Nuclear Education Issue

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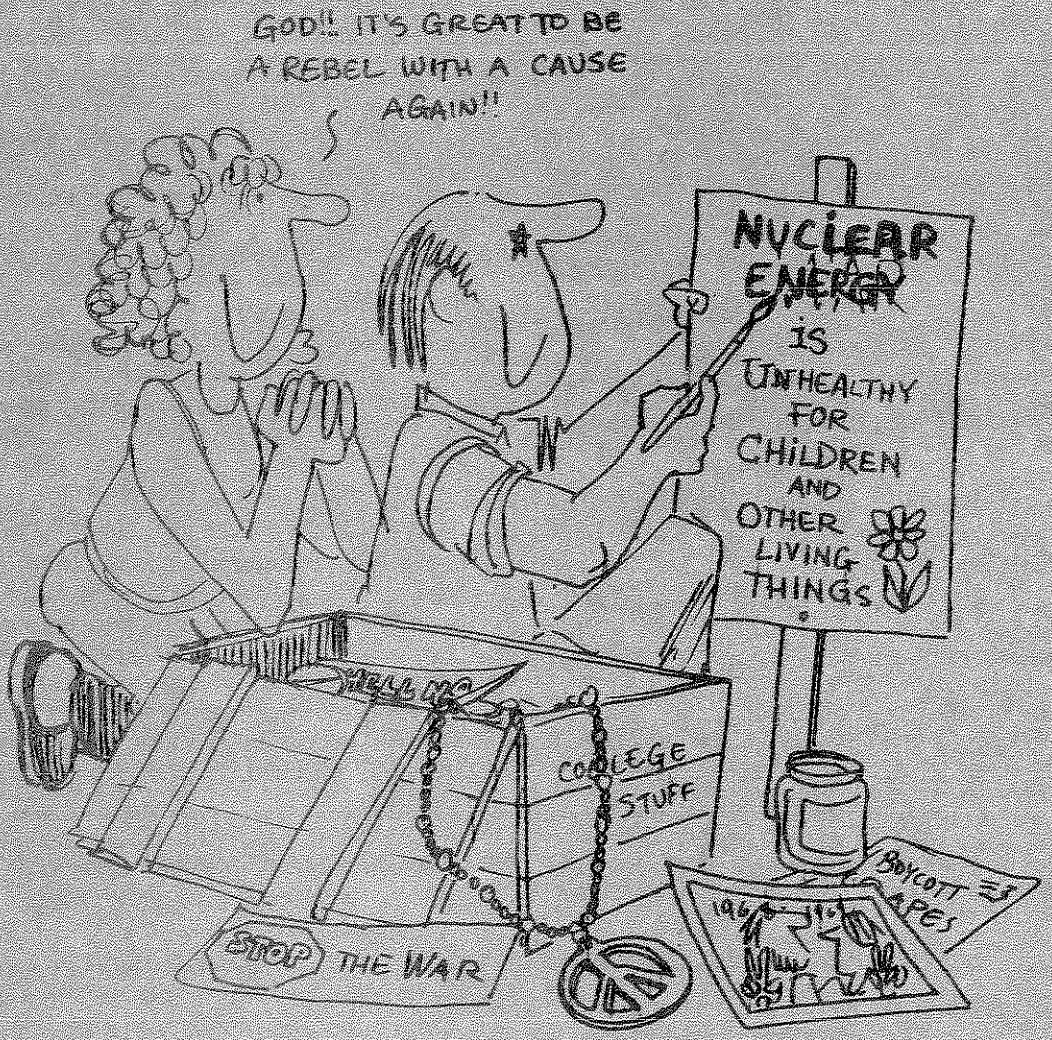
GREEN REVOLUTION

A VOICE FOR DECENTRALIZATION AND BALANCED LIVING

$1.00

This issue of Green Revolution provides necessary information to understand the issues of nuclear energy. That's what the School of Living is about — education for life. There is the expectation, however, that once a person understands the nuclear issues, he/she will want to join with other concerned persons to take appropriate action to safeguard family, community, and future generations.



— *Harrisburg* magazine cartoon by Gene Allen Suchma

The School of Living

Green Revolution

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Founder: Mildred J. Loomis

Green Revolution is the School of Living's voice for reporting on the activities of a world-wide movement of the same name, which works for decentralized government, industry, population. It promotes community, Community Land Trust, Balanced Living, sufficient and nutritious foods, appropriate technology, right education, homesteading, right livelihood, harmonious living on the earth, cooperative self-sufficiency, economic reform.

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HOW THE GREEN REVOLUTION GOT ITS NAME

by Mildred Loomis
[as adapted from her forthcoming book on a history of decentralism.]

In 1940, a growing group of persons concerned with the quality of life, rather than the over-riding desire for things, were becoming interested in Decentralization. At the School of Living in Suffern, N.Y., more and more persons found their lives becoming integrated. In homesteading, they could be honest, practice social justice, experience personal growth, and live in harmony with nature.

This trend was given a name in a dramatic meeting at the School of Living in 1940. In that year, School of Living forums were well-received by progressives and radicals of New York City. Persons came to the forums as resource people and as learners. The conferences were for a weekend, sometimes longer.

World War II had begun, and serious people probed deeply. A particularly thoughtful group came to the Education Seminar in January, 1940, including Dr. Stringfellow Barr, president of St. John's College of Annapolis; Morgan Harris, educational director of a major N.Y. cooperative; William Newcomb, a Georgist editor; Graham Carey, noted sculptor; Peter Maurin from the Catholic Worker movement; plus other teachers, homesteaders, and the School of Living staff.

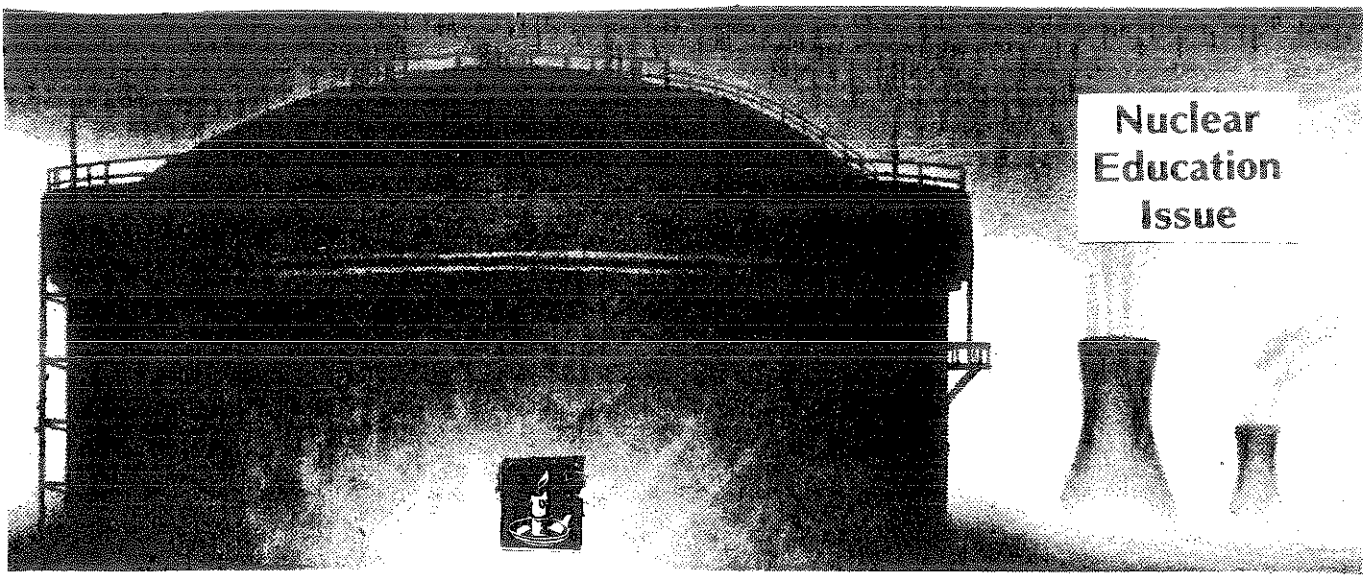
Seminar members outlined their primary concerns and solutions for social ills. Graham Carey mentioned his debt to English distributists Hilaire Belloc and Eric Gill, and showed how art and responsibility are joined — both resulting from human work. A person tending a machine which makes boxes uses very little of her capacities. An artisan carving a wooden bowl, on the other hand, uses many aspects of her personality or self. She uses her mind in designing, her will in persevering, her creativity, and of course, her body and muscles in carving. She is in control of the whole process, and is thus fully responsible for the object she makes. According to Graham Carey, a reform in work was the principal need of modern industrialism.

"No — the land problem is the first needing solution," maintained Bill Newcomb. He outlined the thesis of Henry George. "Homesteaders are blocked by the high price of land. Nations go to war for profit in land and minerals. Land monopoly causes depressions and unemployment. Family security and world peace depend on ready access to land — we've got to solve the land problem first," Newcomb maintained.

"I maintain that cooperation is the first need for a better world," Morgan Harris offered. "Competition is our ruination." He showed how consumer cooperative groups eliminated intermediaries. "If we don't cooperate, we will never solve world problems," he declared.

Dr. Barr described the Great Books program at St. John's University as a way to define and probe universal problems, and to develop motivation and skill in solving them.

(continued on inside back cover)



Nuclear Education Issue

A number of events within a two-month period this Spring caused the American public to re-examine their attitudes toward nuclear energy and nuclear weapons.

On March 12, the government conceded after twenty years of assurances to the contrary that we have no acceptable technology for the disposal of radioactive waste.

One day later, March 13, five nuclear power plants were shut down because of inadequate earthquake safeguards.

Then on March 28, a combination of mechanical problems, design deficiencies and human error brought the three-month-old Three Mile Island reactor to the verge of a meltdown.

In an atmosphere of conflicting reports and public distrust, people along the coast from Boston to Richmond contemplated the direct threat that nuclear power posed to their lives. Millions learned that their states had no adequate evacuation plans, that nuclear facilities around the country were not equipped to provide accurate measurements of radiation releases, and that the operators and regulators of the nuclear industry were completely unprepared to deal with the accident.

With 73 nuclear plants currently completed, and 93 under some stage of construction, there is much reason for the American public — if not the entire world — to be concerned.

Through it all, the nuclear industry has repeatedly assured the public that the plants are safe. But for more than a decade, some of the world's leading doctors and scientists have been warning about the dangers of nuclear energy. Dr. John Gofman, co-discoverer of the Uranium-233 isotope and a participant in the Manhattan Project that developed the atomic bomb, predicted five years ago that normal operation of American nuclear reactors, even without a major accident, coul cause some 30,000 additional deaths each year from cancer, leukemia, and birth defects.

The National Academy of Science calculates that 6,000 U.S. children will each year enter the world deformed as a result of pre-birth exposure to nuclear radiation. The newly-published document, called the Bair Three Report, also says that ½% of the U.S. population, or 1,000,000 people, will in their lifetimes develop cancer as a result of nuclear technology.

Most nuclear facilities are far-removed from the daily lives of people. As a result, large corporate interests and the federal government have been able to present the image of safe, clean, and economically sound nuclear industries through expensive public media campaigns. Consequently, public awareness and knowledge of the issues involved is lacking.

It wasn't until May, 1977, when 2,000 members of the Clamshell Alliance marched on a nuclear site at Seabrook, N.H., that atomic energy became an issue widely debated by mainstream America. At that, it took the rather bizarre spectacle of Governor Meldrim Thompson locking 1400 demonstrators in the National Guard armories before atomic energy became a really hot topic.

Right now in the U.S. alone there are more than 75,000,000 gallons of high-level nuclear wastes, much of it from the nuclear weapons program. It is in "temporary storage". In the next 22 years, if nuclear power industry plans are carried out, there will be an accumulation of more than 90,000 tons of used reactor fuel to store away for some 250,000 years.

Substantial amounts of low-level wastes are permanently buried in eleven sites in underground trenches that government officials assured would be good for hundreds of years. But in less than ten years, dangerous leaks occurred in six of them.

"Nuclear power poses the greatest public health hazard the world has ever encountered," says Dr. Helen Caldicott. "Cessation of all forms of nuclear power is the ultimate form of preventative medicine."

"Speaking as a doctor who sees little children dying of leukemia, and who cares deeply about the value of and the essence of life, I'd rather have a candle to read by at night," says Dr. Caldicott.

"Sorry to say I don't know, but how does a nuclear power plant produce electricity?"

All power plants, whether fueled by oil, coal, gas or uranium, function in basically the same way — the fuel provides heat to turn water to steam; the steam is used under pressure to turn a turbine, which is hooked up to an electric generator.

In a nuclear plant, the heat is provided by the splitting (or fissioning) of a radioactive substance such as uranium-235. When the atoms fission, heat is given off, and two or more smaller atoms result which are radioactive waste-products.

In an atomic bomb, the chain reaction of splitting atoms is purposely allowed to get out of hand, resulting in an immense explosion with blast, heat, and the dispersion of all the highly-radioactive substances.

In a nuclear plant, the fuel is diluted so an atomic explosion is physically impossible. However, an enormous amount of heat can be produced. The speed of the chain reaction is regulated by having "control rods". These can be lowered among the tubes of uranium fuel to absorb neutrons, and thus slow the chain reaction.

The nuclear reactor consists of a core which is a very strong metal pressure vessel. Into this are placed the fuel rods containing uranium pellets, plus the control rods which can be inserted or withdrawn to regulate power output. There are also thousands of instruments to inform the operators just what's going on inside the reactor. Pumps put water into the reactor, and other pumps take it out. The water may be pressurized, as it was at Three Mile Island. The pressurized water is used to turn other water into steam, which turns the turbine.

In most plants, water from a nearby lake, river, or ocean is used for cooling. Cooling towers may also be used.

The reactor core, the steam generators in pressurized systems, and a large number of pumps are housed in the "containment", which has four-foot-thick walls and is intended to contain radioactivity in the event of an accident. Also there is an emergency core cooling system — a series of tanks and water pumps — which must get water to the fuel within 60 seconds should a pipe break or normal pumps fail. The containment, in turn, is housed inside a building.

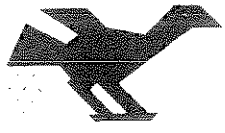
After a period of time, the uranium fuel is spent sufficiently to be replaced, but it continues to emit deadly radiation.

Radioactivity is lost over time as unstable atoms break down in their progress toward a stable state. Strontium-90 has a half-life (the time required to lose half its radioactivity) of 28 years, while plutonium-239 has a half-life of 24,100 years. Iodine 131 has a half-life of only 8 days, but iodine 129 has a half-life of 17.2-million years.

"So, nuclear power produces radiation — but they say that low-level radiation is no big deal. What are the facts?"

Scientists have learned a lot about radiation in the last fifty years, and there is more to be learned. The effects of radiation take a long time to show — but when they do show they are in the ugliness of cancer, advanced aging, and genetic defects.

It is now thought that there is no dose of radiation so small that the risk of malignancy is zero.



Three types of hazardous radiation are alpha particles, beta particles, and gamma rays. Gamma radiation is the most penetrating, requiring elaborate shielding by thick concrete, lead, or deep water. Beta particles require only ordinary steel for shielding, while alpha rays can be stopped by mere paper or even skin.

Scientists now believe that the radiation standards may be as much as ten or twenty times too high.

According to Dr. Rosalie Bertell of the Tri-State Leukemia Survey which studied leukemia cases in New York, Maryland, and Minnesota between 1959 and 1962, there is evidence that when either the father or the mother is exposed to radiation before conception of a child, the child can be a greater risk for pneumonia, rheumatic fever, asthma, allergies, dysentery, leukemia and solid tumors. These damaged children are then subject to further radiation damage, and a constantly worsening public health problem emerges.

"All doses of radiation cause some damage," Dr. Bertell says. "We know of no safe-dose level."

Present standards for nuclear industry workers permits 5 rem of exposure — the equivalent of 500 to 5,000 chest X-rays yearly. These exposures can be exceeded in an accident situation. Yet even a few X-rays can cause measurable human health damage. One spinal X-ray, or one abdominal X-ray, accelerates the aging process approximately one year, for instance.

The cancer danger to workers exposed to radiation was discovered in the 1920s, when young women who were hired to paint watch dials with radium paint began to die of cancer.

Radiologists — X-ray technicians — were early victims of radiation prior to 1950 when awareness of radiation risks was low. They had a 600% higher death rate with leukemia than the general population.

The level of exposure regarded as "safe" has continuously dropped over the years. Until 1950, scientists assumed a save level was 52 "rems" per year. (A rem is a unit of radiation set up to measure biological damage.) Then a new exposure of 15 rems per year was recommended by the International Commission for Radiation Protection. In 1975, cancer researchers petitioned the Nuclear Regulatory Commission to reduce the level to 0.5 rems.

The Environmental Protection Agency guidelines which become effective December 1, 1979, states that no member of the public shall be allowed to receive more than 25 millirems (0.025 rems) per year to the body.

"Just how does radiation work to cause its damage?"

Radiation is harmful because it alters the electrical charges of atoms and molecules in body cells. The period of time it takes for this to be destructive depends upon the cumulative amount of exposures.

Low level radiation causes cancer, but no one knows exactly how. It is believed that the cancer cycle is started by damage to the genes. If a person is radiated, or inhales or eats a particle of radiation, this radiation can collide with a gene and damage it, either killing it, or leaving the disabled cell alive. A cell that survives continues to function normally for five to 40 years, when instead of dividing and producing new cells, it goes haywire and produces billions of identically damaged cells, forming a tumor. These cells can then break off and travel through the body, dividing uncontrollably and forming new tumors.

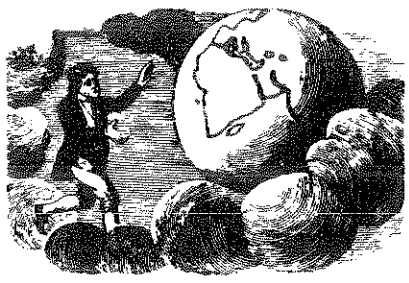
It takes only one radioactive atom to damage a gene, and only one gene to initiate the cancer cycle. Radiation can also cause genetic mutation if a cell in the reproductive organs is damaged.

In the human body, many radioisotopes are concentrated in a specific organ, meaning that most effects of radiation are concentrated into a small area, such as thyroid, skin, liver, ovaries, lungs, bone.

Once radiation is created, it is dispersed by the wind and brought down by gravity, rain, snow and fog. If winds are calm, the radiation will just deposit near the nuclear facility. After radionuclides reach the ground, they can be absorbed by plants and people, through inhalation or ingestion as well.

Most types of cancer are known to result from radiation. The most common type is leukemia, but the bone-marrow and soft tissues like the brain, kidney, or lung may also develop radiation-induced cancers. The formula used to calculate the risk of radiation-induced cancer is to multiply the rems of exposure by the persons exposed; divide by 2,000 and the answer is the probable number of cancers which will result. For instance, if 20,000 residents of an area are exposed to 5 rems of radiation, 50 cancers are likely to result. If the population affected is pre-school children or unborn children, the likelihood of cancer is increased.

Because rapidly-dividing cells are highly susceptible to radiation damage, infants are hit harder than adults by exposure, and embryo and fetus are hit still harder. One radioactive atom is up to 100-million times more toxic to a developing embryo than a molecule of potent substances such as thalidomide.



The risks to a fetus are 200 times greater than the risks to a 50-year-old man, according to the National Academy of Sciences, and the risk is greater during the first three months of pregnancy.

The routine use of diagnostic X-rays for medical and dental purposes also involve risks which should be weighed against the diagnostic benefits. Dr. Irwin Bross estimated as many as one-half of all X-rays are useless or unnecessary, and two-thirds use two to ten times the dosage that is feasible with up-to-date equipment.

Cancer is not the only problem resulting from radiation exposure. The radiation seems to speed the aging process, and heightens susceptibility to diseases associated with aging.

Pre-mature aging is caused by damage to the cellular mechanisms that enable the body to cope with life. The body becomes more susceptible to leukemia, to infectious diseases, and to heart disease. These human ills will most likely occur at an earlier age if there is increased radiation pollution of the environment.

It is the insidious way that radiation works that often makes it appear so innocent. Nuclear workers do not mentally connect a case of pneumonia in one of their children with radiation they may have received at work even before the child was born.

There is evidence that the extent of damage by radiation to human fetuses is being concealed by new government programs which use a procedure called *amniocentesis* to identify fetuses which can be expected to be defective babies. The mothers are then convinced

that an abortion is the necessary response. The result is in actuality a cover-up of the extent of genetic radiation damage and damage to fetuses.

Although these problems affect individuals and communities, there is no means by which a community can enter into the decision-making, and by which community health can be protected. There is no mechanism for citizen participation in nuclear-power decision-making. This has led to secrecy and control of information on the part of government and industry. For instance, if there is radiation exposure from an accident at a reactor, there is no regulation making it necessary for the company to inform the public. In fact, such information can be withheld, as it was at Three Mile Island, on the grounds it "would cause panic" to the people.

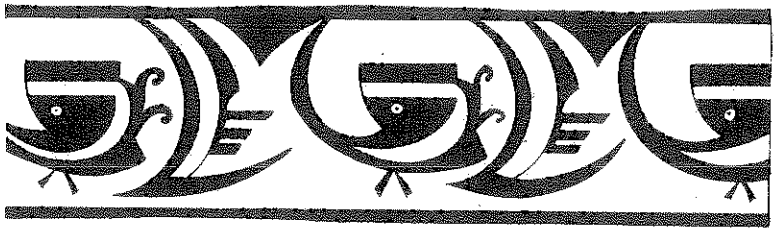
A serious social situation is emerging as people discover they have been cruelly deceived, and confidence in government is weakened as a result. The intimidation of persons who work to control nuclear power, or to complain of nuclear injury, will bring about even more unrest, which in turn could bring about even more police controls and secrecy.

"Is all of the talk about radiation damage just a theory, or is there solid proof?"

Radiation cannot be seen, heard, smelled, or touched. People are not even aware of its presence. It does not cause immediate damage in small doses — often years intervene before the cancer develops. Thus it is difficult to put the blame on radiation when just one cancer victim is involved. But by studying large groups of people who have been exposed to radiation, a definite pattern appears.

For instance, Dr. Alice Steward, a British member of the Royal College of Physicians, reported in 1958 that mothers who had abdominal X-rays during pregnancy were twice as likely to have children who would die of cancer before age 10 than mothers who were not X-rayed. As a result of her study, obstetrical practices began to change.

Dr. Irwin Bross of Buffalo, N.Y., was involved in the Tri-State Study, which followed a population of 13 million people in a three-state area who had received medical and dental X-rays. He found an increase in childhood leukemia and significant genetic degradation among those with low-level radiation.



Dr. Thomas Mancuso of the University of Pittsburgh studied the death certificates of former workers at the Hanford Nuclear facility in Washington state, the principal producer of plutonium for the nuclear weapons program. The study showed the 35,000 workers involved had increases in cancer when exposed at levels 10 to 20 times **below** that recommended by federal standards.

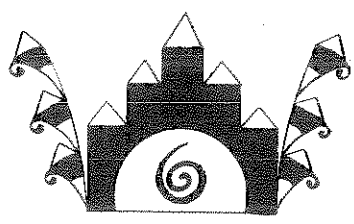
Dr. Mancuso had received a federal grant for the study which was intended to refute an earlier study by Dr. Samuel Milham which showed a 25% increase in cancer among Hanford workers. When Mancuso refused to cooperate, his grant was cut off and anonymous criticisms attacked his work and personal integrity.

A congressional hearing to investigate the Mancuso case and other cover-ups was held by the Commerce Subcommittee on Health and the Environment in 1978. In addition to revealing how Mancuso had been harassed, the hearings explored cancer and leukemia findings among former military and civilian personnel exposed to atmospheric atomic weapons testing in the 1950s. The U.S. Government had steadily refused to recognize and pay service-connected claims submitted by those who had participated in the tests.

The hearings revealed that the troops had been exposed to fallout of radiation intentionally. Scientists attended some tests in full protective gear while troops faced the radiation wearing only undershorts. Former serviceman Artie Duvall, Jr., said he had been told that he had been exposed to lethal radiation, but that if he told anyone, he would be jailed and fined. When he waited until his ten-year secrecy oath was over to make a claim for the cancer he had contracted, he was told he had waited too long to receive benefits.

People whom the military used as unknowing guinea pigs to test nuclear damage have had a great deal of difficulty in getting compensation. They were not informed of the risks they were taking before the tests, nor have they ever been informed. The Veterans Administration has yet to make an award to a victim of nuclear testing.

One case study: Patrick Stout, an Army counterintelligence agent, was driver for Brig. Gen. Leslie Groves, who directed the very first atomic blast three weeks before Hiroshima. Groves accompanied reporters to the blast site, and to emphasize the area was safe from radiation, ordered Stout into the bomb crater, where he remained for a half-hour. Stout died of leukemia 22 years later.



There is the not-so-unusual case of Orville Kelly, a former sergeant in the U.S. Army. He was exposed to nuclear detonations in the Marshall Islands in 1957 and 1958. He was in command of several dozen servicemen who were required to observe blasts from the beach. Kelly was diagnosed as having lymphoma in 1973, but was refused service-connected disability.

Also, a class action suit has recently been filed by the family of a former serviceman exposed to a series of nuclear tests that had one child born with a birth defect, and another without an esophagus who died shortly after birth. The suit would require the government to inform all persons involved in the tests of the resulting risks to their children.

At Yucca Flats, Arizona, on August 31, 1957, three thousand GIs waited a few thousand yards from a steel tower holding "Smokey", a 44-kilaton atomic bomb. They were guinea pigs in an experiment to determine how troops would react physically and psychologically to nuclear combat.

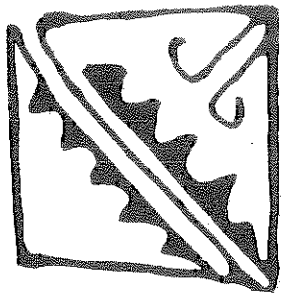
Paul Cooper of the 82nd Airborne followed instructions, turned his back to the blast, and covered his eyes. He said: "I could see the bones in my hands like an X-ray when the bomb went off." Within minutes, those troops marched over ground still hot from the explosion to within 100 yards of ground zero, remaining there the better part of an hour. Cooper died of leukemia.

The U.S. atmospheric atomic-bomb testing program lasted more than 17 years. 181 nuclear devices were detonated in the open air at Pacific and Southwestern test sites. An estimated 400,000 military and AEC personnel, and an undetermined number of civilians, were showered with radiation. They were told that the risk of injury was virtually non-existent, that the tests were under strict control, and that the radiation dosages were too low to cause any harm.

It is now apparent, however, according to the documentary record that has surfaced only recently, that the truth fell short of these assurances. Accidents occurred; warnings concerning potential health hazards were ignored; unfavorable scientific studies languished; fallout figures may have been manipulated by officials to support contentions that risks were negligible.

"That's terrible! And what happened to the people living in the area?"

While atmospheric testing has been stopped by the U.S., a recent study showed that fallout from atomic bombs tested 20 years ago is responsible for more than 116,000 cases of lung cancer in the U.S. alone.



As far back as 1953, AEC officials began a record of decisions that, critics say, stifled, reinterpreted, or discredited a number of studies that might challenge the agency's assertions that all was well. That year, sheep grazing north of the test site (in Utah) suffered a mysterious illness and some 4,300 of them died. While an AEC scientist concluded that radiation was "at least a contributing factor" the report blamed malnutrition.

In 1965, Dr. Edward Weiss of the U.S. Public Health Service completed a study in which he found "excessive" leukemia deaths in two Utah counties close to the Nevada Test Site. AEC officials attacked the study, which was not released until pressure was applied 14 years later.

During the Nevada test years, 25,000 people lived within a 200-mile arc. Most of the area's longtime residents are Mormons who do not use alcohol, tobacco, and coffee. They are rural folk, and as such, they would be expected to have exceptionally low cancer rates. Yet they claim to have experienced a rash of cancer in the last two decades. Former Secretary of the Interior Stewart Udall says he knows why — "These are the only people in the world who have lived for years with contamination in the food chain, who were irradiated repeatedly for years."

Mrs. Irma Thomas, 72, of St. George, Utah, says within a one-block radius of her home, 29 people have had cancer, and eight have died from it. "We didn't any of us believe the Government would do this to us," she says. More than 200 people who had lived throughout the test period in town had died or were suffering from cancer. (In 1960, the town's population was just over 5,000.)

Documentary evidence given to a congressional committee reveals that President Dwight D. Eisenhower once encouraged the Atomic Energy Commission to confuse and mislead the public about the dangers of nuclear fallout. One AEC commissioner said, "We must not let anything interfere with these tests — nothing."

So, for more than twenty years, a heavy government campaign was waged to convince all those living in the fallout path of more than 100 nuclear tests that they were in no danger. Now, at least 32 children have died of leukemia, and 20 of radiation-caused cancer.

In the early days of testing, if persons complained, they were told tales that reports of fallout hazard were just anti-American propaganda invented by "the Communists".

But now, over 500 Utah residents have decided to sue the U.S. Government for the radiation damage they have suffered.

In predicting the possible hazards that may come out of the Three Mile Island horror, experts are

looking back at the soldiers and citizens exposed to fallout from atmospheric tests in Nevada during the 1950s and early 1960s.

"Anyhow, that was for weapons. Isn't peacetime nuclear power different?"

Similar situations have arisen in private industry. In West Valley, New York, Nuclear Fuel Services, a private corporation, attempted to reprocess spent nuclear fuel. It hired 1400 part-time workers, most of them teenagers. Often, NFS exposed some of them to fifteen minutes of radiation, causing a shot of radiation that standards say should take three months to accumulate. Then it fired them. Dr. Irwin Bross, a cancer expert from Buffalo, called it the "most callous use of human beings since the slave trade".

When NFS found that strict regulations concerning waste cut into their profits, they closed down, pushed 3-million cubic yards of low-level waste into a shallow trench, and covered it with dirt. Radiation has already leaked into water tables. The company got off free, as the site had to be taken over by the state, which found even it couldn't handle the expense, and the site has been turned over to Washington to handle.

Last February, the Department of Energy announced it will cost more than $1-billion to disassemble the facility and dispose of the wastes. NFS, owned by Getty Oil, left behind 600,000 gallons of boiling radioactive wastes so concentrated that a single gallon dispersed in a populated area could kill more than 2,000,000 people. No one knows what to do with the material. The situation is urgent — West Valley is in a zone subject to earthquake, which could split the tanks and make abandonment of several counties a necessity. Or a power interruption to the cooling system could result in these wastes overheating and exploding as they did in a Russian facility in 1958, obliterating a seventy-square-mile area.

At Sheffield, Illinois, the Nuclear Engineering Co., owned by the giant Teledyne, Inc., simply abandoned its radioactive waste disposal saying the State of Illinois could look after it. State officials were stunned.

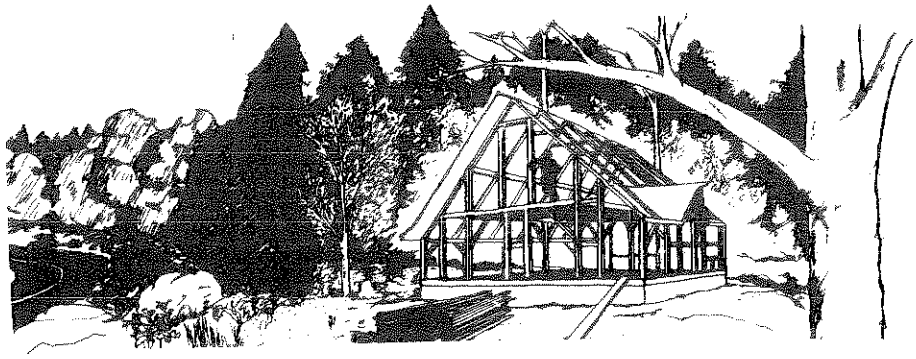
The site, one of the most deadly in the world, had operated for the last nine years without renewal of its NRC license. Over 3.2-million cubic feet of waste is buried in 21 trenches on the 20-acre site. Another NECO operation at Maxsy Flats, Kentucky, was shut down in 1977 after radioactive water was detected seeping from trenches.

For nuclear workers, a high percentage of the jobs are dangerous. Consolidated Edison Company, for example, had to employ 1500 welders to repair and insulate hot water pipes in radioactive areas onb a nuclear reactor. Each welder worked 15 minutes until he had received his maximum permissible-dose of radiation. And that ended the job.

Temporary workers at nuclear facilities are often used for high-radiation tasks. Sometimes temporary workers may outnumber regulars ten to one. Sometimes the temporary help is not fully informed of the hazards of their jobs — a worker may be sent inside to turn a bolt and receive a maximum dose of radiation within minutes. He may be paid for a half-day's work, but not be told that he faced an increased risk of genetic damage or cancer.

The handling of wastes from nuclear facilities remains an unsolved dilemma. Workers at waste facilities receive high doses of radiation — in 1971, 60% of the workers received more than the permissible limits. Major "temporary" waste storage sites are found at Hanford, Washington; Savannah River and Barnwell, South Carolina; Idaho Falls, Idaho; Oak Ridge, Tennessee; Maxey Flats, Kentucky; Sheffield and Morris, Illinois; Beatty, Nevada; and Niagara County, New York.

Dr. Thomas Najarian of the Boston University School of Medicine has reported a 450% higher death rate from leukemia among Portsmouth, N.H., Navy Yard nuclear submarine workers than in the general population. Surveying the deaths of 146 people who had worked there, he found 38% had died of cancer, double the national rate. Ronald Belhumeur of Dover, N.H., a civilian employee, testified, "The crew that I worked with on the Nautilus are all dead. I am the last one. The machinist died of cancer after exposure to radiation from a spill of contaminated water. My fellow workers, tank cleaners, died from cancer, and one from natural causes. Then in 1977, my supervisor and a machinist supervisor died only months apart from leukemia."



Dr. Caldicott says that "the increasing radiation exposure of workers and the general public implies tragedy for many human beings. Increasing numbers of people will have to deal with cancer, or perhaps more painful still, deformed or diseased offspring."

It is important, she says, "to keep in mind the fact that the nuclear industries are relatively young. Nuclear power has been in commercial production for only 25 years; arms production for 35. Since the latency period of cancer is 12 to 40 years, and genetic mutations often do not manifest themselves for generations, we have barely begun to experience the effects radiation can have upon us."

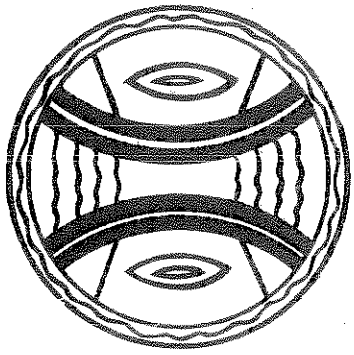
* * * * *

Physicist Ernest Sternglass says that about a million people may have been exposed to up to 130 times more radiation than the government has admitted, as a result of radiation from Three Mile Island. Federal agencies did not have the proper instruments near the plant to measure all escaping radiation. Also, Sternglass says, federal monitoring does not take into account the inhalation of fission gasses, which can increase radiation exposure 130 times. He figures 300 to 2500 cases of cancer could eventually be triggered by the Three Mile Island fiasco.

Even without disasters such as Three Mile Island, official statistics on cancer mortality rates indicate that those states with the largest nuclear plants face the most sharply-rising cancer death rates.

Cancer mortality rates declined sharply in the four states without nuclear power: Alaska, Hawaii, Montana and New Hampshire.

* * * * *



"Does the government know of all these hazards? Is there anybody in Washington concerned with this?"

The U.S. Government recently released its Interagency Review Group Study on Nuclear Waste Management, and found a number of problems of serious concern. The end conclusion was that there is no one who really knows how to dispose of nuclear wastes.

Despite these concerns, the report gave the green light to the Waste Isolation Pilot Project in New Mexico, and other "Away From Reactor" sites. These would simply be new swimming pools for spend fuel rods, constructed with tax dollars at new sites rather than at existing reactors.

On April 26, 1978, the House of Representatives Committee on Government Operations tabled its report on nuclear power costs. This is what it found: "There is no demonstrated technology for permanently and safely disposing of this waste."

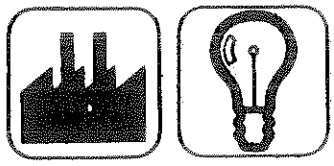
Not only that, but "neither the federal government nor the nuclear industry has prepared reliable cost estimates for the ultimate disposal and perpetual care of radioactive wastes and spent nuclear fuel. After 30 years of nuclear power development, technology to dismantle a large commercial reactor has not yet been demonstrated, and the costs of dismantling such a reactor is still unknown."

The Committee also found that capital construction costs of nuclear plants, as well as fuel costs, "have risen dramatically. Construction costs have risen ten times faster than the consumer price index, and more than twice that of coal-fired plants."

"Utilities have overbuilt their capacity for electrical generation far in excess of demand. This high-capital overbuilding has cost consumers many millions of extra dollars for nuclear-generated electricity," the report states.

But if nuclear power is not available? The Interagency study says that "solar power, including wind, waste, wood, biomass, ocean thermal" are the most attractive energy alternatives to nuclear power. "If the Federal government spent only a small portion of what is has already spent on nuclear power development for the commercialization of solar power, solar-generated electricity would be economically competitive within five years, in the view of many experts," it found.

Regarding new energy needs, the Committee found that "the United States could meet a substantial portion of its new energy needs for the next 25 years through energy conservation."



To answer the argument that nuclear construction was a boost to the economy, the Committee found that "nuclear plants are capital-intensive and thus produce few jobs. Renewable energy sources such as solar and conservation are not capital intensive, and are expected to produce many jobs — 500,000 construction jobs for solar hot-water installation alone, or three times as many jobs as produced by the nuclear industry."

The Committee recommended that Congress should consider repealing the Price-Anderson Act "and allow the nuclear industry to assume full liability and financial responsibility for the safe operation of commercial nuclear plants."

Also, it said that the Nuclear Regulatory Commission should require as a condition of licensing that applicants be able to prove there is no economically-sound alternative for meeting electrical demand. In fact, licensees must show there is a need for new

generating capacity of the type and amount proposed, the Committee said.

The Committee recommended that utilities be required to charge customers year-by-year a proportion of the full cost of radioactive waste disposal, spent fuel management, perpetual care, contingencies, and decommissioning costs.

"Well, even with the dangers, at least we know that nuclear power is cheap. Right?"

If all costs are considered, nuclear power is the most expensive power. "All costs" includes disposal of nuclear wastes, tearing down nuclear plants after their 30-year life-span is completed, rising costs of nuclear fuel, and other factors which have been absorbed by tax dollars or simply kept hidden away.

The case for the nuclear option has always rested heavily on economics. According to this argument, nuclear-generated electricity costs less than that produced by coal-fired plants. However true this may have been, it is no longer the case. For one thing, changes in plant design for greater safety have nearly trebled the inflation-adjusted cost of a nuclear-generated megawatt of electricty.

The accident at Three Mile Island threatens to raise the cost even higher. Utilities raise money by selling bonds and stocks. The large banks and insurance companies which dominate the money markets have generally been glad to provide the cash at a moderate cost to utilities because they were assured a good and relatively risk-free rate of profit. Three Mile Island changed that illusion forever. If investors are forced to bear the economic risks associated with nuclear accidents and shutdowns, instead of the rate-payers of the electricity, they will demand to be paid for their risk-taking.

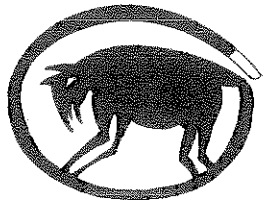
Investors and management are starting to wise up to the high costs of nuclear energy. "New nuclear power plants cannot be justified on economics anywhere in the central part of the U.S.," says James J. Humphries of the Boston investment firm Harris, Upham & Co. In Lincoln Nebraska, officials rejected buying 13% of the local reactor because they could get one whole coal-fired plant for $20-million less. The Florida Power Corporation has abandoned nuclear power because of uncertainties and costs.

Sanders Miller, a Wall Street investment analyst, has stated that nuclear power is "economic lunacy on a scale unparalleled in recorded history". Nuclear power is a major cause in increasing electric rates due to its enormous cost; it consumes billions of tax dollars through investment credits, subsidies for research, etc.; the government must subsidize its insurance because private insurance companies believe nuclear energy is too dangerous to insure, and there are enormous unknown costs for eventual "decommissioning" of the plants and disposal of radioactive wastes. Nuclear power requires so much capital that other sectors of the economy must go without, such as housing or solar energy, and this actually destroys jobs.

The U.S. House of Representatives Subcommittee on the Environment, Energy, and Natural Resources has stated: "Contrary to widespread belief, nuclear power is no longer a cheap power source. In fact, when the still-unknown costs of radioactive waste and spent fuel management, decommissioning and perpetual care are finally included in the rate base, nuclear power may well not be economically competitive with safe, renewable resource energy alternatives such as solar power."

Meanwhile, in Canada . . .

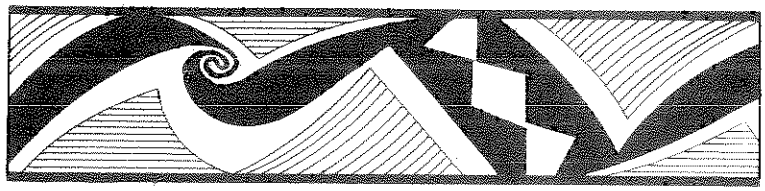
Canada is also into nuclear power. Ontario Hydro has committed that province alone to $13.7-billion to nuclear power, and according to a utility spokesman, "There just isn't any turning back." Ontario Hydro is the second largest public power utility in the world, next to the Tennessee Valley Authority in the U.S. The pair are "neck and neck" in a race to become the most thoroughly committed to atomic energy in the world. Although Hydro now has a 30% surplus of generating power, it is building at least three huge nuclear stations.



The Canadian public has been taking a new interest in nuclear matters, and there have been calls for shutdowns on the floor of the Ontario Legislature. It was charged that Hydro officials had misrepresented radiation statistics to legislative fact-finding groups.

One experimental Canadian plant near Montreal has operated only 167 days in the past eight years because of problems — and it still doesn't work. Once, the plant accidentally dumped ten tons of radioactive "heavy water" into the St. Lawrence River.

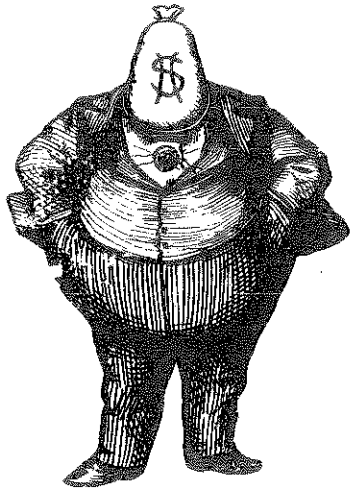
But some Canadian utility officials haven't been too concerned about the dangers. "There are accidents in coal mines, there are accidents on trains, there are accidents on highways. If there weren't accidents at nuclear plants, something would be very, very wrong," said Arthur Porter, chairman of the Ontario Royal Commission on Electric Power Planning.



Originally, the Atomic Energy Commission predicted a nuclear plant would cost $134 per kilowatt to construct. That was 1967. Today, costs are $1000 per Kw and rising. Also, nuclear plants are shut down much of the time for repairs, often due to safety problems, and operate an average of only 59% of the time.

The new safety requirements as a direct result of TMI will also boost nuclear costs. There will be an increase in plant shutdowns, which are particularly expensive for nuclear plants because so much of their costs are tied up in capital instead of day-to-day operating expenses.

The price of nuclear fuel, uranium, has increased 600% since 1974. It was $8/pound, and now it is nearly $50/pound. According to the **Wall Street Journal**, costs are expected to rise to $200 or $300 within the next decade.



But attractive as it might have been to planners of company profits, nuclear power costs now seem to be out of control. A study for the U.S. Department of Energy, completed *before* the disaster at Three Mile Island, concluded that private utility companies would not be able to cope with nuclear power much longer. Nationalization might be necessary to prevent collapse of the U.S. economy.

The author of the study, according to the *Christian Science Monitor*, is Massachusetts Institute of Technology professor David Rose. Dozens of utilities are already on the verge of "institutional collapse".

A recent Harvard Business School report found that many utility companies already are facing possible bankruptcy, and forecasted that up to 12 of them may go under in the next decade.

Government and private studies have shown that if the same amount of money now being spent on nuclear power were redirected, there would be savings of both money and energy, while boosting the economy. For instance, if the money were put into a comprehensive energy conservation and building insulation campaign, electrical use would be cut as much as 20%, more than the nuclear plants presently produce, and the economy would be strengthened because the workforce would be greatly enlarged, providing more jobs.

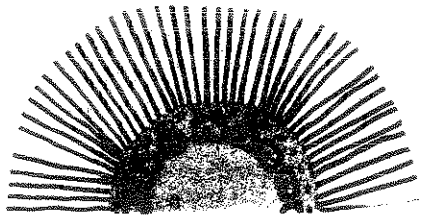
As a result of the Three Mile Island near-disaster, MetEd applied for a 40% rate increase to help pay costs involved.

Another negative economic factor is that nuclear plants are more likely to be shut down for longer periods of time than other types of plants — and they are more expensive to maintain during closures. The cost of maintenance of a non-producing plant can be $20-million a month.

All costs are paid by the consumer, either directly through utility rates, or indirectly, through tax dollars.

"What's this about tax money? Do you mean that in addition to paying for nuclear power in our light bill we're paying for it in our taxes?"

For decades, the U.S. Government has spent billions of dollars to promote the development of nuclear power. The Energy Research and Development Administration estimated in 1976 that over $9-billion had been spent in subsidies for research and development. If these costs were reflected in electric rates, costs of nuclear-produced electricity would be 50% higher. Tax credits also provide utilities with about $4-billion annually, or 20% of the costs of each new nuclear plant.



The industry has traditionally tried to pass on to the public as much of the risk as possible. For instance, if a nuclear plant took out full insurance for its damage-causing potential, the cost of nuclear power would be prohibitive.

The Western Hemisphere's largest insurance companies (which presumably can afford competent advice) have refused, even as a coalition, to underwrite more than about 1% of potential liability for a nuclear power-plant accident.

As a result, the nuclear industry pushed through Congress the Price-Anderson Act, which limits the total liability of a utility in the event of an accident to $560-million, and $100-million of that is insured by the Federal Government. However, the Nuclear Regulatory Commission has conceded that a major accident could cause $40.5-billion in damages. Thus it is that the people who live in the vicinity of nuclear plants are forced to bear the staggering health and economic risks of nuclear power. Check your own insurance policy — nuclear damages are excluded.

As Duke Power Company put it in arguing for the constitutionality of Price-Anderson before the Supreme Court: "Without protection of the liability limit, investors would be unwilling to risk money in a power company, because of the possibility that claims from a nuclear accident could bankrupt them."

"ONE oft-ignored fact about nuclear power is that every plant is a temporary structure that begins to wear out from the first moment it is put into operation. The average lifetime is only 30 to 40 years..."

— graphic by Cry California

"If a nuclear plant only lasts thirty years, what do they do with it after it's useless?"

The NRC describes four methods of "decommissioning" a nuclear plant after it is too brittle from radiation to be used more. It can be dismantled by robot-like remote control machinery; it can be entombed in cement, sealed from any human access; it can be mothballed — that is, simply remove the fuel and place the plant under secure guard for all eternity. The fourth method involves combinations of the others.

All this is necessary because neutrons produced by the uranium fuel pass into the steel and concrete structures housing the fuel, producing radioactive atoms. After 30 or so years, it becomes "too hot to handle", and must be abandoned. But it is so radioactive it must be permanently guarded, either on the site, or disassembled and guarded elsewhere.

Another problem with dismantling is that the work cannot proceed for perhaps twenty years after the plant is shutdown because of the radiation. During this time, the plant would have to be carefully monitored and guarded, again increasing costs.

Decommissioning is expected to cost as much as construction. The small and experimental Elk River Reactor, built in 1962 at a cost of $6-million, was dismantled in 1968 at a cost of $6.9-million.

That's one example. For another, the 14-year-old Humboldt Reactor in California is shut down now, and is being considered for permanent closing because earthquake faults are near the plant. Or in Illinois, the 17-year-old Dresden reactor may have to be shut down because the plant has become so radioactive routine maintenance cannot be performed. In Michigan, the Fermi 1 plant sustained a partial core meltdown that forced premature shutdown and mothballing.

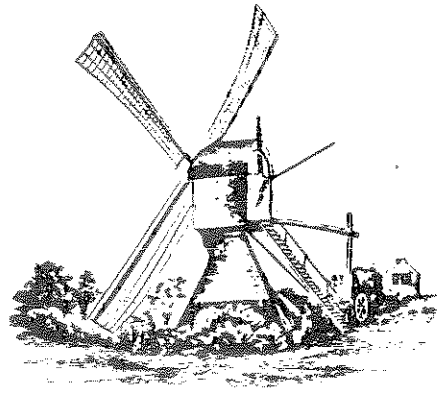
And then there is Three Mile Island — in all likelihood, the plant is no longer usable. Neither temporary mothballing nor entombment appears feasible unless the fuel is removed first, but can workers get close enough to enter the containment building?

"The only politically acceptable solution is to dismantle the reactor and go bury it away from populated areas," says Robert Bernero, a senior engineer at NRC.

Senator Gary Hart of Colorado calls Three Mile Island a "billion-dollar mausoleum". But engineers don't yet know if the dismantling could be done, or how to do it.

The costs involved would be staggering — if the technology were available to make it possible at all. In 1977, the Comptroller General of the United States submitted a worried report to Congress, "Cleaning Up The Remains of Nuclear Facilities — A Multibillion-Dollar Problem". The report speaks of the urgent need to develop acceptable methods for decommissioning and disposal, to determine the costs, and to decide who is going to pay the bill. "The cost of decommissioning should be paid by the current beneficiaries, not by future generations," the report concludes. That these questions are still unsettled after three decades of the nuclear power era is itself unsettling.

Technocrats have traditionally be-



lieved that if they are working on a solution to a problem, they will find it in time to avert impending catastrophe. Engineering classes have never taught them that a problem might exist for which there is no solution. Perhaps the lesson of the nuclear power age will be that what has been released from Pandora's Box can never be put back.

"At least those nuclear wastes won't be in my backyard. Or is there some other hazard I don't know of?"

In addition to the problem of waste storage, there is the problem of transportation — both of wastes and fresh materials. Extremely hazardous substances are now being transported by truck and rail, passing through highly-populated areas.

An accident with nuclear materials is very different from an accident with hazardous chemicals. Nuclear contamination is forever.

In 1977 alone, significant accidents occurred in Pike County, Illinois; Piketon, Ohio; near Springfield, Colorado; and Rockingham, North Carolina. Some municipalities have banned nuclear shipments within their borders.

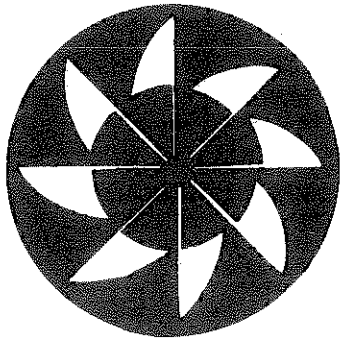
Nuclear shipments include fresh fuel, such as yellowcake coming from uranium mills, uranium hexaflouride for enrichment, and fuel rods being shipped to nuclear reactors. Then there are the low-level wastes, such as contaminated clothing. There are also high-level wastes and spent fuel-rods. Exposure to the latter type means imminent death for humans. They are typically shipped in large quantities in casks weighing tens of tons.

Most defense shipments and 50% of commercial nuclear shipments are made by truck. The Department of Energy maintains a fleet of specially-equipped trucks, driven by armed guards trained for this duty.

Nuclear plants are already filling up with wastes awaiting disposal. Plants in New England now contain three times more wastes than the plants were designed for. When off-reactor sites are designated for waste-storage, there will be many more shipments to make.

There is no federal regulation of nuclear materials once in transit. There are no regulations to specify route to be followed, to assure training for carriers of nuclear cargo, to limit shipments in urban or hazardous areas, to insure adequate emergency response for in-transit accidents, or even to notify authorities of large shipments to be made.

A study made by Sandia Laboratories calculated that an accident causing a major release of plutonium in an urban area could cause some 4,000 deaths from cancer, and $2-billion in property damage. The New York City Health Department calculated that a release of spent fuel could result in 10,000 deaths in a short time.



Yet from 1971 to 1974, there were 144 "incidents" involving nuclear cargo. Of these, 36 were serious — and this was at a time when fewer than 45 nuclear plants were operating. In the 1980s, there will be a large increase in the number of shipments of the most dangerous type of materials: spent rods and high-level wastes.

Between 1958 and 1968, thirteen accidents occurred involving Air Force planes carrying nuclear weapons. The most recent information available is about the 1968 crash landing of a B-52 in Greenland. The four hydrogen bombs aboard were blown up by the TNT triggers used to detonate the warheads. This non-nuclear explosion scattered plutonium and uranium from the warhead into the air and around the crash site. The heat generated from the crash and the explosion melted the ice, and the plane and the plutonium sank into the ocean.

In September, 1977, a tractortrailer of 40,000 pounds of uranium yellowcake crashed in southeastern Colorado, spilling 10,000 pounds of the hazardous material onto the roadside. Police officers and passers-by waded through the yellowcake, not knowing of the danger. It took twelve hours for professionals to arrive at the scene. No prompt clean-up was begun because the shipper and the state argued over responsibility, and even when the dispute ended, it took three days for the clean-up to begin.

On Jan. 19, 1979, twelve steel drums containing uranium oxide fell out of a trailer in St. Louis on I-70. Ten days later, near Monteagle, Tennessee, a truck overturned on I-24, spilling 46 barrels of radioactive material on the pavement and rupturing several barrels.

The governors of Nevada, Washington and South Carolina have told federal officials that unless there are more safeguards on nuclear waste shipments, they will shut down the only U.S. depositories of commercial low-level nuclear waste. Nevada Gov. Robert List said that trucks were arriving with dripping cargo, and in May, a truck carrying nuclear waste caught fire at the gate of the Beatty storage area. "This is an extremely serious national hazard," List said.

"Well, if these nuclear wastes are so deadly and dangerous, why don't they just get rid of them once and for all?"

Nobody knows how to get rid of nuclear wastes — neither the wastes of the last three decades, nor the greater quantities of waste being produced today and in the future.

The military and industry were so eager to get into nuclear activity that they assumed the problem of dangerous nuclear wastes would be solved with a little research. That has not been the case. Some scientists believe there is no safe way to handle nuclear wastes.

Presently, spent fuel rods are temporarily stored in underground, concrete-lined pools. No one knows what to do with them. There are 4,000 tons of radioactive waste material that has been produced by industry, and much more than that created by 35 years of building bombs and operating submarines.

Many experts feel that the question of nuclear waste disposal is of greater importance than reactor safety, since wastes will remain dangerous to all life for periods of thousands or 100,000 years into the future, its safety assured every moment.

At one time, scientists tried burying the wastes miles deep in salt beds. But that now appears unsatisfactory. Other scientists have proposals for making ceramic-like containers, but no one can be sure they will be effective, and if the experiment fails, it will be too late — the damage will have been done forever.

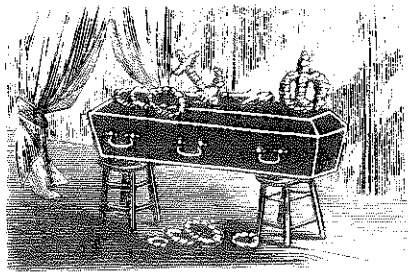
Underground water tables, possibilities of earthquakes, and unknown reactions between earth, nuclear wastes, and their containers may occur.

The best available plan is burying them, what scientists call "geologic isolation". Scientists are searching for sites where gigantic caverns could be excavated deep underground and used to hold the dangerous wastes. A single repository would have 2,000 acres of floor space — more than 3 square miles. By the year 2000, between 4 and 12 such sites will be needed.

Scientists will have to hope that their choice will remain good for 100,000 years, through every course of human and natural events.

The 1980 U.S. federal budget contains $890-million for disposal — primarily just studies of the problem.

However, the need for waste facilities is so great officials admit that construction may begin on a repository before the studies are completed. It is assumed that the containers in which the waste is stored will last only a small fraction of the isolation period. From then on, it will be up to natural geologic barriers to keep the radioactive waste contained.



Whichever site is chosen, it will have to be guaranteed safe from earthquake, faulting, volcanism, changes in groundwater flow, and surface erosion.

The repositories will have to be about 1,000 feet underground. The problem is that scientists believe that during the tens of thousands of years ahead, there is a possibility of glaciers, like those which covered parts of North America only 20,000 years ago. A glacier could gouge as much as 1800 feet of soil and rock, exposing the radiation. This means much of the northern U.S. is not suitable for repositories.

In fact, the NRC is still trying to find places to dispose of the high-level radioactive wastes from nuclear weapons production during World War II. These wastes are still bubbling away in temporary storage tanks at Hanford, Washington — and their radioactivity will last for centuries. The tanks corrode continuously, often leaking hundreds of thousands of gallons of waste into the earth.

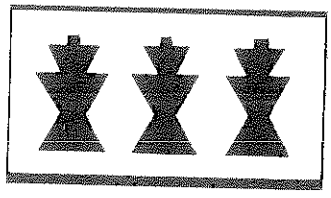
Although efforts are being made to improve the Hanford facility, the old tanks cannot be completely emptied. Leaking tanks cannot be cut off from receiving waste since the tanks, organized into 14 "tank-farms", are linked up by a network of pipes. Explosive hydrogen has built up in some tanks because of chemical properties in the nuclear wastes.

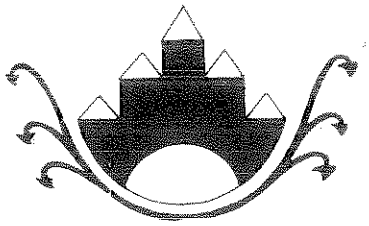
At least sixteen existing plants have extensive corrosion or cracking in pipes which carry radioactive wastes, the NRC admits. In some plants, as many as a quarter of the pipes are out of service.

On Feb. 12, 1979, the **Wall Street Journal** described the outcome of waste disposal debates as determining whether nuclear power would resume its growth, or is relegated to a minor place in the energy-supply picture. The recent findings that salt beds are not suitable dumps has been a major setback for the industry. Also, a number of states have outlawed repositories.

Radioactive waste disposal is likely to add from 10 to 20% to consumers' utility bills, say the experts. By 1995, it will cost at least $40-billion to get rid of toxic nuclear wastes.

The question as to which part of the country is willing to become the nuclear garbage can for the rest of the country still begs answering and may do so for a long time.





South Carolina citizens are becoming increasingly unwilling to shoulder the bulk of the U.S. nuclear burden. The state is now the home of a nuclear submarine base, seven nuclear power plants, a commercial low-level waste storage facility, a commercial fuel fabrication plant, a reprocessing plant, and the militaries Savannah River Plant which includes five reactors and facilities for storage of both high and low level waste. The City Council of Charleston, S.C., has passed an ordinance banning the transport of nuclear wastes through the city in a June vote.

"Won't adequate safety precautions prevent all radiation problems?"

In January, the NRC repudiated a study it has used for five years to show that nuclear plants are safe.

Rep. Morris Udall noted that "nuclear proponents have for years used the Rasmussen Report to assure the public that nuclear power is safe. The commission has now made clear that the Rasmussen Report is useless for that purpose."

Comparisons of safety records with other industrial operations are very misleading, not only because the nuclear industry is very young, but because the effects from radiation exposures do not show up immediately as countable corpses or visible injuries.

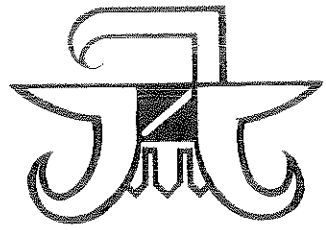
A commercial plant of 1000 megawatts will contain the radioactivity equivalent to the fall-out of 1000 Hiroshima-type bombs. If breeders ever are used, they will be even more hazardous because of the plutonium involved. In this context, nuclear fission energy is not the "cleanest and safest", but rather the "dirtiest and most hazardous" form of energy ever used.

The name of the game is to "Keep Radioactivity Out of the Environment Forever." Accidental release to the environment of only a small fraction of radioactive materials represents a monumental threat to land use and to the lives of exposed populations, and to generations to come.

An Atomic Energy Commission study performed in 1968 but with conclusions only recently released, said a major accident at an 800 megawatt plant involving the release of only 15 percent of the fission products, could cause 45,000 fatalities, 74,000 injuries, contamination of 50,000 square miles of land, and $17-billion damage. This did not include genetic damage which would be inherited by future generations.

"Containment" of radiation must be successful for thousands upon thousands of years under all foreseeable and even unforeseeable malfunctions, accidents, and sabotage.

John Gofman, professor of medical physics at the University of California, says, "My conclusion is that the plutonium already dispersed from atmospheric bomb testing has signed the death warrants of some 1,000,000 persons in the northern hemisphere, and the estimate covers only the deaths which will occur over the first 30-50 year period."



Even if this generation opts for nuclear power, it must take into consideration it is burdening all future generations to deal with its wastes.

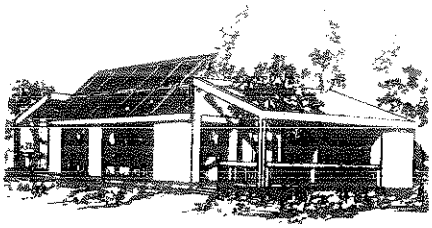
The designers, equipment fabricators, construction workers, plant operators and managers are fallible. Yet in nuclear plants, one can have no errors. Poor design, miscalculations, bad judgments, negligence, carelessness, or errors can violate the planned-for safety of even the best of plants.

Environmental pollution by radioactive materials is irreversible. It becomes harmless only with the passage of time — hundreds of thousands of years after the last nuclear plant is shut down.

When Dr. Dixy Lee Ray, then chairman of the U.S. Atomic Energy Commission, was once asked how a massive leak of 115,000 gallons of high-level radioactive waste could have escaped over a period of 1½ months from a well-monitored, carefully supervised, strictly managed AEC storage facility before management took action. Dr. Ray's response was, in words that may go down as the epitaph of us all, "It ought not to have happened in the way it did."

There was a near-disaster nuclear accident at the Idaho National Engineering Laboratory last October 17, 1978, while many of the plant's technicians were watching the final game of the World Series on a TV set that had been smuggled into the plant, reports the *Washington Post*.

The accident led to a momentary



chain reaction which released a burst of radioactive krypton and neon gases into the atmosphere. The accident was serious enough that the plant was closed for a month and 1500 workers were laid off during the investigation into the incident.

A critical build-up of uranium in solution might have been caught earlier had the workers been watching the guages instead of watching the Yankees beat the Dodgers.

"Remember we were told that nuclear plants were super-double fail-safe — accidents couldn't happen?"

According to documents which the Union of Concerned Scientists was able to obtain under the Freedom of Information Act, for every accident which has been made public, dozens have been successfully buried away in industry files. Literally hundreds of accidents involving serious injuries to plant workers and major releases of radioactivity into the environment have been covered up by the nuclear industry for many years.

In 1969, Dairyland Power Cooperative employees became concerned about high radioactivity levels in drinking fountains in their Genoa nuclear plant near Lacrosse, Wisconsin. An investigation uncovered a hose connecting the plant's drinking water system to a 3,000-gallon tank of radioactive waste. (More recently, the Genoa plant is said to be emitting radioactive materials at levels over 100 times the national average.)

At another plant, 14,000 gallons of radioactive water were spilled when a "regulation basketball" was used to plug a pipe, and was expelled by water pressure.

In November, 1955, the first experimental breeder reactor at Idaho Falls came within a half-second of exploding. By chance, a scientist saw the reactor going super-critical and hit the "scram" just in time.

Fittingly on Columbus Day, in 1957, toxic radioactive materials poured from the stacks of the Windscale, England, nuclear reactor for several days while a nuclear fire raged within the reactor core. Milk was dumped, animals destroyed, and people exposed to dangerous levels of radiation without being alerted by officials who were aware of the peril.

On January 3, 1961, a reactor near Idaho Falls exploded as a result of a power excursion. Three technicians were killed. Arms and heads had to be cut from the bodies and buried separately along with other radioactive wastes.

October 5, 1966 was the date of a partial core meltdown at the Enrico Fermi plant just outside of Detroit. It released so much radiation that the reactor could not be opened for a year. Secret evacuation plans for 100,000 people were shelved when safety measures to control the system worked within one second before the plant would have exploded.

Especially because of the nuclear industry's pronouncements of super-double-failsafe safety standards, the nuclear accidents which have happened are more than astonishing.

* * * * *

As for advance planning for safety, the North Anna nuclear plant in Louisa County, Virginia, may be indicative of grave problems. The Nuclear Regulatory Commission has had to lay on fine after fine for violations, including management's concealing of the fact the plant sits astride a geological fault, that radiation leaks are 18 times the permissible level, not to mention that the pumphouse is sinking into the ground threatening a pipe rupture. Mismanagement and key structural defects wind up the list. Four olther nuclear power plants are scheduled for construction at the site.

In Tucson, Arizona, the American Atomics Corporation uses radioactive tritium to manufacture watch dials and self-illuminating signs. A vice-president of the firm is also a commissioner on Arizona's Atomic Energy Commission. In May, the firm admitted that it had been dumping tritium into the city sewer system, and sure enough, samples of sunshine cake from the school district's central kitchen returned from testing laboratories showing radiation three times the federal limit. The kitchen was immediately closed. However, the director of the Atomic Commission, Ken Geiser, seemed unconcerned. "Children somehow aren't harmed by chemicals or radiation as much as older persons," he claimed.

Safety inspectors for the NRC have been critical of certain nuclear plants, according to internal memos obtained by the Union of Concerned Scientists. Yet the NRC says the memos do not reflect NRC "official views".

The Peach Bottom II plant in Pennsylvania was said to have an "error-prone" staff, and "plant management has appeared incapable of correcting increased radiation levels," the memos say.

The Salem I (N.J.) plant's control room was said to be "a disaster waiting to happen."

At Oregon's Trojan nuclear plant, a control room shift supervisor was so wrapped up in a broadcast of a basketball game that he ignored a surge of radioactive water spilling over the top of a tank, flooding the plant's auxiliary building. Portland General Electric Co. officials have admitted the truth of charges of a concerned worker that shift supervisors were spending much of their time playing games, tying fishing flies, sleeping, or working on crossword puzzles.

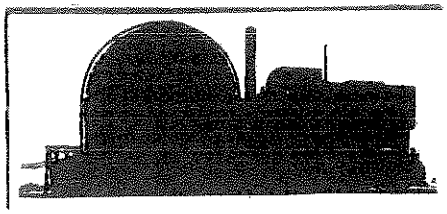
Meanwhile, Canadians were outraged in June when they found out the Atomic Energy Control, the Ontario Government, and Ontario Hydro had lied to them when they said the Rolphton nuclear plant had been shut down for routine maintenance. The truth was that a major leak of radioactive heavy water had been found within the plant.

Concerned for its public image, the Canadian Nuclear Association has launched a "public relations" campaign — which will be paid for by ratepayers. President Nicholas Ediger says that Three Mile Island was "much more a radiation fantasy than a nuclear event."

"We must in some way convince the society we serve that nuclear power does indeed hold the promise that we know it has," asserts Robert Taylor, chairman of Ontario Hydro.

Alan Wyatt, chairman of the Association's public affairs committee, criticized reporting of the Three Mile Island disaster. Ignoring the long-range effects of radiation, he said, "Three Mile Island killed nobody, it injured nobody." The reporting went on and on, he said, and yet only a few paragraphs were devoted to an earthquake in Yugoslavia in which hundreds were killed. "Where is the perspective?" he asked reporters.

As to criticism that the Chalk River reactor was spewing out radioactive contaminants, Dr. Don Charlesworth, head of the station's environmental authority, said, "I hope the public doesn't think the Chalk River operation sits here doing the country's nuclear research and development without releasing some radiation."



The Adventures of Reddy Kill-O-Watt

[*The following excerpts are from Not Man Apart*, an excellent environmental newspaper published by Friends of the Earth, 124 Spear St., San Francisco, California 94105.)

Now if you want your confidence restored in the nuclear industry, don't read any further.

"Light bulbs are commonplace pieces of electrical equipment. Sometimes bulbs burn out, but most people have no trouble replacing them . . . except for nuclear engineers.

"In March of 1977, an attempt was made to replace an indicator bulb at the Dresden 2 reactor. The wires twisted and short-circuited as the operator tried to remove the bulb. The resulting current surge knocked out a motor control center and closed the feedwater heater valves. The temperature of the feedwater dropped 150 degrees in 20 minutes.

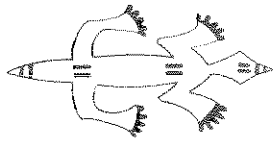
"Four months later, a technician was replacing an indicator bulb at the Millstone 1 reactor. A similar event sequence occurred: wires short-circuited, a relay flipped open, closing an oil pump which in turn stopped the reactor feedwater pump. A day and a half of repairs brought the plant back into service.

"In March of 1978, a light bulb accidentally fell into an open light assembly on the control console at the Rancho Seco reactor. That created a short circuit in the power supply to pressure, temperature, flow and level sensors in the reactor. The readings on the control guage went haywire, sent conflicting signals to the automatic controls, and forced the baffled operator to scram the plant. It took five days before the reactor could be returned to service.

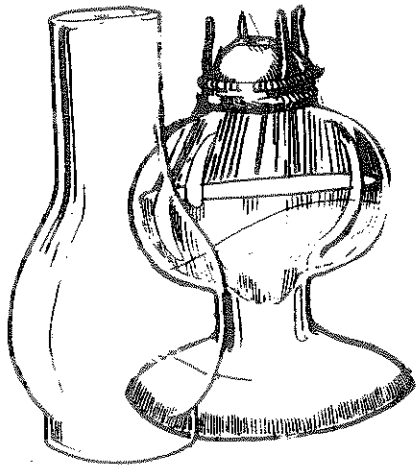
"Light bulb changes have even caused a blowdown. In October, 1978, an attempt to change a burned-out bulb at the Pilgrim 1 reactor caused a ground, which activated an overcurrent relay and cut off the generator. The reactor scrammed, and a steam relief valve accidentally opened and did not close until the reactor had blown down from 1020 to 330 pounds. The unit came back into service eighteen days later.

Rain magazine, in reprinting this light-bulb account added, "Now if they'd only used a candle."

Well, in one reactor they *did* use a candle, and almost created a meltdown.

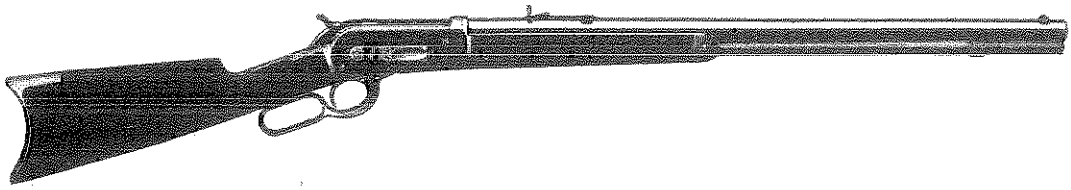


It happened at Browns Ferry nuclear plant in Alabama. An electrician did use a candle to locate air leaks in the room containing control cables. The candle set fire to insulation, short-circuiting not only the operating controls, but all the safety systems as well. After the fire was put out, it took 16 hours to bring the plant back under control. A meltdown was narrowly averted. Damage was estimated at $160-million.



One safety engineer of the plant was so shaken by the accident, he resigned, later saying no reactor is safe in human hands. Though the emergency menaced many lives, citizens in the area were never alerted because no one informed local authorities.

If people who can't change lightbulbs can't be trusted with a candle . . .



"If nuclear plants can be so easily disrupted and if people can make bombs, then security must be quite a problem?"

Because of the threat of sabotage and "terrorism", operators of nuclear facilities institute strict security measures, including extensive background checks of all employees, and limited access to unauthorized persons. As part of these security measures, a growing number of facility officials have initiated intelligence programs in order to monitor the actions of people who speak out strongly on issues such as nuclear power. As a result, surveillance has become a new nuclear hazard: a threat to civil liberties and the exercise of democratic political rights.

"Intelligence may involve electronic and other means of surveillance, but the most important aspect is infiltration of the groups themselves," said the Rosenbaum Report of the Nuclear Regulatory Commission.

The problem of security was exemplified last April when saboteurs entered the Surrey, Virginia, nuclear reactor and did $6-million worth of damage to 62 nuclear fuel rods. The thing that is most disconcerting to security personnel is that the saboteurs went about their chores for over 7 hours without being detected.

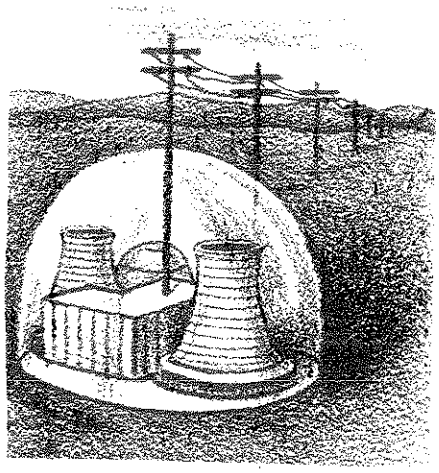
Although it is compulsory that a nuclear plant have its security plan approved by the NRC, there is no similar requirement for plans to protect the civilian population in event of a nuclear accident.

The U.S. Government admits that it has lost track of hundreds of pounds of weapons-grade uranium and plutonium. For example, in 1965, 206 pounds of weapons-grade uranium was stolen from Apollo, Pennsylvania — it has been traced to Israel.

"So peacetime nuclear energy is really connected to nuclear weaponry?"

In her book, *Nuclear Madness*, Dr. Caldicott says, "The early developers of nuclear energy did not intend for it to benefit humanity. Rather, they explored its potential forty years ago specifically to produce atomic bombs, weapons that would inflict unprecedented damage on enemy powers."

Dr. Caldicott says that seven years later, "the collective guilt generated by the deaths of over 200,000 Japanese civilians moved the United States Government to advocate a new policy: the 'peaceful use of atomic energy' to produce 'safe, clean electricity', a new form of power touted as being 'too cheap to meter'. (With) substantial government subsidies, insurance protection, and the potential for huge profits, together industry and government leaders decided that nuclear power would become the energy source of the future."



Despite public assurances that atomic weapons insured American safety, their existence generated considerable anxiety about the possibilities of a world holocaust. President Eisenhower was urged by scientists to set forth to the public the exact nature of atomic dangers. Instead, the speech raised hope that the atom might serve man and not destroy him.

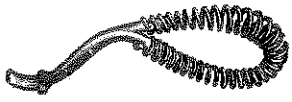
This "Atoms for Peace" speech to the United Nations in 1953 marked the beginning of large-scale government funding for the development of nuclear power plants. There was also the goal to try to lure non-aligned nations away from the Soviet Union with the promise of aid of nuclear technology and funds.

What was not revealed was that the civilian program was basically to provide the technical knowledge and industrial base for military applications of nuclear energy. Although the Atomic Energy Commission seemed to be a civilian agency, actually the thrust of most of its work was the production of fissionable material for atomic weapons. Also, the development of civilian applications also served to salve the conscience of scientists

working on the nuclear programs, many of whom were concerned about the military consequences of their work. Thus it was that the commitment of funds to development of nuclear power plants was not its potential as an inexpensive source of power — rather it served to legitimate the continued development of atomic weaponry.

Increasing numbers of scientists, many from the nuclear industry itself, warn us against relying on nuclear plants for energy. These experts say that the safeguards can never be made adequate, and that the dangers are inherent and unavoidable.

The amount of nuclear weaponry is staggering. The U.S. has a stockpile of 30,000 weapons, equal to 615,385 bombs like the ones dropped on Japan. (The bomb dropped on Hiroshima immediately killed 78,000 people and injured 84,000.) Then the Soviet Union has a stockpile roughly half that of the U.S. — yet neither side has figured out how to use its nuclear weapons to political or military advantage. Although publicly, every U.S. president has disavowed the use of nuclear weapons, every administration since Harry S. Truman has secretly planned first-use of nuclear weapons.



As though the current weaponry were not enough, a whole new series is being developed at the Livermore Weapons Laboratory in Los Alamos and elsewhere. New weapons like satellite killers, laser and particle cannons, neutron bombs, and cruise missiles will make the current weaponry obsolete in the escalation of megadeaths.

"If there are all these problems and high costs connected with nuclear energy, why do electrical utilities want it?"

Despite the name "public utility", most of the companies providing electricity in the U.S. are owned by private investors. Although they are required by law to provide service to their customers, their primary purpose, like that of other corporations, is to reap benefits for their stockholders and executives. As Philadelphia Electric's vice-president John Warner put it, second to growth, the major marketing challenge for PE is "to take full advantage of economic growth to maximize profit for Philadelphia Electric Company. I did not say maximize sales — I said maximize profit."

Utilities are regulated by state-government agencies, perhaps called "Public Utilities Commission." The Commission decides how much the rates will be based on the formula of operating expenses plus rate-of-return (investment minus depreciation). This means a utility company is allowed to make as profit a percentage of the money invested in generating plants and equipment. Wages paid and fuel costs fall under the category of operating expenses, and a utility is not allowed to make a profit on this. The result is that a utility will try to minimize the operating costs and try to maximize its capital investment, i.e., construction costs. The higher the costs, the more the profits the utility can make. It is no wonder, then, that when possible, electric companies decide to build nuclear plants, since they are the most expensive way to produce electricity, and thus the most profitable.

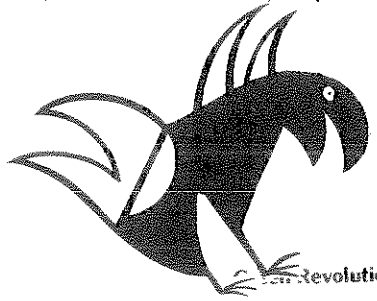
Even so, utilities companies could never raise enough money through electric bills to cover all the costs of nuclear energy — it is simply too expensive. Several states, such as New Hampshire, allow the company to charge consumers for the plant as it is being built in the form of special surcharges on the electric bill. In New Hampshire, the surcharges are expected to be eight to ten percent greater each year until 1985. It makes no difference if the plant ever actually produces electricity — the company gets the money anyway.

But that still isn't enough to cover the costs of nuclear energy. Utilities must borrow money, generally from banks, in the form of bonds. Here another irony presents itself. As a general rule, the safer an investment, the lower the interest rate. So the poorer the investment nuclear power is, the higher are the interest rates, and the more the banks profits. Often board members of the banks also sit on the utility companies boards. The consumers pay the higher cost, and all of this before a single watt of electricity comes into the home.

The incentive towards constructing expensive new plants is greatly strengthened by federal government policies which provide billions of dollars in subsidies for research and development of nuclear power, and tax loopholes for new construction so that utilities can avoid paying any income taxes if they invest enough in expensive generating plants.

The latest government study, the Ryan Report, indicates that nuclear power plants probably don't provide any increase in net energy at all. But from the point of view of shareholders and bond-buyers, that is good news indeed!

Nuclear power has social costs as well. There are the cancers and genetic defects as a result of increased long-lasting radiation. There is the necessary exploitation



of Third World nations for uranium. Or the problem of increased nuclear armament proliferation. Or in the continuing massive unemployment caused by reliance on capital-intensive technologies. These are the fruits we will be reaping for generations.

"How did we ever let the production of electricity get so huge and centralized?"

Electrical energy can be produced to serve small areas, but a study of the General Electric Corporation will serve to show how production and distribution of electricity became centralized.

The U.S.'s original electrical system was set up principally by Thomas Edison and J.P. Morgan. Contrary to common belief, Edison did not invent the light bulb, electrical generators, or electrical motors — all these were in use in Europe before 1880. At that time, individual stores and factories had their own electric generators. Edison is remembered by the industry because he visualized a system created under his patent control where power would be generated at a central station, and businesses would buy electricity from it. A rival firm, Thompson-Houston, took out patents on an alternating-current system which was able to reach a larger area than could Edison's direct-current system.

However, J.P. Morgan, the investment banker, acquired financial control of both firms and merged them in 1892 into a new firm, General Electric. Eventually, GE took over more than 100 other industrial firms.

Having centralized the manufacture of electrical equipment, GE proceeded to centralize the control of utilities which bought and used this equipment. According to James Ridgeway, the noted investigative journalist, "In 1905, GE formed the largest of the utility-holding groups, the Electric Bond and Share Co.," which was described by one U.S. senator as "the most gigantic monopoly" in world history, dwarfing Standard Oil Company in its magnitude. All these electric utilities purchased their equipment from GE at above-market prices, keeping operating expenses high. But utilities like high operating costs, for the higher their expenses, the greater their profit, since they are guaranteed a "fair return on their investment." Thus Morgan profited twice on each sale.

GE came to control about 60% of U.S. utilities, but an intimated anti-trust action caused it to sell some of its companies. However, by the mid-1930s, six super-finance

giants controlled the top utility-holding companies — two of these were totally under Morgan's control, and Morgan was suspected of having large interests in the other four, Ridgeway points out.

The pattern continues to this day. In 1974, a study by the late Senator Lee Metcalf showed that a holding company called J.P. Morgan, Inc., owns a major New York bank, Morgan Guaranty Trust, which in turn has major holdings in 41 utility groups. The Chase Manhattan Bank, a Rockefeller corporation, has major holdings in 42 groups.

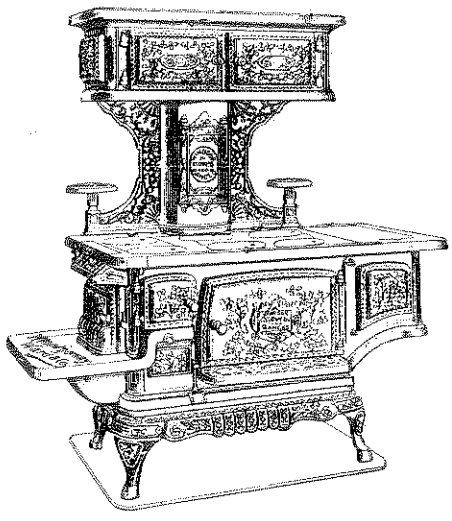
Thus the U.S. electricity monopolists built the type of electric system that was the most profitable and most easy to control — a highly centralized one. Geographically, the system was centralized in plants that sold electricity over the largest possible area. The technological functions of inventing, patenting, and manufacturing equipment were concentrated in a few industrial firms, the largest of which is GE.

From this position of power, the centralists were able to insure that the electric system would use energy, capital, and technology very intensively. By the 1930s, the industry's lobbying and advertising arm, the Edison Electric Institute, recognized the industry's sales would not grow very fast if it promoted only appliances that use electricity efficiently, such as refrigerators. It turned to promoting inefficient uses of electricity, such as home heating — a utility has to burn from two to three times as much oil to heat a home electrically as if the home were heated with its own furnace. GE makes deals with housing construction companies so they will install electric heat rather than oil furnaces in new homes, and as a result, GE is able to sell ever-larger power plants to the local utility.

The system is capital intensive, partly because government regulations often require that utilities can increase profits only as fast as they increase investments. Thus utilities have an incentive to buy more equipment than they really need. And the system relies heavily on complex technology, since simple technologies would invite competition from many firms each with a small amount of capital — complexity is easier to monopolize. For instance, when GE invested $200-million to develop and patent its nuclear plants, the very size of the investment drastically limited the number of other companies in the world which could hope to become competitors.

GE was in on the ground floor of the nuclear industry. Arthur Compton, a GE consultant, was influential in having the U.S. drop its atomic bombs on Japan. The first study of military and non-military uses of the atom which the U.S. Government commissioned was headed by Zay Jeffries, a GE executive. He called for world-wide control of atomic power by the U.S.

The decision to drop the bombs upon Hiroshima and Nagasaki, killing 175,000 civilian human beings, was made by a committee under Secretary of War Henry Stimson. Although Japan was near defeat, the U.S. was afraid Russia would receive the credit and the spoils. The Stimson Committee recommended the bombings. Stimson came from a family intermarried with members of the Morgan inner circle, and the law firm with which he was associated had the Morgan group for a client. The alternate chairperson of the Committee was George Harrison, president of the New York Life Insurance Co., a firm dominated for years by the Morgan group. Another member of the Committee



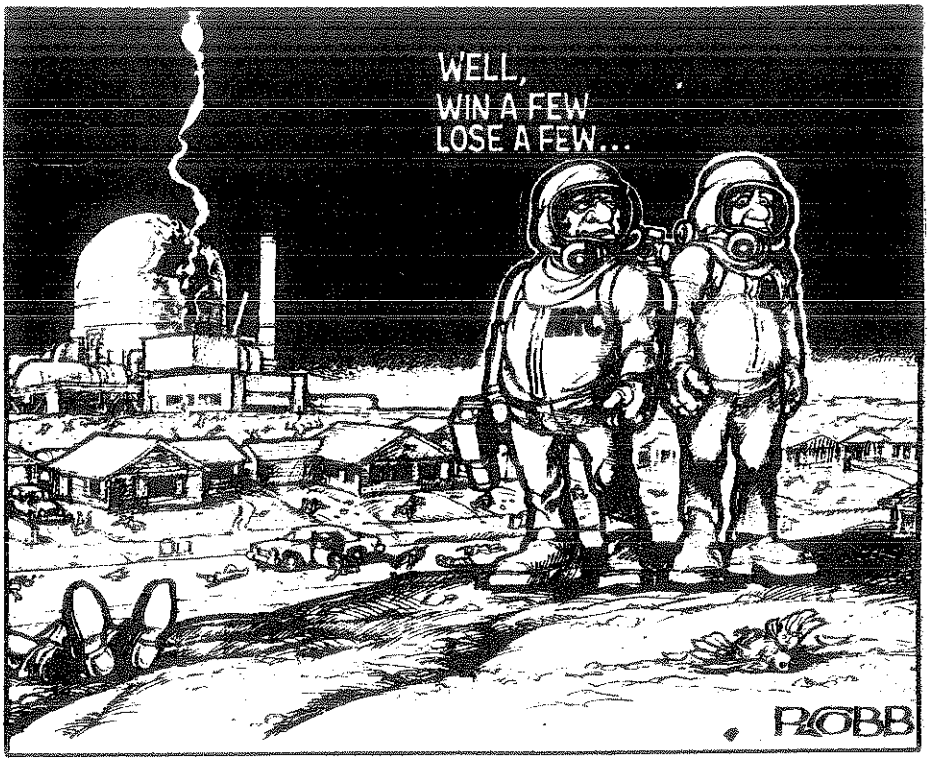
was Harry Truman's special representative, James Byrnes — after he resigned as Secretary of State, he became a director of Newmont Mining, the central holding company of the Morgan group in the field of minerals.

Thus it was no surprise when the Atomic Energy Commission, although supported entirely by public funds, chose to place great emphasis on "fostering private enterprise." This meant that General Electric received an estimated $4.2-billion in the AEC sweepstakes.

"At least we won't run out of nuclear fuel like is happening with oil and coal. True?"

The basic raw material for both nuclear power plants and nuclear bombs is concentrated uranium ore, called "yellowcake". The biggest suppliers of yellowcake in the U.S. include Gulf Atomic (controlled by Gulf Oil, owned by the Mellons) and Exxon (controlled by the Rockefellers). In just two years, these and other corporations have jacked up the price of yellowcake from $8 to $40 a pound.

One of the major arguments given for converting to nuclear power as our primary source of electricity is that unlike oil, natural gas, and coal, we will not run out of fuel for the reactors. But it is now clear that the fuel for nuclear plants, namely uranium, is in just as short supply



as oil and natural gas. Some say we have only enough uranium at affordable prices to last 30 to 40 years.

Two solutions to the problems of uranium shortage are being promoted by the government and nuclear industry. One is "reprocessing" of the waste products which could recover uranium and plutonium for re-use. The second is the "breeder" reactor, which would produce more nuclear fuel than it consumes. Reprocessing would be a short-term possibility, but the industry wants to develop the breeder.

There is one problem with the breeder — it has not yet been shown to work, and it is extremely dangerous and expensive. Unlike the existing nuclear plants, breeder reactors are subject to exploding with the force of an atomic bomb. Breeder reactors not only have all the risks of regular reactors, but two major additions. First of all, the fluid in the primary cooling loop is molten sodium instead of pressurized water. The sodium transfers heat to a water loop which generates steam for generating electrical power like any other steam generator. But hot sodium reacts violently with either water or air, and must be kept out of contact with either with absolute certainty. Secondly, the plutonium produced in the breeding process is the most dangerous substance known to science. Its oxide is a very fine yellowish-green powder which is easily air-borne, and inhaled by people. It is so carcinogenic that microscopic amounts are sufficient to cause lung cancer. A plutonium economy would be the most irreversible and immoral step that humans have ever taken.

"But if we reject nuclear power, what other alternatives do we have?"

Some people believe that nuclear energy is necessary to replace dwindling oil stocks. This view is contradicted by Vince Taylor in a report done for the U.S. Arms Control and Disarmament Agency.

"The choice is seen as either accepting the risks of nuclear power or accepting a certain future of declining wealth and increasing violence as dwindling supplies of oil and gas cause economic disruption and pit nation against nation in the fight to control the few remaining resources," Taylor says. "Furthermore, so this line of reasoning goes, even before shortages of oil become critical, the industrial nations of the world will be hostages to Arab oil and nuclear power is seen as offering the only near-term hope of reducing dependence upon this uncertain energy supply."

Taylor argues this is a mistaken assumption. He believes there is a "truly remarkable potential for reducing energy inputs without affecting the quality or quantity of energy services."

"Energy is not consumed for its own sake, but is used in combination with other materials, equipment and labor to accomplish desired ends — heating, cooling, lighting, transportation, mechanical work, communication," he writes. "Energy is, thus, only one of many different resources involved in providing energy services, and the amount of energy required to provide a given service can vary widely depending upon the amounts of other resources that are combined with energy, and also the technology employed."

Taylor believes that the productivity of conventional energy resources could be extended 50 or 60 years. The costs of doing so are relatively small. That allows time for a transition to benign, renewable, energy sources.

"Simple measures such as improving the thermal design of new houses and factories, increasing insulation and heat recovery in existing homes, increasing efficiencies of furnaces and air conditioners, improving gasoline mileage by lightening vehicles and using more efficient engines, cogenerating electricity and industrial process steam, improving the efficiency of design and use of electric motors in industry, and increasing recovery of industrial waste head could provide major reductions in energy consumption without any sacrifice in energy services," Taylor says.

Moreover, nuclear power won't make much of a contribution to future energy supplies within the next 25 years, and its contribution won't lessen U.S. dependence on the Middle East or reduce anticipated growth in consumption in gas and oil, Taylor reports.

"But that sounds like we won't be able to maintain our current standard of living!"

Probably we cannot — with or without nuclear energy.

Our centralized, over-industrialized capital-and-energy-intensive civilization was built upon cheap energy from high-grade easily-obtained fossil fuels. These sources are nearly exhausted and now no new sources of cheap energy are in sight. Abundant energy will not do — it must be cheap, and the short era of cheap energy is now over.

Note that solar energy was always abundant, but never cheap. Petroleum, on the other hand, was cheap but never abundant. We will succeed in burning in 200 years the entire supply which was formed in millions of years.

Many facets of our present civilization will have to be abandoned. The World Trade Center in New York City is an example. Its electrical demand is 80,000 kw. This is more than the domestic electrical demand of Schenectady, New York, a city with a population of 100,000.

In energy terms, we will no longer be able to afford a food system in which so much of the food supply is consumed two or three thousand miles from where it was grown. As a more specific example, Massachusetts imports 80 per cent of its food, mostly from California. Agriculture has actually become a minor factor in our food system.

For each calorie produced in food, the system requires an input of 10 calories of fossil fuel. Although much of this is used directly on the farm in the form of fertilizer, insecticides, herbicides and fuel for machinery, the majority of it is used in transportation, processing, packaging, freezing, merchandizing and cooking. In brief, it is industrialized agri-business rather than farming. In the Third World, this ratio is reversed — for each calorie of energy input, the peasant farmer, with the aid of the earth and sun, produces 10 calories of food. In energy terms, he is 100 times as efficient as we are.

The decentralized society of the new solar age will also be less industrialized and more agrarian. The farm will again become a source of biomass energy as well as a source of food and fiber.

The proponents of nuclear power often claim that it is now too late to change our minds. We are committed to a nuclear program because we need the energy of both coal and uranium to maintain the growth

rate upon which the health of our economy depends. At present, our energy system uses about 13% of its requirements as end-use electricity. Of this 13 per cent, about 13 per cent is generated in nuclear plants. This is less than two per cent of our total energy demand.

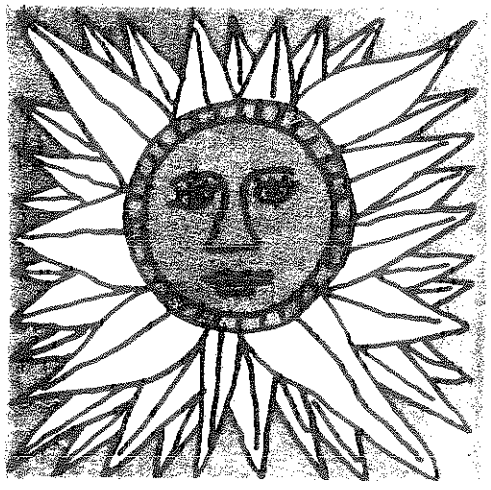
To say we cannot do without nuclear power is to say we cannot reduce our electrical demand by 13 per cent, nor our total energy demand by two per cent.

A recent study by the American Institute of Physics entitled **Efficient Uses of Energy** claims that the efficiency of our use of energy could be increased by a factor of three or four theoretically. Others say a factor of two is more realistic. The per capita energy consumption in England is 40% of ours, and in France and Switzerland it is 20%. As recently as 1963, our own per capita energy consumption was only 50% of what it is now.

Clearly we could stop building nuclear plants and gradually phase out existing ones as we adopted a technological and lifestyle strategy to reduce our energy consumption. We could then depend upon coal to generate a decreasing demand for electrical energy until we finally achieved a full solar-powered, decentralized, democratic and convivial society.

The switch from capital-depleting energy to income energy from the sun will probably bring about sweeping changes in the social order. Both coal-burning and nuclear-sourced energy systems are inherently very large central-station electric-generating plants. The economies of scale are real and compelling. Such large installations lead inevitably to similar concentrations of industry, business, and people. A highly-centralized social order tends to be complex, hierarchical and bureaucratic. It also tends to be unfathomable, unmanageable and alienating. These characteristics are in evidence in most highly-industrialized countries because of the nature of their energy system.

Solar energy, on the other hand is inherently dispersed and decentralized. As such, it is initially distributed energy and should logically be processed locally on a small scale for local use. This tends to make it democratic, easily-understood and convivial.

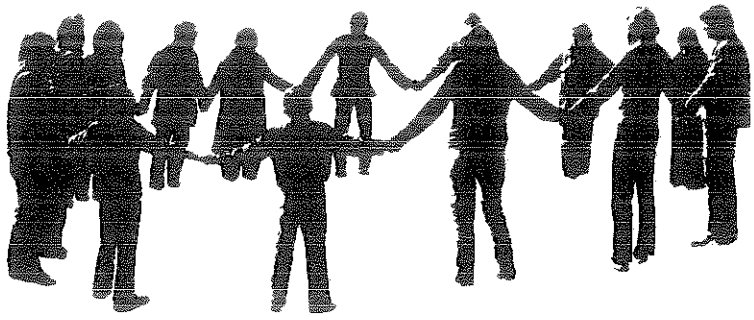


Dr. Barry Commoner, a renowned ecologist, insists that "within the next ten years, we could be getting a fifth of our energy from the sun." Even right now, solar energy for home and hot water heating is competitive with electric heat throughout most of the U.S. For industrial use, coal plants are cheaper and more reliable than reactors.

A study just completed by research associates at Commoner's Center for Biology of Natural Systems, concludes that 63 of the 71 currently licensed nuclear power plants can be shut down immediately "with no loss in electric output or reliability. The remaining eight plants can be phased out in the next few years; and all new nuclear plants expected to come on line by 1987 can be cancelled, also with no shortage in needed power."

The shutdown would increase total coal consumption by 8.9% and oil consumption by 3.4% until solar and other alternate technologies could be geared up to replace nuclear plants within a ten-year period. Hydroelectric power, industrial cogeneration, windmills and other options can also help.

Utilities in the U.S. now have an average excess generating capacity of 30%, and yet nuclear plants are generating only 13% of electricity. And besides that, there is the figure of the President's Council on Environmental Quality that increases in efficiency of power use could allow the U.S. economy to operate with today's technology on 30-40% less energy, with no loss of production, jobs, or standard of living.



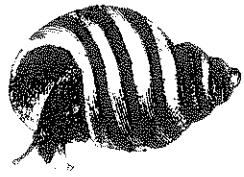
Commoner explains that even the seven nuclear plants that service Chicago, the area that derives the greatest proportion of its electricity from nuclear (40%) could be shut down quickly with no loss of electricity to users. The local utility, Commonwealth Edison, runs its nuclear plants at 57% efficiency, and its fossil-fuel plants at 37% efficiency because nuclear plants are more profitable for it. By upping the efficiency of the fossil-fuel plants, and purchasing excess energy from neighboring plants, ComEd could shut down its nuclear facilities.

The need for hundreds of nuclear plants was based on the assumption that energy usage would continue to expand rapidly. Yet, since costs of electricity started to rise rapidly in 1973, demand has slowed drastically, to about 1% per year in Philadelphia, for example. Yet Philadelphia utilities have refused to recognize the new circumstances and now have 47% excess generating capacity — meaning it could produce 47% more electricity than consumers use during the day of greatest demand. Philadelphia could shut down all its nuclear plants and still have more electricity than consumers could use.

Some, like British physicist Amory Lovins, advocate "The Soft Energy Path" — stressing diversity and small-scale investments. Its total technology is the sum of dozens of relatively small components, each doing what it does best. It operates on renewable resources such as sun, wind, water. The chance of technical failure is lower, capital costs are lower, and more jobs are created.

At the present time, there are 72 nuclear power plants in operation, yielding about 13% of the electrical power for the U.S. Government plans call for as many as 500 plants by the year 2000, producing up to 65% of total power.

It is naive to believe that the problems of economics or waste disposal will mortally wound nuclear power — no matter how objectively unviable and undesirable that technology becomes, it will remain a major aspect of national energy policy because of the influence of the vested interests that support it. . . If we are going to have a solar future, it will be created only by paving a path that permits a solar transition. However, nuclear power sits like a massive boulder at the very beginning of that path. The first step in a solar future is the removal of the nuclear barrier; the second step is the creation of a groundswell of support for its replacement with solar.



Some observers believe that the energy industry really considers nuclear power only a temporary expedient, a way to make money and to hold off efforts for small-scale alternative technology development until the industrial giants can find a way to see what is now free — the energy of the sun, the wind, the earth.

"Do you mean that the utilities are trying to make money on free solar energy?"

One of the schemes being seriously considered by the same folks who brought you nuclear power is the Solar Power Satellite, a large collector some 55 square miles in area which will rotate around the earth. It would weigh 90,000,000 kg. Some sixty of the huge satellites are being proposed to provide 20% of the U.S. electrical needs in the year 2000. The Government has gone so far as to do feasibility studies, citizen response surveys, and other moves to gear up.

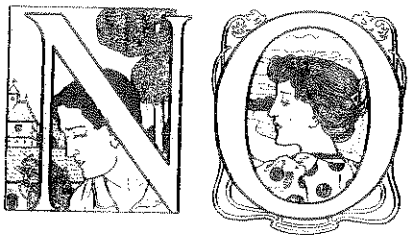
Not only would the huge satellites insure that electrical production remained in the hands of the utility giants, but the manner of transmitting the electricity to the earth would be microwaves — and already there is concern for microwave potential for damaging living organisms. The microwave beam which would be generated could cook the entire world's population, and could be used as a weapon.

The satellites would have solar cells, and as they moved in orbit, they would beam solar energy to earth via microwave to large, flat receiving antennas, there to be converted into electricity. In 1977, Congress decided to spend $15.6-million for an analysis of the project. Critics maintain that just the massive microwave radiation is enough to abandon the idea — large doses cause cancer, central nervous system damage, cataracts, genetic damage, even death.

If that isn't enough, 35 square miles of land would be required for each receiver, plus high-voltage transmission lines. There would be three to five daily launchings and re-entries of the rocket (larger than Saturn V) needed to carry workers and materials into space. Development would cost $44-billion; then each of the 60 satellites would cost $7.6-billion. The project would require the creation of the most massive organizational/financial/management pyramid ever incorporated. The plan has military features, too — simply by redirecting the microwave beam, the satellite becomes a strategic anti-personnel weapon.

Incredible? No more than the existence of nuclear power.

WHAT OTHERS ARE SAYING ABOUT NUCLEAR POWER

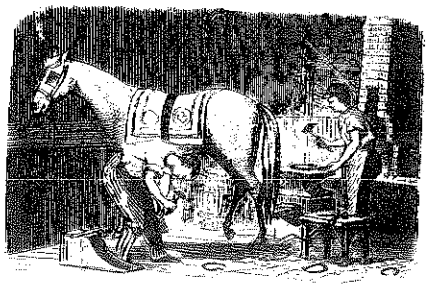


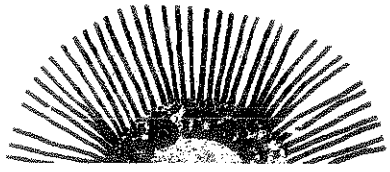
(Even before Three Mile Island, the nuclear industry was on the retreat, as described in this commentary from the Jan. 1978 issue of *The New Ecologist*, an English journal published at 73 Molesworth St., Wadebridge, Cornwall, England.)

Forced to defend itself in public, its image sullied, and its integrity questioned, the nuclear industry is on the retreat. Now adverse publicity is beginning to hit where it hurts most — at the morale of employees. Disenchantment at its power stations, disillusionment in the universities, and disinterest amongst its would-be prize recruits are all placing a powerful brake on the nuclear bandwagon.

Increasingly, employment in the nuclear industry is being looked upon as distinctly anti-social. Not surprisingly, then, that Wouter Van Dieren, a Dutch journalist, reports the symptoms of growing personal stress amongst nuclear employees: heart and stomach diseases, aggressiveness, feelings of guilt, and a general despondency are becoming increasingly noticeable and are beginning to worry the authorities.

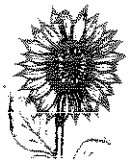
Perhaps more seriously, the industry is having problems finding the top level recruits that it needs for its program to flourish. Students who are willing to apply for a job are probably not the best ones, and at the State University of Groningen, Holland, such was the disinterest that a professor of nuclear technology has been forced to leave because there were no students for him to teach.





"The best students," warns Hannes Alfven, the Nobel Prize-winning physicist, "do not go nuclear any more, and many of those already in the nuclear trade are switching over to other activities if they can — and the best usually can. This is important because it means that as time goes by, it will be increasingly difficult to solve those remaining problems in nuclear energy. Extremely sophisticated and difficult problems are now in the hands of people who often do not belong to the elite which developed nuclear technology in the past. In fact, it was in part this elite which earlier discovered the dangers of nuclear energy and publicly opposed it, or left quietly.

And where have all the brilliant technicians and physicists gone? Alfven suggests that the field which is proving most attractive to them is — alternative technology.



"We do not believe that our true energy needs justify dependence upon nuclear power plants as a source of electricity."

[The National Council of the Fellowship of Reconciliation, POBox 271, Nyack, New York 10960, adopted a statement of concern about nuclear energy. Part of it reads as follows.]

Nuclear power poses a threat to the health and well-being of individuals, our society, and the environment in the following ways:

•1) there is evidence that radiation from the normal emissions of power plants is having damaging effects upon health.

•2) the health of persons working with nuclear materials and wastes has been adversely affected.

•3) the threat of catastrophic accident has not been eliminated.

•4) no feasible plan for storage of wastes has been adopted.

•6) nuclear technology requires security measures which constitute a grave threat to our civil liberties.

•7) Nuclear energy is an inefficient and costly form of energy production, especially when hidden costs and government subsidies are taken into account.

•8) Alternative forms of energy production create more jobs and greater job security.

•9) Nuclear energy represents a further concentration of economic and political power in the hands of a few, not only within our country, but globally, by reinforcing the domination of developing countries by developed nations through the export of capital-intensive polluting technologies.

•10) Wherever the federal government prevails on nuclear issues, the rights of states to offer additional health and environmental protection to their residents is violated.

We understand that our society faces an energy shortage, and that this is a matter of great concern for many. To some extent, however, the energy shortage appears to us to be caused by overconsumption and by wasteful lifestyles in the U.S. and other countries which are able to exert economic or military domination over other parts of the world.

We favor conservation of energy; we favor increases in research and development funds for alternative forms of energy, especially solar. We do not believe that our true energy needs justify dependence upon nuclear power plants as a source of electricity.

"How far the experts will go to sooth our nerves no one knows. Perhaps if confronted with a meltdown and large areas of uninhabitable land near Harrisburg, they would congratulate themselves for saving Philadelphia."

[This commentary is excerpted from an article by Vince Books in Sojourners **for May, 1979.** Sojourners **is published at 1309 L St. NW, Washington, D.C. 20005, and to them we are grateful.]**

The experts had said that a major nuclear catastrophe was as likely as a direct hit by a meteor. They told us not to worry. They have back-up systems for back-up systems. They said they had planned for virtually every conceivable eventuality. But the experts had not planned for what happened out there on Three Mile Island.

They told us there would never be significant radiation leakage. They were wrong. When radiation was detected, they said the levels were not dangerous; we will see. They told us the young and unborn were in no danger. They changed their minds.

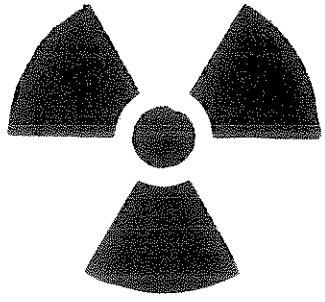
They said there would be no meltdown. So far, we have been lucky. They said not to worry about radioactive iodine in the milk because the cows were not yet grazing; when the iodine showed up later they said not to worry as recent fallout from a Chinese bomb test had produced higher levels.

How far the experts will go to soothe our nerves no one knows. Perhaps if confronted with a meltdown and large areas of uninhabitable land around Harrisburg, they would congratulate themselves for saving Philadelphia and Pittsburgh.

Listen closely to the experts and you will catch their bottom line: if you want life as currently defined, you must learn to live with the risks of nuclear power.

In Scripture, we read that one day long ago Satan stood on a high mountain. Jesus Christ was by his side. Before them stretched all the kingdoms of the world. Satan promised them all to Jesus in return for worship. Such worship implied destruction and the sword as the only means for conquering the nations. It appeared to be the only choice, but Jesus refused. He had alternatives.

Today, the experts are more insistent than ever. They tell us we have no choice but to accept nuclear power. Like nuclear weapons, it is a



grim necessity. That remains a lie.

God's truth is never a grim necessity. It does not chain us to a nuclear economy or any other form of enslavement. When it comes to nuclear power, we may be damned if we do, but despite what the experts think, we won't be damned if we don't.

We have alternatives.

We must seek ways to highlight the need for a nonviolent economic system committed to meeting human needs rather than to private profit.

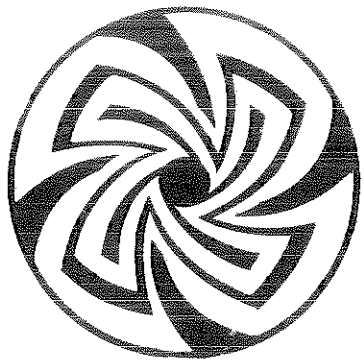
We have learned that we need to begin with ourselves and in our own communities, building structures and movements out of which a decentralist, democratic and caring new society can spring, recognizing that the roots of war, exploitation, and the destruction of the environment lie not only in conflicts between nations, but within ourselves and our feelings of powerlessness to take control of our own lives.

If the ongoing saga of non-violent action against nuclear power holds out any lessons at all for us, it is that a system of beliefs is only as good as the degree to which it empowers people to act responsibly upon them. This, in essence, is the future of nonviolent struggle.

"In 24 hours, we knew all we needed to know — we knew we were not safe."

[These remarks are excerpted from a sermon delivered Easter, 1979, at the Cathedral of St. John the Divine by Episcopal Bishop Paul Moore, Jr., reprinted in Clergy and Laity Concerned Reports, 198 Broadway, New York, N.Y. 10038.]

Dark forces are destroying our cities and killing our children. They are hidden by the veil which the experts and the authorities of our day place over our eyes. Rip off that veil. Have a look at how we have been blinded.



The experts say that we can destroy every Soviet city forty times, but they keep on building three more hydrogen bombs each day.

The experts say the defense budget helps the economy and unemployment, but the Bureau of Labor Statistics says that a billion dollars spent in defense creates only 49 to 74 thousand jobs, whereas the same billion dollars spent, for instance, in education, would produce 187,000 jobs.

The experts say (even after the last three weeks of terror) that nuclear power is safe. We have not noticed an upsurge in the real estate market in Middletown.

The experts of Three Mile Island have lowered a veil over our eyes. They told us we could not understand the workings of nuclear energy. They told us to trust them to keep us safe. And we did. But in 24 hours all of America knew what a meltdown was, and every television set was monitoring the hydrogen bubble. In 24 hours we knew all we needed to know — we knew we were not safe.

Rip off the veil and use your own values and set forth your own interests. Use your God-given common sense, because the experts proceed from their set of values and their self interests.

Here are the questions for you, not the experts, to answer:

Would you rather get along with one small car or have your grandchild born deformed because our excess of energy use demands nuclear power?

Would you rather have the young employed, or be able to destroy Soviet cities more than forty times?

Do you really think peace is furthered by our manufacture and sale of half the arms of the world?

Do you want someone like Idi Amin to have access to atomic bombs? Or are you willing to pursue disarmament more vigorously?

Do you want atomic wastes which no one knows how to deal with increasing year by year? Or can you do without air conditioning?

Who needs experts to answer these questions?

It will take leadership and courage on the part of all of us.

The two greatest evils and greatest dangers to our nation are the defense industry and nuclear power. The one destroys our economy, the other poisons our blood. They are inter-related and deeply ingrained in our national life. They must be faced head-on with action for a simpler standard of living to conserve energy, and a peace movement so profound as to touch the source of the evil of the arms race.

Nuclear Language

Some of the controversy over spent facilities can be attributed to a lack of words that adequately connote the opening up and disposal of large nuclear reactors. "Mothballing" or "decommissioning" perpetuate the illusion that things can be easily undone, like decommissioning a battleship. Our finite language cannot cope with the infinite horrors of the nuclear age.

Furthermore, nuclear people obscure the realities with their choice of words. For instance, fires never occur in nuclear reactors, only "rapid oxidation". And don't worry about an explosion — the worst that can happen is an "energetic disassembly. One nuclear consultant has urged that nuclear waste be renamed to make it more acceptable to communities who oppose an atomic garbage dump in their midst. The possibilities range from "nuclear issue" to "nuclear bonus material".

"The churches are going to have to deal with nuclear ethics as more and more of their members demand it."

[**Timothy Miller, a lecturer in religious studies at the University of Kansas, tried with others to block the delivery of reactor parts to a site in Kansas where the state's first nuclear power plant is being built. After his arrest, he wrote an essay for** Christian Century, **from which this article is excerpted. We are grateful to him and to** Christian Century.]

The ethics of nuclear power is a topic not much discussed in the churches today, but in the future, church people will not be able to ignore it. Nuclear power poses many critical problems:

1. What dangers are imposed on society at large by the growing, malignant presence of nuclear materials?

2. What attitude should be adopted toward the awesome costs of decommissioning reactors at the end of their useful life (30 years or so)?

3. What can be done to eliminate the possibility that nuclear material can be seized by terrorists and used to make weapons?

4. Do we really believe we can trust the American research-and-development establishment to give us a genuinely low-risk technology for atomic power when it has never done so with any other process?

5. Aren't we betraying our obligation to the future of the human race when we leave in the environment many of the most toxic substances ever known, some of which will take hundreds of thousands of years to decompose?

6. What should be done to contain those wastes for which, even the most optimistic nuclear advocates say, we are a couple of decades or so away from finding any permanent storage — and whose "temporary" storage is already causing serious problems?

The churches are going to have to deal with nuclear ethics as more and more of their members demand it.

For the most part, the churches have been full participants in the moral passivity and decadence of the "Me Decade". Evangelicals and liberals alike have accepted, and even promoted, narcissistic self-indulgence, glorification of the ego and of interpersonal aggression, and the outrageous materialism of our time. Enough of that! Now is the time to draw the line, to take one's ethical stand, and articulate it in public action.

"Only if our bondage to an enervating sense of powerlessness can be broken can an effective response to the energy crisis be made."

[**After the Three Mile Island disaster, a group of faculty at the Lancaster Theological Seminary made a statement. Their experience of this terrifying event led them to a new understanding and awareness of the theological dimensions of the nuclear power issue. They believe that Three Mile Island was one of those occurences in history which "breaks the seemingly inevitable sequence of events and opens up new possibilities for the creative participation in the shaping of history." Printed here are excerpts from the statement.**]

We confess our responsibility for conditions leading to the Three Mile Island accident. We confess we have become increasingly aware of the danger of nuclear power, but we did not publicly advocate stopping the construction of nuclear facilities, nor did we demand stronger safety standards.

We confess our appetite for electrical energy which contributes to the ever-growing need for more power plants, more nuclear energy, greater risk of nuclear accidents, and greater chance of widespread destruction.

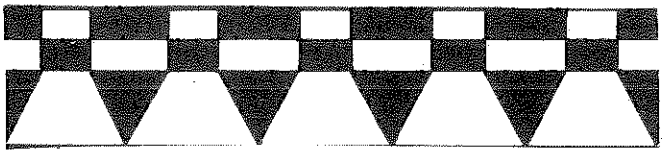
We commit ourselves to sustained theological reflection and invite others to join us in this task.

We commit ourselves to specific public action directed at reducing the nuclear threat to humanity, and call others to the same or similar action.

Kathe Kollwitz

We believe that nuclear energy is a part of God's good creation; it has been developed in ways which have become destructive in our time. The accident at Three Mile Island highlights these harmful aspects of nuclear power in a dramatic way that summons the Church to speak out.

A quarter century ago, it seemed that atomic fission would become the ideal source of energy for the future. It was available in almost limitless supply, and experts were convinced that it could be used to produce electricity economically and without significant danger. After a generation of experience, however, those assumptions have been brought sharply into question. Evidence now strongly indicates that nuclear power in its present form is unsafe, uneconomical, and unsound ecologically. Three Mile Island has served the important purpose of raising the debate concerning the acceptability of nuclear power from the level of esoteric discussion to public consciousness.



How have we gotten ourselves into this position and why is it so difficult to extricate ourselves from it?

To a large extent, this situation is a consequence of prior value choices which, having assumed a life of their own, have become powerful forces over us, holding us in the grip of their own power. We point to powerful structures which we ourselves have participated in creating and which we have allowed to become rooted in our lives in a way that is destructive and yet difficult to dislodge.

The most basic and persuasive of these is the American standard of consumption, generating what Roger Shinn has called "the monstrous energy binge of the affluent societies of the Twentieth Century". A basic assumption of those who argue that nuclear energy must be part of our energy mix for the foreseeable future is that we in the United States cannot change our lifestyle in a way that will significantly reduce our voracious and ever-growing appetite for energy. We are the biggest energy consumer in the world, and also by far the most wasteful. The "American Standard of Living" holds us tenaciously in its grip, and it has become a demonic power in our time, hindering us from acting not only on this question, but on such related issues as world hunger and environmental pollution. An appropriate response to the energy crisis will be possible only if this "power" over us is broken.

The mesmerizing magic of technology has beguiled us into a false worship of technology, as if it could by its own power solve all our problems. We have placed our trust in its sophisticated hardware, advanced equipment and large-scale operations. Particularly in the field of nuclear energy, we have encouraged technology to follow its own lead without waiting to collect sufficient data on environmental, medical, and social impact.

Along with this has gone the naive faith that technology can solve whatever problems emerge along the way, and that technologists rise above the limitations and the self-interest which characterize the activities and opinions of the rest of us. The result today is a heavy investment in highly-sophisticated nuclear technology which, from the very fact of that investment, draws momentum to perpetuate itself. Only if this idolatry can be broken can we hope to make an adequate response to the energy crisis.

Very strong economic and political structures have now been built upon the foundation of nuclear power, notably the public utilities with investment in nuclear power, the construction industry which builds their plants, and the Nuclear Regulatory Commission which is entrusted with the conflicting double responsibility of both promoting and regulating the use of nuclear power.

This complex of industry and government represents vast wealth and enormous political clout. Its interest is naturally in protecting its own huge investment (e.g., $1-billion at Three Mile Island alone), and in increasing the profitability of nuclear energy. Abandoning nuclear power would thus have immense economic consequences for this industrial complex, and indeed, for the whole nation. One must therefore logically anticipate from industry representatives every effort to suppress and minimize findings that emphasize the high costs and dangers of nuclear energy. Only if such entrenched power can be counterbalanced by public, political power in such a way that the true values of nuclear energy can be accurately assessed will it be possible to make an adequate response to the energy crisis.

Perhaps the most debilitating of the evil powers we face, however, is yielding to a pervasive sense of impotence and apathy to take any action which will significantly affect the centers of power where decisions are made. The opinion is widespread that forces beyond our control are determining our economic and political future, and that all efforts by ordinary citizens to shape that future are futile. This amounts to a cynicism with respect to both our Christian and our democratic heritages. Only if our bondage to an enervating sense of powerlessness can be broken can an effective response to the energy crisis be made.

At times in history, an occurrence takes place which breaks the seemingly inevitable sequence of events and opens up new possibilities for creative participation in the shaping of history. Selma, Kent State, and Watergate were occasions of this kind. Three Mile Island is also such an event, a moment of truth in which the grip of the "powers" over us is at least temporarily broken. In such a moment, our values are judged, and we are given a suddenly-expanded opportunity to decide the course of our future. If the Church is of God, then surely it is called to play a leadership role in such a movement.

This issue of *Green Revolution* has been compiled from a wide variety of sources. We are grateful to the many teachers we have had in putting it together.

Thanks first of all to Gene Allen Suchma, art editor of *Harrisburg*, published each month by the Harrisburg Independent Press, 315 Peffer St., Harrisburg, Pa. 17102.

One of the best current news sources for nuclear power and other movement news is *WIN Magazine*, published at 503 Atlantic Ave., 5th floor, Brooklyn, N.Y. 11217. We are grateful to WIN writers Warren Liebold, Steve Hoffius, Don Michak, Joseph Bowring, Kitty Tucker, Henry Etzkowitz and Loring Wirbel for their thoughts and information.

Another excellent alternative news source is *In These Times*, an independent socialist newspaper published by the Institute for Policy Studies, 1509 North Milwaukee Ave., Chicago, Illinois 60622.

An excellent resource is *Groundswell*, published by Nuclear Information and Resource Service, 1536 Sixteenth St., NW, Washington, D.C. 20036.

Thanks to Hal Rubin, writing in *Cry California*, published by California Tomorrow, 681 Market St., San Francisco, California 94105, a top-notch environmental magazine.

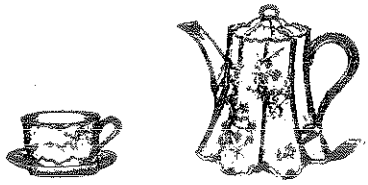
Thanks to John Woodmansee for his article in *The Proust Bulletin*, an interesting new magazine published at 413 Malden Ave., E., Seattle, Washington 98112.

Thanks to *The Elements: A Journal of World Resources*, published by the Public Resource Center, and edited by James Ridgeway, at 1747 Connecticut Ave., Washington, D.C. 20009.

Thanks to Michio Kaku writing for War Resisters League News, 339 Lafayette St., New York, N.Y. 10012.

Thanks to David Holman, writing in *People And Energy*, published by the Institute for Ecological Policies, 1413 K St., NW, 8th floor, Washington, D.C. 20005 (also the home of the Interfaith Coalition on Energy which works to involve religious groups in energy programs.)

. . . and with much thanks to our many teachers . . .



Thanks to Ken Bossong of the Citizen's Energy Project, 1110 Sixth St., NW, Washington, D.C. 20001, for his article in the *Sun Times*, published by Solar Lobby, 1028 Connecticut Ave., NW, Washington, D.C. 20036.

And also thanks to Harvey Wasserman writing for Pacific News Service, to Zodiac News Service, to Dr. George L. Weil, former assistant director of the U.S. Atomic Energy Commission's Reactor Development Division. Thanks also to Bart Conta of Cornell University, writing for *Eco-Justice Themes*. And to *Lancaster Independent Press* and *High Country News*. And to Avid Albert, associated with the Philadelphia Life Center of the Movement for a New Society, and *Fellowship*, of the Fellowship of Reconciliation.

Thanks to the Environmental Action Foundation, Dupont Circle Building #724, Washington, D.C. 20036, publisher of "How To Challenge Your Local Electric Utility: A Citizen's Guide To The Power Industry".

Thanks to a *New York Times Magazine* article by Patrick Huyghe and David Konigsberg on "The Grim Legacy of Nuclear Testing" (April 29, 1979).

Thanks also to Keystone Alliance, 1006 S. 46 St., Philadelphia, Pa. 19143. And to Campaign for Political Rights, 201 Massachusetts Ave., NE, Washington, D.C. 20002.

Other organizations you'll want to contact are: Mobilization for Survival, 3601 Locust Walk, Philadelphia, Pa. 19104; (215) 386-4875, publisher of an excellent newspaper on nuclear power. And American Friends Service Committee, 1501 Cherry St., Philadelphia, Pa. 19102. And Friends of the Earth, 124 Spear St., San Francisco, California 94105. And Clergy and Laity Concerned, 198 Broadway, New York, N.Y. 10038; (212) 964-6730. And Environmental Policy Institute, 317 Pennsylvania Ave., SE, Washington, D.C. 20003; (202) 544-8200.

Two other sources of information on energy are: American Wind Energy Association, 1621 Connecticut Ave., NW, Washington, D.C. 20009, and *Alternative Sources of Energy Magazine*, Rt. 2, Box 90A, Milaca, Minnesota 56353; (612) 983-6892.

Among the sources of resources are: *Paul Jacobs and the Nuclear Gang* (a 60-minute color film), 1501 Broadway #1904, N.Y., N.Y. 10036.

No Nukes: Everybody's Guide To Nuclear Power by Anna Gyorgy & friends, 478 pp., $8 paperback, from South End Press, POBox 68, Astor Station, Boston, Massachusetts 02123.

Packard Manse Media Project, POBox 450, Stoughton, Massachusetts 02072, has an excellent slide film of Dr. Helen Caldicott, *I Have Three Children Of My Own*.

Green Mountain Post Films, POBox 177, Montague, Massachusetts, 01351, has excellent films about nuclear energy.

Sojourners Magazine, 1309 L St., NW, Washington, D.C. 20005, has a packet intended for churches, "The Nuclear Challenge To Christian Conscience".

North Country Anvil, POBox 37, Millville, Minnesota 55957, has published a "Primer on Nuclear Power" — excellent for $2.50.

Thanks also to *Manas*.

Stepping Stones

Documentary films about nuclear energy useful for community education and organizing and to counter the media campaign of the utilities, are available. Contact: Green Mountain Post Films, POBox 177, Montague, Massachusetts.

Special instruction for reading problems is available on a sliding-scale as a community project by a certified teacher. Contact: Piper/Aloe, Route 1, Box 100, Cedar Grove, N.C. 27231; (919) 732-4323.

Evolutionary Ethics: Humanistic Psychology & Social Change is the topic of the 17th annual meeting of the Association for Humanistic Psychology to be held August 25-29, Princeton, N.J. Contact: AHP, 325 Ninth St., San Francisco, California 94103; (415) 626-2375.

Cooperative Self-Reliance Festival sharing alternative lifestyle options stressing self-reliant activities will be held Sept. 15-16 in Albany, N.Y. Contact: CSRC, 196 Morton Ave., Albany, N.Y. 12202; (518) 472-9760.

A woman coordinator is needed in the Southeast Regional Office of the War Resisters League. Contact: WRL, 108 Purefoy Rd., Chapel Hill, N.C. 27514; (919) 967-7244.

A Drop In Center for the Homeless is being opened by the Community for Creative Non-Violence in Washington, and needs food, supplies, money, labor. Contact: CCNV, 1345 Euclid St. NW, Washington, D.C. 20009; (202) 667-6407.

Landmark federal prison suits are being brought by the Lewisburg Prison Project, which needs funds to continue. Contact: LPP, POBox 128, Lewisburg, Pa. 17837.

A National Network for Travelling Communitarians is being established for travelers and hosts via a referral service rather than a directory. Contact: Dan Loubert, President, Corporate Communities of America, 7501 Sebago Road, Bethesda, Maryland 20034 (301; 229-2802.

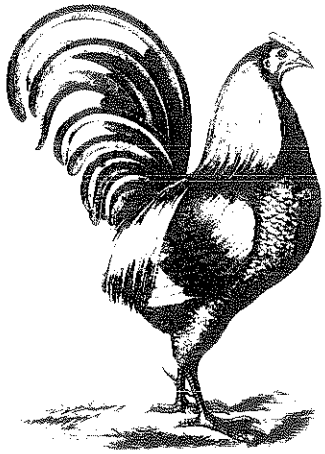
SOLAR TIMES, a new magazine covering the rapidly-developing solar-energy scene, is starting publication for the solar professional. Contact: Solar Times, 901 Bridgeport Ave., Shelton, Connecticut 06484.

A Home-sharing Program for Seniorshas been organized by Seattle's Gray Panthers to provide economical supportive living. Contact: National Ministries, American Baptist Church, Valley Forge, Pa. 19481 for a national directory of alternative living projects for the elderly.

A book on solar heat for swimming pools has been released by the Florida Conservation Foundation. Contact Environmental Information Center, 935 Orange Ave., Winter Park, Florida 32789.

The Community Playthings Catalog is chuckful of solid toys made by the Bruderhof Community and excellent for supplying a school or for gift-giving. Contact: Hutterian Society of Brothers, Rifton, N.Y. 12471.

A Call To Radical Gay Brothers for a spiritual conference in Arizona over Labor Day weekend is being held to raise consciousness about New Age politics. Contact: Spiritual Conference, POBox 1414, Los Angeles, Cal. 90028; (213) 876-5953.



A Mind-Body-Spirit International Festival will feature "The Dome of Ancient British Mysteries" at the New York Coliseum Sept. 26-30. Contact: Graham Wilson, 498 West End Ave. #8A, N.Y., N.Y. 10024; (212) 877-7616.

Toward An Appropriate Technology is a new film showing various projects through the U.S., and their impact upon energy and food consumption. Contact: Third Eye Films, 12 Arrow St., Cambridge, Massachusetts 02138; (617) 354-1500.

Desert-Adapted Agriculture conserving water and energy is the subject of a survey being done for the National Center for Appropriate Technology, which is looking for persons to interview who have practical innovations in this field. Contact: Meals for Millions Foundation, 715 North Park Ave., Tucson, Arizona 85719; (602) 624-7963.

The Freedom of Information Act is under attack from many sides, especially as information revealing the dangers of nuclear energy could fall into the hands of anti-nuke forces, and the Fund for Open Information and Accountability is seeking to keep FOIA healthy. Contact: FOIA, 36 West 44th St., New York, N.Y. 10036; (212) 730-8095.

The sixth annual Historic Communal Societies Conference will be held at Zoar, Ohio, the site of an 1817-1898 settlement of Germans on 5500 acres of land in Tuscarawas County near Canton; it will be October 18-20. Contact: Kathleen Fernandez, Box 404, Zoar, Ohio 44697.

The American Association for Marriage and Family Therapy will be having its 37th annual convention in Washington, D.C., October 4-7. Contact: AAMFT, 924 W. Ninth St., Upland, California 91786.

Aquarian Research Foundation Newsletter

5620 Morton St., Phila., Pa.
19144
(215) 849-1259 or 849-3237

AUGUST 5, 1979 #100
HISTORY TO THE MINUTE

Dear friends,

This newsletter happens to be number 100 in our series and at the same time represents the tenth anniversary of our foundation which started here in early September, 1969.

From that time to this, the newsletter has gone out to many new subscribers so at Judy's suggestion, I will tell about the start of the organization. To make that much easier, I'm using a narrower column width and 10% smaller type. Please let me know if you find that too hard to read.

STARTED BY A WITCH ?

"What is the difference between a commune and a coven ?"

"Oh, I know a woman who lives in the house where Rosemary's Baby was filmed !"

That was part of the strange conversation which led to the start of A.R.F. ten years ago this summer. For two years, I had been travelling around the U.S. setting up printing presses for any group opposing the Viet Nam war, and while doing so, I tried to visit every kind of communal group I could find.

Behind me were fifteen years with the Hutterite Society of Brothers which was a community of 600 people in Paraguay, S.A. that moved to the U.S.A. in 1950. After that I had lived in two other communal groups for 18 months and then spent ten months as printer for the national office of S.D.S. in Chicago.

I had joined the Hutterite group at age 20 after only one year of college, and now I was starting my own project at 41. I had come to believe that as a nation, we faced a time of crisis with a rising pressure for social change countered by a rising resistance to change. To prevent chaos and violence, we had to find ways to reduce society's resistance to the changes that were now required.

AN AGE OF AQUARIUS

On a deeper level, came the recognition that the whole system of money, politics, selfishness and power was doomed, and must be replaced by a new one in which all of us would be ruled from within by the spirit of love. I was sure that such a new age was coming but could not tell if it would come soon enough to prevent the ultimate horror of thermonuclear war.

I published an article in WIN Magazine called, "Community for a New Age" asking people to join with me in forming such a dedicated group that we could tackle this problem together. Copies of the article are still available.

Dick Gregory speaks at nuke protest in Phila. Aug. 4, '79. Girl translates to sign language

Through that article I came in contact with Gemma who lived in the Germantown section of Philadelphia. She had $ 50 and a dog and I had $ 50 and a car. We made a quick trip to visit friends in Cincinatti, Washington, D.C., and New York to find a place to start. On the way, Gemma told me of a film, Rosemary's Baby, and I mentioned that I knew a woman who lived in the building where that movie was filmed.

LIKE A BOLT FROM THE BLUE

We tried to call the lady several times and then forgot about her entirely until a few days later when a friend we were visiting suddenly said, "What is the difference between a commune and a coven ?" We had not been speaking of such things at all, and without answering the question, I said, "I know a lady who lives in the house where Rosemary's Baby was filmed", went to the phone and found her at home. That was to be our last night in N.Y.C., and it was a great joy to hear her say, "You can't start a commune on $ 50; why don't you come over and we'll give you a check !". We did, and she gave us a check for $ 350 with the assurance that there was more where that came from.

After that incident which Gemma found unbelievable, we were led to return to Philadelphia where we found an 8 room house in a fairly nice area for only $ 50/mo. if we would fix it up a bit ourselves. We also met some left-wing radicals in a commune called, "Institute for Educational Development and it was one of them that gave us the name, Aquarian Research Foundation.

Ten years of miracles and changes have taken place since then and now we are involved in so many things that it would not be possible to give all the history here. Just to answer inquiries, I started a newsletter in the first month and the first five years of that newsletter were later compiled into a book called, Unpopular Science, some copies of which are still available for $ 4 and in hard cover for $ 10. We recommend that book if you want to know a lot more about the early years of ARF.

PEOPLE LOVING PEOPLE is to be the title of a book of photographs that we have now begun to work on. Last Sunday, Jose Mena (who is with us from Mexico), Linn Hoffman, a professional photographer, and I flew up to the Vermont Creative Center in our Cessna to begin work and discussions for the production of this new book.

People Loving People is to be a photographic masterpiece by the best photographers and printers depicting all kinds of people in affectionate (but not pornographic) situations. It would be the kind of book that could sell as a popular gift item suitable for both relatives and sweethearts, or just friends who are not part of any alternative movement.

The photos will speak for themselves and the text, which will be large type with ample margins, will allude only gently to the communal situations in which the pictures were taken; places where affection is perfectly natural. It may speak to the great sexual mix-up here in which people are pushed into unwanted sexual relationships because of their need for simple affection.

In the back of the book, there will be a page or two of smaller type giving sources of information on successful communal groups throughout the world, and telling people how they may arrange to visit such places if they wish. The book is intended to be a very soft-sell approach to reach a large public with a message of love and affection in alternative lifestyles which the media has completely neglected.

COST OF PUBLICATION

As a high quality 8½ x 11" paperback, it will cost $ 4.00 ea. to print the first five thousand. That price may rise with inflation. When all other costs of publishing and distribution are added in, the retail price will lie between $ 10 and $ 20. However, in order to finance the first printing, we will have to make a pre-publication offer. We will probably accept $ 8 per copy from readers of this newsletter for books that are paid for in advance of the printing date. We'll be more definite about that in a later issue.

OTHER COMMUNITIES

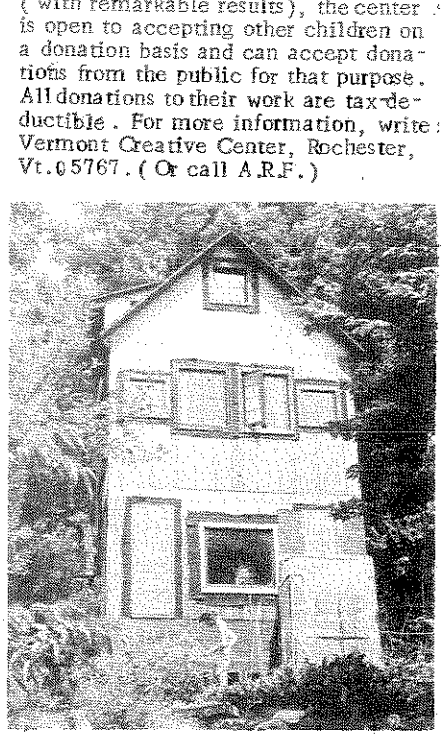
Though most of the photos for the book will probably be done in Vermont, we are also looking for one or two other communities where pictures can be taken. No picture will be used without the agreement of the people in it, and that agreement will be sought after the person has seen the picture.

THE VERMONT CREATIVE CENTER

is now populated by 95 people (summer; 75 in winter). It is the largest and probably oldest community in Vermont (32 years). It is a fantastic place to raise children in the freest, healthiest way.

The community is building new housing so rapidly that there is not much time to finish the exterior of one before the foundations for the next are laid. All this is expensive and the community is poor. We are hoping that the large sale of People Loving People can make a large contribution towards their work. Money from the book will be used to build a learning center for the children and further the community's educational work.

In addition to raising their own 20 children in a very free and happy way (with remarkable results), the center is open to accepting other children on a donation basis and can accept donations from the public for that purpose. All donations to their work are tax-deductible. For more information, write: Vermont Creative Center, Rochester, Vt. 05767. (Or call A.R.F.)



This house at the Vt. Creative seems built for utility first, beauty second.

THE FREE SYSTEM

Ernest Mann (Larry Johnson) publishes a newsletter called "little Free Press" (715 E. 14th St., Minneapolis, Minn. 55404.) which he sends out for the cost of postage or donations. In many interesting ways, he represents that all of us should work for free to get rid of the money system that causes so much suffering. Of course, we agree that in time, that is the way it will be, but we don't feel able to do everything in that way immediately. In some ways, however, we are making a start.

Vermont Creative Center is educating children (including food and lodging) on a donation basis, and we've decided to take people in our plane to visit such communities on a donation basis also. We have also decided to expand our printing for peace and safe power groups in the same way, trusting that a "free system" may already be workable in some areas.

FREE PRINTING

Labor and paper are the main costs in any printing job. Other supplies only cost about $ 2 per side for up to 10,000 copies. So we are now offering to do free or donation based printing for any group working for peace and a new age of love. We have received a donation of 125,000 sheets of paper (8½ x 11" & an odd 8½ x 12" size). People wanting other paper simply supply it themselves.

We are hoping that in the near future that as the amount of donated work increases, we'll also have more people moving in with us to do the work. It may seem strange to some that we work for free but there is another way of seeing that; we could say that anyone working for peace and safe energy is actually working for us, so why should we expect them to pay for the privilege ?

We know it costs money to eat and live (and especially to travel by air) but we are expecting that the money will come from others who are moved by the same spirit of love and who happen, at this time, to have more than we do. All donations to Aquarian Research Foundation are tax deductible and we can use any amount at any time. Our income this year has only been about half of what it was last year. We are hoping that (due to inflation ?) our costs will be similarly reduced. We do know that we have found ways of reducing our heating bill to half of what it was before in spite of the fact that fuel has gone way up.

STAR MATCH GOES FREE

Another project that we are attempting to run on a free or donation basis is our new research in astrology which is intended to find out how well astrology works as a means of determining who is likely to be compatible with whom. We started by asking for $ 12 for six months service of matching people in the Phila. area who are seeking partners, but in order to get a larger pool of people as soon as possible, we've decided to put it on a donation basis. We hope that if the system works as well as expected from evidence seen so far, adequate donations will be received from happy participants to cover the costs and time involved. Please call or write if you're in this area and want more information.

As part of the research project, we are also offering to match up all the people at the Vermont center who are seeking partners. That will give us a very objective method of seeing if the people matched astrologically are compatible as it's hard to hide any incompatibility when people are living so closely together in a large group.

CEPA BOYCOTT TO CLOSE NUKES

According to Lee Frissell of CEPA, if 100,000 people would refuse to pay their electric bill at the same time, the Phila. Elec. Co. would be hit very hard and they could be forced to listen to those who were protesting rate hikes & nuclear plants. To bring about such a refusal, it is felt necessary to have 250,000 people sign pledge cards indicating they will refuse to pay their bill when asked to do so.

Lee Frissell is one of the leaders of the Consumer Education and Protective Association which is related to the Consumer Party running Lucien Blackwell for Mayor of Philadelphia.

As more and more people become disenchanted with the present government and conditions, the chances of a political victory by the Consumer Party are vastly increased and as a result of their naming a popular black city councilman as their mayoral candidate, the fame of the Consumer Party has increased immensely in the past few days. It really looks like they could win at the polls in November.

SHUTDOWN

In case anyone is still uncertain why we are demanding the shutdown of all nuclear systems (in spite of a so-called "energy crisis", or if you just want clear and factual scientific information about it, one of the best books to read is Shutdown published this year by The Farm in Tennessee. For a copy, send $ 4.95 to: The Book Publishing Co., 156 Drakes La., Summertown, Tn. 38483 or call (615) 964-3574.

NEGATIVE ION GENERATORS

In the last 75 years a great deal of scientific research has been done on the effect of positive and negative ions in the air we breath. It has been found that this factor is much more important to some people than others.

Ions are molecules or atoms from which an electron has been added or removed. An atom with extra electrons is a negative ion and one where an electron is missing is positive.

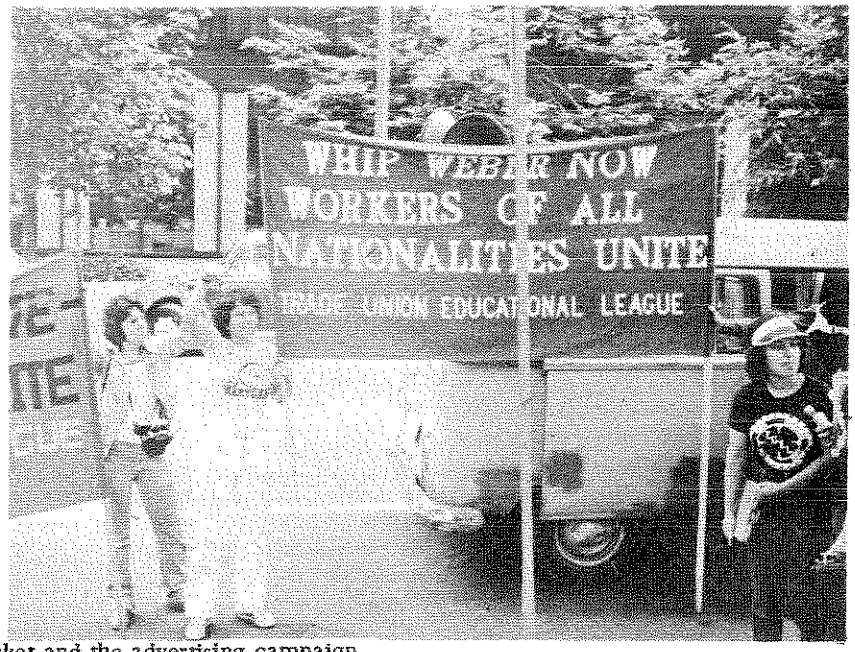
THE NATURAL STATE

In nature air is ionized by trees, waterfalls and storms so that in the environment of Vermont we would find between 1,000 and 4,000 ions per cu. centimeter of air. There would be about 10% more positive ions than negative ones. Sometimes, due to unusual weather conditions, a very unhealthful condition develops and there may be as many as 30 times more positive ions than negative ones. At such times, sensitive people will notice many symptoms such as tension, irritablility, dizziness, sleeplessnes, or even migraine headaches and depression or apathy. At times, in polluted city atmospheres, it is not possible to measure any ions at all.

And even if the weather outdoors is good and there are sufficient negative ions there, the situation in a building may (and usually is) entirely different. Natural building materials like wood and stone hinder the negative ions less than such things as steel, concrete and plastic.

GENERATING NEGATIVE IONS

It is possible to increase the supply of negative ions in the air in any indoor environment by the use of a high voltage D.C. power supply, and now that the FDA has agreed that negative ions are healthy and safe, many negative ion generators have come on the market and the advertising campaign has begun. These units for home, office, or car are sold for between $ 79 & $ 150 or more. It may be possible to build one yourself for far less than that so that if parts are bought retail they would cost around $ 25 - $ 50. All that you need is a safe source of direct current voltage in the range from five to fifteen thousand volts. The positive end can be connected to the ground or electric power line and the negative end to a few sharp needles or points from which the energy is most easily discharged.



Washington, D.C.: Affirmative Action Marchers in June, 1979/

TESTING FOR NEGATIVE IONS

It is easy to tell if a negative ion generator is functioning properly by the use of a small neon bulb. One wire of the bulb is connected to a 2" square metal plate and the other wire is held in the hand. A 0.03 mfd. condensor is connected across the neon bulb (NE 2).

When the negative ion generator is producing negative ions, if the metal plate is held a few inches from the device, and the other wire is touching the body, the neon bulb will soon start to flash and the red flash will occur only at the wire of the neon bulb that is connected to the metal plate. If the opposite electrode flashes, your polarity is wrong and you are producing positive ions. Another way of measuring ion production without regard to polarity is to simply hold any fluorescent tube a few feet from the generator in a very dark room and the end nearest the generator will begin to flash.

It may be possible to use one of our A.R.F. "Body Field Meters" (which are high sensitivity electronic millivolt meters we sell for $ 50) to directly measure the ionization of the air, but we have not yet had time to do all the testing with those to determine their accuracy for that purpose.

ION GENERATORS FROM A.R.F.

Recently, we managed to obtain 25 high voltage power supplies which we've been testing as negative ion generators. We ran 4 of them continuously for two weeks (they only use 5 watts of electricity), and they seem to hold up well. They were built by General Electric as high voltage supplies for xerox machines.

After making them safe against shock and some further testing, we hope to make some of them available to our readers for about $ 45 each on a money-back basis. You have to try such a unit yourself for several days or weeks to know if any of your health problems are actually due to lack of negative ions in the air. Please feel free to phone us day or evening if you are interested in obtaining one of these units. (215) 849 - 3237.

PREVENTION MAGAZINE ON IONS

Prevention Magazine (Emmaus, Pa 18049, $ 9/yr.) for July, 1979 has an excellent article on the importance of air ionization. I would suggest that you read that if you wish more information.

NICOCORTYL FRAUD

An organization calling itself "The Anti-Tobacco Information Centre" is attempting to sell by mail a product that is claimed to end the desire to smoke in people who have smoked for a long time and want to quit. We had great hopes for the product, but our hopes have been dashed. If any of our readers have had any experience with the product, either positive or negative, we would like to hear from you.

Of course, there are no smokers in our household, but we had hoped to be able to help others with a positive report on the product.

AFFIRMATIVE ACTION VICTORY

In June, 1,000 people converged on Washington, D.C, to demand that the U.S. Supreme Court vote to uphold the Affirmative Action Program and "send Webber back". Brian Webber had sued a large corporation demanding that the workers who had been discriminated against in the past should no longer receive special treatment in training and hiring situations. His case was extremely similar to the Bakke case in California where Bakke was upheld by the court.

Almost none of the participants in the march believed that their efforts would be effective in swaying the decision of the court and it was quite a suprise to most of us when the court decided in favor of the minorities.

The Keystone Alliance anti-nuclear group supported the affirmative action program and several of us from the Keystone group went to D.C. to show our support and also to hand out a leaflet indicating our support and also the fallacy of nuclear power. We printed four thousand leaflets and there was no doubt that all of the marchers and many of the bystanders got one. See photos of the Affirmative Action march in this newsletter.

AUGUST DAYS OF PROTEST

Ever since the atomic bombing of Japan in August, 1945, that month has been a traditional time of protest against war and nuclear power. Today there is an increasing feeling of urgency as many people begin to realize we have only a few years left in which nuclear madness can be stopped. There is no reason to believe that Three Mile Island was just a freak occurence, but it is rather to be seen as a serious warning of worse disasters to come from the madness of modern science/politics.

So, tomorrow, fifty groups and a number of famous people, including Dick Gregory will be meeting all day in center city Philadelphia to hold an anti-nuclear fair. Right now, while I'm typing this newsletter, Jose Mena is doing his first printing photography and as soon as that is ready will be starting to print five thousand copies of the day's program which have to be ready in the morning.

FOLLOW-UP ON GOOD THINGS

K-CYCLE ENGINE

We had some further talks with the inventor of the K-Cycle engine, Hoken Kristiansen of Winnipeg, Manitoba, Canada. Hoken indicates that two of the new engines are already under test in cars, one in Canada where it is running on gasoline and the other in Italy where it is used on diesel oil. It seems likely that in the next couple of years the old type of car engines will be on the way out and the K-Cycle will be coming in both for cars and small planes. The K-Cycle which is able to have its power stroke much longer than its intake stroke is therefore able to burn any liquid fuel with increased efficiency, and non polluting, vibration free, noiseless operation. I can't wait for the look on the faces of airport personnel when we first take off in a small plane that hardly makes a buzz.

Group of Japanese (on bench) tell some Americans of their experience of the atomic bombing of Hiroshima. Laurie, our enchanted princess carries signs in front.

REVERSE OSMOSIS WATER:

We are still producing more than we can use of the best tasting drinking water around at almost no cost at all.

The Reverse Osmosis Water Purifying device manufactured by Home Pure Water Corporation is surely the best water purifier we have seen and reqires very little maintenance. For about a year, ours has been maintenance free exept for a slight leak that we noticed where a fitting for the high pressure water input screws into the device. As it is made of plastic, we decided not to tighten it much but used some gasket compound on the thread which permanently cured the problem. This purifier makes water purer than spring water at almost no cost at all without heat or cleaning to contend with. We get 4 gallons per day which is more than we can use and can afford to give it out free to all who want some.

For more information contact:
Home Pure Water Corp.
P.O. Box A.
Bismark, North Dakota 58501
(701) 258-7740.

END OF NEWSLETTER 100

Our newsletter always gets left to the last minute, but of course that is thecharacter of a newsletter. It should be up to the minute.

We are happy to be able to tell about the large demonstration in Phila. yesterday at which Dick Gregory spoke and about 1,000 people attended.

Now I am rushing to get this to the bus tosend it out to the Deep Run people who will pick it up in York, Pa. and combine it with Green Revolution magazine.

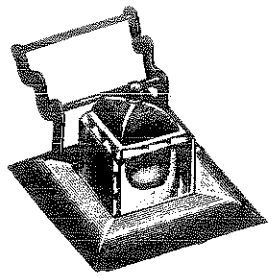
I amhaving to type this last paragraph just before rushing off and it may have more than the usuall supply of errors. Aside from this, Judy has checked all the spelling and so we're certain there are no mistakes.

This evening we are expecting another visitor and I have to be back as soon as possible for that. ARF is fast becoming a more communal household and I'll have to tell about that next time.

Peace & love

Art & Judy

Art & Judy Rosenblum



Green Revolution Readers: The news of energy crisis (but not limited to that) should show the alert minds that the only way supporters of low energy or alternative technology and more independence on the land will get their way is to stop the anarchistic pulling in all directions, to drop the ridiculous idea of decentralization and villages as the "pure" way of life, and get together on one location.

The village idea should be laid in its grave once and for all. What this does is create a covering of asphalt and concrete over more and more of the land. The "decentralization craze" began in the 1950s as A-bomb fever grew and is the prime reason for the energy and raw materials shortages.

One alternative is my vision — The Total Life Community® 1977. We can rebuild our vehicles to use methane and alcohol or steam. We need to start with people able to produce income without contact with the competitive environment, such as writers, artists, etc. What we do not need are the social workers, psychologists, psychiatric leaches who want to use us as guinea pigs while making money on books. Besides, spare us the "grasshoppers" who want to have their "participation in the democratic process" without doing any of the work.

Anyone interested in my idea must write in long hand, not printing, and apply as if they were trying to get into an exclusive club, because that is what it is. We don't have openings for those who are curious or who are community-hopping. We prefer those over 40.

M. Manning
c/o 206½ West Olive
Cabot, Arkansas 72023

Green Revolution People: Sometimes little things become very important. When I picked up a paperbound copy of Borsodi's **Flight From the City**, thinking it would be something simple and light on farming, I didn't know it would transform my whole philosophy. It sent me on a treasure hunt for more books and information by and about Ralph Borsodi, and his school of decentralist thought. Over and over again I found the name Mildred Loomis.

Last week I read her **Go Ahead And Live**. I was both impressed and encouraged. I need to know much, much more, so please send me **Green Revolution**.

Gail Bowers
Harrisonburg, Virginia

Green Revolution People: I like your work and your expression, "digging at the roots". Are you planning any pamphlets with pictures and diagrams directed to sixth-grade level? That would suit people like me that find it hard to get into difficult economic readings. Millions like me need vivid, clarified, diagramatic, close-to-home imagery — simple, dramatic, story-telling economic and social concepts, practices, theories, and ideas. We need this to grasp them with both intellect and emotion. Couldn't you begin with a house and garden with people living and associating from different rooms? Or a Tale of Two Towns? To be highly "educated" and "scientific" creates terrible walls between those who have time to pursue ideas and the majority of people.

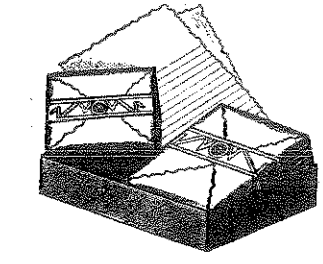
Couldn't we have charts of different types of economic systems — capitalism, communism, socialism, fascism, and decentralism? We need to clarify such terms as "left-wing radical", "right-wing conservative" and "decentralist". We ought to acknowledge what is good in each, and to point up their errors, too. It's important to show what is lacking — what makes them turn to government? Are there differing factions among decentralists? What is the point of departure for action?

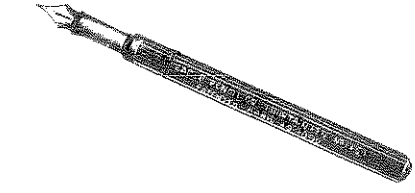
Thanks to Borsodi's reference to Danish folk schools.

Couldn't decentralists formulate some inspirational yet practical way to get from where we are to more harmonious situations? Maybe energize some emergency, interim voluntary educational "peace corps" type of thing. Why not villages and town becoming hosts to five or ten families from the cities, and reviving community trades in food, clothing, and shelter along with it.

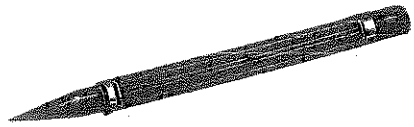
I also feel need for some chart-like historical overview of many different practices and theories — clarify through classification and comparison.

Martha Shaw
POBox 86
Ashley Falls, Massachusetts 01222





'Digging at the roots'
'Work with children'
'Digging at the roots'
'Work with children'
'Write me long hand'
'Transform my life'
'Support your efforts'
'Show the other side'



Greetings, Green Revolution People: Thank you for the receipt of **Green Revolution** again. I was on your mailing list in the '40s, sympathetic to the idea of decentralizing the human family for the purpose of sanity and hygiene as well as the future of the human species.

Re Communities. Through the years I have come to the conclusion that if the future of the human species is to be rewarded with a new outlook on life and a healthier physical future, it must come with working with children, getting the new and young ones to take on the aspirations and new habits that a future always requires.

By training the new young, especially those who have no inherited ties, like orphans or discards, into a new life style, the future gets a start in a new direction. The unwanted can be expected to be glad to belong to a group that is oriented toward a cooperative and self-supporting goal and system.

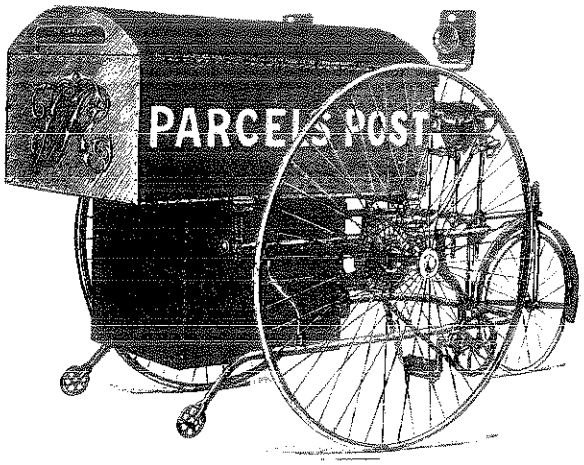
Those groups starting with adults usually end up dispersing — they have no common goal, or their self-interest background prevents them from practicing a service-style way of life. This is difficult to change to when the physical body and the intellect have become conditioned to a selfish way of life, and where financial reward is the ultimate goal of any activity.

What I am suggesting is that the **Green Revolution** be carried on by groups based on the young, and these in turn, when the time is appropriate, be encouraged to start another such group elsewhere. Conversion of an adult is an intellectual event, usually, but training of the young is a complete conversion for lifetime. It is so easy for adults to be back-sliders, but the ideas and habits developed in the young hang on for life.

This is one of my thoughts on the future of the human family — wish I was younger so as to carry out some of my ideas.

Martin J. Fritz
P.O. Box 5
Pacific Palisades, California 90272

Letters from the Readers



Green Revolution People: The Borsodi discussion on "Exploring the Concept of Normal Living" is great, and it would be interesting to know where that statement really came from.

D.R. Hale
Aurora, Ohio

(The statement consisted of condensed excerpts from Borsodi's book, "Education and Living". The Editors)

Green Revolution People: The last issue on Community was one of the best I have received, and I've been receiving it from the beginning.

With all our personal struggles, we sometimes forget we are not all, but a part of a process. This not only applies to individuals, but to groups, cities, states, nations and planets.

Don H. Abbott
Escondido, California

Green Revolution People: I have supported your efforts through the years, even though I felt that you people weren't going far enough in your actions.

Man is not a flesh-eating animal biologically — read **Man's Place In Nature** by Thomas Henry Huxley. Yet, you people endorse animal husbandry.

You folks want peace on earth. Begin with yourselves. Stop murdering animals and eating their carcasses.

Stop the animal excrement manuring in your agriculture. Read the literature of the Vegan Society, Malaga, N.J.

Locate in a warmer climate. Man is a primate, a monkey. He belongs in tropical zones.

You should plant fruit trees by the hundreds. Orcharding is the real answer to the food problem.

David Stry
Cuernavaca, Mexico

Green Revolution Readers: John Rippey, or friend, please call me at (301) 270-0449.

Paul Rippey
48 Philadelphia Ave.
Takoma Park, Md. 20012

Green Revolution Readers: I'd like to tell you of my own experience with the School of Living. In 1951, I left Canada to live in Melbourne Village. Through their brochure, it seemed an ideal set-up of Subsistence farming, with part-time work in their cooperative fabric-printing concern. I was met at the bus station in Florida, and taken on a tour of the village. To my shock I found homes and owners in the upper brackets, with but one couple developing their acre as a homestead. Ralph Borsodi's home I visited, and a year or so later was invited to a meal. There was no attempt at putting into practice his homesteading theories — just an elegant home in a landscaped setting of tropical plants.

As I couldn't afford to buy into the Village (there's a $500 membership fee plus the cost of acreage and a home that must be of a size and high standard no subsistence person could afford), I settled in a $750 used 17'-trailer in the municipal park. A few years later, I bought a half-acre where I helped eke out my dollar-an-hour job by raising a dozen broilers and planting many berries and fruits.

I'm living on a subsistence standard very happily, growing and preserving my own crops, among practical people who go to their daily work like most Americans untroubled by impractical schemes dreamed up by people that have accumulated their wealth through the ordinary channels of business. I think it would be only fair to print this letter in **Green Revolution** to show the other side.

Rod Bacon
Lyons, Oregon 97358

Green Revolution People: Here at Appalachian Regional Office of International Tree Crops Institute USA, we enjoy reading **Green Revolution**. We are committed to decentralism, and are ready to assist the School of Living. We'll supply a bibliography of tree cropping in the Appalachia to anyone interested.

Gregory Williams
Route 1
Gravel Switch, Kentucky 40328

Green Revolution People: Mighty congratulations for introducing into the **Green Revolution** pages those eye-resters.

I read your thoughts re Three Mile Island, and begin to get some sort of pic of you. Speaking now for most if not all readers, I think you've done so far a bang-up job on composition — keep it up.

I like the new response-plan in School of Living and the **Green Revolution** — send what you can to support and help. And I'd like to see a Reader's Questions & Answers Page — let any reader ask a question, and let other readers (not the editor) write the answer, or write personally to the questioner. I would start with two questions: Why do humans have round blood cells and the camels have oval ones? And why is the water molecule triangular? Why is nature so diversified?

Might I suggest that you use just as many as you can of brief items? Few (I suspect) of your readers actually read all of each issue. I doubt even one-fifth does. But they will read a flashed on thing.

Chet S. Dawson
845 Luvras
Belo Horizonte, Brazil

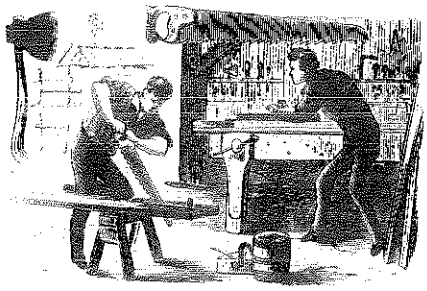
(We understand that short catchy things are more approachable and readable. Unfortunately, in attempting to lay a foundation for the School of Living's educational philosophy, the nature of the material is logical, lengthy, building step by step, and does not lend itself to fragmentation. We urge readers to understand the difference in what **Green Revolution** has to say, and what, for instance, **Time** has to say, and discipline themselves accordingly to engage in the serious thought and study which is necessary to bring about real change in human life on this continent. But thanks for the suggestions and the roses. The Editors)

Green Revolution People: Don't you ever have meetings of members and friends of the School of Living (and **Green Revolution** subscribers) where they can concentrate on giving and receiving and on what can be done by and for the School? I would certainly be very much interested in attending and hearing what's said at such a meeting.

Mel Most
POBox 164, Cooper Station
New York City, N.Y.

(Good idea! Only problem is that there isn't any group of people anyplace or are **the** School of Living, with another group of people in other places who are "members and friends". You who are reading this are the School of Living — don't wait for someone else to make it happen, because there ain't nobody else. New York City readers who would like to meet together might correspond with reader Mel Most to start a series of meetings moving. The Editors)

WORKSHOPS



Decentralist Coalition

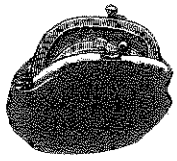
September 14, 15, 16. **Decentralist Coalition**. A working group has put much thought and work into the serious confronting of deep, crucial social/political problems. They believe that "decentralist" solutions may contribute to the current "public" concern for "democracy, liberty, and the future". To that end, the Conference Committee is agreed that the 1979 Decentralist Conference should be limited to 50 invited persons whose work, writing, or organization are a recognized aspect of the decentralist "movement". They are arranging opportunity for this group to define and promote a program in 1980 that will help "humanize" the economic/social trends in this country and the world. They hope both goals and structure will be forthcoming so that any person can wholeheartedly and voluntarily take part in 1980. If you are one of those persons, please let us know. Write out your suggestions for the 1979 Conference to consider. After the conference, we will publish a report of the September Conference proposals for:
Neighborhood Self-Help; Rural Development and Homesteading; Appropriate Technology; Worker-Management and Briarpatch Business; Community Communication; Land Tenure, Money & Economics; Decentralist Media; Moral/Education/Spiritual Development; Decentralist Politics.

Land Trusts

October 12, 13, 14 — **New Schools for Children and Adults.** Childrens' Home Schools, with parents who are doing it; Free Universities and Schools of Living. (Site: Deep Run Farm, York, Pa.)

October 19, 20, 21: *Land Trust Conference*, Deep Run Farm, York, Pa. Discussion leaders from both urban and rural land trusts, the Henry George movement, technical experts on writing trust legal documents, an IRS expert with authoritative tax information, and organizers. There will be concurrent sessions for beginners and the more advanced. The Community Land Trust is increasingly being recognized as the most effective way of preserving land and at the same time protecting use rights of individuals.

December 1, 2, 3 — *Meaningful Celebrations*. Bob Kochtitsky of National Alternative Celebrations, on simplifying celebrations and diverting energy toward human needs. (Site: Deep Run Farm, York, Pa.)



(Cost for each seminar varies, but typically might be $45 per person, including meals and shelter. Bring sleeping bags. Costs are negotiable and bartering is possible. Telephone (717) 755-1561, or write School of Living, POBox 3233, York, Pa. 17402 for further information.)

Green Revolution's only source of support is the contributions of its readers. If you have not helped recently, your help with printing and postage costs would be appreciated now.

(continued from inside front cover)

"And much adult immaturity comes from faulty child-training," put in a teacher. "In my view, nothing outweighs the loving free relationships between adults and children."

Ralph Borsodi spoke. "You all have touched immensely important problems. You have demonstrated the complexity of education for living. Our need is for agreement on what constitutes universal, major problems of living, and of implementing human solutions for them. The School of Living attempts this. Let's develop an education which includes and integrates all the areas you have raised here."

Then he read the charter of the School of Living: ". . . the School of Living has as its primary purpose to assist adults in their study and use of the accumulated wisdom of mankind. Believing that wisdom is best forthcoming from the universal and perpetual experience of human beings, the School of Living aims to assist adults in becoming aware of, and in defining and dealing with major problems of living, common to all people, everywhere."

We sat by the fire, late into the night, seeking common ground.

In the morning, Bill Newcomb summarized: "Each of us has a special ax to grind, a special reform to sponsor for that better world. Our professions represent what is most important to us. But here at the School of Living, we've seen a new concept of the good life, and of education for a good society. We've seen something larger than our own work. Each of our specialties is necessary, but not adequate alone."

"Right," agreed Morgan Harris. "The School of Living is a wheel, of which each of us is a spoke."

"Or an umbrella," suggested Graham Carey, "which covers us all."

"The School of Living's job is synthesis — integration," Newcomb continued. "The School should federate us, rather than unite us. That federation would be a new movement. It needs a name. What should it be?"

Suggestions came. "The School of Living Movement." "Decentralization." "The New Age."

A sturdy man, with the strong leathered look of the countryside, stood up. "I'm Peter Maurin of the **Catholic Worker**, just over from France," he said. "This morning, the paper says Nazi planes are bombing my country. Troops are pouring across the border. Refugees are stranded along the highways in the area of my home, my friends, and my family." He stopped, and we waited.

"My people love life and the land. In every country, there are those who do. The only hope I see for the world is the spirit and work like the School of Living. In France, we call it 'The Green Revolution'."

For a while, no one spoke. "Good," said one. "I agree," another said. "Me too," from a third. Several nodded.

Later at lunch, Morgan Harris raised his glass of carrot juice to propose, "Long life to the Green Revolution!"

The term found acceptance. Some used it in **Free America**, in **Christian Century**, **The Catholic Worker**, and of course, in the School of Living's **Interpreter**. From that beginning, the Green Revolution was our term for the decentralized, organic culture the School of Living stood for. In 1963, it became the official title of the School of Living monthly magazine.

Gradually, the term "Green Revolution" spread. In the 1960s, **The Catholic Worker** published a book by Peter Maurin titled **The Green Revolution**, in which he wrote, "The only way to prevent a Red Revolution is to promote a Green Revolution. The only way to keep people from looking up to Red Russia of the Twentieth Century is to help them look up to Green Ireland of the Seventh Century."

Imbedded here is not only the title, Green Revolution, but a philosophy of which Peter Maurin and Ralph Borsodi were leading spokespersons and demonstrators. Thus it was that the term "Green Revolution" was introduced to America from France by the School of Living and Peter Maurin in 1940.

(Ironically, the term "Green Revolution" was co-opted by U.S. agencies to refer to highly technological agricultural methods developed to achieve high-yield crops in Third World nations. Unfortunately, the methods advocated make the land dependent on petrochemical fertilizers and pesticides, and mechanization, centralizing agricultural controls, land, and displacing people.)

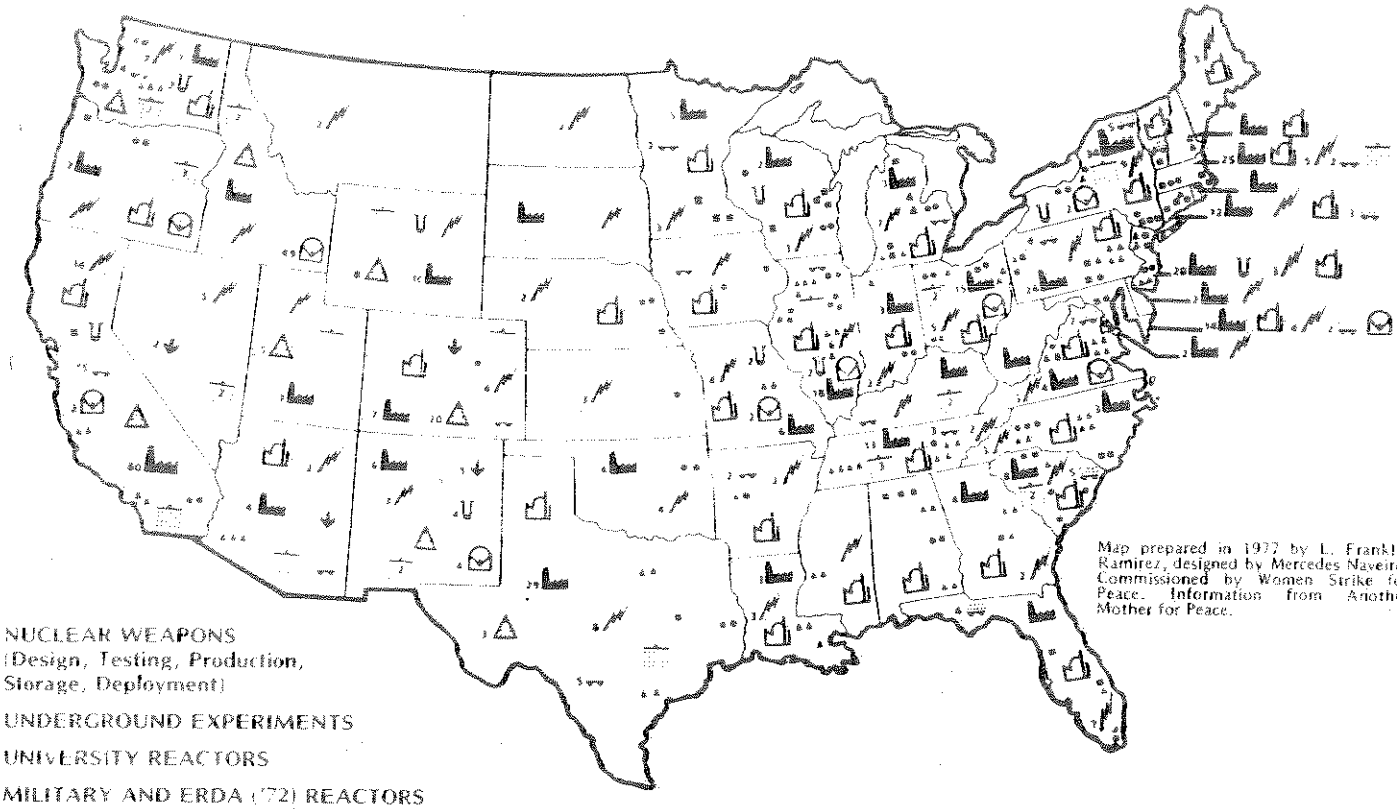
* * * * * * * *

Decentralists who do not know Peter Maurin will find him a stimulating advocate. In "The Case For Utopia", he wrote: "The world would be better off if people tried to become better. And people would become better if they stopped trying to become better off. For when everybody tries to become better off, nobody is better off. But when everybody tries to become better, everybody is better off. Everybody would be rich if nobody tried to become richer, and nobody would be poor if everybody tried to be poorest. And everybody would be what he ought to be if everybody tried to be what he wants the other fellow to be."

Yet Maurin was not just a critic. He advocated a "life close to the land." The Catholic Worker Movement continues to endorse family farms, land trusts, hand-crafting, appropriate technology, and fostering a communal spirit through communal ownership, food-buying, cooperatives.

Peter Maurin, born in France in 1877, one of 24 children, died in 1949.

(Further information on the Catholic Worker Movement, or to subscribe to **The Catholic Worker**, is available at 36 E. First St., New York, N.Y. 10003; (212) 254-1640.)



Map prepared in 1977 by L. Franklin Ramirez, designed by Mercedes Naveiro, Commissioned by Women Strike for Peace. Information from Another Mother for Peace.

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