific thought distinguish the efficient existence of discrete, whole processes from the physical continua in which they participate? For example, the Earth's biosphere as a whole represents a singularity within the constant biogenic migration of atoms throughout the galaxy, just as individual organisms represent singularities within the process of biogenic migration through the biosphere.[3] Do these singularities represent unique manifestations of physical space-time, as Vernadsky hypothesized?

If so, it makes clear the revolutionary implications of interplanetary spaceflight at accelerations sufficient to produce an artificial gravitational field, as contained in the Moon-Mars colonization proposal of Lyndon LaRouche. The consideration of living processes within accelerated reference frames amidst the dense radiation fields of cosmic space goes to the heart of the fundamental questions at the root of a true, Unified Field Theory.[4] Although the theoretical questions involved are fascinating in themselves, human progress depends on their answer by direct experiment—which a rapid development of helium-3-powered fusion rockets could easily make possible within this century, and perhaps even within decades.

However, there already exists a vast record of experimental evidence pointing to the unique physical space-time attributes of living organisms, including the biological significance of electromagnetic radiation.



NASA Artist's depiction of a fusion-propelled spacecraft on an interplanetary mission. Meeting the challenge of how to enable human beings to withstand the dense radiation fields of cosmic space will have revolutionary implications for our understanding of the biosphere.

Aside from more energetic biochemical reactions, organisms are highly sensitive to forces operating at apparently much lower orders of magnitude. Such weak forces prominently include low-intensity electromagnetic radiation, producing so-called "non-thermal" effects; that is, operating below those intensities capable of heating or noticeably disrupting living tissue. These effects have been extensively documented, despite historical opposition to the orthodox view of the organism as nothing more than a biochemical machine governed by point-to-point interactions in the small. Typical of such prejudice, is the Linear No-Threshold theory, which declares any amount of ionizing radiation as biologically damaging, despite the overwhelming evidence for the benefits of low-dose radiation.

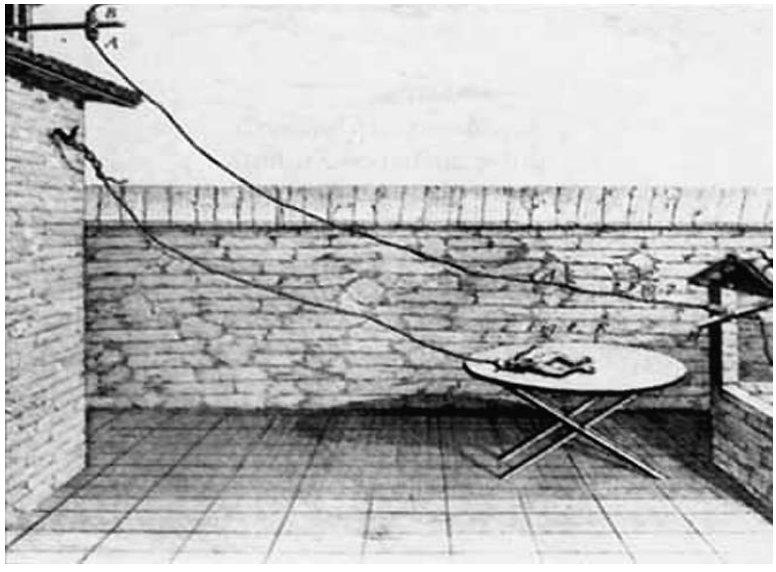
Vernadsky's definition of an individual organism as inseparable in principle from the entire biosphere, and, by extension,

1. Sky Shields, "Kesha Rogers Victory Launches the Rebirth of a Mars Colonization Policy!," this issue, p. 8.

2. Peter Martinson, "Towards a New Periodic Table of Cosmic Radiation," this issue, p. 18.

3. Shields, see Note 1.

4. Sky Shields, "The Significance of Biological Research in Space for the Development of a Unified Field Theory," Submission to the National Research Council's Decadal Survey for Biological and Physical Sciences in Space, October 2009. http://www8.nationalacademies.org/SSBSurvey/DetailFileDisplay.aspx?id=399.



Luigi Galvani (1737-1798) was experimenting with static electricity and a dissected frog, when a metal tool touched an exposed frog nerve, causing the dead frog's leg to kick, thus initiating a study of electromagnetism and life.

from the cosmic processes which produced it, demands a new understanding of the organism as, essentially, a uniquely organized electromagnetic process. However, this should not imply the New Age vitalism of "life energies" or similar mysticism. Similarly, some investigators in the field of bioelectromagnetism, professing to reject the limitations of a traditional mechanistic view, have relied instead on a cybernetic interpretation of self-organizing phenomena in life, despite the fact that the living processes they study are *in principle* irreducible to cybernetic concepts such as feedback loops and information theory, derived entirely from the operation of machines.

The Body Electric

As we shall see, confronting the challenges of a manned Mars mission today offers the most lawful means for deepening our understanding of the relationship of electromagnetism to life, a subject of investigation which goes at least as far back as the famous 18th Century experiments by Luigi Galvani on the electrical stimulation of frog legs. The field of study now includes everything from the bioelectric organs used by sharks to hunt their prey, to the nature of electrical regulation of the human brain and nervous system, to the internal magnetic compasses of birds and fish. One of the most dramatic manifestations of electromagnetic regulation in organisms is the phenomenon of regeneration, the re-creation of fully functional body parts which are lost because of injury, the study of which led scientists like Robert Becker[5] to

5. Robert O. Becker and Gary Seldon, *The Body Electric: Electromagnetism and the Foundation of Life* (New York: William Morrow and Company, 1985).

The planarian, a primitive flatworm, can regenerate the whole organism from almost any piece of itself that is cut off. Internal electromagnetic currents determine positioning.

This sea star is growing new legs.

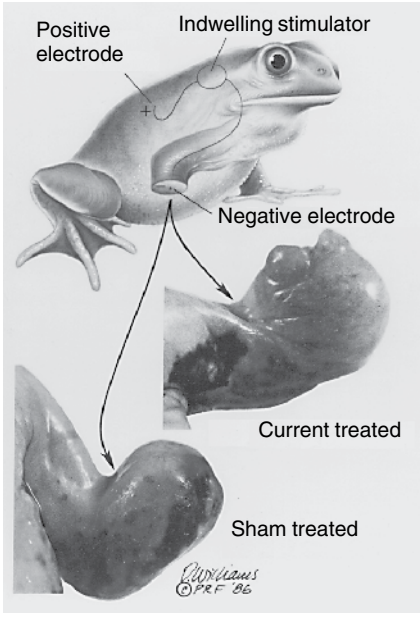
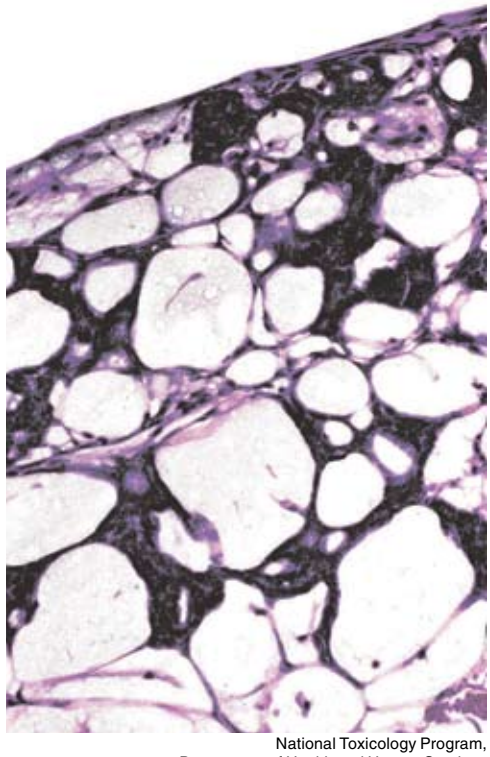


Figure 1
ELECTRICAL STIMULATION OF FORELIMB REGENERATION IN ADULT FROGS

The negative electrode is routed into the limb stump tip, and the positive electrode under the skin of the back, as depicted in the drawing of the frog (top). The photographs below the drawing show actual responses of current-treated and sham-treated limbs. The arrows point to the plane of amputation in the limbs.

Source: R. Borgens, *J. Exp. Zool.*, Vol. 200, pp. 403-416. Reprinted by permission of Wiley-Liss, Inc.



National Toxicology Program, Department of Health and Human Services

Image of blastema cells, a mass of cells at the stump tip from which the new limb eventually forms. Surrounding the blastema are clear cystic spaces.

begin the systematic investigation of the relationship between electromagnetism and living systems.

Measurements made in the 1830s first established that small electrical currents are produced around injured tissue in animals. Where does this electricity come from? The discovery of the nerve action potential not long afterwards seemed to solve the mystery, by attributing bioelectrical potentials to the differences in ion concentrations across cell membranes. However, later experiments demonstrated that, although the emergence of direct electrical currents depended on the presence of peripheral nerve tissue, they were not merely secondary effects of the action potential. These direct currents exhibit very distinct behavior during regeneration, a capacity which becomes more prevalent in organisms the lower down the evolutionary ladder one goes. For example, the planarian, a species of flatworm with a primitive nervous system, can regenerate whole organisms from almost any piece of itself that is cut off! Experiments showed that the head-tail axis of the planarian was determined by electric poles established by internal currents, and that artificially reversing the direction of current could produce a head where a tail would normally be found, and vice versa.

However, it was the study of salamanders which first revealed the highly specific behavior of the currents of regeneration. In amputated salamander limbs, the injury current was found to reverse direction a short time after injury, going from positive to highly negative. This reversal in polarity, combined with an increase in its magnitude, is accompanied by the formation of a mass of cells at the stump tip, called the blastema, from which the new limb eventually forms. As regeneration proceeds, the magnitude of the polarity slowly diminishes, eventually returning to zero. In non-regenerating animals like frogs and even rats, partial regeneration can be induced by mimicking these highly specific polarity and magnitude changes with applied electric current.

The blastema itself turns out to be adult cells that have de-differentiated into a totipotent state, capable of re-differentiating into the needed new types of cells required by the regenerating limb. So, in addition to the question of the origin of the electrical currents, we must ask: How is it that such currents are capable of initiating the process of blastema formation by inducing specific cells to de-differentiate, and how do they help to determine the form of the regenerated body part? "All the experiments led to one unifying conclusion: The overall structure, the shape, the pattern, of any animal is as real a part of its body as are its cells, heart, limbs, or teeth."[6]

What role does electricity play in "remembering" the whole organism, even when the physical parts disappear?

In humans, the closest analogue to regeneration (as distinct from wound healing) is the repair of bone fractures, which is accompanied by the formation of a blastema and the characteristic polarity and magnitude reversals of the injury current in regenerating limbs, and which has been found to be accelerated through the application of pulsed electromagnetic fields. The electromagnetic control system for the body as a whole extends from the brain throughout the nervous system and, among other things, regulates the overall activity and sensitivity of the brain's neurons—although the seemingly unlimited capacity for the brain to reorganize itself, generally termed

6. Becker and Seldon, see Note 5.

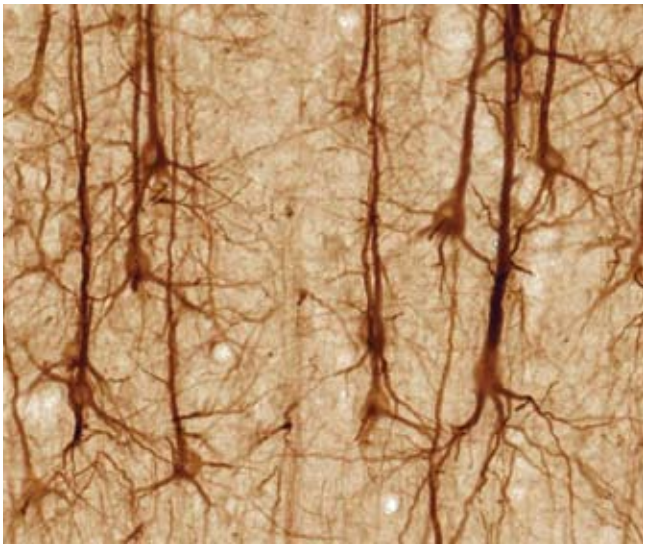


Image of neurons in the brain. In the human, the electromagnetic control system regulates the whole body, including the activity and sensitivity of the brain's neurons.

German biologist Hans Driesch (1867-1941) pioneered experiments showing that each individual cell is dependent on its relationship to every other cell in the developing embryo.

neuroplasticity, seems to defy any simply biological or bioelectric explanation.

Then again, explanations for many of the most basic processes of biology have proved elusive. For example, the formation of the blastema in regeneration is strikingly similar to embryogenesis, the intricate and highly coordinated processes governing the action by which a full organism develops from a single, undifferentiated germ cell.[7]

Northwestern University Prof. Günter Albrecht-Bühler.

It is now known that weak electrical currents play a significant role in the formation of the embryo, and just as in regeneration, exhibit highly specific forms of behavior.[8] Experiments on chick embryos showed that artificially manipulating the current in one part of the embryo leads to significant changes in the whole, indicating that the electric field's primary function is not limited to governing local cell migrations, but rather in helping to direct differentiation throughout the entire embryo. The pioneering experiments of Hans Driesch at the end of the 19th Century had already established that an individual cell's fate is dependent on its relationship to every other cell in the developing embryo, a seeming total dependence of the part on some pre-existing whole. Alexander Spemann's work not long afterwards showed that the interplay between part and whole was more complex, as certain groups of embryonic cells, which he called "organizers," could determine the fate of neighboring cells.

What means do cells possess to interpret their position within the whole, so important for differentiation? Northwestern University researcher Günter Albrecht-Bühler has shown that cells can emit and detect light pulses in the near infrared range, a kind of cellular sight which

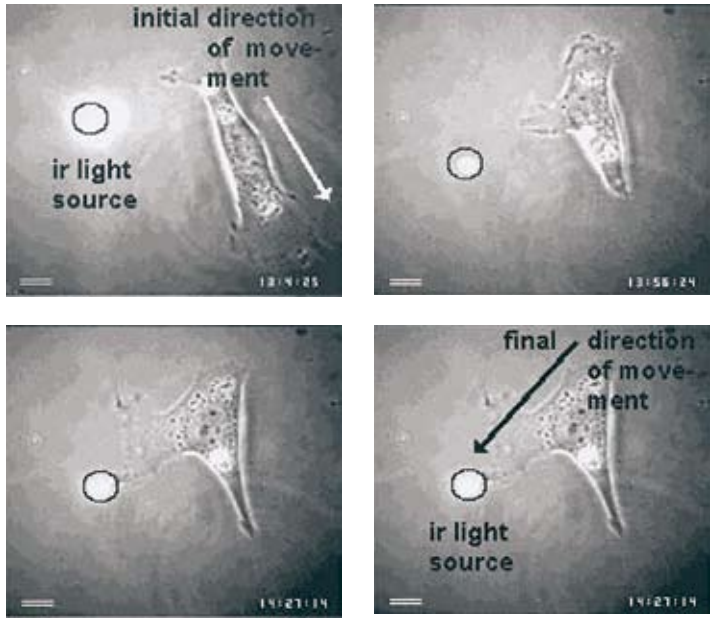


Figure 2
CELLS RESPONDING TO NEAR INFRARED LIGHT
Günter Albrecht-Bühler's work shows that cells use centrioles to "see" all objects around them that emit or scatter near infrared light. This is from Albrecht-Bühler's website on "cell intelligence." www.basic.northwestern.edu/g-buehler/FRAME.HTM

Source: Courtesy of Günter Albrecht-Bühler

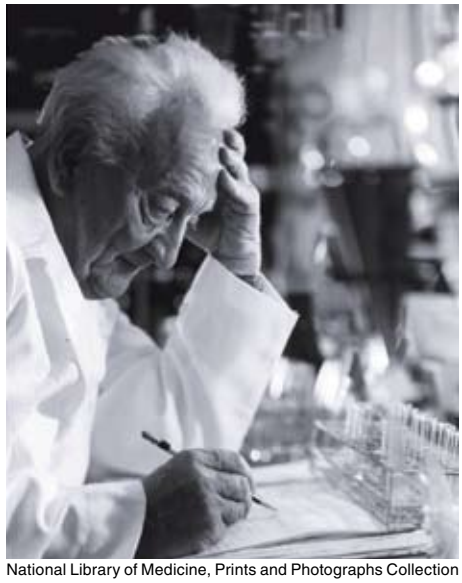
7. There also appears to be an interesting relationship between regeneration and cancer. Becker reports on the work of Meryl Rose, who demonstrated in 1948 that salamanders infected with cancerous growths could be cured by amputating a limb and inducing regeneration, implying that regeneration's guidance system could control cancer, and underscoring that the state of the entire nervous system can affect cancer.

8. Colin Lowry, "The Electric Embryo: How Electric Fields Mold the Embyo's Growth Pattern and Shape," *21st Century,* Spring 1999, pp. 56-70.

causes different types of cells to respond in different ways to the same signal. Other experiments established that different cell types also respond in distinctive ways to an electric field. Combined with Alexander Gurwitsch's 1920s discovery of mitogenetic radiation in the ultraviolet range, a biophotonic communication process governing mitosis, there appears to be a highly differentiated electromagnetic communication and control system already evident in the earliest stages of an organism's life.

In the chick embryo experiments noted above, different, asymmetric electric fields were produced by different parts of the developing embryo. When the internal field of one, but not the other, was artificially disrupted, a pseudoembryo developed, possessing the correct, basic external bodily form, but whose internal tissue was an undifferentiated mess. An analogous situation occurred in the formation of pseudolimbs in experiments on artificial regeneration. In these cases, the external form of the organism was not simply the end result of internal tissue differentiation, but seemed to have an independent existence, closely related to the action of the electrical fields. Again, how are these fields generated? And how do they help any given cell know how, or if, to differentiate?

Alexander Gavrilovich Gurwitsch (1874-1950)



National Library of Medicine, Prints and Photographs Collection

Albert Szent-Györgyi (1893-1986), pictured here in 1955, was awarded the Nobel Prize in 1937 for his work on cellular respiration.

The Biological Field

The fact that organisms can generate unique fields that play such a significant role in morphology, as during embryogenesis and regeneration, lends strong support to the biological field theory of Gurwitsch, who developed the idea in conjunction with studies of the even weaker mitogenetic radiation detected during cell mitosis. While recognizing the necessity for an "invariant law" to describe the coordinated action of individual cells within the whole organism, he was careful not to limit the biological field to any particular energetic manifestation, but to leave open the possibility that it could be expressed by any of the known physical field phenomena, or yet undiscovered physical processes.

How might the direct bioelectrical currents be a manifestation of this biological field? Becker drew on the work of Albert Szent-Gyorgyi to hypothesize that these currents operated by a process analogous to semiconduction in solid-state materials. The highly ordered internal structure within and between cells could faciliate the movement of free electrons. Gurwitsch similarly proposed that the primary work of metabolic energy involved the maintainence of highly ordered "non-equilibrium molecular constellations" within the protoplasm-protein complex of cells, and that some of the mitogenetic radiation was connected with these structures. This may indicate one possible link between the highly quantized effects of mitogenetic radiation, and the direct current system operating throughout the whole organism.

Unlike Gurwitsch, others saw in the field concept a way to reduce biological processes to strictly physical ones, that the only difference between the living and non-living "is to be found in all probability in more complex fields and more complex molecular structure,"[9] rather than in the unbridgeable distinction of separate, but interacting, phase spaces. In this sense, the concept of field itself has been reduced to supposedly "real" particles of inorganic matter surrounded by fields,

> a remnant of old materialistic conceptions. As a matter of fact, insofar as "particles" are known to be fields and field-structures they fill the volume of a macroscopic object completely, and to this extent the object is a continuum. It is only as a field-continuum that it coheres.[10]

Wolfgang Köhler, one of the founders of gestalt psychology, recognized that the very concept of discrete particles of matter was nothing more than an artifact of a naive interpretation of vision. As a result, the precepts of both biology and physics were limited by their inability to deal with the ontological reality of functional, self-organizing wholes—the gestalt phenomena of human mental activity.

> In biology the controversy has centered on the problem of whether life processes can be explained physico-chemically or whether vital forces must be postulated. Indeed,

9. H.S. Burr and F.S.C. Northrop, "The Electro-Dynamic Theory of Life," *The Quarterly Review of Biology*, Vol. 10, No. 3 (Sept. 1935), pp. 322-333.

10. Wolfgang Köhler, *The Place of Value in a World of Facts* (New York: Liveright, 1938).

Wolfgang Köhler, a founder of gestalt psychology, advocated an approach to biology that started from cognitive processes.

> the properties of life processes with which biology is concerned are not unlike the psychical phenomena responsible for the Gestalt problem in psychology. This does not mean, however, that the vitalists' doctrine in biology recommends itself as particularly fruitful, for the vitalists' answer precludes the possibility of success in a search for physical Gestalten. The biologists have of course made some attempts at discovering analogies in physics, but thus far little more than vague comparisons with crystal formations have been achieved. . . . The closest approach between general biology and psychology occurs in the theory of nervous functions, particularly in the doctrine of the physical basis of consciousness. Here we have an immediate correspondence between mental and physical processes and the demand seems inescapable that at this point organic functions be thought of as participating in and exhibiting essentially Gestalt characteristics.[11]

Because the thought and language of physics, consequently carried over into biology, had been based on machanistic assumptions, a new conceptual foundation for these sciences would have to be built up from the language governing *cognitive* processes—an approach consistent with Vernadsky's discovery of the subsuming characteristic of the noösphere over both the biotic and abiotic.

According to the machine conceptions, order in nature can only be imposed by certain fixed constraints, a necessary corollary to the idea at the root of the second law of statistical thermodynamics: that natural processes inherently tend toward disorder. It is true that within any given boundary conditions for a given system, there is a definite tendency toward an equilibrium state describable by the second law. However, the principle of direction in that system can also be attributed to strictly physical (what Max Planck called "dynamical"), rather than statistical, principles, such as the system's tendency to reduce its total potential.[12] The machine conception fails even as a beginning point in reasoning. Within certain boundary conditions, which themselves cannot be defined by the second law, even inorganic systems have the capacity for regulation purely through the interaction of the physical forces inherent in the system.

The array of these physical forces active in biological processes is not a subset of, but rather subsumes those found in inorganic systems, and appears to include not only chemical and electrodynamic phenomena, but everything from laser-like biophoton emissions, to nuclear transmutation and superconductivity, processes whose abiotic expression may represent merely "limiting conditions" of their more universal manifestation in life. These processes act to reshape the topological boundary conditions represented by any given physical state of an organism, as in the case of the electric fields governing limb regeneration.

In a machine, the distinction between process and structure is unambiguous; for example, hot gases are conducted through the rigid chamber walls of a car engine. In an organism, the energetic flow required for metabolism literally builds, and constantly maintains, the structure of the organism. Moreover, this energetic flow is part of a continuous process extending from terrestrial, to solar, to cosmic space, begging the question: Are there any strictly inorganic systems for which the second law has universal significance?

Leaving the Womb

The existence of continual, periodically varying, and interpenetrating electromagnetic fields form an invisible part of the terrestrial environment that is as real as the oceans, mountains, and atmosphere, although we may forget about such radiations in the same way a deep sea fish forgets about water. Sources of this radiation include the Earth's magnetic and electric fields, each of which exhibits diurnal and periodic variations in conjunction with the activity of the Sun as well as larger astronomical cycles; natural changes in the atmosphere, such as thunderstorms; cosmic background radiation such as radio and gamma rays; and man-made sources.

In many ways, the evolution of life on Earth has been bound up with the evolution of the electromagnetic fields of the planet, as through the creation of the atmosphere by which the electric fields of the planet are maintained, or the more extreme case of magnetic field reversals, whose cause remains a mystery, but which have historically coincided with mass extinctions. More interesting is a possibility that the magnetic field itself is either a product of, or at least conditioned in some way, by the action of living processes, possibly through the motion of conducting currents in the oceans.[13]

A vast body of experimental work has documented widely varying influences of environmental electromagnetic fields on

11. Wolfgang Köhler, "Physical Gestalten," in Willis D. Ellis, ed., *A Source Book of Gestalt Psychology* (London: Kegan Paul, Trench, Trubner and Co., 1938).

12. Wolfgang Köhler, "On the Problem of Regulation," in Mary Henle, ed., *The Selected Papers of Wolfgang Köhler* (New York: Liveright, 1971)

13. Gregory Ryskin, "Secular Variations of the Earth's Magnetic Field: Induced by the Ocean Flow?," *New Journal of Physics*, June 2009.

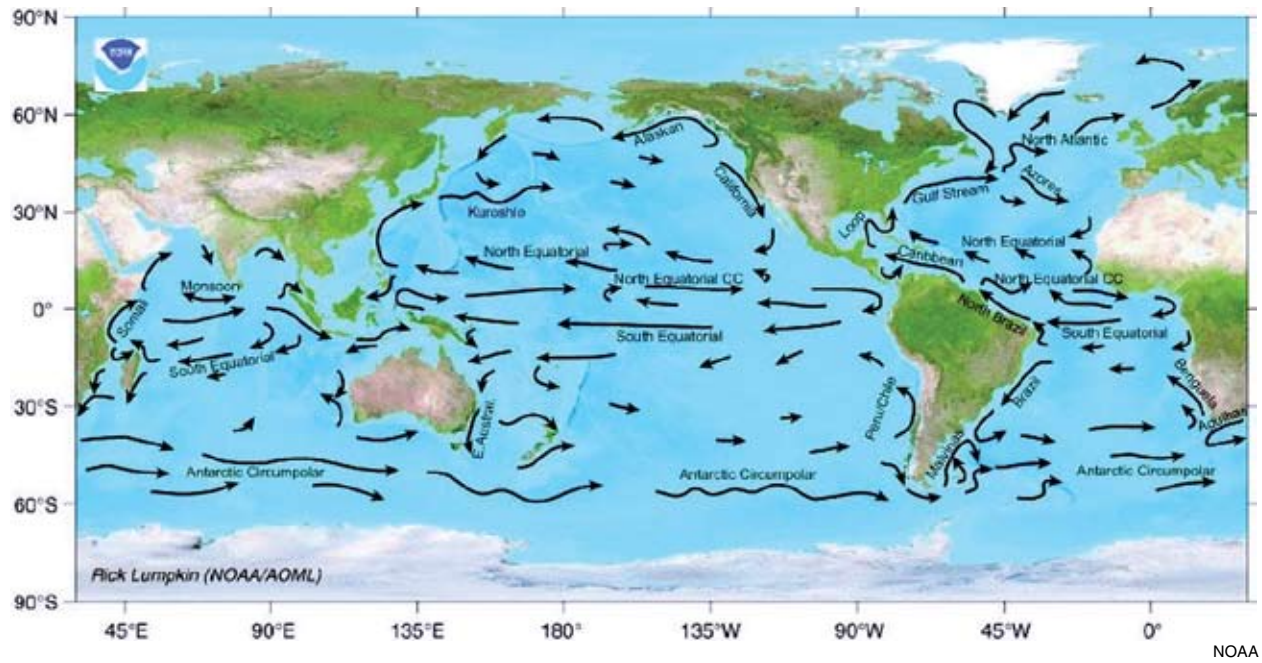


Figure 3
MAJOR OCEAN SURFACE CURRENTS

It is possible that the magnetic field of the Earth is conditioned in some way by the motion of conducting currents in the ocean.

the behavior and internal vital activity of organisms, including all the known plant, animal, and human biorhythms. Such fields act in conjunction with those produced by the organism itself. However, the very broad measurable parameters of electromagnetic radiation, including its frequency spectrum and modulation, intensity, and orientation, and the fact that organisms can be sensitive to extremely slight variations in any one of these, make the correlation of specific effects with specific forms and qualities of radiation difficult to determine. Add to that the corpuscular cosmic rays and their secondary atmospheric by-products, and the potential functional relationships of various radiations and life appear almost infinitely complex.

Ultimately, determining the specific forms of "resonance" between organisms and the energetic phenomena of their environment will depend on learning more about the way organisms exhibit such high degrees of selectivity, one of the clearest expressions of the unique physical space-time of living matter. At the nuclear scale, this includes not only what specific chemical elements an organism will utilize, but also which isotopes. At the molecular scale, this includes not only the elemental and isotopic composition of molecules, but also their *structure,* discovered by Louis Pasteur as the presence of a principle of dissymmetry, reflected in the ability of left- or right-handed molecules to rotate polarized light (electromagnetic radiation).[14]

Bioenergetic phenomena in general should be considered in light of Pasteur and Pierre Curie's work on the principle of dissymmetry, which Vernadsky believed was one of the most important avenues for scientific exploration into the physical space-time manifestation of directionality in living processes.

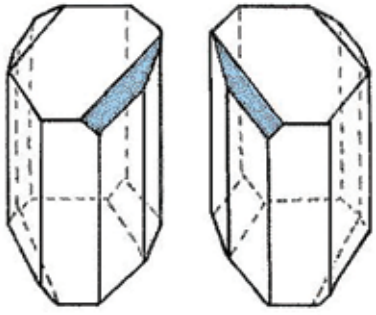
In general, the cyclical character of the relationship of organisms to energetic phenomena must reflect that of organisms to matter: They are utilized and transformed by the organism as part of the continual process of the biogenic migration of matter-energy through the biosphere in its evolution to higher states of development. Defining this selectivity with respect to electromagnetic radiation may help to actually redefine the electromagnetic spectrum itself, with which "living systems may be playing an unimaginably huge concert . . . creating a completely new category of phenomena outside of classical electrodynamics."[15]

Perhaps we won't fully appreciate the subtle, but crucial, nature of our dependence on an appropriate electromagnetic "diet," until we are forced to create it ourselves from scratch—beginning with the first lunar bases, and then en route to and on the surface of Mars.

One example, related to the overall bioelectromagnetic control system first revealed by regeneration, suffices to demonstrate that frontier research in space is no luxury, but rather, an absolute necessity.

14. A recent experiment detected a similar effect for a beam of electrons, with interesting implications for our discussion here. See "Chiral Asymmetry: The Quantum Physics of Handedness," in Mark P. Silverman, ed., *Quantum Superposition: Counterintuitve Consequences Coherence, Entanglement, and Interference* (Berlin: Springer, 2008).

15. Fritz-Albert Popp, "Electromagnetism and Living Systems," in Mae Wan-Ho, Fritz-Albert Popp, Ulrich Warnke, *Bioelectrodynamics and Biocommunication* (Singapore: World Scientific, 1994).



◄ *Louis Pasteur (1822-1895) discovered the principle of dissymmetry in molecules—the ability of left- or right-handed molecules (above) to rotate polarized light.*

Pierre Curie (1859-1906) worked with Pasteur experimenting with dissymmetry.

Bone loss in astronauts in space has long been recognized as a major problem, and it is one that appears closely related to osteoporosis on Earth. However, it cannot be fully accounted for by the mechanical "unloading" of bone stress caused by microgravity, and undoubtedly involves an electromagnetic component. Robert Becker proposed one possible means by which bone might respond to external electromagnetic fields in space.

Bones are able to reshape themselves according to mechanical stress, creating more growth in areas that bear greater compression loads, and compensating by eliminating bone material in other areas. This self-regulating system of growth and loss is governed by electrical signals, and the piezoelectric property of bone may allow it to generate the necessary electrical currents by mechanical stress. Human bone is an intricate structure composed of a matrix that includes tiny apatite minerals of calcium phosphate bound to interwoven collagen fibers, as well as trace elements like copper. Becker found that the trace atoms of copper might act as a kind of electromagnetic "peg" holding the collagen and apatite together, which could be loosened through a disruption of the body's internal electric fields.

Space osteoporosis may result from unnatural currents induced in bone by a spaceraft's rapid motion through the Earth's magnetic field, with a polarity reversal every half orbit, or it may be a direct effect of the field reversal. This abnormality, which may change the activity of bone cells directly, would be superimposed on abnormal responses of bone's natural electrical system, which is almost certainly affected by weightlessness. The unfamiliar external field reversals could also weaken the copper pegs, at the same time that the bones are in a constant state of "rebound" from their earthly weight-induced potentials, producing a signal that says, "No weight, no bones needed." We know that the more even distribution of blood caused by weightlessness registers in the heart as an excess; as a result, fluid and ions, including calcium, are withdrawn from the blood. However, the effect probably isn't caused by weightlessness alone, for the Skylab astronauts did rigorous exercise, which would

NASA

STS-119 Mission Specialist Joseph Acaba, works out in March 2009 on the Space Shuttle Discovery's bike, called an ergometer. Bone loss in astronauts in space is a major problem, and NASA has space exercise regimens to counter the lack of stress on bones in zero-gravity. But research is needed on the possible space electromagnetic effects on bone and other tissue.

have supplied plentiful stresses to their bones. They worked out so hard that their muscles grew, but decalcification still reached 6.8 percent on the twelve-week mission.[16]

Such possible effects, which point to the more general electromagnetic properties of biological regulation, can only be tested by experimenting with artificial electromagnetic fields on astronauts in orbit. In addition, current space biomedical research indicates that bone fracture healing is impeded in reduced gravity conditions. The relationship of ionizing radiation, which is more abundant outside the protection of Earth's magnetic field, to the rate of both fracture healing and bone loss in reduced gravity environments is being studied as well, although primarily in Earth-bound laboratory conditions.

Again, these relationships can only properly be investigated outside of the pervasive electromagnetic and gravitational fields of the Earth. Far beyond the specific effects on bone and other organic tissue, such studies could lead to a new understanding of the broader relationship between ionizing radiation, electromagnetism, and gravitation.

Indeed, radioactive decay itself, a property of the inner structure of atoms once thought immutable, and which is a source of ionizing radiation, has been shown in some cases to correlate with astrophysical cycles.[17] This further underscores that the fundamental properties of even inorganic matter cannot be studied as the isolated phenomena of "particle physics," and calls to mind Vernadsky's emphasis on the role of cosmic processes in shaping the inherent character of all matter. Here lies the true value of a real science-driver program for space exploration, in forcing the combination of fusion and nuclear research, with astrophysics, biology, and physical chemistry, to allow seemingly paradoxical observations to be compared and analyzed across a wide range of experimental domains. This becomes crucial as we confront the prospect of supporting human life outside the "womb" of the Earth.

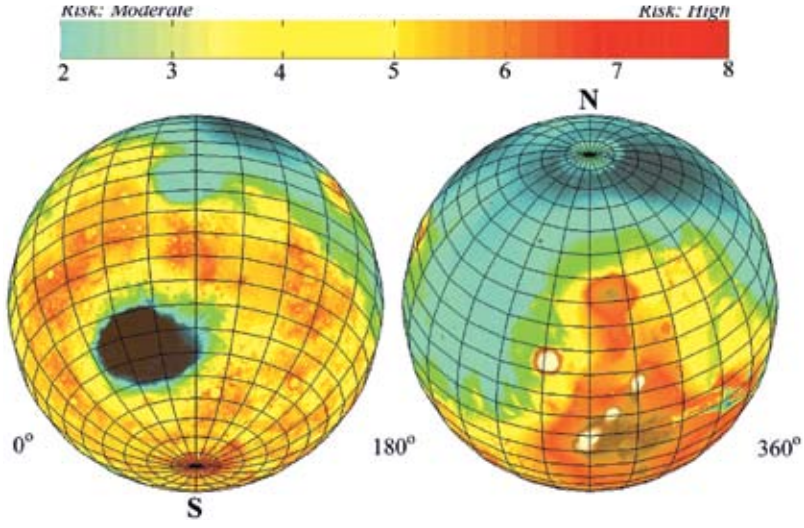


Figure 4
COSMIC RADIATION ESTIMATES FOR MARS

This global map of Mars shows estimates for amounts of high-energy-particle cosmic radiation reaching the surface, which will be a serious health concern for explorers and colonizers of the planet. The estimates are based on cosmic-radiation measurements made on the way to Mars by the Mars radiation environment experiment, an instrument on NASA's 2001 Mars Odyssey spacecraft, plus information about surface elevations on Mars from the laser altimeter instrument on NASA's Mars Global Surveyor.

As on Earth (which has a much thicker atmosphere), the areas with the highest elevation have more radiation, because there is less atmosphere to block out some of the radiation. Colors in the map refer to the estimated average number of times per year each cell nucleus in a human there would be hit by a high-energy cosmic ray particle. The range is generally from two hits (color-coded green), a moderate-risk level, to eight hits (coded red), a high-risk level.

Source: Jet Propulsion Laboratory/JSC/NASA

A New Causality

In a sense, we are faced today with same complex of paradoxes that arose with the simultaneous emergence of atomic science, relativity, and quantum physics in the first decades of the 20th Century. Seemingly continuous processes, such as energetic phenomena, appeared to be organized in the very small as discrete processes. Likewise, discrete phenomena, such as matter, could be represented by continuous processes.

Max Planck and Albert Einstein called for the development of a new concept of causality, rather than the statistical indeterminacy imposed by the quantum mechanists. In this respect, it is worth recalling the words of Planck's student, Köhler, that "Max Planck once told me that he expected our approach [in gestalt psychology] to clarify a difficult issue which had just arisen in quantum physics, if not the concept of the quantum itself."[18]

Vernadsky at the same time recognized that for the truths of science to be universal, the standpoint of the naturalist had to be adopted in order to study the full scope of physical phe-

16. Becker and Seldon, see Note 5.

17. Jere H. Jenkins, Ephraim Fischbach, et al., "Evidence for Correlations Between Nuclear Decay Rates and Earth-Sun distance," Astroparticle Physics, Vol. 32, No. 1, August 2009.

18. Wolfgang Köhler, "Gestalt Psychology Today," Address of the President at the 67th Annual Convention of the American Psychological Association, Cincinnati, Ohio, Sept. 6, 1959. http://psychclassics.asu.edu/Kohler/today.htm#1

Philippe Moussette/NASA

Northern lights in Canada taken with a fish-eye lens. We need to develop a full mastery of the entire electromagnetic spectrum and its role in sustaining human life in the Solar System.

Laurence Hecht

Sky Shields (left) and Oyang Teng, working on the Cosmic Ray Project.

nomena and their expression in all three universal experimental domains of the abiotic, biotic, and noetic.

The basis for this new science of dynamics, as LaRouche has called it, will rest on a mobilization of the scientific and economic means necessary to secure an interplanetary future for mankind, including a full mastery of the entire electromagnetic spectrum and its use to sustain human life throughout the Solar System. This approach will define the meaning of science for the next century, if we have the wisdom to let that knowledge guide our actions in the present.

Oyang Teng is a member of the LaRouche Youth Movement's "Basement" research team. He can be reached at oyangt@gmail.com .

Additional References

Frank S. Barnes and Ben Greenebaum, *Bioengineering and Biophysical Aspects of Electromagnetic Fields* (Boca Raton: CRC, 2007).

Robert O. Becker and Andrew A. Marino, *Electromagnetism and Life* (Albany: State University of New York, 1982). http://www.rebprotocol.net/November2007/Robert%20O.%20 Becker%20and%20Andrew%20A.%20Marino%201982%20Electromagnetism%20and%20life%20156pp.pdf

Phillip S. Callahan, "Insects and the Battle of the Beams," *Fusion,* September-October 1985, pp. 27-37.

Lyndon LaRouche, "Project Genesis," *Executive Intelligence Review,* April 18, 2008, pp.36-53. http://www.larouchepub.com/eiw/public/2008/2008_10-19/2008 -15/pdf/36-53_3515.pdf

LaRouche Youth Movement, "The Matter of Mind," LPACTV Video, November 2008. http://www.larouchepac.com/news/2008/12/15/lpactv-matter-mind.html

Michael Lipkind, "Alexander Gurwitsch and the Concept of the Biological Field," Part I, *21st Century,* Summer 1998, pp. 36-51.

_____, "Alexander Gurwitsch and the Concept of the Biological Field," Part II, *21st Century,* Fall 1998, pp. 34-53.

Max Planck, *The Universe In Light of Modern Physics* (London: George Allen and Unwin, 1931).

Alexander Presman, *Electromagnetic Fields and Life* (New York: Plenum, 1970).

S. Rowlands, "Some Physics Aspects for 21st Century Biologists," *Journal of Biological Physics,* Vol. 11 (1983), pp. 117-122.

Sky Shields. "Human Creative Reason as a Fundamental Principle in Physics," October 2008. http://www.larouchepac.com/news/2008/10/11/report-basement-human-creative-reason-fundamental-principle-.html

Vladimir Vernadsky, *The Biosphere* (New York: Springer, 1997).

_____, "Problems of Biogeochemistry II: On the Fundamental Material-Energetic Distinction Between Living and Nonliving Natural Bodies of the Biosphere," *21st Century,* Winter 2000-2001, pp. 20-39. http://www.21stcenturysciencetech.com/translations/ ProblemsBiogeochemistry.pdf

The Overpopulation Fear Behind the Ban on DDT

by Donald Roberts and Richard Tren

At some point in the 1960s, David Brower, who was the executive director of the Sierra Club,[1] and who, in an interview with the *San Francisco Chronicle* in 1998, was quoted as saying that "overpopulation is perhaps the biggest problem facing us,"[2] encouraged Paul Ehrlich to write a book on the problems of human population growth. Ehrlich published his bestseller, *The Population Bomb,* in 1968. The main theme of his book was that human population growth was the root cause of society's modern environmental problems.[3] Ehrlich con-

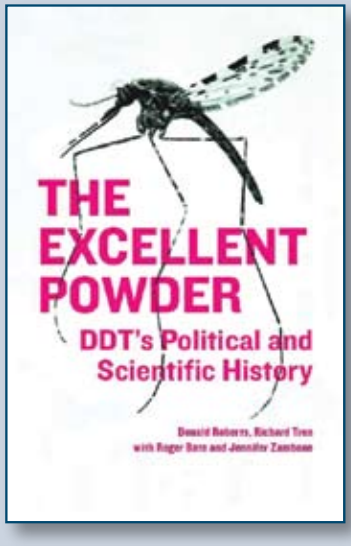
WHO/Thomas Moran

DDT came under attack because it allowed children in the developing sector to survive and not die of malaria. Here, Indonesian school children.

1. While the Sierra Club was formed in 1892, and so predates most environmental activist organizations, it definitely advanced as part of the environmental movement that came to life in the 1960s.

2. *New York Times,* "Environmental leader quits Sierra board, May 20, 2000, http://www.nytimes.com/2000/05/20/us/environmental- leader-quits-sierra-board.html (accessed April 14, 2009).

3. Paul Ehrlich, *The Population Bomb,* 1971.



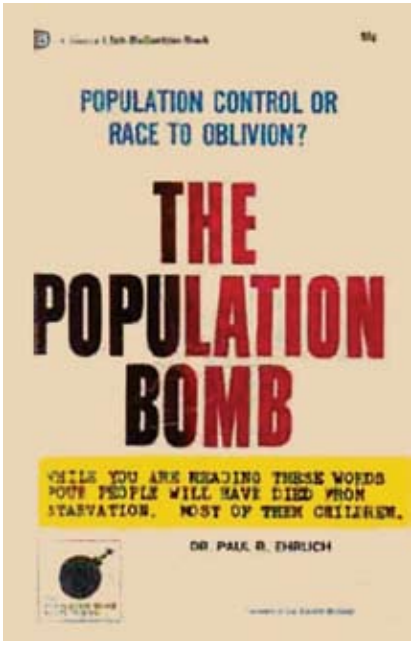
EDITOR'S NOTE

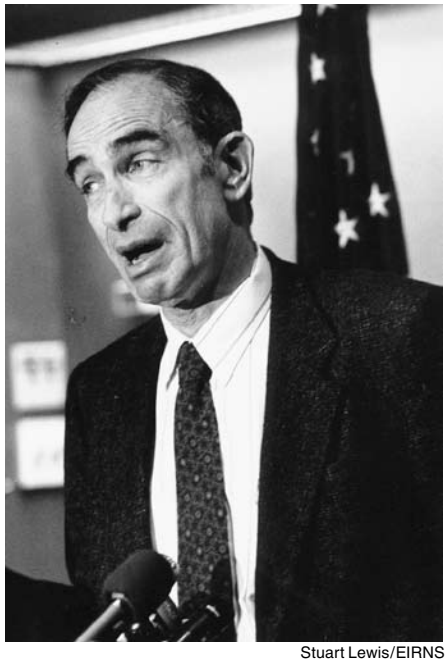
We are pleased to present this short excerpt from the new book The Excellent Powder: DDT's Political and Scientific History, *by Donald Roberts and Richard Tren, (with Roger Bate and Jennifer Zambone). The 432-page book, launched at a Washington, D.C. press conference on April 21, 2010, is available from booksellers at $25.00.*

Dr. Roberts is a medical entomologist and researcher and Professor Emeritus of Tropical Public Health at the Uniformed Services University of the Health Services in Bethesda, Md. He was formerly chief of the Department of Entomology at the Walter Reed Army Institute of Research in Washington, D.C. Roberts has worked on DDT and malaria research since 1970, and he pioneered work on DDT's primary effectiveness as a spatial repellent and irritant.

Richard Tren is an economist and co-founder and chairman of Africa Fighting Malaria, a malaria policy and advocacy group with offices in South Africa and Washington, D.C. He co-founded AFM during the negotiations of the Stockholm Convention, and, by working with malaria scientists from around the world, helped to secure an exception for DDT's continued use in malaria control.

We have slightly edited this excerpt, adding some notes as indicated,and photos and captions. A review of The Excellent Powder *appears on p. 52 of this issue.*





Stuart Lewis/EIRNS

"Instant death control" is Malthusian Paul Ehrlich's view of the role of DDT in saving lives from malaria, as presented in his 1968 alarmist book, The Population Bomb.

jured public fear by predicting dire scenarios of worldwide famines between 1970 and 1985 (none of which came true then or since).[4] Perhaps overlooked by many who read the book, Ehrlich also picked up Rachel Carson's anti-DDT theme. In a May 1970 issue of *Audubon,* Ehrlich even warned that DDT and other chlorinated hydrocarbons may have substantially reduced the life expectancy of people born since 1945.[5] Fear tactics proved to be just as important in scaring people about population growth as they were in the war on pesticides. Ultimately, *The Population Bomb* promoted concerns that DDT caused rapid population growth as it reduced the burdens of malaria.

Ehrlich and David Brower were not alone in working against population growth and DDT. Attorney Dick Bower, Ehrlich, and Charles Remington formed the Zero Population Growth (ZPG) organization in 1968.[6] In Michigan, Dr. Lewis Batts, a medical doctor and bird-lover worked to achieve a DDT ban. Like Charles Wurster, Batts was one of the founders of the Environmental Defense Fund (EDF). He was also a member of ZPG.[7] Batts pledged $10,000 to

4. Michigan State University, "Founder of Zero Population Growth to speak at Michigan State's advanced degree ceremony," MSU press release, Jan. 13, 2007, http://newsroom.msu.edu/site/indexer/2743/content.htm (accessed April 14, 2009).

5. R. Bailey, "Earth Day, then and now," *Reason,* May 2000, http://reason.com/news/show/27702.html (accessed April 14, 2009).

6. B. Ryerson, "Visionary co-founder of population connection dies," *The Reporter,* Vol. 39, No. 2, Fall 2007.

7. Zero Population Growth was an organization dedicated to reducing the rate of growth in human populations to zero. In other words, the rate of human births

The Environmental Defense Fund made its name (and its funding) litigating to stop DDT.


THE GAYLORD NELSON NEWSLETTER

Washington, D.C. May 1970

Earth Day - 1970

Mass Movement Begins

In New York City, thousands of persons thronged in the warm Spring sunshine, and the world-famous Fifth Avenue belonged to the people. For a few hours, a small section of the great city banned motor vehicles, and people promenaded on a proud boulevard usually congested with buses, trucks and cars. It was April 22—Earth Day in New York—and it was a holiday. Assistant Chief Inspector Arther Morgan, who was in charge of the police on the scene, observed:

"Everyone's Beautiful"

"Everyone's beautiful. Just look at them. We're actually enjoying it."

In Madison, Wis., Earth Day was observed at sunrise over Lake Mendota with a Sanskrit benediction and a reading of the last chapter of the Book of Genesis with an apology to God for man's assaults on the landscape.

Earth Day observers in Milwaukee nominated the toad, the praying mantis and the ladybug as substitutes for DDT.

Thousands Marched

In Greensboro, N.C., in Atlanta, Ga., and in Miami, Fla., thousands marched in demonstrations for a clean environment. The Governor of Maine called for the Earth Day commitment to be "a truly lasting one," and the mighty Chicago Tribune observed incredulously that, after demonstrations on the city's broad new Civic Center Plaza, "there was no post-rally litter remaining to be cleaned up."

A new movement had begun, and movement-millions—students, laborers, farmers, housewives, politicians, professional people, liberals and conservatives—who might have found it difficult to find common agreement on any other subject, were gathering together in a massive educational effort to talk about survival and the quality of survival in a world they all share.

In the little more than seven months after Sen. Gaylord Nelson suggested the idea of national teach-ins to discuss the crisis of the environment, the movement grew rapidly through March and April. On Earth Day, it was estimated that 2,000 college campuses, 2,000 community groups and 10,000 elementary and secondary schools were holding events.

In some places it was as the post exclaimed while watching a rally of 30,000 in Philadelphia's Fairmount Park, an "educational picnic"; in others it was the serious business of government.

Special Legislation

During April, the state legislatures of Massachusetts and the House of Representatives in Pennsylvania set aside time for impromptu addresses on the environment and the introduction and passage of legislation aimed at protecting, preserving and restoring the environment.

Scientists, ecologists, environmentalists, educators and political leaders warned darkly before massive gatherings and small meetings that time was running out for the world and that all men had a responsibility to themselves and to leave a legacy of life for their children.

500 Invitations

Senator Nelson, who received nearly 500 invitations to speak at Earth Day observances, described

Wisconsin Senator Gaylord Nelson (1916-2005), the founder of Earth Day in 1970, helped win the ban on DDT in Wisconsin.

Zero Population Growth, which was co-founded by Paul Ehrlich, changed its name to Population Connection, but as this recent cover of its magazine shows, its message is still that of overpopulation.

Santa Clara University

Sierra Club executive director David Brower (1912-2000) encouraged Paul Ehrlich to write The Population Bomb.

Garrett Hardin (1915-2003) was against sending food to Ethiopia during the 1974 famine, because it would encourage population growth.

Anti-population extremist George Woodwell admitted under oath that he had overestimated the amount of DDT in the soil, but he refused to correct his Science *article.*

support legal action against DDT and another chlorinated hydrocarbon, dieldrin.

When the Michigan Department of Agriculture decided to spray dieldrin against the Japanese beetle, a highly destructive plant pest, DDT opponents, including the EDF, used the occasion as a pretense to carry out legal action against DDT. They achieved a statewide ban against most uses of DDT in April 1969.[8]

In Wisconsin, the court battle over DDT started Dec. 2, 1968. Senator Gaylord Nelson was the opening speaker against the use of DDT. According to Hugh Iltis, a professor of biology and long-time supporter of Nelson, the hearings "dragged on for a year and [led to] the eventual banning of DDT in Wisconsin and four years later to victory in the banning of DDT nationwide."[9] Senator Nelson went on to be recognized as founder of Earth Day,[10] an event first held on April 22, 1970. He was also an avid believer that the major problem facing the world was uncontrolled growth in human populations. In his own words,

> The same powerful forces which create the crisis of air pollution also are threatening our freshwater resources, our woods, our wildlife, and the scenic beauty of the nation. These forces are *the rapid increase in population,* industrialization, urbanization and *scientific technology* [emphasis added].[11]

In this statement, Nelson enunciates some of the main themes of environmentalism. One is to reduce population growth, and another is opposition to technology. Given DDTs association with both population growth and technology, it seems clear why the environmental movement would dedicate itself to DDT elimination. Though many environmentalists may have done a lot of good in exposing serious problems of pollution and endangered wildlife, there were some highly influential individuals within the movement that used their power and influence to campaign on population growth and specifically against DDT on those grounds.

The issue of withdrawing spray programs as a means of population control was broadly discussed and debated. Garrett Hardin, a leader in population control, believed that "every life saved this year in a poor country diminishes the quality of life for subsequent generations."[12] Likewise, in the prologue of *The Population Bomb*, Ehrlich announced with great authority: "In the 1970s and 1980s hundreds of millions of people will starve to death in spite of any crash programs embarked upon now. At this late date nothing can prevent a substantial increase in the world death rate."[13] We are now more than forty years past the publication date of Ehrlich's book. Hundreds of millions of people did not starve to death as Ehrlich predicted. Today, with a global population approaching seven billion, enough food is still being produced (although there are problems and inequities in

would be equal to the rate of human deaths.

8. Michigan Environmental Council. "Lew Batts: Key player in Michigan's environmental turnaround," http://www.mecprotects.org/lewbatts.html (accessed April 14, 2009).

9. H.H. Iltis, "Gaylord Nelson: Fighter for the environment, defender of the Wild Ones, visionary of living within limits," http://www.for-wild.org/wchf/htm/GaylordNelsonIltis.htm (accessed April 14, 2009).

10. D.J. Webber, "Senator Gaylord Nelson, Founder of Earth Day," University of Missouri, 1996, http://web.missouri.edu/~polidjw/Nelson.html (accessed April 14, 2009).

11. H.H. Iltis, "Population prophet," FightingBob.com, Dec. 4, 2005, http://fightingbob.com/article.cfm?articleID=462 (accessed April 15, 2009).

12. G. Hardin, "Stalking the wild taboo."

13. Ehrlich, *The Population Bomb,* p. xi.

food production, distribution, and sales).[14]

At the end of his chapter on "the problem," Ehrlich concludes that

> there are only two kinds of solutions to the population problem. One is a "birth rate solution," in which we find ways to lower the birth rate. The other is a "death rate solution," in which ways to raise the death rate—war, famine, pestilence—find us. The problem could have been avoided by population control, in which mankind consciously adjusted the birth rate so that a "death rate solution" did not have to occur.[15]

The last sentence is written in the past tense, as if there is no longer a solution other than a "death rate solution." As background to this conclusion, Ehrlich argues that use of medical science in reducing death rates in developing countries contributes to the problem of population growth, stating that

> The development of medical science was the straw that broke the camel's back. While lowering death rates in the ODCs [overdeveloped countries] was due in part to other factors, there is no question that "instant death control," exported by the ODCs, has been responsible for the drastic lowering of death rates in the UDCs [underdeveloped countries].

Benoist Carpentier/WHO

The reality of Paul Ehrlich's "death rate solution" to population control: A young girl suffering from cerebral malaria in a Benin hospital.

As Ehrlich goes on to explain, the export of death control that he refers to is the use of DDT for malaria control.

> The introduction of DDT in 1946 brought rapid control over the mosquitoes which carry malaria. As a result, the death rate on the island [Ceylon] was halved in less than a decade. The death rate in Ceylon in 1945 was 22 [per 1000]. It dropped 34% between 1946 and 1947 and moved down to ten in 1954. Since the sharp postwar drop it has continued to decline and now stands at eight. Although part of the drop is doubtless due to the killing of other insects which carry disease and to other public health measures, most of it can be accounted for by the control of malaria.[16]

Most people would consider such a dramatic reduction in a country's death rate to be a marvelous outcome of an effort to reduce the disease and suffering of poor people. Most people could recognize that any population-growth problem is a separate problem, which should be dealt with separately from working against the use of DDT for control of malaria. That does not appear to be Ehrlich's point of view. He sheds more light on his perspective in comments about malaria and population control in the South American country of Colombia.

> Death control [DDT use] did not reach Colombia until after World War II. Before it arrived, a woman could expect to have two or three children survive to reproductive age if she went through ten pregnancies. Now, in spite of malnutrition, medical technology keeps seven or eight alive. Each child adds to the impossible financial burden of the family and to the despair of the mother.[17]

Ehrlich shows no insight into the despair of a mother or father from the loss of a child. Perhaps he has never known of a woman who has watched as all her children and husband die

14. S. Leahy, "Population: Global food supply near the breaking point," Internet Press Service News Agency, Feb. 1, 2007, http://ipsnews.net/news.asp?idnews=33268.

15. Ehrlich, *The Population Bomb,* p. 17.

16. *Ibid.*, p. 16.

17. *Ibid.*, p. 22.

from malaria. Regardless, it was against this background of hysterical concern about growth in human populations that the environmental movement carried out its litigation and publicity wars against any and all uses of DDT.

Both *Silent Spring* and *The Population Bomb* criticized the use of DDT. Carson claimed that the justification for public-health use of DDT didn't make sense, that DDT quickly became ineffective and only made problems worse. Her basic thesis was any use of insecticide would select for resistance and the insecticide would lose its effectiveness. She claimed that it would select for "tough, resistant strains,"[18] so that more chemical would be required to get the same level of kill or else a more poisonous chemical would need to be developed. Carson was wrong on both claims. Resistance is not dealt with by using more of a public health insecticide. Furthermore, resistance signals a need for another mode of chemical action, not a more toxic chemical. Ehrlich, on the other hand, claimed that public-health use of DDT was so effective that it was an unacceptable contribution to limiting death, which in turn contributed to rapid population growth. Remarkably, the anti-DDT movement has been largely based on two entirely contradictory statements by Carson and Ehrlich. But contradictions aside, both books figure prominently in the creation of the modern environmental movement and, to this day, the two books stand as pillars of environmental theology.

President Nixon (left) and Chief Justice Warren Burger (right) at the swearing in ceremony for William Ruckelshaus as administrator of the Environmental Protection Agency. Two years later, Ruckelshaus, a member of the EDF, banned DDT in the United States, without regard to the scientific evidence.

[Editor's note: Elsehere, the authors stress that DDT's effectiveness in malaria control is not because it kills mosquitoes, but because it repels or irritates them, driving them away from sprayed houses. This holds for all mosquitoes, including those that are resistant to DDT. Also, without the killing of mosquitoes, specific resistance to DDT in the mosquito population will not develop.]

If U.S. activism against DDT had stopped at U.S. borders, we might be inclined to assume that environmentalist motivations were directed at improving environmental conditions in the United States alone. However, as we will show later, and as exemplified in the international negotiations at the Stockholm Convention on Persistent Organic Pollutants, the environmental movement was hell-bent on eliminating DDT from malaria-control programs worldwide.

Anti-DDT Litigation

The 1960s legal actions against DDT by environmental groups in New York, Wisconsin, Michigan, and elsewhere culminated in the 1972 EPA ruling banning DDT (see Appendix 5 for more detailed accounts of the legal actions against DDT). These attempts to gain through the courts what could not be achieved through science were an exercise in emotive fear tactics and environmental politics. The most significant of these, the EPA's consolidated hearing, started in 1971 and continued until April 1972. Analyses of hearing records by Robert Ackerly, the chief trial counsel from the DDT industry, and Dr. J. Gordon Edwards, a highly respected professor of entomology at San Jose State University, show that key witnesses for the EPA and the EDF did not present credible testimony. As a result of that testimony, Hearing Examiner Edmund Sweeney filed his opinion, recommending that DDT not be banned:

> DDT is not a carcinogenic hazard to man. DDT is not a mutagenic or teratogenic hazard to man. The uses of DDT under the registration involved here do not have a deleterious effect on freshwater fish, estuarine organisms, wild birds or other wildlife. The adverse effect on beneficial animals from the use of DDT under the registrations involved here is not unreasonable on balance with its benefit. The use of DDT in the United States has declined rapidly since 1959. The Petitioners have met fully their burden of proof. There is a present need for the continued use of DDT for the essential uses defined in this case.[19]

18. R. Carson, *Silent Spring*, 1972, p. 237

19. E.M. Sweeney, "EPA hearing examiners recommendations and findings concerning DDT hearings," April 25, 1972, 40 CFR 164.32. [Ed. note: A photocopy of excerpts from this can also be found at http://www.21stcenturysciencetech.com/Articles%202007/ ddt_hearing.pdf]

The hearing examiner offered his opinion on the value of cross-examination:

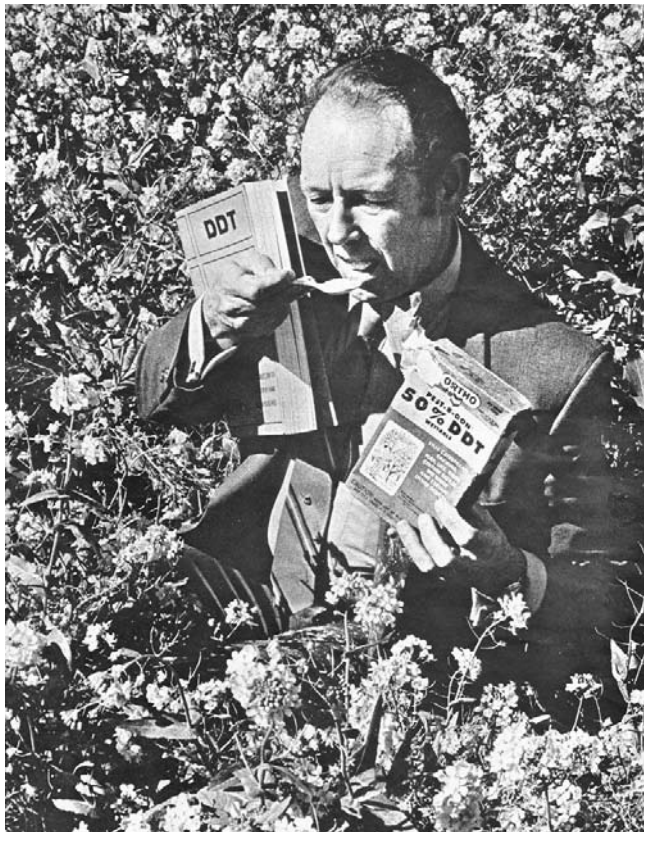
> I think the right of cross-examination spurred a genuinely sober assessment of the facts available, particularly on the question of the benefits and risks of DDT; and it exposed those few instances where the purpose was to generate more heat than light on the subject.[20]

The judge also offered his opinion on the chemicals that might be considered as DDT replacements if DDT were banned:

> Although it was not in issue here, there was ample evidence to indicate that DDT is not the sole offender in the family of pesticides; and that necessary replacements would in many cases have more deleterious effects than the harm allegedly caused by DDT.[21]

The judge also commented on the credibility of the witnesses, noting that "there were some appalling instances of incredible inactions such as the publication of a paper containing faulty information which, after discovery, was never corrected and, apparently, is still being relied upon.[22] This appalling instance was a paper by George Woodwell published in *Science* magazine in 1967.[23]

Judge Sweeney presented his opinion in April 1972 after eight months of trial, "during which time the Examiner called 125 witnesses, entered 365 exhibits into the record and presided over a proceeding that produced a 9,312-page transcript. This was an extraordinarily thorough hearing."[24] Yet, two months later, on June 2, 1972, the EPAs administrator, William D. Ruckelshaus, issued his opinion,[25] ignoring the results of the hearing and canceling all uses of DDT for crop production and non-health purposes in the United States, strongly implying in his opinion that DDT was almost assuredly toxic to humans.[26] While the EPA reserved the use of DDT for emergencies, particularly public-health emergencies, this ban effectively ended the use of DDT in the United States and compromised its use in the rest of the world.[27]



Entomologist J. Gordon Edwards (1919-2004), championed the use of DDT to save lives, and fought the lies promoted by the Malthusians. This photo, from the September 1971 issue of Esquire *magazine, shows Edwards eating a spoonful of DDT, which he regularly did to demonstrate its non-toxicity.*

Dr. J. Gordon Edwards described the administrator's lack of attention to the administrative hearing and the

20. R.L. Ackerly, "DDT: A re-evaluation. Part II," *Chemical Times and Trends,* 1981, p. 52.

21. *Ibid.*

22. *Ibid.*

23. *Ibid.*

24. Edmund Sweeney, "Introduction to the Examiner's Report" (1972). Sweeney said: "[N]o Hearing Examiner will ever enjoy the privilege that I had in listening to so many leaders in the field of scientific and medical achievement … No restrictions were placed on the number of witnesses they could present, other than the necessary exhortations concerning relevance and materiality. The pros and cons of DDT have been well aired. I think the right of cross-examination spurred a genuinely sober assessment of the facts available, particularly on the question of the benefits and risks of DDT." EPA, "Consolidated DDT Hearing, Hearing Examiner's Recommended Findings, Conclusions, and Orders" (40 CFR 164.32) April 25, 1972, p. 16.

25. Consolidated DDT Hearings. I.F. & R. Docket Nos. 63, et al. United States Environmental Protection Agency, Environmental Appeals Board. In The Matter of Stevens Industries, Inc., et al. Before the Administrator, U.S. Environmental Protection Agency; Opinion by William D. Ruckelshaus. June 2, 1972.

26. 37 Fed. Reg. 13369 (July 7, 1971). Nixon was apparently furious about the decision to ban DDT. "I completely disagree with this decision," he wrote, and declared that he wanted "plenty of effort to get it reversed." J. Brooks Flippen, *Nixon and the Environment* (Albuquerque: University of New Mexico Press, 2000), p. 172.

Nixon clearly gets no points for consistency, having initially supported the moves to ban DDT.

WHO proved prescient in its fear that the U.S. actions on DDT would affect world use. The EPA didnt think it would be a problem. Ruckelshaus's attitude concerning use of DDT and global public health was formed even before the consolidated hearings on DDT conducted by Edmund Sweeney and is revealed in a 1971 EPA document: "nonetheless, this Agency will not permit the triumphs of public health achieved in the past to be a continuing justification for use of a particular substance in future. To this extent, the requirements for use of economic poisons in a relatively developed country such as the United States may force a divergence from what is permitted in the developing countries where the public health impetus for control of such disease as malaria may require continuing use of pesticides whose side effects would no longer be tolerable here." Environmental Protection Agency, "Reasons underlying the registration decisions concerning products containing DDT, 2,4,5-T, Aldrin, and Dieldrin." March 18, 1971, EPA, Washington D.C., p. 8.

27. Other governments, especially European ones, had already banned the use of DDT.

trial transcript:

> EPA Administrator William Ruckelshaus did not attend a single day of the seven months of EPA hearings on DDT, and aides reported that he did not even read the transcript (*Santa Ana Register,* 23 July 1972).[28]

Ruckelshaus's opinion was entirely contradictory to the scientific findings of seven months of testimony. For example, Ruckelshaus found that DDT presents a carcinogenic risk.[29] Based on animal-test data, he concluded that DDT "should be considered a potential carcinogen."[30] In contrast, Sweeney concluded that DDT is not a carcinogenic hazard to man.[31] On the subject of possible replacements for DDT, Sweeney concluded that leading replacement chemicals were more dangerous than DDT. Ruckelshaus's opinion addressed the issue of a replacement chemical differently. He recognized methyl parathion as the chemical that would be the primary DDT replacement, and he acknowledged that deaths had resulted from operational use of methyl parathion. (In comparison, no human deaths or even illnesses had resulted from the operational use of DDT.)

To allow for the increase in toxic risk from the use of methyl parathion, the EPA allowed a six-month waiting period before the full weight of the opinion would come into effect, meaning the order would not be effective until December 31, 1972. This waiting period was meant to allow time for the USDA and the EPA to provide training for operators of spraying equipment and others to use a much more dangerous insecticide.[32] This part of the ruling, more than any other aspect, shows how the EPA opinion was designed to hand a political victory to the environmental activists. At the time of the Ruckelshaus opinion, the EPA knew, from almost twenty-seven years of widespread DDT usage, that DDT was not known to cause human deaths or even human illness. In 1972, the EPA also knew, and openly admitted, that methyl parathion was a documented cause of human deaths.

In 1975, the EPA submitted an assessment to the U.S. House of Representatives of the scientific and economic aspects of its decision to delist DDT for use in agriculture. In its assessment of poisonings associated with accidental exposures to parathion and methyl parathion, they found that

> parathion and methyl parathion are the pesticides most frequently cited in incidents involving accidental exposure to pesticides. Preliminary data from the EPA Pesticide Accident Surveillance System (PASS) shows that parathion is the third and methyl parathion is the fifth most frequently cited pesticide in 1973. Based on an analysis of PASS data, Osmun (1974) stated that for 1972 and 1973, parathion and/or methylparathion were connected with 78% of the reported episodes relating to agricultural jobs, particularly those involving fields sprayed with pesticides for which safe reentry times for workers had been set.[33]

Not until twenty-seven years after promoting methyl parathion as a substitute for DDT did the EPA finally come to terms with the risks of methyl parathion. The Agency accepted voluntary cancellation of many registered uses of methyl parathion in 1999 with an assessment that

> methyl parathion is hazardous to workers—people who handle or apply the pesticide as part of their occupation, and people who work in fields to harvest treated crops. *Protective clothing and equipment are not sufficient to reduce the risks to workers to acceptable levels [emphasis added].*[34]

So, twenty-seven years after being forced to use methyl parathion, history has proven that Sweeney was right—DDT is not a human carcinogen, and the primary replacement insecticide was truly more dangerous than DDT. The EPAs tradeoff was clear: risk of poisoning and death for innocent Americans in exchange for a victory of environmental activism.

Until very recently, U.S. development policy completely ignored this risk-risk consideration, arguing that the United States can't support the use abroad of any substance that it doesn't use at home, even if the risks are completely different, and even if the substance is much safer to use than people think. "For us to be buying and using in another country something we don't allow in our own country raises the specter of preferential treatment," said E. Anne Peterson, Assistant Administrator for Global Health at USAID. "We certainly have to think about 'What would the American people think and want?' and 'What would Africans think, if were going to do to them what we wouldn't do to our own people?'"[35]

Many years after his decision to ban DDT, Ruckelshaus, in an interview with the *New York Times,* reported to be mystified by this position:

> But if I were a decision maker in Sri Lanka, where the benefits from use outweigh the risks, I would decide differently. It's not up to us to balance risks and benefits for other people. There's arrogance in the idea that everybody's going to do what we do. Were not making these decisions for the rest of the world, are we?[36]

28. J. Gordon Edwards, "Pesticides in medicine and politics," Prepared for address to Doctors for Disaster Preparedness, San Diego, Calif., 14 June 1997. Copy on file with authors, p. 36.

29. R.I. Ackerly, "DDT: A re-evaluation," p. 53.

30. T.R. Dunlap, *DDT: Scientists, citizens, and public policy* (Princeton, N.J., Princeton University Press, 1981), p. 234.

31. Ackerly, "DDT: A re-evaluation," p. 51.

32. Consolidated DDT Hearings, 1972.

33. Environmental Protection Agency (EPA), "DDT, A review of scientific and economic aspects of the decision to ban its use as a pesticide." Prepared for: Committee on Appropriations, U.S. House of Representatives. Washington, D.C., July 1975.

34. EPA, "Methyl parathion risk management decision," Aug. 2, 1999, http://www.epa.gov/pesticides/factsheets/chemicals/mpfactsheet.htm (accessed April 14, 2009).

35. T. Rosenberg, "What the World Needs Now Is DDT."

36. *Ibid.*

Reconstructing the Magnifying Mirror of Archimedes

by Charles E. Hughes

About two years ago, after reading references to descriptions by classical writers of Greece and Rome, who wrote during the 1st and 2nd centuries B.C., I wondered if a telescope using a magnifying mirror could have been produced and utilized in that ancient time period.

You have probably heard the story about Archimedes, the Greek scientist from the city-state of Syracuse, in what is now Sicily, Italy. It is said that he invented a device to focus solar rays upon invading Roman ships to cause them to burn up. Archimedes lived from 287 B.C. to 212 B.C., and made important discoveries in physics and geometry, such as the principle of specific gravity. I surmised that his burning device was a large concave mirror, probably made of bronze.

William Curran

The author with his 34-inch mirror. Ancient observers could have made a similar mirror to produce a magnification power of 40.

Later, I found some more details on the Archimedes "burning mirror," in a book by Robert Temple entitled *The Crystal Sun,*[1] about optics in the ancient world. Temple reported that mirrors and lenses of glass and rock crystal have been found in archaeological excavations in Greece and Rome, and even back to Egypt and Babylon. More than 400 examples of magnifying lenses exist in museums today from Greece and Rome, although these are usually labelled as jewelry!

As for Archimedes burning up Roman ships, Temple says this is how it was done: A single giant mirror would be useless, as its focal length would be fixed and a ship could simply sail out of range. Instead, about 70 men were placed on the ramparts of Syracuse, facing the ships. Each man had a large mirror, which Temple says was a bronze shield, flat and highly polished. The men were arranged in a semi-circle with the open part facing the target, all focussing their reflections on one part of the ship. The result would be the same as that of a large concave mirror which had an adjustable focal length. Opening the semicircle a bit would lengthen the focus; closing up the array would shorten the focus. This was coordinated carfully to keep all of the mirrors focussed on the ship.

Archimedes in thought, depicted in a 1620 painting by Domenico Fetti, which is now in the museum Staatliche Kunstsammlungen in Dresden, Germany.

Temple reports that the Italians demonstrated this method in 1989 using Navy sailors and a large glass mirror, focussed by each sailor, to set on fire a small wooden boat. They wanted to prove that Archimedes had accomplished this, since Archimedes' feat was a proud tradition of Italy, and Italian history. However, this sheds little light on ancient magnifying mirrors.

I found more descriptions of ancient mirrors in *The Electric Mirror on the Pharos Lighthouse* by Larry Radka.[2] One such mirror was located in the tower of the famous lighthouse in Alexandria in the 2nd Century B.C. Radka claims that this mirror was used at night to project a beam out to sea to guide ships into the Egyptian port. In daytime, it served as a telescope to spot approaching ships. Radka says that the lighthouse used a carbon arc device as a light source, and that the mirror users had invented wet cell batteries to produce an electric current to run a carbon arc.

Perhaps this is so, but I don't wish to dwell on that aspect of the lighthouse, which is one of the seven wonders of the ancient world; I want to focus on possible telescopic mirrors. Radka gives references to ancient writings by Polybius, Pliny and Plutarch among others in his book.

Building a Magnifying Mirror

I decided to replicate a mirror similar to the above descriptions, although these reports were inadequate and I had to figure out for myself the possible form and characteristics of such a device.

If the ancients had magnifying mirrors, did they use them on the Moon and planets and perhaps discover things only later discovered in the 15th Century about the nature of the Solar System? For

A 17th Century engraving showing the siege of Syracuse with Archimedean mirrors focussed on the attacking Roman ships.

An engraving of the Lighthouse of Alexandria by Magdalena van de Pasee dated 1614, which is now in the Museum of Art, Rhode Island School of Design. The ancient Pharos lighthouse was 300 feet tall and considered to be one of the Seven Wonders of the World. It was destroyed by two earthquakes, in 642 A.D., and 1303 A.D.

example, did the planets like Jupiter have a round shape, did Venus have phases, did Saturn have rings, and the like? A large mirror of bronze, polished stone, or glass of about 40 power could reveal that.

I happened to own a big glass tabletop, 34 inches in diameter, almost a meter wide and half an inch thick. My plan was to make this into a concave mirror with a 400-inch focal length, about 35 feet. This, I calculated, would yield a magnifying power of 40. The glass, if not coated with metal, as modern telescope mirrors are treated, would reflect about 20 percent of the incident light as a metalized glass mirror. This would be enough to see the moon clearly.

If the ancients had made a similar mirror of bronze, the metal of choice in 200 B.C. for large castings, the reflecting power would have been about 65 percent, much better than uncoated glass. But I had to use glass because I owned a glass disk. A disk of bronze that large would have cost thousands of dollars, and would need to be custom cast in a foundry.

So, I took my 34-inch diameter disk, bought about 20 pounds of tungsten carbide abrasive, and got a second piece of round glass, 14 inches in diameter, to serve as a grinding tool. The tool was wood with a glass face (which was less expensive that making it all glass). It was made up of six 14-inch plywood disks, 3/4-inch thick. A 1/2-inch thick glass coaster was glued with silicon rubber to the plywood to do the grinding. I then put the glass table on top of a 36-inch grinding table made up of many pices of 36-inch plywood spool faces, donated by a neighboring electrical supply company. The table had to be thick enough to keep the tabletop glass slab absolutely flat during the grinding of a concave face into it.

Standard Techniques

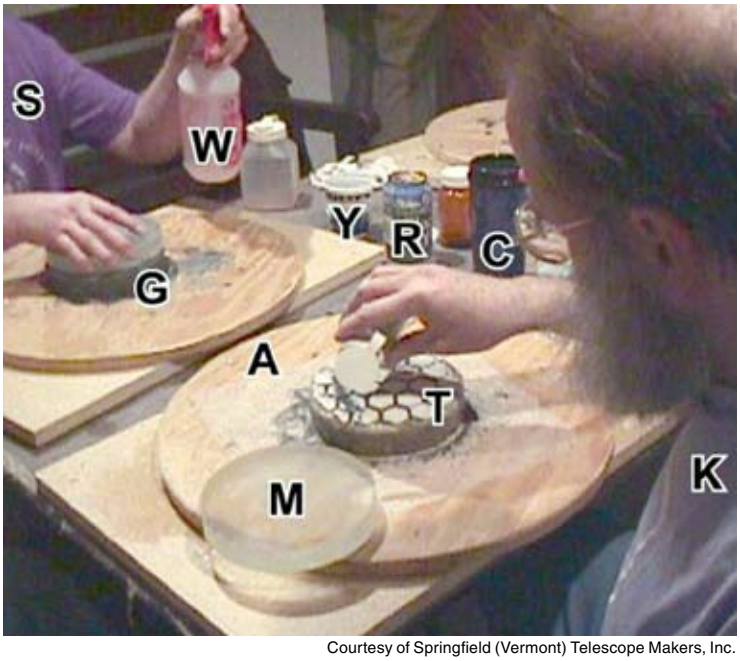
I was using standard mirror-making techniques scaled up, as described in *Scientific American*'s book on telescope mirror-making *Amateur Telescope Making—Book One*. I tried several ways to do the mirror; for example, placing the tool on top of the mirror blank, my glass tabletop. The tool was about half the size of the mirror. I expected trouble trying to evenly grind the concave shape, because the mirror was only 1/2-inch thick, a bit on the thin side. Ideally, my mirror should have been at least 1 inch thick, so I was pushing the envelope dangerously!

I placed a 36-inch rug section, cut round like the mirror under it, so that the mirror would grind evenly over the entire surface, avoiding multiple focal centers, or astigmation.

The grinding was begun on Feb. 17, 2008 and completed on Aug. 28, 2008. The grinding went through a number of grain sizes of tungsten carbide abrasive, which is as hard as diamond but cheaper; I went from large grain sizes down to a fine powder to smooth the mirror surface. Then I used a special tool coated with paper squares and cerium oxide as the polishing agent. All the ginding and polishing was done with water; no dust was produced.

I judged the progress of the work by putting a metal ruler across the diameter of the mirror and measuring the space under it, at the center of the mirror, with a leaf gauge. This value in inches was used in a math formula to calculate the focal length. The distance under the ruler is called the *sagitta,* and is inversely related to the focal length, the distance from the mirror to the point of convergence of the reflected light rays. The sagitta needed to be a bit less than a quarter-inch or about 0.230 inch to give me a 40-power mirror.

Assuming that the ancients did not know how to make a telescope ocular or the magnifying lens near the eye, the mirror would have to be 40 power, using



Courtesy of Springfield (Vermont) Telescope Makers, Inc.

Grinding telescope lenses at a Stellafane telescope-making course. To cut a spherical concave surface into a mirror blank, a full-size tool is rubbed against the blank, with a wet grit mixture, to abrade the glass. (It also abrades the tool, which becomes convex.) The mirror blank M is sitting to the side on plywood turntable A, while mirror maker K is sprinkling silicon carbide grit (black particles) onto tile tool T from a plastic salt shaker in his hand (attached cap hides the holes). Mirror maker S chooses to apply grit from a yoghurt cup Y with a plastic spoon. The grit is kept wet with water (to lubricate the grit and trap glass dust) from a spray bottle W.

Mirror maker S is grinding with one hand, mirror on top, with a solid glass tool G on the bottom; he will rotate the mirror and tool in opposite directions, frequently and at random angles to insure grinding strokes will curve the entire surface of the mirror and tool. One charge of grit and water, called a wet, lasts about 10 minutes in rough grinding. Rough grinding will take 4 to 6 hours in total for a mirror this size.

For more photos and descriptions of grinding, see http://stellafane.org/tm/mc/index.html

only the naked eye. This required that my mirror have a focus about 10 times greater than a modern telescope mirror, which needs a focus of only 3.5 feet, instead of 35 feet.

I did not carry out the polishing to a perfect finish, but stopped when there were still pits on the surface from the grinding operation, but the mirror was reflective enough to test on the Moon and terrestrial objects.

The Accident and Take #2

In September 2008 during testing, the mirror fell from the test stand onto a nearby tool box, and broke into several pieces! I was determined to succeed with this mirror, however, so I gathered up the fragments, keeping the largest to experiment with, to see if the shattering had ruined the optical properties. It had not; the fragment approximately 20-inches square worked normally, although it was of irregular shape.

I ordered another piece of glass from American Glass Company in Hackensack, N.J. for $150; made a new tool; and started the process all over again. The new mirror, which I called Archimedes 2, or Archie-2, was completed by August 2009.

Next, I started to build a mounting for the mirror. My idea was to make an octagonal box with side trunions, only 12 inches deep and mounted on a square cart which would be movable on caster wheels (see photo, p. 47). The mirror is mounted in a cell at the rear of the octagonal box. It is free to move from vertical to horizontal and to rotate a complete circle.

The whole apparatus was painted a bright red and moved to the basement of my workplace in September 2009 to be tested. I determined the focal length of the mirror by holding a flashlight in front of the mirror, and backing away, moving the light from side to side until the light filled the mirror, and no motion could be detected in the flashlight reflection. This was found to be 405 inches, about 35 feet, which was the length of focus I had planned upon.

The 35-foot focus would give the mirror a power of enlargement of 40, using the naked eye alone. I tested the mirror on distant terrestrial objects outdoors, and it magnified them 40 times. The mirror was employed by pointing it at the target and interposing the observer facing the mirror, 35 feet from the front, at the focus. The magnified object seemed to appear in, or slightly in front of, the mirror.

On Jan. 29, 2010, a full Moon about 10 degrees above the northeastern horizon was imaged. I could make out the "seas" on the disk, which was round, sharp, and fairly bright in the mirror. Two other persons present confirmed the sighting and took a photo of the image with an electronic camera. The photo details were less sharp than what we saw with the naked eye.

Unlike a conventional telescope image, where an eyepiece is used to enlarge the image and is only in clear focus over an inch or two, the Archie 2 image stays in focus throughout the entire distance of the focal length; it gets larger until maximum magnification is reached at 35 feet.

The Archie 2 observations show that a concave mirror of extreme focal length can serve as a telescope, using only the mirror and the human eye. It is likely the ancient observers could have done just that.

Footnotes

1. London: Century Books, 2000.
2. Parkersburg, W. Va.: The Einhorn Press, 2006.

More Articles by Charles Hughes On Telescope Making

Making Your Own Telescope
21st Century, Spring 2004

"Constructing a Very Large, Short Focus Telescope"
21st Century, Fall 2005

"John Dobson Debunks the Big Bang"
21st Century, Spring-Summer 2006

A MODERN ARCHIMEDES MIRROR

Italian Town Makes Good Use of Solar Mirror

Daniele Miazza

Mayor Pierfranco Midali (left) and architect Giacomo Bonzani in the Viganella town square.

Viganella in Winter darkness, before the mirror installation.

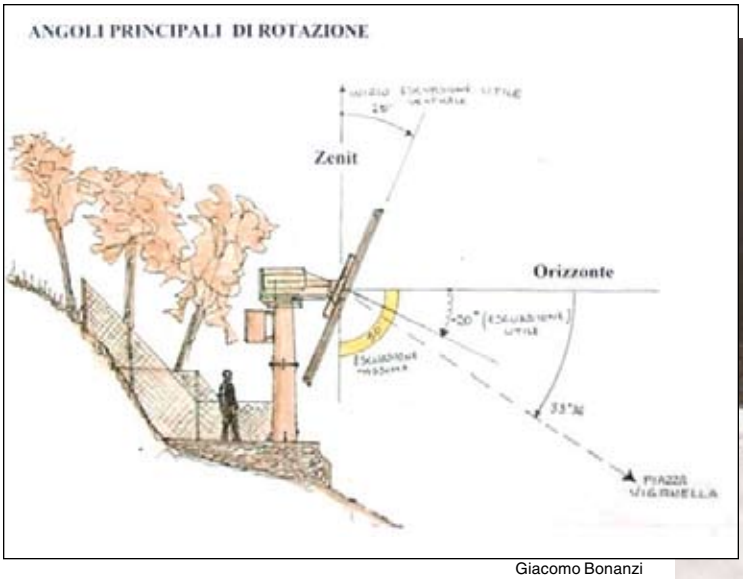
In the tradition of Archimedes, the Mayor of Viganella, a town with a population of 200 in the Italian Alps, decided to use a large mirror to create some sunlight in the town square or piazza. Viganella lies in a valley so steep that each year, from Nov. 11 to Feb. 2, it receives virtually no sunlight! The mayor, Pierfranco Midali, noted that people happily socialize in the piazza in the Summer, and that the deprivation of sunlight for 84 days in a row, was taking a toll on the town spirit. So, he decided to do something about it.

It all began in 1999, when the mayor commissioned the architectural firm of Giacomo Bonzani to construct a sundial on the church wall, very much of a tradition in Italy. However, the mayor told Bonzani not to bother painting the lines for the Winter part of the dial, because the Sun never shone there.

Then and there, the two men decided to try to raise the money to bring the Sun into the piazza in Winter. Bonzani drew some quick sketches and talked to some of his engineering friends. Other people also got involved and they found three

Giacomo Bonanzi

Lowering the mirror in place, 3,500 feet up the mountain.



Giacomo Bonanzi

The engineering plan for the mirror.

Giacomo Bonanzi

The mirror viewed from the rear.

Giacomo Bonanzi

The mirror capturing sunlight.

sources of funding. Then they located a firm which makes mirrors to see around corners for safety reasons on winding mountain roads, and to light the entrances of the tunnels in the Alps between Savona and Turin.

The work was launched, and a mechanically polished stainless steel mirror ordered.

On Dec. 19, 2006, the 26 X 16 foot mirror was lifted by helicopter up the northern face of the mountain above the town, to a height of 3,500 feet. It is controlled by computer to follow the Sun and keep the light on the piazza. It can also be radio-controlled from the town. The cost was a mere 100,000 euros, which works out to about 6 cents/day per capita over the expected 30-year lifetime of the mirror.

Now the city square, the entrance of the church, and the city hall can be bathed in sunlight throughout the Fall and Winter, for the first time in the town's 800-year existence!

Archimedes would be pleased.

—Rick Sanders

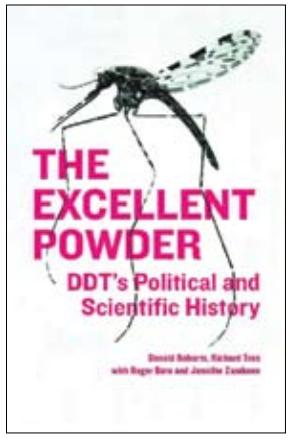
Giacomo Bonanzi

Sunlight!

MURDER BY MALARIA

The Malthusian War Against DDT

by Marjorie Mazel Hecht



The Excellent Powder: DDT's Political and Scientific History
Donald Roberts and Richard Tren (with Roger Bate and Jennifer Zambone)
Indianapolis, Ind.: DogEar Publishing, 2010
Paperback, 432 pp., $25.00
(available at http://www.theexcellentpowder.org/)

The Excellent Powder is a myth-destroying book that needs to be widely read, and to be put in every library, especially school libraries, as a reference work. In fact, this political and scientific history of DDT should be required reading in environmental science courses, to make sure that new green recruits know the extent of the death toll that will result from the continuing hysteria against DDT.

Readers of *21st Century* will be familiar with much of the history that authors Roberts and Tren cover in the book's 432 pages and 800 footnotes. But there is much that will be new, even to longtime supporters of the use of DDT for malaria control. Here I will review just a few of the highlights:

The most surprising myth is the persistent assumption that DDT works so effectively because it kills mosquitoes; even the World Health Organization continues in this belief. The reality is that yes, DDT kills mosquitoes on contact, if the insects rest on a sprayed surface for a sufficient time. But the effectiveness of DDT, as documented in studies from around the world since the 1940s, is based on its characteristic as a *spatial repellent and irritant.* Mosquitoes will avoid a house whose inside walls have been sprayed with DDT, and even those mosquitoes that venture inside a sprayed house, will be irritated by the spray and leave the area.

This characteristic of DDT, which author Roberts himself documented in field studies on malaria prevention in South America starting in the 1970s, is what makes DDT uniquely effective. No other pesticide acts as a spatial repellent (and no other pesticide continues to work for six to twelve months after one light application). But from the start, as Roberts and Tren document, this quality of DDT as a repellent has been misunderstood and ignored.

The result of this misunderstanding continues to be catastrophic for malaria control. Traditional malaria control assumed, based on a mathematical model, that DDT worked to stop the transmission of malaria by killing mosquitoes, thus preventing female mosquitoes from transmitting the malaria parasite by biting humans.

A. Otiato/USAID/Angola

A child suffering from cerebral malaria in an Angolan hospital. Today, one child in Africa dies of malaria every 30 seconds.

So, when DDT-resistant mosquitoes began to appear after the widespread use of DDT in agriculture, it was assumed that DDT would no longer be effective for malaria control, because it would no longer kill mosquitoes. Malaria programs, including those of WHO, then stopped the use of DDT, based on presumed mosquito resistance (and in addition to the mounting anti-pesticide campaign). Roberts and Tren provide voluminous documentation on all aspects of this issue.

This transmission question is key: If the incidence of malaria is decreased by house spraying, there will be fewer humans with the parasite to transmit to biting mosquitoes. Thus, when houses are sprayed, the incidence of malaria dramatically and rapidly declines. If there are no human carriers of malaria, then mosquitoes cannot transmit the disease, as human beings are the only species that hosts the malaria parasite.

Global Malaria Eradication

Given the spectacular success of DDT during World War II in stopping the spread of insect-borne killer diseases like typhus and malaria, it was assumed after the war that DDT would be able to eradicate malaria worldwide. By 1952, DDT use had eradicated malaria and other insect-borne diseases in the United States. (Note that these diseases had been killers in the northern states, as well as in the South.)

Other countries also began to use DDT successfully, and the World Health Assembly directed the World Health Organization to begin a global malaria eradication program in 1955, primarily using DDT for house-spraying. The program was remarkably successful, as Roberts and Tren document. But before the program could complete the job of freeing the world from malaria, the ugly hand of Malthusianism intervened to sabotage

U.S. Army

During World War II, DDT was routinely sprayed in barracks and dusted onto soldiers and civilians to stop the spread of insect-borne diseases. After the war, DDT spraying continued to protect populations.

WHO

In 2006, the World Health Organization reversed its 30-year ban on DDT and permitted its use for indoor house spraying (known as IRS for indoor residual spraying). Under pressure, three years later, the WHO has backed the phase-out of DDT by 2020 or earlier.

the goal of eradication and the use of DDT and pesticides in general. By 1969, the word "eradication" was eradicated, replaced by the term "malaria control."

The success of DDT and the sabotage are both discussed in detail in *The Excellent Powder.* In particular, the authors present new records that document the Malthusian takeover of malaria control and international policy in general. That population control became a policy aim is not just an assertion; it is rigorously documented.

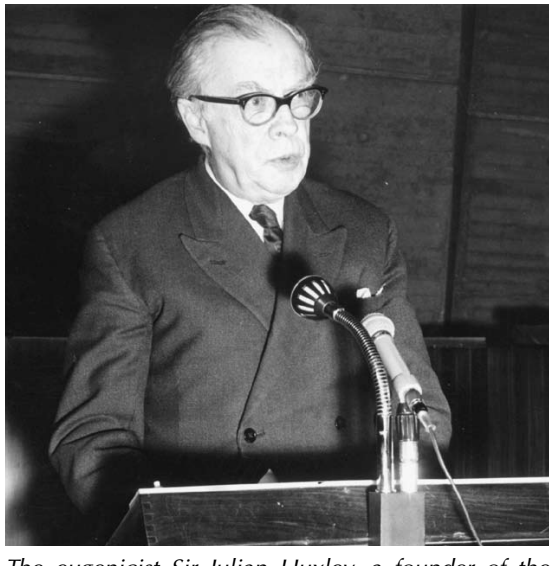
'Population Control' Prevails

DDT's effect on malaria, one of the top killer diseases worldwide, was to spur population growth. When parents stopped dying young, when babies could grow up to maturity, populations grew and began to prosper. This set off alarms among the Malthusians, who began a far-reaching population control offensive, which included funding for "environmentalism" and "family planning," at the same time removing funds from malaria eradication.

(The U.S. side of this story is told in the excerpts from *The Excellent Powder,* which appear on p. 38 of this issue.)

Sir Julian Huxley, the first director of the United Nations Education, Social, and Cultural Organization (UNESCO) and a founder of the World Wildlife Foundation, is a key player in this murder campaign. Roberts and Tren document some of this, but there is more to the story. Huxley was a prominent member of the British Eugenics Society, serving as its vice president and then president, but after Hitler gave eugenics a bad name, Huxley adopted "environmentalism" as a more palatable banner under which to carry out the culling of mankind.

Huxley wrote: "Even though … any radical eugenic policy will be for many years politically and psychologically impossible, it will be important for UNESCO to see that the eugenic problem is examined with the greatest care, and that the public mind is informed of the issues at stake so that much that now is unthinkable may at least become thinkable."



The eugenicist Sir Julian Huxley, a founder of the World Wildlife Fund and of UNESCO, preferred preserving wildlife to saving human lives. Here, Huxley addresses a UNESCO meeting in 1965.

Roberts and Tren note that Huxley founded the World Wildlife Fund "because of his concern that growth of human populations in Africa was endangering African wildlife."

Left out of this part of the story is the role of today's most rabid Malthusian, Prince Philip, and his now deceased fellow royal, Prince Bernhard of the Netherlands, in promoting WWF enviromentalism to stop population growth. These Malthusians founded the World Wildlife Fund to raise money for the expansion of the International Union for the Conservation of Nature. The IUCN, in turn, had been set up in 1948 for the purpose of reducing world population, especially in the developing sector, and, in the name of "conservation," securing a hold on the world's raw materials.

Decentralization

Starting in the 1960s, UNICEF (the United Nations Children's Fund) and other United Nations programs, along with the U.S. Agency for International Develop-

Paul E. Alers/NASA

Prince Philip wants to reduce the world population to 2 billion and has often stated his desire to be reincarnated as an AIDS virus to help the depopulation process.

Sander Lamme

Prince Bernhard of the Netherlands (1911-2004), co-founded the World Wildlife Fund and was its first president. Bernhard had to resign from the Nazi Party in order to marry Princess Juliana, who later became Queen of the Netherlands.

ment (USAID), rapidly switched from funding disease control to funding family planning, as Roberts and Tren document. UNICEF and USAID pulled completely out of funding the malaria eradication program. Instead, these agencies decided that malaria control should be decentralized and run through local community health programs, which also were to carry out family planning.

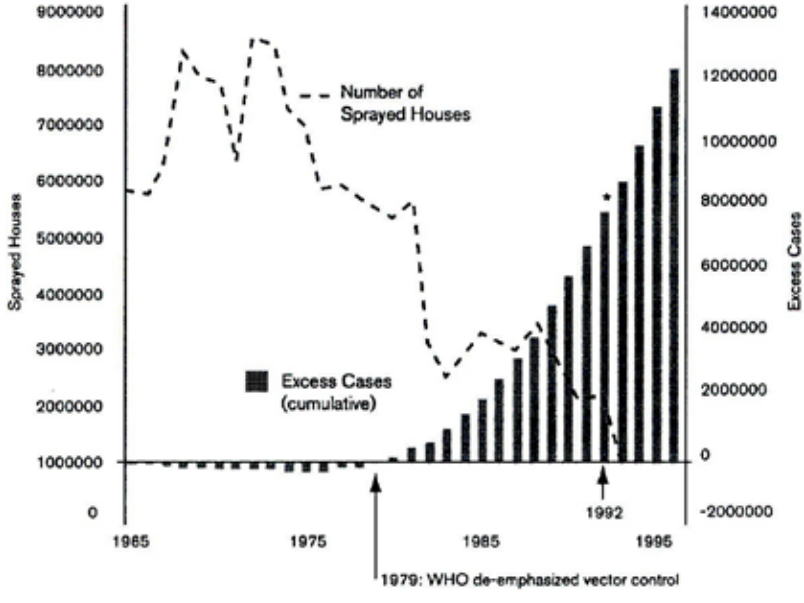
The centrally managed malaria eradication program ceased to exist by the early 1970s. As Roberts and Tren report, the former chief of epidemiology in the World Health Organization's malaria division, Dr. Mohyeddin A. Farid, said that the period from 1969 to 1980 was one of "de-eradication and anarchy"—and a surge in malaria incidence. Farid also noted the irony that the high child mortality of disease-ridden nations would work against any birth control program, as parents would want to have more children to make up for those killed by disease.

The decades from 1980 to 2000, Farid stated, were characterized by malaria cover-ups and resignation. Epidemic statistics were covered up, and drug distribution and treatment became the main weapons used against malaria. As Farid noted, this approach ignored the problem of drug resistance that would develop in the malaria parasite.

A look at the graph in the accompanying figure dramatically shows how malaria incidence soars as house-spraying declines.

Roberts and Tren provide a good picture and many references for the demonization of DDT internationally and the building pressure on the World Health Organization against DDT and house spraying, culminating in 1997 in the decision by the World Health Assembly (which makes policy for the WHO) to reduce reliance on insecticides and instead promote "integrated pest management" and alternative methods of disease vector control. What this amounted to is more

CUMULATIVE NUMBERS OF EXCESS MALARIA CASES OVER AVERAGE NUMBERS PER YEAR (1965-1979) FOR BRAZIL, COLOMBIA, PERU, ECUADOR, AND VENEZUELA



*First year excess cases grew by more than 1 million cases/annum.
Data adjusted to a standardized ABER.
Source: *The Excellent Powder*, p. 99.

WHO/National Library of Medicine

Vector control worked as part of a centralized malaria eradication plan that included house spraying. Here, scientists conduct mosquito larvae counts in Togo.

malaria. As the authors explain, vector control (killing mosquitoes) isn't the same as disease control, which "is designed to limit disease transmission by breaking vector-human contact and preventing biting."

Roberts and Tren also point out that malaria is mainly a disease of the rural poor, and to apply integrated pest management, for example, by manipulating the aquatic habits of mosquito breeding over large areas, would cost more and be environmentally destructive, as opposed to house spraying with minute quantities of insecticide.

As the incidence of malaria and malaria deaths climbed over the past two decades, the health establishment adopted another nice-sounding but weak anti-malaria method to champion: insecticide-treated bed nets.[1] This was the method of choice of the Roll Back Malaria program, initiated in 1998 by the World Bank, the World Health Organization, and other donors. At that time, the World Health Organization estimated that there were between 300 and 500 million cases of malaria every year, and between 1 and 2 million deaths. Eleven years (and many millions of Roll Back Malaria dollars) later, those figures were still the same.

In contrast, as Roberts and Tren point out, the earlier malaria eradication program was a resounding success in lowering disease and death rates in countries where it was practiced.

By 2006, the malaria situation was so dire, that the new head of the World Health Organization's Global Malaria Program, Dr. Arata Kochi, announced to the world the obvious. Present methods of malaria control weren't working, and the World Health Organization would roll back its 30-year virtual ban on DDT and bring back DDT for house spraying as an effective weapon against malaria. This policy change met with a storm of criticism from the environmentalist movement, and even within the World Health Organization. The anti-pesticide lobby then successfully lobbied to have the WHO adopt a goal of phasing out DDT entirely by 2020, without the present exception for public health emergencies.

It should be noted that there is not now, and never has been, a crash program to develop an effective alternative to DDT for house spraying. The anti-DDT lobby has not supported this kind of an effort, just vague talk about alternatives. The current alternative pesticides are not spatial repellents, require more frequent application, are

John Haskew/IFRC/WHO

Roll Back Malaria has championed the bednet, a good thing to use, but bednets are not able to bring down malaria incidence without house spraying.

1. Bednets as a method of disease-control are largely ineffective unless combined with DDT house-spraying. The reason is that nets require user compliance, whereas once house walls are sprayed, it will deter mosquitoes for several months, no user compliance required.

USDA APHIS Pest Survey Detection and Exclusion Laboratory

DDT spraying was widely used in the United States to control destructive pests like the gypsy moth and the beetle that caused Dutch elm disease.

more highly toxic to insects, and cost more.

Birds and Bias

Chief among the other DDT myths knocked out by *The Excellent Powder* is that DDT use killed off U.S. birds, especially that American icon, the bald eagle. No literate person can avoid seeing this myth pop up almost daily in the local and national press, usually in the form of "the ____ bird population is now on the rise since the days of DDT use wiped them out."

Roberts and Tren document the falsity of this popular myth at length. Briefly, the facts show that eagles, peregrine falcons, and others had precipitously declined in numbers (because of hunting and land development) long before the introduction of DDT in the post-war years.

As for robins, the tear-jerking subject of Rachel Carson's *Silent Spring,* There were some robin deaths when DDT was sprayed directly on birds. Carson bewailed the robin deaths on the University of Michigan East Lansing campus, which used DDT in an effort to save the large elm trees from Dutch elm disease, a destructive fungus spread by the elm bark beetle. The tree protection effort did initially kill a few sprayed robins. But aside from these initially killed birds, the remaining DDT did not harm the robin populations on the campus—or nationally. In fact, robins had a population boom in the years of DDT use, not the extinction Carson's book implied.

Allegedly disappearing birds, especially raptors, were a main focus of the anti-DDT campaign, beginning in the late 1960s, leading to the U.S. ban on DDT in 1972. Roberts and Tren show how this campaign was based on lies.

American robins were increasing in number, at the same time that Rachel Carson pronounced robins to be on the verge of extinction.

The Myth of Human Harm

Another major myth that Roberts and Tren overturn is that DDT harms human beings. In fact, not one single death or illness can be attributed to DDT in all the years of its spraying and manufacturing. In more than 65 years of research on DDT, the anti-DDT scientists have continued to turn out studies claiming that DDT promotes premature births, retards baby development, make babies become obese as adults, effeminizes male babies, and causes all types of cancer. (Note that these are my characterizations of studies; Roberts and Tren criticize such studies in scientific terms. They carefully note the criteria that must be met in any epidemiological study, chiefly that of cause and effect.)[2]

The researchers tendentiously promoting the alleged harm of DDT go so far as to unashamedly claim that the risk of using DDT outweighs any harm from malaria; this, while one child in Africa dies every 30 seconds from malaria! Their scare stories continue to circulate in African countries, to stir up opposition to government programs that use DDT in house spraying.

What kind of twisted morality grips such researchers to persist in attacking

2. Don Roberts has an excellent summary of how to evaluate a scientific study, in an article that appeared in *Outlooks on Pest Management*, February 2010, "Impact of Anti-DDT Campaigns on Malaria Control." As he demonstrates there, "those who campaign against DDT have failed to show, through replicated and confirmatory studies, that a specific type of public health harm from DDT was:

"• Consistent with current biological or theoretical knowledge of the type of harm and its known risk factors,

"• More common with higher DDT exposure and less common with lower exposure,

"• Less common prior to DDT exposure and appeared or increased in frequency with onset of DDT exposure, and

"• More common with DDT exposure and less common once DDT use was stopped."

As he points out, years of broad and heavy DDT usage were not accompanied by reports of disease or birth defects in the medical and statistical records for that time. "The lack of proof that DDT caused harm to human health back in those days of intense exposures goes far in explaining why, to this day, there is no evidence human health has been improved in any way by stopping public health use of DDT" (p. 5).

DDT, and to blatantly lie about it? There are many such lies exposed in *The Excellent Powder.* Dr. George Woodwell, for example, published an article in *Science* magazine claiming that he had measured 13 pounds per acre of DDT residues in marsh sediment. Yet, under oath, Woodwell admitted that he had knowingly measured the DDT levels at the site where the DDT spray trucks washed down, although he neglected to report this fact. The actual measurement, he acknowledged would be 1 pound per acre. Neither he, nor *Science* magazine published a retraction.

Woodwell, it should be noted, is a close friend and collaborator of Paul Ehrlich, and if anything is a more radical Malthusian, who views human beings as a disease on the planet.

Woodwell knowingly promoted lies about DDT. Other scientists and science writers seem to be more blindly led to their research conclusions by the popular myth that DDT is dangerous. Some claim that they oppose DDT because it is bad for animals, but would permit its limited use for house spraying.

Charles Wurster, a founding member of the Environmental Defense Fund and a leader in the fight to ban DDT, recently told me that he and EDF never intended any population control. "We were just concerned with protecting wildlife." Baloney, I say, after reading the documentation presented by Roberts and Tren. At least Wurster's good friend Paul Ehrlich, is truthful enough to say in print that DDT needed to be banned as a "death rate solution" for human beings.

Roberts and Tren discuss in depth the biased anti-population views of the anti-DDT scientists and science writers and editors. I would go a step further and call some of the anti-DDT scientists genocidal maniacs.

The Ideological Parasite

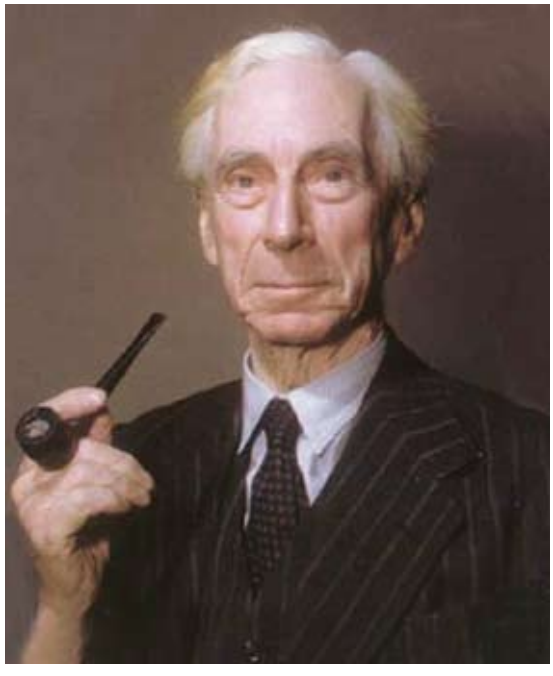
Harm from DDT is a defining cultural myth of the 20th Century, as *The Excellent Powder* amply documents. It functions as a mental parasite, seemingly unable to be controlled by rational argument and scientific evidence. How did a postwar world, in which millions had just lost their lives, give birth to a new generation that views overpopulation as a problem? The answer is complex, and only partially covered by Roberts and Tren.

From the top, population control is a project of the oligarchical elite, typified by Britain's Prince Philip, whose intention is to keep the masses dumb, and thus manipulable. They and their willing servants, like Paul Ehrlich, intend to reduce world population to 2 billion, eliminating the other 4.7 billion.

This is not hyperbole; these Malthusians openly discuss their aim. Lord Bertrand Russell, for example, candidly called for culling the population by war, disease, and famine. In his *Prospects of Industrial Civilization,* Russell wrote in 1923: "[T]he white population of the world will soon cease to increase. The Asiatic races will be longer, and the Negroes still longer, before their birth rate falls sufficiently to make their numbers stable without help of war and pestilence.... Until that happens, the benefits aimed at by socialism can only be partially realized, and the less prolific races will have to defend themselves against the more prolific by methods which are disgusting even if they are necessary."

In his 1951 *Impact of Science Upon Society,* Russell wrote about the goal of population reduction that "War ... has hitherto been disappointing in this respect ... but perhaps bacteriological war may prove more effective. If a Black Death could spread throughout the world once in every generation, survivors could procreate freely without making the world too full.... The state of affairs might be somewhat unpleasant, but what of it? Really high-minded people are indifferent to happiness, especially other peoples'...."

(For those who stubbornly refuse to believe this of the lauded peacenik philosopher Russell, these and similar pronouncements are all on the record, as are the hateful views of Prince Philip.)



Lord Bertrand Russell advocated war, famine, and disease as "disgusting" but "necessary" methods to keep population down.

Name the Enemy!

If I have one criticism of this excellent book, it is that Roberts and Tren don't go far enough in naming the enemy: the British Empire and its financial oligarchy. That is what we are fighting against in the case of DDT suppression, and in the persisting colonial mentality that stifles development in general. Historically, and at present, the Empire views mankind as mere cattle to be herded and culled where necessary. Environmentalism and its Malthusian scientific promoters serve this Empire.

The battle for DDT, for continuing its use for house-spraying, has to be fought in this context, against this real enemy.

In the historical record, over millennia, advanced science and technology have been the measure of progress, liberating men and women from heavy labor, so that they were free to use their minds. Advanced science and technology were also the means for keeping the environment clean, as increased energy flux densities produced better quality and cleaner power. As Roosevelt's Tennessee Valley Authority showed, man's management of nature can give us a beautiful world.

The Excellent Powder provides excellent information for us to win this fight. It deserves to be read, to be placed in libraries and in school curricula, and to be a bible in the war against murder by malaria.

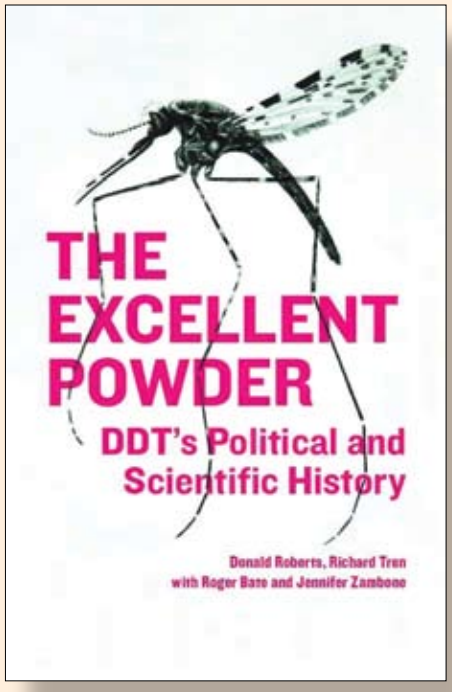
The Excellent Powder:
DDT's Political and Scientific History

by **Donald Roberts**, medical entomologist, and
Richard Tren, economist and director of Africa Fighting Malaria

The real story of DDT:

- How it works to stop the spread of malaria, and why other methods don't work as well
- How the facts show that DDT did not kill off bird populations
- How there is no human harm from house-spraying with DDT
- Who wants to stop DDT use, and why

And much more



Released April 21, 2010
Paperback, 432 pp., $25.00
Available from booksellers or http://www.theexcellentpowder.org/

Reviews

"Truly excellent … debunks many of the unfounded beliefs about DDT that persist in spite of broad underlying evidence …."
—Veronique de Rugy, nationalreviewonline

"I've followed the DDT debate for over a decade, and this book should be an argument ender."
—Nick Schulz, The American

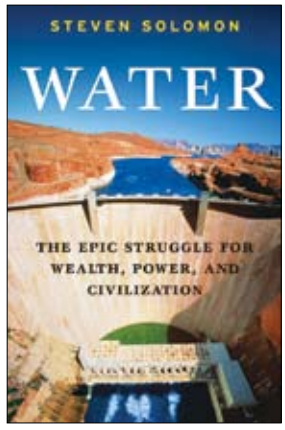
"The Excellent Powder … will provide insight into how science can be destroyed by politics. Highly recommended."
—Michael Shaw, Contributing Columnist, HealthNewsDigest.com

"… a myth-destroying book that needs to be widely read, and to be put in every library…."
—Marjorie Mazel Hecht, Managing Editor, 21st Century Science & Technology

"Donald Roberts and Richard Tren do more than merely defend the banned and much-maligned insecticide…. [T]hey boldly call the widespread withdrawal of DDT a public health disaster."
—Barbara Hollingsworth, Local Opinion Editor, San Francisco Examiner

An Epic Without Vision

by Glenn Mesaros



Water: The Epic Struggle for Wealth, Power, and Civilization
Steven Solomon
New York: Harpers Collins, 2010
Hardcover, 596 pp., $27.99

This book is one of epic pessimism about man's ability to create new resources, such as fresh water. Here's one example from author Steven Solomon:

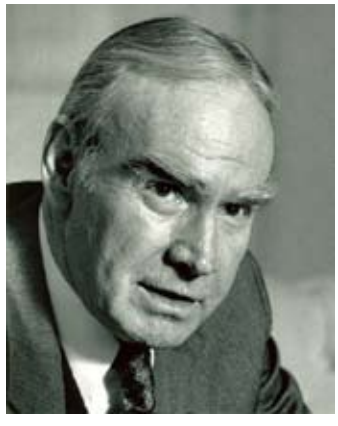
"The World Commission on Dams Report was a resounding turningpoint: The Global era of unbridled giant dam building was over."

And another: "… [D]esalinization cannot be the panacea technology to solve the world's water crisis in the short term.… Even if costs plunged, there are unsolved environmental problems about how to dispose of the briny waste; inland regions cannot be reached without expensive pumping and building long acqueducts."

Contrast this with the approach of Rep. Jim Wright, the Texas Democrat, who in his 1966 book *The Coming Water Famine,* described the problem, and proposed to solve it with a Great Project to provide the nation with a future fresh water supply.

Wright, who spent 34 years in the House of Representatives, and was Speaker of the House from 1987 to 1989, was an original pro-growth FDR Democrat (a far cry from today's environmentalist Pelosi-led anti-capitalist lemmings, who are marching over the cliffs of oblivion into the "never never" land of carbon tax credits and banning harmless CO_2).

Wright wrote about real pollution problems in American rivers and streams, back in 1966, and advocated the Clean Water Act, which spent hundreds of billions of dollars to clean up the mess. Now, every day, I walk over the Mississippi River in Minnesota, which is clean enough to drink, and full of wildlife, right in metropolitan Minneapolis.


Jim Wright: An epic thinker with vision.

The aim of Wright's book about a "coming water famine" was to provide an infrastructure solution for future generations. He advocated a bold, visionary plan to divert water from the Yukon River in Alaska, southwards through the Natural Rocky Mountain Trench in Canada, and thence to the arid Southwest, California, and Mexico.

This "dream is, admittedly, both grandiose and visionary," he said. "However, the nation was built by visionaries. There have been some disturbing indications in recent years that we may have lost some of our capacity for dreaming and acting in those areas concerning our survival upon this earth. We must recapture that capability if we are to survive.…"

Wright called the Alaska waterway the "North American Power and Water Alliance," known as NAWAPA, and said that it "has almost limitless potential if we possess the courage and the foresight to grasp it."

The Cultural Shift

But just in the period when Wright was proposing NAWAPA, a cultural shift was imposed on the United States, replacing scientific optimism with its opposite.

Steven Solomon represents the "long descent of man" started by the Baby Boomer generation in 1968, which plagues the intellectual life of the trans-Atlantic world from Washington, D.C., to Berlin. Although Solomon has some good chapters on the past usage of water, from the Grand Canal in China, to the Nile River in Africa, to the Erie Canal in North America, in the development of industrial societies, he views these developments as apparently all over now in the 21st Century:

"No new innovative breakthrough capable of expanding usable water supply on a large enough scale to meet the demand is anywhere evident on the horizon…" he writes.

And: "The age of water scarcity consequently heralds the potential start of a momentous transition in the trajectory of water and world history: from the transitional paradigm based on centralized, mass scale infrastructure … to a new efficiency paradigm built more upon more decentralized, scaled to task, and environmentally harmonious solutions that make more productive use of existing supplies."

Small is Beautiful

Solomon's paradise of future water usage can be found in "rural parts of India

and Central Asia where British colonialism did not penetrate with its centralized, modern water techniques." For example, he says, "[V]illage built and managed water tanks in India offer small, local, partial, but helpful solutions to the nation's great water storage shortages."

"Several promising principles have been enunciated. These include striking a balance between the '3 E's': environmentally sustainable use of water; equitable access by the world's poor … efficient use of existing resources…."

Solomon pays the usual drivel of homage to Rachel Carson for starting this movement in 1962 with her *Silent Spring,* describing a world where the birds do not chirp any more because DDT killed them. This fraud did not save any birds, but killed millions of people of color, who died from malaria that DDT could have prevented. Today, even the World Health Organization recommends indoor spraying with DDT to combat malaria.

Solomon also recalls Earth Day, 1970, where "20 million Americans rallied to support an environmentally health planet." I remember this "day of infamy" at Rutger's University in New Jersey, where the local Socialist Workers Party leader wore a badge which portrayed belching smokestacks, and proclaimed, "Capitalism fouls things up." He ended up drunk as a skunk on Ripple Wine that day.

Trans-Pacific Region

Fortunately, for the future of mankind, the trans-Pacific region of Russia/India/China has rejected the "small is beautiful" mantra of the now discredited "global warming," British dominated, environmental cartel.

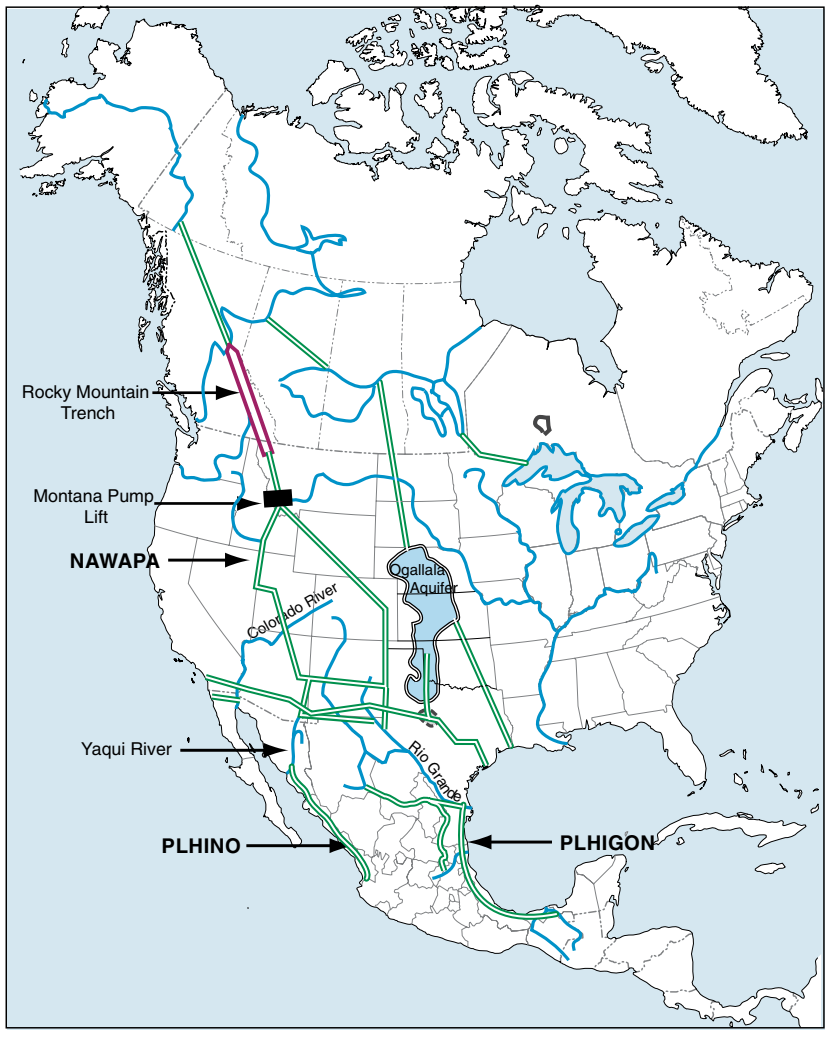
'NAWAPA-PLUS'

The great North American water project, the North American Water and Power Alliance or NAWAPA, was designed by the Parsons Engineering firm in the 1960s to harness about 17 percent of unused runoff from Alaska and northern Canada and bring it southward. Most of that 1,000 cubic kilometers of runoff water now flows unused into the Arctic Ocean.

NAWAPA-Plus, as conceived by *Executive Intelligence Review,* would extend the original NAWAPA design to link up in Mexico with both the PLHINO and the PLHIGON water projects, as shown, creating a single, integrated North American water project.

In the original NAWAPA design by Parsons, the water would be channelled into the Rocky Mountain Trench, a natural reservoir about 800 km in length, which runs from the center of Canada down into the northern United States. It is about 15 km wide and 100 meters deep, on average, and could store some 400 tp 500 cubic kilometers of water, at a height of about 900 meters above sea level.

At the northern tip of the Trench, a navigable waterway would be built in Canada, from Vancouver in the West to Lake Superior and the St. Lawrence Seaway in the East—a great waterway that would connect the Pacific with the Atlantic.



Sources: Parsons Company, *North American Water and Power Alliance Conceptual Study,* Dec. 7, 1964; Hal Cooper; Manuel Frías Alcaraz; *EIR.*

For more on NAWAPA-Plus, see the Special Report, "Plhino: Water to Green Mexico's Farmland," *21st Century,* Spring 2009. Also, see the LaRouche video report on the project, "NAWAPA-PLHINO: The Future of the Americas," http://www.larouchepac.com/node/9257.

China completed the world's largest dam, the Three Gorges Dam, in 2006, right in the middle of the "no new dams" era on the flood prone Yangtze River, despite opposition from the U.S. Export-Import Bank. It stands 600 feet high, and a mile and one half across, with "multi-tiered ship locks and a nearly 400 mile long reservoir."

As Solomon writes, "China is the unapologetic, leading state representative of the hard path."

"In 2001, Chinese leaders launched the transnational civil engineering water transfer scheme … to redirect rivers of water—two and a half to three times the volume of the Colorado River or 25 times more than Libya's subterranean Man-made River—northward from the Yangtze basin. Three separate channels, totalling 2,200 miles in length, were designed to carry the water across mountains, canyons, waterways, railways … to deliver parched north China from its dire thirst."

In effect, China is doing what the United States could have done with NAWAPA in diverting the Yukon River in Alaska all the way to Mexico between 1965 and 1995. As Jim Wright said in 1966, "our water problems will be solved only by moving water from areas of comparative abundance to sections of critical scarcity."

Congressman Wright forecast the benefits of NAWAPA to the United States, Canada, and Mexico: millions of acre feet of water, kilowatts of energy, irrigated land, and increased domestic national product by untold billions of dollars. Today, we can add the realistic plans to build a tunnel under the Bering Strait, thus linking Alaska, and North America, to Russia, and Asia with a high speed rail lin, which would revolutionize the world's economy.

Again, in contrast, Solomon's lack of wisdom does not even mention that a huge increase in nuclear power development could solve the final cost containment of desalination of salt water.

One has to ask, what, really, is the point, of these "Epic" books on "natural" resources by Western publishers? To keep you, dear reader, in a controlled cultural and mental enviroment, away from the limitless potential of the universe that can be harnessed by each new generation of creative human beings.

GLOBAL WARMING UPDATE

Compiled by Gregory Murphy

Save the Whales So Their Dung Saves Us

A new report from the researchers of the Australian Antarctic Division (http://www.aad.gov.au/default.asp?casid=37724) claims that increased whale excrement in our oceans could help fight global warming by encouraging the growth of carbon-dioxide-consuming algae. The iron-rich droppings would feed blooms of phytoplankton, which, in turn, help regulate the ability of the ocean to store carbon.

Researcher Steve Nicol claims that a larger population of baleen whales in the Southern Ocean would work, but does not know how much whale dung it would take to make a difference.

Mike Double/©Commonwealth of Australia

Dung ho: Whale droppings being collected from a net.

The Insanity of Green Power

Yet another scam in solar power has been exposed in Spain, where solar power plants were caught using conventionally fueled arc lights to shine on the solar panels at night to increase the output of their solar plant. Why? Because solar power commands higher prices in the electricity market.

During plant inspections, it came to light that several solar power plants were generating current and feeding it into the net at night. To simulate a larger installation capacity, the plant operators also made use of diesel generators.

The scam operators apparently failed to realize that someone would eventually notice that solar plants are not likely to produce current in the dark. Had the plant operators connected the conventional electricity generators during the daytime, to add to their solar power, the swindle might not have been noticed.

Courtesy of Anthony Watts

The SARCLIGHT®: The soon-to-be patented "solar power at night" arclight system.

For more on the story, see http://wattsupwiththat.com/2010/04/13/the-insanity-of-greenery/

New Fashion Accessory For Global Warmers

There's a new face mask that we leave to readers to evaluate: The "Green Screen" by designer Robert Ortega, a graduate student at Columbia University Graduate School of Architecture, is an anti-bacterial and reusable face mask that "sequesters the CO_2 from every exhale."

The mask is made from pulp and embedded with seeds that actually sprout. It does double duty, protecting your lungs and protecting the environment from your negligible carbon-dioxide emissions. And, it's recyclable—in your compost pile.

You can see the creation here: http://inhabitat.com/2010/04/25/green-screen-a-living-carbon-capturing-face-mask-that -filters-bacteria/

The American Power Act: A Fascist Climate Dud

On May 12, Senators John Kerry (D-Mass.), chairman of the Senate Foreign Relations Committee, and Joseph Lieberman (I, Conn.), unveiled their cap and trade bill, entitled The American Power Act. This bill proposes to cut greenhouse gas emissions by 17 percent by 2020 and 83 percent by 2050. The bill mentions nuclear power, but it is not serious.

Chip Knappenberg, assistant to University of Virginia climatologist Patrick Michaels, analyzed the bill, and found that the global temperature savings of the Kerry-Lieberman bill is astoundingly small—0.043°C (0.077°F) by 2050 and 0.111°C (0.200°F) by 2100.

In other words, by century's end, reducing U.S. greenhouse gas emissions by 83 percent will only result in global temperatures being one-fifth of 1°F less than they would otherwise be. This is scientifically meaningless, although the genocidal effects of the bill are very real.