May 15, 1979

FRIENDS JOURNAL

Quaker Thought and Life Today

Nuclear Power:

We are not only our lives, but the sum of all history, the future seed.

—page 8

Contents

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Cover photo by Theodore Hetzel

FRIENDS JOURNAL

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This issue was already underway at the time of the Three Mile Island nuclear power plant accident. Several of the authors have updated their articles in consideration of that event. Due to the very controversial nature of the nuclear power industry, we have felt that in this issue, contrary to our usual practice, footnotes referring the reader to further resources should be included. They are listed at the end of the articles to which they refer.

We hope that Friends will engage in further discussions about the issue of nuclear power, and that some will share the results of this further reflection with us.

Disaster In Our Own Backyards

by Susan Corson

It was Saturday, March 31, and I—a long-time Philadelphia resident—found myself unexpectedly driving to Vermont, disbelieving all the while that this was really happening to me. My fiance, my four cats, our hastily-packed suitcases, camping gear should we need to

Currently associate editor of the Friends Journal, *Susan Corson is also an occasional writer, and a member of the steering committee of Liberty to the Captives, a Christian human rights direct action group. She attends various meetings in the Philadelphia area.*

be on the road further than Vermont, and a bundle of manuscripts ready to be copy-edited for this issue of *Friends Journal* all were jammed into my Volkswagen. How we came to be on the road to Vermont ironically relates directly to this special issue.

On Wednesday, March 28, at 4 a.m. on Three Mile Island, eleven miles southeast of Harrisburg, Pennsylvania, what has been called the "worst accident in the history of U.S. nuclear power production" began to occur. Initially, at the nuclear power plant located there, the turbine—which generates electricity from steam contained within the system—shut down. By early morning, company officials of Metropolitan Edison, responding to expressions of concern from the community, began to issue reassuring statements to the press, declaring that "a small amount" of radioactive water had leaked from the primary cooling unit onto the floor of the building containing the nuclear reactor, but that "there have been no recordings of any significant levels of radiation and none are expected outside the plant." Within hours, outside investigators from Pennsylvania's Department of Environmental Resources and the Nuclear Regulatory Commission had discovered that the "small amount" of radioactive water on the floor of the containment building was actually 250,000 gallons and that "small" amounts of radiation were being released into the atmosphere from the plant's ventilation system.

By Thursday afternoon, activists in Pennsylvania's Keystone Alliance were making us at the *Journal* aware that the situation near Harrisburg was very serious. Plant officials continued to claim, "We didn't injure anybody. We didn't overexpose anybody. We didn't kill a single soul. The release of radioactivity off-site was minimal." In Philadelphia, we began to hear rumors of evacuation of the Harrisburg area. Workers who had been bussed into the damaged plant and exposed to large doses of radiation without being informed of the danger began to express their dismay and rage to members of the press. Thursday evening, during the busyness and pleasures of the *Friends Journal* annual dinner and the Seventh Annual Henry J. Cadbury Lecture, I decided to call the Red Cross and make my home available should a large-scale evacuation of the Harrisburg area become necessary.

On Friday, additional releases of radioactivity into the atmosphere caused alarm to spread. Company officials continued to claim that these further releases were "planned" while NRC officials reported them to be "unexpected." Pennsylvania's Governor Thornburgh urged pregnant women and children within a five-mile radius of the plant to leave the area. Schools were closed. Residents were urged to stay inside their homes, with their windows closed and air conditioners off. Curfews were established in nearby towns as residents began to evacuate voluntarily. The surrounding four-county area was alerted to the possibility of mass evacuation.

The growing alarm focused on the presence of a hydrogen gas bubble trapped inside the reactor. We were informed that, should the bubble continue to grow, it could expose the uranium core, causing temperatures to rise sufficiently to cause a meltdown. This in turn might lead to a steam explosion as the very hot radioactive material burned through the floor of the building and came into contact with water below. This steam would cause a massive release of radioactivity into the atmosphere. Officials worried, too, about the possibility of a hydrogen-gas explosion. Said one official, "With a meltdown you get a warning of four to five hours that it has begun. There's no warning at all of an explosion of hydrogen gas."

By now the reassuring statements of various officials had a hollow ring to them. We visited with friends in Philadelphia and everyone laughed and joked a bit nervously about leaving the area. Although slightly over 100 miles from Harrisburg, our own situation had begun to appear more vulnerable and less like a refuge for those fleeing the Harrisburg area.

Saturday morning my fiance's brother phoned from Vermont. What were we going to do? he demanded. Could we give him good reasons why we shouldn't spend a few days in New England? Some scientists quoted in the New England press were saying that there was a fifty-fifty chance of a meltdown. And this was a potentially lethal situation. So now we must make a choice. Should we leave? Should we try to persuade others to go? What about our jobs? What about our families and friends? Should we stay and try to help? What could we do in this kind of emergency? If we stayed, were we part of a potential problem of mass evacuation? We very much hope to have children after we're married, so we wondered what risk of genetic damage or sterility we were running if we should stay? We talked it over and reluctantly decided "better safe than sorry," and began to pack and phone friends and colleagues about our decision.

As we took our leave of Philadelphia, we drove along the East River Drive, a beautiful park-lined highway next to the Schuylkill River. The record-breaking eighty-degree weather had helped to coax out early spring blossoms and birds: magnolias, forsythia, weeping willows, a host of others. It had coaxed out more than the usual number of winter-weary city dwellers as well: jogging, biking, hiking, picnicking with toddling babies by the riverside. My heart ached to see life going on as usual with so much danger looming on the horizon.

We drove north through sleepy towns and reflected on the enormity of the situation. Suppose there *were* a meltdown, not simply the risk of one: how fast would the

superhighways and back roads out of the area become clogged with frustrated and desperate people? How far would this exodus reach? Anti-nuclear activists, like those who filmed "The China Syndrome," claim an area about the size of Pennsylvania would be affected—this meant New York City and Washington, D.C. could be involved. How would this affect the working of our government and the state of our economy? Where would people go? It became clear in the ensuing days that no adequate evacuation plans existed for the Pennsylvania area involved, much less so for a larger area.

Then, too, there were the psychological effects. While leaving, the thought had crossed my mind, "If this thing happens, when will I ever come back home again?" I began to wonder where my friends and colleagues would go—and to realize that if there had been a mass evacuation we'd have great difficulty finding many of them again. I thought about what it would feel like to have to start all over again—no home, no job, few clothes, just four ailing old cats and a ten-year-old VW. Still, it felt better and safer to contemplate that than to contemplate what to do about nuclear contamination.

We reached northern Vermont on Sunday, and watched the news closely. The disruption of local business in the Harrisburg area, the fear people were obviously experiencing was deeply disturbing. I wondered whether they calculate lost work days, depreciation in real estate values or other social costs into the overall cost of such an accident? The papers reported doctors, hospitals and clinics seeing an increased number of people suffering from symptoms of stress and anxiety. It is expected that a few years and several million dollars will be involved in "decontaminating" the Three Mile Island plant. Lawsuits have been filed against the utility. This experience has certainly been costly in many ways—yet if we collectively learn from it, perhaps it has been worth the price of the lesson.

Four days after we left Philadelphia, we decided to return. The hydrogen bubble had been nearly eliminated, and the immediate danger of a meltdown or explosion seemed to be over. As I reflected on the feelings I experienced, a haunting memory from my childhood surfaced. In those days during the late fifties there was much dread about the Russians, their space program and The Bomb. In our elementary school—just as in thousands of schools throughout the country—we were

Map prepared in 1977 by L. Franklin Ramirez, designed by Mercedes Naveiro, Commissioned by Women Strike for Peace. Information from Another Mother for Peace. Reprinted with permission of Clergy and Laity Concerned.

regularly given "civil defense" drills. These consisted of either marching classrooms full of obedient and solemn children into the hallways where we opened our lockers and knelt with our heads inside them, or instructing us in crawling under our desks. In either case, the overall effect upon my eleven-year-old mind was a feeling of vulnerability, helplessness, being at the mercy of an invisible and frightening enemy. Impending doom. Many in my generation have grown up with this feeling. And yet, astonishing as it might seem, we needn't cast about outside our national borders to perceive an "unseen enemy." To a degree made remarkable by the Three Mile Island incident it is apparent to me that we've institutionalized just such a source of insecurity literally in our own backyards. In our thoughtless consumption of air conditioning, electric heating, more and more unnecessary and irrelevant electrical appliances (people did, after all, survive for thousands of years without electric toothbrushes and lawnmowers...) we've edged closer to the Faustian bargain of a nuclear-based energy system. How can we have come so far without really looking at the potential disruption to our social fabric?

I'm not sure, now that the risks are reduced, that we needed to leave Philadelphia when we did. I thank God that this accident was no worse than it was. Yet a few things seem quite apparent to me. We are not in a position to accept the assurances of utility company, nuclear industry and NRC spokespersons that the nuclear circumstances in which we live are "under control." Public confidence has been seriously undermined by the behavior of industry officials, and the public trust seriously violated. We should not be placing our present and future safety in the hands of those whose vested interests are an obvious priority, whose public relations images and profit margins matter more than the overall safety of those human beings who work for them or live nearby. It bears mentioning that electric power demand has been growing more slowly in recent years and the cost of building nuclear plants has escalated to a point where only a few each year are ordered (compared to twenty-six in 1974). Earlier orders are being canceled or deferred. It is to the credit of anti-nuclear activists that much of this slowdown is the result of long delays in building due to legal challenges by opponents. Precisely because we're still in a situation where things can be changed, this is *clearly* the time to act decisively for the future—to urge a moratorium on these "disasters waiting to happen" in our own backyards. The choice, though difficult, seems obvious: invest on a major scale in safe, decentralized, non-polluting technology or continue on down the path to ruin we're currently set upon. If ever there was a time to unite in support of the safety and welfare of our nation and our planet, it is now—before we have a full-scale disaster upon us, courtesy of the "peaceful atom." □

NUCLEAR POWER: UNSAFE!

by Chip Poston

Every degree of luxury hath some connection with evil.
—John Woolman

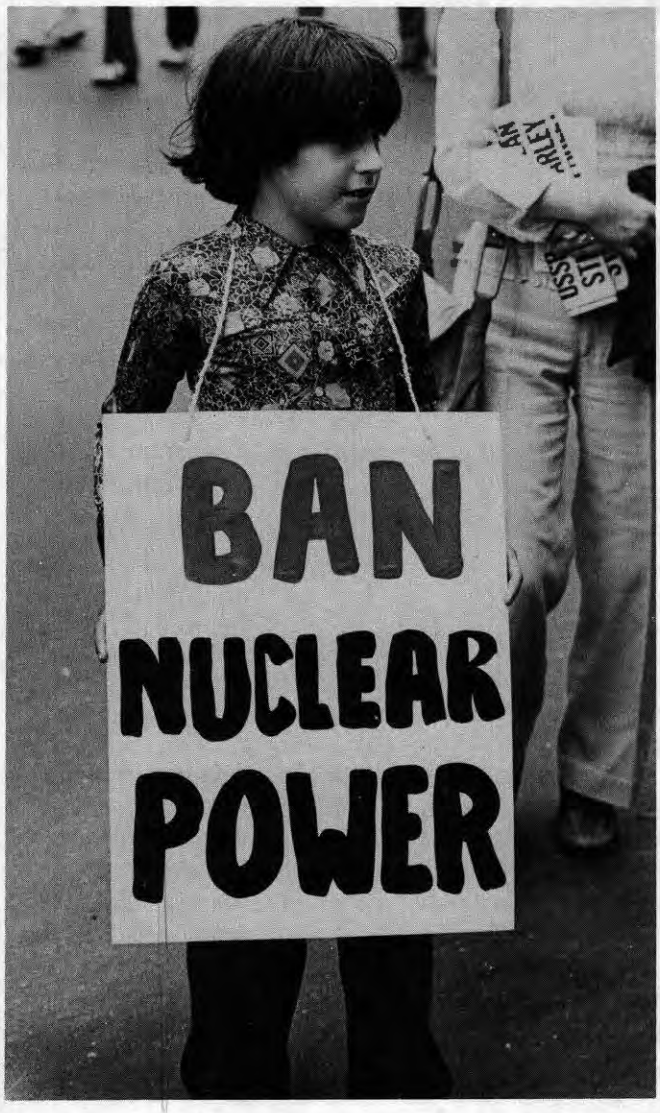
Every reasonable effort must be made to solve this problem that may be with us for a million years.
—Subcommittee on Environment, Energy, and Natural Resources in their report,
Nuclear Power Costs

Americans are energy addicts. We have more than we need, use more than we should, and want more than we have. Our unbounded pursuit of material luxuries has inevitably led to an energy shortage; energy awareness has exploded upon the national consciousness. Where we get it and how we use it threatens to become as controversial in this century as the question of slavery was in the last; and nowhere is the storm of controversy greater than that surrounding the issue of nuclear power generation.

History shows that nuclear energy was initially harnessed for destructive purposes. Only several years after Hiroshima and Nagasaki did the idea of a "peaceful atom" emerge, and public utilities remained skeptical until offered huge government subsidies, insurance protection, and the prospect of tremendous profits. The bad seed, however, did not bear good fruit, and the link between nuclear power and weapons is still apparent today.

A nuclear reactor can be used to generate either electricity or material for weapons, depending upon the inclination of its operators, and the U.S. has painfully discovered many reactors sold to aid developing countries are now being used to produce atomic bombs. Each 1,000 megawatt reactor contains as much radiation as 1,000 Hiroshima bombs, and produces enough plutonium annually to make forty atomic weapons.[1] Government

Chip Poston, currently "something of an apprentice farmer," describes himself as "servant, poet, Christian vagabond." Especially concerned about nuclear proliferation, he is a member of Asheville (NC) Meeting.



Geoff Tischbein

and industry would have us believe that nuclear power and weapons producers function entirely independently; yet of last year's $12.5 billion Department of Energy budget, over $2 billion was spent for atomic weapons.[2]

The prospect of a "meltdown," or major accident, at a nuclear power plant is staggering. According to a study prepared by the Brookhaven National Laboratory for the Atomic Energy Commission (and subsequently kept secret for eight years), a reactor's poisonous contents released into the atmosphere could leave 27,000 persons dead, 73,000 with severe radiation sickness, $17 billion in property damage, and an area the size of Pennsylvania contaminated and uninhabitable, perhaps indefinitely. Had it not been for the Price-Anderson Act, in which the government agreed to subsidize over four-fifths of the insurance costs for each nuclear power plant and set a claim ceiling of $560 million in case of a nuclear disaster, the industry would have been uninsurable from the outset.[3] Today, most homeowner's policies include a "nuclear exclusion" clause which denies individual compensation in the event of a "nuclear catastrophe." The nuclear industry likes to advertise its safety record; yet the Center for Science in the Public Interest reports that already there have been 10,000 disabling injuries at nuclear facilities, including 300 deaths; and at least twenty-six occasions when nuclear power systems have gone, at least temporarily, out of control. If the nuclear industry really is safe, why doesn't it accept full liability and financial responsibility for operation of commercial power plants?

Recent studies have revealed the danger of low-level radiation to be much greater than once believed. Radiation is cumulative in the human body, and any dose, no matter how small, is potentially dangerous. Yet the nuclear industry is predicated on the belief that there are so-called "safe" levels of radiation. Dr. Thomas Mancuso, who undertook an extensive study of the incidence of cancer among nuclear workers at the Hanford Reservation near Richland, Washington (where over half of this country's radioactive waste is stored), discovered an increased rate of cancer among the workers, and has since recommended that governmental levels of "safe" doses of radiation be reduced tenfold. The Atomic Energy Commission terminated funds for his research.

Dr. Rosalie Bertell, a senior cancer research scientist at Roswell Park Memorial Institute (NY), in studying a massive leukemia survey, discovered the most hazardous environmental aspect of the study was the effect on adults of ordinary diagnostic X-rays, previously considered harmless. In her opinion, "The health effects connected with radiation seem to be a *secondary* phenomenon, the primary one being the acceleration of the breakdown of the body, which is the aging process." Dr. Bertell estimates that exposure to one rad (the amount of radiation a person receives from a heavy abdominal or spinal X-ray) is comparable to about one year of natural aging. Her conclusions are painfully clear:

> *This is hard evidence; it's well documented. There's no question about it... The ordinary operation of a nuclear power plant is dangerous to the health of the people in the area, and it is dangerous to the health of the nuclear worker. That danger has been underestimated, and the research showing it has is being suppressed.*[4]

Human beings are more sensitive to radiation than any animal on Earth; women, more sensitive than men; infants and children the most sensitive of all. Yet each reactor daily releases carcinogenic (cancer-causing) and mutagenic (mutation-causing) effluent into the environment.[5]

In addition, there is the very serious problem of radioactive waste products, some of which remain dangerous for hundreds of thousands of years. Because of their extremely long-term toxicity, some nuclear wastes will need to be isolated, and presumably guarded, considerably longer than any human-made structure has ever survived. Yet already, after barely a quarter century

of waste storage, every method used to store radioactive materials has resulted in leaks or release of wastes into the environment.[6] At the Hanford Reservation, approximately 550,000 gallons of high-level radioactive liquids have seeped into the soil.[7] Even after conducting 5,615 studies, the Atomic Energy Commission and its successor, the Energy Research and Development Administration, have not been able to produce a workable technology for long-term storage or disposal of nuclear wastes.[8] Could it be that no such technology exists?

There is also the possibility of such material being lost or stolen; and indeed, 100 pounds of uranium and sixty pounds of plutonium are unaccounted for each year.[9] It takes only ten pounds of plutonium to make an atomic bomb. Dr. Helen Caldicott warns:

> *Two tons of weapons-grade materials are missing right now from the industries of this country, and it's thought that Israel stole enough to make fifteen to twenty bombs. If Israel can steal it, so can the PLO, so can the IRA, so can the Baader-Meinhof gang, so can any lunatic.*

Nor can the possibility of sabotage be discounted; threats against nuclear facilities number in the hundreds already, including three cases where bombs were successfully planted.[10] A primitive nuclear device exploded at a reactor or waste repository could cause one of the largest disasters in history.

Equally disturbing is the practice of dumping radioactive garbage directly into the soil, used in disposing of so-called intermediate and low-level wastes. A National Academy of Sciences investigative committee protested this procedure for ten years and, shortly before being disbanded by the AEC, declared:

> *...none of the major sites at which radioactive wastes are being stored or disposed of is geologically suitable for any manner of radioactive wastes other than very dilute, very low-level liquids.*[11]

The transportation of nuclear materials poses another grave public health threat. Presently there is no monitoring of such shipments once they are in transit; yet the U.S. Department of Transportation reports that between 1971-75 there were 144 accidents involving radioactive materials, thirty-six of which involved excessive radiation releases. State and local agencies are so woefully unprepared to deal with a serious accident involving radioactive materials that over forty municipalities, including New York City, have passed ordinances banning or restricting the shipment of high-level wastes.

Certainly nuclear power is no bargain financially. The Department of Energy estimates it will cost anywhere

Pete Seeger and others entertain outside the U.N. Special Session on Disarmament.

from $2 billion to $20 billion for the long-term storage of military wastes alone, an increase of 1,000 percent over its estimates of only six years ago. Yet the amounts of waste projected to be generated in the 1980s by commercial nuclear power each year, measured in terms of radioactivity, will be equivalent to the total military inventory.[12] It costs about $1 billion to construct a nuclear plant, but its lifespan is less than forty years, after which time the reactor will have to be decommissioned or dismantled, at a projected cost of 3 to 100 percent of the capital cost of the plant. However, as the House Subcommittee on Environment, Energy, and Natural Resource admits, "...these figures are all estimates...and no one really knows how much it will cost or who will pay the bill."

And the nuclear fuel cycle, while creating power, also consumes enormous amounts. The three government-owned uranium enrichment plants at Oak Ridge, Tennessee; Paducah, Kentucky; and Portsmouth, Ohio, for example, consume about three percent of the total electricity used in the United States.[14]

In testimony before the House Subcommittee exploring nuclear power costs, Saunders Miller said:

> *Consider that in 1975 dollars, $614 billion for plant and $62 billion for the support facilities of the nuclear fuel cycle—a total of $676 billion—is projected to be spent by the year 2000.... This compares with the estimated $160 billion figure for Vietnam, which merely culminated in double-digit inflation....*
>
> *On a national scale, the deleterious effects upon the economy could make the perturbations and inflation caused by the Vietnam War pale into insignificance.*

The Stockholm International Peace Research Institute has predicted that within a decade about thirty-five countries will be able to make atomic weapons, and that the spread of nuclear capability will be, in part, a consequence of "peaceful" nuclear programs. Through the international proliferation of nuclear energy, the technology and materials for manufacturing atomic weapons are becoming increasingly available. *Sojourners* editor Jim Wallis succintly states, "The United States has adopted a course for energy development which is suicidal, for us and for future generations. In the face of all this, the need for mass refusal and mass action is painfully clear."

The dangers of nuclear power generation are technically, medically, and economically complex; and in a sense, abstract. Radiation is invisible; cancers can remain latent for twenty-five years; transportation, storage, financial costs, genetic effects and nuclear proliferation are all difficulties which may largely be borne by our progeny. We should strive to remember that while nuclear weapons are built for destructive purposes, nuclear reactors are not. Scientists in the nuclear power industry are well-intentioned; the tragedy is that perceptions have been clouded by self-interest, and there is an unwillingness to admit that obvious hazards exist.

But whatever the answer to our energy problems may be, this thing is certain: nuclear power is not the answer. Alternative energy sources may seem promising, but it is crucial we realize our present consumption levels are far higher than the Earth can support. Over half the energy produced in the United States is wasted. Americans waste more fuel than is used by two-thirds of the global population. We have confused the "standard of living" with the quality of life. Our knowledge is our greatest wealth, yet we starve for lack of wisdom.

There is, as Gandhi said, "enough for everyone's need, but not enough for everyone's greed." Behold, Friends, energy use is a moral issue; and our call is to a radical simplicity (and efficiency), just as our forbears, for the sake of truth, were called to give up their slaves and the unnecessary luxuries which were a part of that life. It is more important than ever that our practice and conviction harmonize; our responsibility has never been greater. We are not only our lives, but the sum of all history, the future seed. And though we may not be the spiritual giants our forebears were, we stand (to paraphrase Vinoba) upon their shoulders; therefore we must see a little further than anyone has ever seen before. □

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[1] *Helen Caldicott, "Nuclear Madness,"* A New Age Special Report, *Spring, 1978, p. 26.*

[2] *Coalition for a New Foreign & Military Policy, brochure: "Your Taxes—Your Choice," 1978.*

[3] Nuclear Power Costs, *23rd report by the Committee on Government Operations, U.S. Government Printing Office, Washington, 1978, p. 46.*

[4] *Rob Wilson Okun, "Dr. Rosalie Bertell—A Scientist Speaks Out,"* A New Age Special Report, *Spring, 1978, pp. 53 and 60.*

[5] *Helen Caldicott,* Ibid., *p. 26.*

[6] *Chip Reynolds, "H.E.U. and You,"* Shared Plow, *December, 1978, p. 12.*

[7] Nuclear Power Costs, *p. 6.*

[8] Ibid., *p. 9.*

[9] *James K. Page, Jr., "Phenomena, comment and notes,"* Smithsonian, *August, 1977, p. 17.*

[10] Ibid.

[11] Citizen's Guide: The National Debate on the Handling of Radioactive Wastes from Nuclear Power Plants, *Natural Resources Defense Council, Inc., 664 Hamilton Avenue, Palo Alto, CA 94301, p. 32.)*

[12] Nuclear Power Costs, *p. 19.*

[13] Ibid., *p. 22.*

[14] Shared Plow, *p. 10.*

Another View Of Nuclear Power

by Victor C. Vaughen

During the past twenty years, I have worked directly with radioactive materials in the United States and in the Federal Republic of Germany. For the past ten years, my co-workers and I have been doing research and development work that should lead to the design and construction of a reprocessing plant for the spent fuels from power reactors. Our hot cell work has been directed at the fuel from each type of reactor generating, or proposed for, generating power in the U.S. Our goal is to discover how each fuel behaves, how the fission products behave, and to highlight the requirements which must be met by the designers of the plants to reprocess the fuel safely, to minimize the impact on the environment (which also minimizes the exposure of the population at large), and to reduce the occupational exposures as well.

Someone asked me recently, "How can you, as a Quaker, do this kind of work?" I was astounded by the question, since, as I see it, my work is akin to converting a sword into a plowshare.

In the early days of my career, I felt that success in this field would be a great boon to humanity: to turn the awesome energies of the atom to its service would provide freedom from energy hunger essentially forever. Today, this sounds very naive, but I still have the desire to work toward a better world in which to live. To me, energy is the work horse that eases the burden of heavy physical work. Energy allows the individual to provide for her or his family's needs and have time left over. Energy allows our society to satisfy its own survival needs and to provide for the needs of others. Energy allows us to create, to build, to transform, to transport, to improve, to recycle, and to grow.

I have a concern for the future of our country. We are going through a period of rapid changes in our society, in our commerce, and in our position in world affairs, and we shall need to accommodate more changes in the near future. People, in thinking about what is wrong with the U.S. today, are reaching for a better tomorrow.

I am concerned about that tomorrow because we may reach a catastrophe before we get there. Energy is like a bicycle that the U.S. is riding. It is one thing to guide the progress of a bicycle by smooth turns of the wheel and judicious applications of power or of braking actions. It is another situation entirely to shove a stick in the spokes, then pick up the pieces and start off in a new direction. I feel the push of both of these philosophies in today's events. I would like to see us keep our balance.

I share a concern that a global energy crisis looms on the horizon. This future crisis will be the result of many factors, including population growth, the desire for increasing standards of living among the poor of all nations, and decreasing conventional supplies. While I am of the opinion that unlimited growth cannot be sustained, much of the growth projected for the U.S. (and the world) is built into the system by the persons already here. The overall U.S. population is expected to stabilize at about 315 million persons over the next twenty-five to fifty years, assuming that the birth rate will stabilize at the replacement rate. If we project a constant requirement for energy per person, the U.S. will need to have about forty percent more energy in 2025 than we use today. This projected constant requirement, of course, implies a somewhat lowered standard of living, since more energy will be used for pollution abatement, recycling of materials, and working of lower grade sources of materials.

On a global scale, the world population is expected to double by 2025, and the global energy demand is expected to quadruple over this period. The energy demand per capita in the developing nations is expected to increase by almost a factor of ten. In 2025, the projected U.S. demand will be only about ten percent of the global energy demand.[1]

Solar energy has been described in glowing terms as the energy source of the future. I believe that solar can supply a good fraction of our future energy needs, but to bring it to fruition, one must have energy to work the materials needed for the solar energy devices. We cannot afford to throw away our energy production capacity before we have demonstrated that we no longer need to maintain it.

If one does not project a drastic reduction in population or an extreme downward change in life style[2] (or both), one must project an increasing world energy demand. To supply that demand, I believe that energy from all sources will be required for the transition period between now and about 2025, when inexhaustible energy sources (including electricity from the breeder and fusion reactors) could be in place.

Victor Vaughen holds degrees in Chemistry from Stetson University and Chemical Engineering from MIT. Currently working at Oak Ridge, he is a member of West Knoxville (TN) Meeting where he has been co-clerk and treasurer.

I have found that Quakerism and science are compatible. In each the search for truth is the paramount driving force. In science, one gathers facts, assembles them into hypotheses, and tests the hypotheses by using them to predict new facts. If there is agreement between the new observations and the predictions, one gains confidence in the hypotheses. Besides this empirical approach, there is a theoretical approach. In this, one accumulates a quantity of "first principles" by sifting out the general truths and laws and applying them in new ways to generate new hypotheses. As before, these must stand the tests of time and be able to predict future results to be accepted into the body of knowledge. Finally, there is inspiration. Most scientists believe that inspiration comes to the prepared mind.

In Quakerism, the search for truth is carried out in a similar fashion. In addition to personal experience and collected wisdom, the Inner Light is the inspiration which guides each person. When there is a disparity between the outward life and the Inner Light, the person is left unsettled. A scientist is troubled in much the same way when her or his search is in its early stages. It is common for the seeker and scientist to spend years searching and testing before finding and proclaiming truth to the world.

I am disturbed by recent events that indicate that the careful search for the truth with regard to nuclear power is being replaced by adversary stances in which polemic arguments laced with half-truths are used. This is neither a Quakerly nor a scientific approach. As my friends in the computer field say, no matter what process is used to make a decision, if the information coming in is garbage, the outcome will be garbage.

I feel at home with the atom in the same way I feel at home in a woodworking shop. One can make beautiful and useful things in a woodworking shop, but one cannot relax one's vigilance without risking an accident. In the workshop, I accept the risk because I find the benefits to be of value. I categorize the extent of the more numerous minor injuries as being of limited consequence, while I take care to make the probabilities of serious injury very small. I believe that this serious attitude towards safety on the job is reflected in the unsurpassed safety record of the nuclear industry with regard to its industrial as well as its nuclear safety.[3]

There has been a great deal of publicity recently about the alleged excessive health hazards due to low-level radiation. Because many of the persons in my group work in low-level radiation fields, as I have in the past, I began to follow the literature in the field. (After all, if the internationally accepted radiation guidelines are wrong, we want to be the first to know!)

The effects of radiation have been studied from the earliest days of the first artificially produced radiation: the X-ray (ca. 1895). In those days, one needed to expose and develop photographic plates to measure the quantity of radiation. We now have very sensitive instruments to accomplish this. The health effects were soon noticed, initially by burns and later by changes in blood chemistry and the occurrence of radiation sickness and leukemia. As more information was obtained, more restrictions were recommended. I remember, as a boy, looking through my feet in a shoe store flouroscope to see how well the shoes fit. This is now unthinkable because of the limits placed on radiation exposures.

We live in a sea of radiation.[4] The human race has always been subjected to radiation. The natural radiation environment is composed of cosmic rays and their activation products (for example, carbon-14), as well as naturally occurring elements such as uranium, thorium, and their products. Our bodies are naturally radioactive with potassium-40.

The estimates for the average background radiation from natural sources range from about 100-200 millirem per person per year in the U.S. If you live or work in a granite building, or if you spend much time at high altitudes, such as living in Denver, Colorado, or flying in jet planes, you will receive more radiation. Some parts of the world have much higher background radiation levels than the U.S., up to about 1,000 millirems per year. Some of the lowest levels of background radiation are measured on the ice caps.

Since we cannot escape the background radiation, we cannot determine exactly what effect it has on people (and other things). If we could set up a controlled experiment with two balanced populations living otherwise identical lives, one population in a radiation-free environment, the other on Earth, we could probably separate out the effects of background radiation in producing cancer. We could determine statistically how many of the roughly 400,000 cancer deaths now occurring each year in the U.S. were caused by the background radiation field. Even following the hypothetical populations for many generations, however, would not tell us how the mutations due to the background radiation level have changed the living things on Earth as they have adapted and evolved since life began. One is left with the unavoidable conclusion that we must accept background radiation and its variability as part of our natural environment, just as we do green grass and blue skies.

I am not saying that radiation is beneficial to life. It is considered harmful, but the harm it causes is not an abrupt function; one does not pass through a dangerous transition by being exposed to a small amount of radiation. It is not like taking one more step and falling off the edge of a cliff. The effects of low-level radiation are cumulative; the more radiation exposure one accumulates the more prone one becomes to cancer caused by radiation. If you routinely eat too much and

exercise too little, you will become more prone to various diseases and an early death from a heart attack. Even if you eat sensibly and exercise regularly, you may still experience these diseases or death by heart attack, because diet and exercise are not the only causes.

The exposure to background radiation accumulates in every person. People do not refuse to work in Denver or fly in a jet plane because they are concerned about the effects of the extra radiation they will receive. They do not refuse radiation treatments for cancer because radiation causes cancer. People balance risks with benefits. The benefits and risks of electricity are considered every time someone turns on a switch or plugs in an appliance.

There is another concern about the biological effects of radiation, mutation, and genetic change. The hypothetical population living in a radiation-free environment, described above, would probably not notice much decrease in the mutation rate and genetic change; genes also mutate spontaneously.

The philosophy of radiation protection is based on a relative comparison between a given standard and the natural background with its variations (100-200 mrem/year). For example, the release limits for nuclear plants are set at about four to five percent of the natural background (approximately five millirem per year), measured at the site boundary fence (the highest dose position for the population at large). The actual releases are smaller than this value. Thus, one could expect the additional radiation effect at the site of a nuclear power plant to be less than four to five percent of those due to natural background radiation. This amount of radiation makes so small a contribution to cancer, compared to the large effects from other cancer causes (such as cigarettes, alcohol, chemicals, X-ray medical exposures, and the variation of background radiation throughout the U.S.), that it would be impossible to prove by experiment that the reactor caused any radiation effects. However, the effects may be calculated, using the linear hypothesis. Since all the U.S. population does not live at the site boundary of a nuclear plant, it is instructive to base the cancer effects calculations on the population down-wind from a single reactor generating 1000 megawatts of electricity. Ellet and Richardson[5] have calculated that on this basis about one cancer death may occur per year per reactor in the U.S. This value is based on the entire fuel cycle, but it omits any contribution from waste disposal. There is the equivalent of about sixty reactors now operating in the U.S. A report by Inhaber[6] compares the risks of various methods of generating power.

The people who have been working on the isolation of nuclear wastes must be exasperated at this point. One hears that the government has not "solved" waste problems, even after all these years. Yet, a demonstration that the isolation and storage of nuclear wastes could be done safely has been about to take place several times. What happened?

The theory of waste isolation appears simple enough. One stores the high level wastes until the heat generation rate is low enough, converts the wastes to some solid form, incorporates these solids in a binding matrix to reduce the leachability of the radioactive species should water reach them (movement by water is the most credible way the long-lived hazardous materials can escape the repository in significant quantities), puts the solids into safe transport containers, and emplaces the containers in an engineered repository located on one of several types of inaccessible, dry, geologically stable places. This would combine a series of barriers, some natural, some engineered, between the wastes and the biosphere, which would keep the wastes isolated indefinitely. And finally, in the very unlikely case that the first choice of places was wrong, one would provide for recovery of the waste containers so that they might be transferred to another repository.

The technological development appeared to be working. Waste types of every conceivable kind were studied on the laboratory scale to find suitable waste storage forms. Water leaching rates were determined. Engineering scale equipment was operated to find suitable large-scale waste treatment processes. Relatively inexpensive containers were developed. Transportation safety was demonstrated. An office of waste isolation was established to select and build demonstration waste storage sites in several kinds of geological formations (salt, volcanic rock, and granite) in several locations in the U.S.

Perhaps it went too well. The problems were thought to be all technological. The demonstration phases never quite made it, usually due to funding reductions at crucial times.

Around 1970, the ground rules changed. Impact statements were called for, intervenors challenged the safety of waste isolation and storage on the basis that it had not been demonstrated, specific safety concerns were brought up, politicians and the public raised an outcry about nuclear storage dumps being forced on them without their approval, and the fears and uncertainties about caring for and ensuring waste isolation for up to 250,000 years combined to bring on the present situation.

Several recent studies have come to the conclusion that the technology for safe waste isolation and storage exists, but that it must be demonstrated. I question whether, in today's adversary climate, a demonstration repository has a chance of surviving the hearings and delays certain to be in store, regardless of its technical merits. This is especially regrettable, since the vast bulk of the wastes now on hand have come from the defense efforts. These

will pose continued risks, the longer their final disposition is delayed.

I voiced a concern in meeting for worship about the use of the one-sided approach, especially by Quaker-sponsored groups. (See box on Quaker half-truths.) A Friend spoke, saying that it might be best to know only one side of an issue, in order that the goal be pursued with vigor. Knowing all sides on an important issue tends to diffuse the focus and prevent concerted action. (Perhaps one reason why Quakers are so inefficient in getting business done is that they look at all sides and are willing to get confused for awhile.)

Another Friend came up to me after the meeting and said that he was not anti-nuclear power, *per se,* but the many questions raised about the safety aspects convinced him we should not proceed with it until these questions are answered. When I pointed out that perhaps the one-sided views he was receiving were deceiving him as to the real state of the art on nuclear safety, he said, "But how am I to know? I am not a scientist."

How, then, can you evaluate the truth of what you read or hear? What can you believe, what should you distrust? You could count the pros and cons and side with the majority, or you could separate the true experts and take their stance, if they agree. However, these approaches leave out something: the common sense, ability, and judgment of each person.

You can evaluate the information, but you must get directly involved; you have to search out information representing all significant sides of the issue to obtain some balance. Examine the evidence and test it by asking a few questions of a general nature: What are the author's credentials? Does the author point out some of the complexities, subtleties and uncertainties, or does she or he present a cut-and-dried case? Does the significance of some of the information come from the presented material, or does the author have to explain every conclusion? Do the conclusions seem reasonable? Are other conclusions just as reasonable? What are the possible outcomes if we accept these conclusions? Is the amount of explanation in balance with the amount of information? Is your final impression one of understanding, or of fear?

Finally, do a followup: read the new literature that is generated in confirmation or rebuttal. (See box on the Mancuso report.) Talk with knowledgeable persons on each side of an issue, and have faith in the basic goodness of people.

The hazards of radiation are real, but not as extreme as popularly portrayed. I believe that nuclear power can be used with safety and due regard for future generations.

I have presented my views in the hopes that by looking at another view of nuclear power, the overall understanding will be increased. I speak in support of the heated discussions, the stimulating consideration and reconsideration of the information spread around in a group, but I speak against the kind of commitment that forces one to resort to un-Quakerly or unscientific means to attain that goal.

I hope we can work toward a choice based not on fear, false information, or utopian dreams, but on an understanding of the facts, the risks, and the benefits. □

One Example of a Quaker-Sponsored Half-Truth

During the discussion about the safety of transportation at a recent AFSC-sponsored workshop, a speaker stated that the transportation of nuclear materials was unsafe, and an example was given. A truck had overturned on the expressway and spilled tons of "yellow cake" all over the highway. It was suggested to the attenders at the workshop that this example of "unsafe" transportation be cited as evidence that the transportation of all nuclear materials was unsafe.

I spoke of this example as being misleading to uninformed persons, both as an exaggeration of the hazards of "yellow cake," and as to the implied hazard of the transport of other nuclear materials. I explained that "yellow cake" is a natural uranium compound with very low radioactivity. It is considered dangerous more from the standpoint of heavy metal poisoning, similar to the hazard from lead compounds, than as a source of radiation. The classes of radioactive packaging are set according to the degree of hazard, and it is not considered very hazardous to ship "yellow cake" in bulk. In addition, packages for small quantities of radioactive materials do not need to meet the stringent requirements set up for spent fuel elements.

In the discussion that followed, it became clear that the speaker was familiar with the hazards of "yellow cake" and with the details of the packaging and transportation regulations for different classes of radioactive materials. I could only conclude that he considered it sufficient for his purposes to present only part of the information, as described above.

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[1] *Ralph Rotty, "The Global CO_2 Problem," paper presented at the WATTec Conference, Knoxville, TN Feb. 23, 1979.*

[2] *M.M. Maxey, "Nuclear Energy Politics: Moralism vs Ethics," Reprint No. 1, Ethics and Public Policy Center, 1211 Connecticut Avenue, N.W., Washington, D.C. 20036 ($0.50).*

[3] *Since I wrote this article, there has been a serious accident at the Three Mile Island nuclear plant, near Harrisburg, Pennsylvania. It will be some time before the sequence of events that led to the accident and the final effects are known. Until then, I must reserve judgment about the correctness of this statement.*

[4] *Pollard has written about the theology of nuclear energy in the universe. W.G. Pollard, "A Theological View of Nuclear Energy," Nuclear News 22 (2), 79-83 (February 1979).*

[5] *W.H.M. Ellet and A.C.B. Richardson, "Estimates of the Cancer Risk due to Nuclear Electric Power Generation," Origin of Human Cancer, Cold Springs Harbor Laboratory (1977).*

[6] *H. Inhaber, "Risk with Energy from Conventional and Nonconventional Sources," Science 203, 718-23 (February 1979).*

[7] *Dates and details taken from a Press Brief conducted by Dr. Sydney Marks, on the Mancuso presentation, Pacific Northwest Laboratories, Richland, Washington, November 1977.*

[8] *T.F. Mancuso, A. Stewart, and G. Kneale, "Radiation Exposures of Hanford Workers Dying from Cancer and Other Causes," Health Physics 33, 369-85 (November 1977).*

[9] *B.S. Sanders, "Low-Level Radiation and Cancer Deaths," Health Physics 34, 521-38 (June 1978).*

[10] *T.W. Anderson, "Radiation Exposures of Hanford Workers: A Critique of the Mancuso, Stewart, and Kneale Report," Health Physics 35, 743-50 (December 1978).*

[11] *Letters to the Editor, in Health Physics, Pergamon Press:*

a. Comment on "Radiation Exposures of Hanford Workers Dying from Cancer and Other Causes," T. Samuel, August 1978, p. 432.
b. Some major statistical comments on "Radioation Exposures, etc.," S.M. Gertz, November 1978, pp. 723-24.
c. Response to (b), by G.W. Kneale, A.M. Stewart, T.F. Mancuso, January 1979, p. 87.

An Example of the Follow-up of a Scientific Publication: The Mancuso Report

A continuing study has been funded by Congress since 1964 specifically to establish whether significant levels of excess mortality could be attributed to the effects of occupational radiation exposure.

The initial intent of the study was to perform a "benchmark" study, in other words, a classic in its field, with all causative factors carefully taken into account. The first principal investigator was Dr. T. F. Mancuso. He collected epidemiological data on all workers (men and women) from the Hanford Atomic Plant, the Oak Ridge National Laboratory and other government nuclear installations. Death statistics were collected as they became available.

Until the summer of 1976, Mancuso consistently reported to the USAEC and USERDA that his results were not suitable for publication, apparently wanting more data before presenting even preliminary findings. In October, 1976, a paper was presented at the Health Physics Society Meeting, followed in November, 1977, by a published death rate study* based only on deceased white males who had worked at the Hanford Atomic Plant.[8] The majority of the data on hand were ignored. This study claimed to have found excessively high cancer death rates from exposure to low levels of radiation. It was widely publicized and immediately became a hot topic in the debate about the safety of nuclear power. It still is a hot topic.

The sudden "discovery" that low levels of ionizing radiation were "far more" hazardous than expected did not go long without challenges. Several rebuttals followed Mancuso's paper in the same journal.[9-11]

Anderson[10] did a thorough re-analysis of Mancuso's paper after seeking clarification from Mancuso's co-authors. Anderson found that liberties had been taken in the calculations of very precisely defined correlating relationships, with the effect that the final values quoted in the Mancuso paper were incorrect. When these values were recalculated by the standard methods, the incidence of leukemia (a known radiation-induced cancer) was found to be excessively low for the irradiated group, with only about fifteen of an expected thirty-two cases found. Two rare types of cancers, neither especially linked to radiation, were found to be slightly more prevalent in the irradiated group, while the others were below normal.

While it would be foolish to suggest that radiation reduced the incidence of leukemia or some of the other cancers, one is bound to say that a slightly greater rate could be caused by radiation exposure or by some other factor that may occur with radiation exposure.

A careful follow-up study was recommended to determine if the suspected increase in rate of the two types of rare cancers could be confirmed, and the causes, if any, definitely proved.

* A death rate, or proportional mortality, study is selected for rapidly screening information from death certificates for clues as to possible common causes of death when an unusual number of deaths is suspected or observed. These leads are followed by careful studies to establish (prove) the causes for any excess mortality so that corrective action can be taken.

Barbara Benton

Is Nuclear Power Safe?

by Ann Morrissett Davidon

It is important that the arguments for and against nuclear power be stated as accurately and concisely as possible, so that the general public will know what the crucial issues are and not be confused by partisans with vested interests. The "vested interests" are obviously more on the side of those in the nuclear industry, since so much money has now been spent in development and construction. As with the Vietnam War, the tendency is to keep pouring resources where they have already been going in order to try to recoup or justify earlier investments. But nuclear proponents also believe that—with the looming depletion and difficulties of other energy sources like oil and coal, and despite the near catastrophe at Three Mile Island—nuclear power is still the cleanest, cheapest, and most efficient of presently-developed possibilities.

There are "vested interests" among nuclear opponents, too, but these material concerns are of a somewhat different nature. Environmentalists, from whom the early impetus came against nuclear power, have long been concerned about its ecological effects. Peace activists too, of course, have long been protesting the environmental effects of nuclear bomb testing, not to mention the devastating effects a nuclear war might have. The main dangers usually cited against nuclear power are: thermal pollution and low-level radiation emissions, threatening the ecological balance as well as human life; radioactive wastes, for which no safe permanent storage has yet been found; the possibility—considered remote until Three Mile Island—of a major accident, especially a reactor core meltdown, emitting vast amounts of lethal and long-lasting radiation into surrounding areas; theft, sabotage and blackmail; radioactive contamination and dissemination risks in mining, transportation, and other processes in the nuclear fuel cycle.

The nuclear power proponent seems to knock off these arguments with ease: All energy production generates heat which changes the ecological balance, so why pick on nuclear power? As to low-level radiation, it is all around us, human-made and natural; the small amount escaping from nuclear power plants is negligible compared to the dangerous amounts people expose themselves to every year from medical and dental X-rays,

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among other radiation sources. Scientists are working on the problem of safely storing radioactive wastes; no provable human or environmental damage of any significance has yet occurred, and by the time wastes become a larger threat, we probably will have solved the storage problem. The safety measures taken in nuclear power plants are so much more strict and rigorous than in any other industry, the chances of a major accident are almost nil. Even Three Mile Island is evidence of the safety of nuclear power as compared to oil and coal: no one has yet been killed in a nuclear power accident. The precautions and security measures taken in nuclear power plants make theft, sabotage and blackmail almost impossible. The dangers in mining, transportation, etc. are fewer than in other energy industries because nuclear fuel is "cleaner" and greater precautions are taken.

Environmentalists point out many loopholes in these responses. The fact that nuclear power is usually produced on a larger scale than other energy processes means that more heat is emitted and the ecological balance is more affected. Accidents can cause, and have caused, dangerous leakages of radioactive particles into the air, earth and water, the effects of which are not easily or immediately accessible. Even the low-level radiation normally emitted by nuclear power plants can be harmful, as recent studies have indicated, so to argue that X-rays and other radiation sources are more dangerous begs the question. Do we advocate air pollution because more people are killed by smoking?

The problem of safe storage is now recognized as much more serious than it was first considered to be. Thermally and radioactively hot spent fuel rods sit in cooling tanks in the vicinity of nuclear plants whose operators seek increasing space in which to put them. These rods contain biologically dangerous radioactive materials including strontium 90, iodine 131, cesium 137, and plutonium. Still more dangerous are the radioactive wastes left from reprocessing which must be stored in containers and locations in which there is no possibility of leakage, as they contain some plutonium (whose half-life is 24,400 years) and other highly toxic radio-nuclids. According to Dr. Helen Caldicott, a physician who has specialized in the medical effects of radiation:

> *Every month numerous leaks of radioactive wastes are reported in the U.S. in quantities from several gallons to 200,000 gallons. When this dangerous fluid leaks, it will inevitably contaminate the water system of the planet, and the various elements are taken up by the food cycle. Radioactive iodine, strontium 90, and cesium are absorbed by roots of grass and vegetables and are further concentrated in the flesh and milk of animals when they eat the grass. Iodine 131, strontium 90 and plutonium are concentrated in milk, both human and animal. Cesium is concentrated in muscle (meat) and plutonium is also concentrated 1,000 times in fish compared to the background water concentration.*

The Union of Concerned Scientists points out that in the U.S. alone there are more than seventy-five million gallons of high-level nuclear wastes (much of it from nuclear weapons production). If nuclear power industry plans are carried out, we will have accumulated 90,000 *tons* within two more decades. These wastes will remain deadly for at least a quarter of a million years. In 1975 over 2,000 biologists, chemists, engineers and other scientists urged drastic reduction of nuclear power plant construction at least until "major progress is achieved in the required research and in resolving present controversies about safety, waste disposal, and plutonium safeguards." The fact is that no permanently safe storage method is yet in sight.

Meanwhile, leakages continue, and radioactive dumping is discovered at sites such as West Valley, New York, where Getty Oil abandoned a nuclear fuel reprocessing plant when new safety standards became too expensive. Six hundred thousand gallons of nuclear waste were left for New York State to try to clean up, at undetermined costs to health and to taxpayers.

And what about plants too "hot" to continue operating? Every nuclear power plant eventually meets this fate and, along with spent fuel rods and radioactive wastes, must be sealed off from human access.

Long-range effects of radiation and radioactive contamination, to which workers in the industry are particularly liable, are not yet fully known. So far the percentage of accidents, cancers and other illnesses directly related to the nuclear industry are cited as lower than in the oil and coal industries, but overall long-range medical and genetic effects have not been calculated. According to Helen Caldicott, up to twenty percent of uranium miners have died of lung cancer over a twenty-year period of mining. Workers in nuclear plants are released after a critical amount of radiation exposure. Comprehensive studies have not been made of their later work or health records. We do know that leukemia and other cancerous conditions are higher among those exposed to radiation in nuclear test site areas and in the vicinity of nuclear plants, though these figures are disputed by those who argue that other pollution factors enter into such calculations. At any rate, with continued and increased nuclear production, resultant illnesses or accidents in the nuclear industry will, because of long-range radiation effects, increase and will be more difficult to remedy than the illnesses and accidents occurring in other industries.

As to major accidents, we have now seen in Three Mile Island that they are not so remote. While it may be true

that a fully catastrophic accident is extremely unlikely, when it does occur—as it eventually must, sooner or later, by the law of averages—it will be much more devastating, far reaching, and irreversible than any oil spill or mine cave-in, any explosion of oil tanks or coal gas. As MIT physicist Victor Weisskopf pointed out in 1968 in *Physics Today:*

> *Since the yield per atom is so many millions of times higher than in any conventional way of producing power, the consequences of accidents caused by human error are much worse. Although a nuclear power station cannot explode like a bomb, it can spread large amounts of radioactivity in accidents which cannot be completely excluded.*

In any case, nuclear opponents do not advocate oil and coal as alternatives: they urge the development of solar and other energy sources which are abundant in nature (wind, subterranean heat, vegetation) and available to all through solar and other devices which can be utilized in homes, buildings and factories. They say that these methods, plus conservation of energy which we now waste profusely, could decentralize the power industry, decrease the dangers and dependency, benefit small businesses, create more jobs, and provide safe, clean, cheap, reliable and renewable energy which is not susceptible to disastrous accidents, blackmail or sabotage, or theft of lethal materials.

It is this last consideration that most troubles some nuclear opponents. The much-touted precautions taken by the nuclear industry against diversion of fissionable materials are not 100 percent foolproof, and already there have been alarming disappearances of such materials. Helen Caldicott states that there are now two *tons* of plutonium unaccounted for by inaccurate records, loss within nuclear plants, etc. And what does all this say for the "security" of the nuclear industry, quite apart from its *deliberate* promotion of nuclear technology around the world?

One can go on with this dialogue perhaps indefinitely. Nuclear proponents can point out the costs and technical problems of solar energy, especially produced on a large scale. Nuclear opponents can cite the costs and technical problems of nuclear energy—not only in its radioactive wastes, but also in the vast wastes of energy in our society which create the "need" for such a centralized and intensive technology.

But the main dangers inherent in nuclear technology probably lie more in social-political considerations than in strictly technical ones. The primary danger engendered is the increased probability of nuclear war. Although some nuclear proponents argue that there is no more connection between nuclear power and the nuclear bomb than there is between electricity and the electric chair, it is not the electric chair which is threatening to annihilate civilization, but nuclear bombs. Materials for making nuclear weapons are becoming increasingly available as nuclear technology spreads, and the technology itself enables increasing numbers of nations—and technicians—to produce and "perfect" nuclear weapons. To quote Victor Weisskopf, former director-general of the European Center of Nuclear Research,

> *Even the detonation of a single weapon of modern design over a city would be a catastrophe unprecedented in human history. Yet these two large countries, [the U.S. and USSR] keep assembling more and more of these horrendous means of annihilation, knowing well that any use of these devilish gadgets would mean certain destruction of a large part of the world, making it unfit for habitation, with little chance of a recovery of civilization. . . . It is the apotheosis of irrationality and antilogic—the triumph of madness.*

As nuclear power affects us now, even without consideration of nuclear war, the social effects are increasingly dangerous. Crucial decisions concerning production, safety, security, use of byproducts, disposal of wastes, etc. are in the hands of relatively few people (whether in private enterprise or government). Safeguards against theft and sabotage require extensive policing, which already has been inadequate in preventing disappearance of radioactive and fissionable materials from nuclear industries such as Kerr-McGee. A nuclear-powered economy, as Dorothy Zinberg wrote in the January 1979 *Bulletin of the Atomic Scientists,* will inevitably bring us "more governmental control of material and human beings than ever before." Even now, files and photos are kept of open, nonviolent nuclear opponents by police and corporation security units—while covert diversion of materials, possibly by foreign government agents, are reported by the press and remain unsolved.

A society dependent on nuclear power is also more vulnerable to major dislocations. Nuclear production is capital-intensive rather than labor-intensive, meaning that those who have the money are in control, while fewer jobs are produced. Also, if failure or even a limited nuclear accident or shutdown occurs, entire areas dependent on the plant can be deprived of heat, light, and movement—elevators, escalators, assembly belts, typewriters, clocks, radios, (and even of air, in sealed, totally air-conditioned buildings!). This is true now, of course, with the present centralization of power utilities, but would be even more so with extensive highly-centralized nuclear power. The costs of any disfunctioning are, of course, enormous and inevitably passed on to the consumer and taxpayer.

While nuclear power plants are built like fortresses,

they are not totally impregnable. Apart from the possibilities of minor or major accidents and sabotage by workers, nuclear stations have been built near geological faults and earthquake-prone areas in California and in the Delaware Bay vicinity (no area is, in fact, completely earthquake-proof). Recently the Nuclear Regulatory Commission repudiated its 1975 statement that the chance of a serious accident at a nuclear reactor was as unlikely as a meteor striking a large city. Whatever the increased chances are now likened to, they need not be confined to celestial events: in 1970 a B-52 bomber, on a simulated bombing run, crashed about a mile from the fourth nuclear power plant built in the nation, at Big Rock in Michigan. (This plant, the first of two licensed to use plutonium, has also been found to have leakage of radioactive material.) In this regard, it is important to keep in mind that if Europe had been dependent on nuclear power during World War II, today it would still be an uninhabitable pile of radioactive rubble.

Finally, nuclear proponents argue that nuclear *fusion* will solve many of the present problems; it will be safer, cleaner, more efficient, etc. It is true that hydrogen is more abundant than uranium, and produces less radioactive waste. But it produces more neutrons for a given amount of energy, which are available for producing radioactive materials and nuclear weapons. And most of the cautions and dangers already cited also apply to nuclear fusion (basically the combining rather than splitting of atoms, as in the hydrogen bomb). In addition, the fusion process is unlikely to be accessible for decades, and is so complex and costly that even a portion of the money and resources being spent on its research and development could revolutionize the solar industry—and produce more jobs.

The sun and other abundant renewable energy sources are not all we have to draw on: there is also untapped human energy. This is latent in all unemployed, underemployed, and exercise-seeking human beings. It may be facetious to suggest that all the millions of joggers across the nation hitch themselves up to some energy device. (One family reportedly hooked up its television set to a wheel that must be pedaled to produce the TV's electricity!) But it is deadly serious that a better use and distribution of all our energy sources—human and mechanical—must be found if we are to survive. Beyond conserving natural resources and curtailing the great waste we indulge in, we must develop energy processes which produce safe, meaningful jobs; which decentralize rather than concentrate industry; which do not produce deadly by-products and wastes; and which are renewable and less vulnerable to sabotage, theft, catastrophic accident or attack, or misuse for destructive purposes. The nuclear industry scores lowest on all these counts. It is clearly time for a change. □

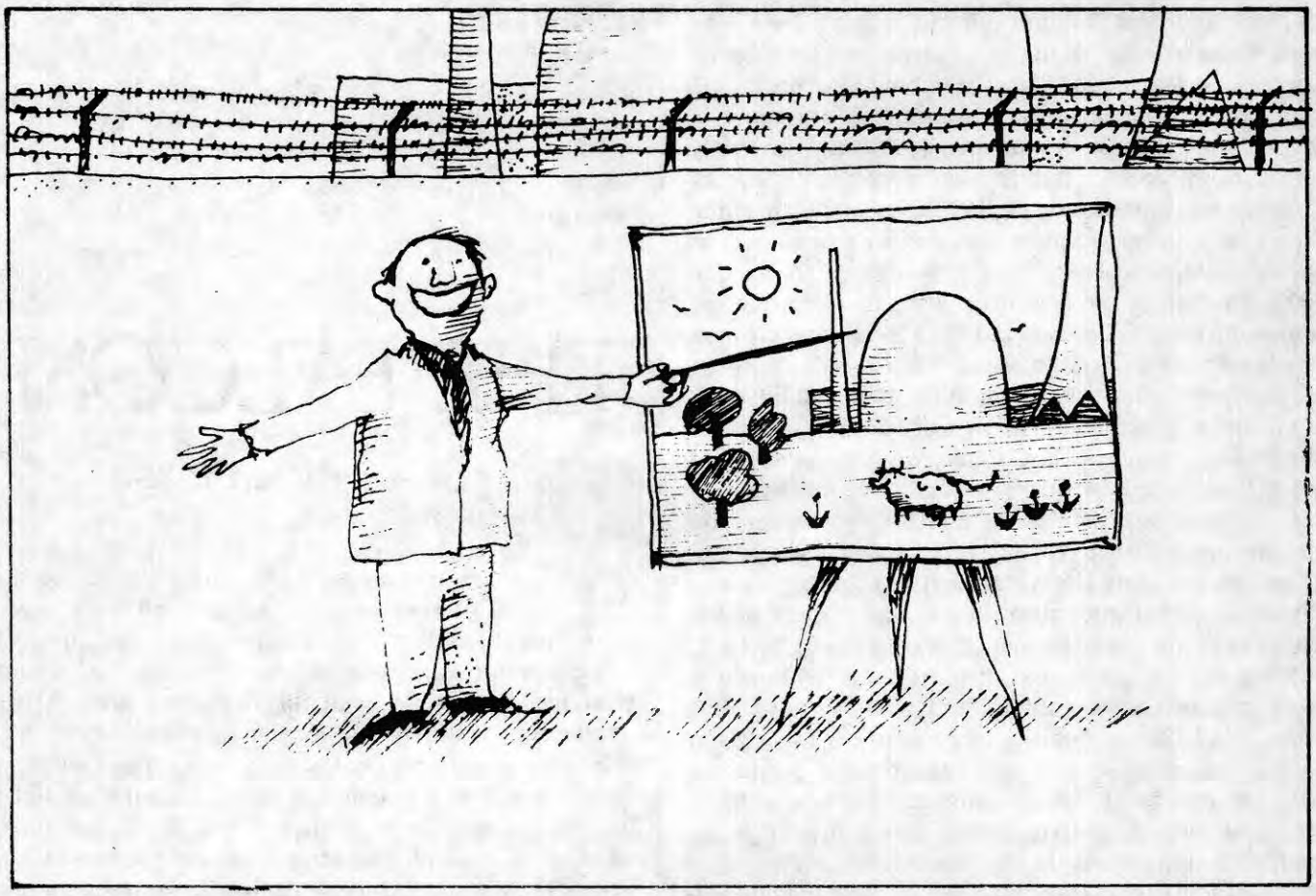
THE FALCON

by Sara Seem Rittenhouse

The overwhelming need for a right sharing of the world's resources confronts us from every newspaper headline and television newscast. Some of us are more conscious of how much energy our conveniences cost. We carpool. We don't give electric appliances for Christmas. We hang our laundry to dry. We turn down the thermostat, chop wood, and invest in long-johns. Yet, watching the faces of hunger in India and Africa and the grim faces behind the Asian guns, hearing righteous phrases across conference tables and in Senate chambers, we come to realize our gestures are just that. The love and concern through which we testify to that of God in every person have not yet reached enough of these faces to make a real difference in their collective lives. The policies which affect their future, and in which we participate, are somehow beyond our influence. That this is so is no excuse for not trying, but rather shows a need to do more, on a corporate as well as individual level, to enable our institutions to better express their original purposes. In Yeats' poetic words: "Turning and turning in the widening gyre, the falcon cannot hear the falconer." We must bring it down and give more thought and time to re-training.

I know of no better example of this situation than the present controversy over nuclear power. A promise of great benefit has now been shown to be an equal or greater threat of grave danger. Our government, charged with the responsibility for our health, safety and welfare, is not in fact discharging that responsibility adequately in the nuclear area. Moreover, it has consequently endangered the well-being of all the world's people, present and future. How do things go so awry?

Sara Seem Rittenhouse is chairperson of the Social Concerns Committee of Lehigh Valley (PA) Meeting. Describing herself as a "concerned human being," she feels "everyone is responsible to make the system work."



Susanna Natti/from No Nukes

That we in the United States are not the only nuclear users is irrelevant to the morality of our action. We are responsible only for our own actions; yet we cannot avoid that responsibility as individuals or as a body, or the intensity of conflict among us which may result.

To educate oneself on the pros and cons of nuclear power is a difficult task for the layperson. It is easy to obtain power company publicity releases and back-to-nature rhetoric. But if these extremes do not satisfy, one must turn to the *Bulletin of Atomic Scientists* or the *American Medical Association Journal.* The untrained intelligence may not quite take in all the figures and graphs, but the summaries are always understandable.

One finds oneself balancing figures. The American Nuclear Society says the demand for electricity has doubled every ten years for the past thirty years or more and is expected to continue to do so. Yet Robert Pollard, who resigned as project manager for the Nuclear Regulatory Commission because "it was lying to the public," claims that our rise in electricity demand has slowed and that our power capacity is now thirty percent over peak demand. We're proud of our standard of living and wish the world could share in it. But then how did Sweden, Denmark, and Switzerland consume about half the per capita energy we did in 1974, yet have a higher per capita gross national product, according to World Watch Institute?

It seems one must also choose between experts: Drs. Bross, Mancuso, Gofman, Tamplin, and Rotblat's warnings on the dangers of low-level radiation against the American Medical Assoication's finding that coal causes more deaths than the atom. On one hand, Barry Commoner in his book *The Poverty of Power* claims that we use our energy sources inefficiently; on the other, nuclear spokespersons promise energy so cheap that efficiency isn't worth worrying about. Does the new process of vitrification of radioactive wastes used in France wipe out the necessity, in Dr. Alvin Weinberg's words, to maintain the "meticulous attention to detail...and the longevity of human institutions" essential to nuclear technology? (Dr. Weinberg is former director of the Oak Ridge National Laboratory.)

If we declare a moratorium on nuclear power, would our economy suffer permanently, or would conservation and new technologies indeed mean more jobs? Which kind of power source would best help the poor of the underdeveloped countries? Should that help "trickle down" or "bubble up?"

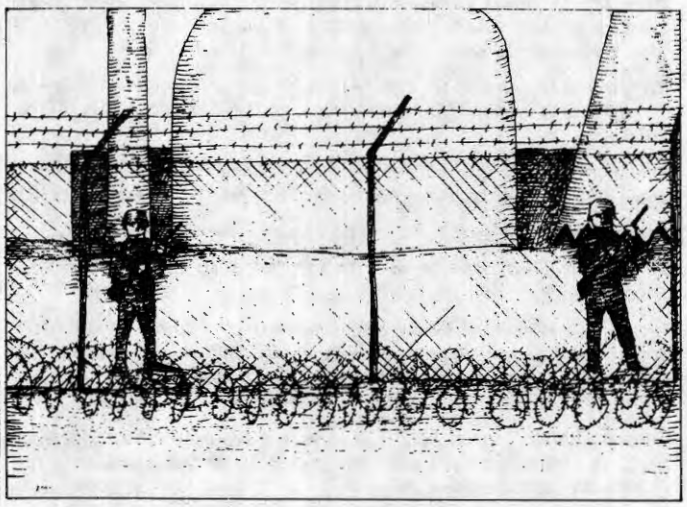
Then comes the human factor: the "should" versus the "probably would" theory versus reality. We should live

more simply, but our style of life is so easy and, after all, our society is built around the gasoline engine. There are a great many "shoulds" in the Nuclear Regulatory Commission's standards for nuclear power plant licensing. Yet to judge by that commission's own performance in living up to them, its members are all too human. One reads of nuclear accidents unreported until the state health bureau investigates, as in Colorado, yet one personally knows local power company officials to be conscientious. One reads that plutonium is considered indestructible as well as deadly, and that former Senator Gravel of Alaska said a loss rate of one to two percent has been common. One is introduced to the idea of a nuclear priesthood of waste guardians. One grows aware that the atom doesn't make judgments.

There is the matter of definitions and translations: questions as to whether "permissible" means "safe"; whether radioactivity is the same as radiotoxicity; and whether "stress" and "strain" are equal. Is the phrase "design meets the intent of these criteria" a way around specifications? Does "as low as practical" mean it can't be made to go lower, or it costs too much to go lower? Are the words "reasonable... without undue risk" in the nuclear plant licensing specifications sufficient qualification for guarding the health and safety of the public and the workers?

There is the worry of proliferation, increasing with every export of atomic technology. What about the dangers of transportation? Are we ready to deal with the possibility of sabotage and the abrogation of civil rights which would surely result from this or from a nuclear emergency of any sort?

The area of least knowledge is that of the effects of radiation. The nuclear industry stresses its good safety record as compared to other industries, but it is, as yet, a short record of about twenty years and it speaks only of public involvement, not workers or miners. It admits to the near catastrophic Brown's Ferry, Alabama, incident in 1975 and belatedly the one at the Enrico Fermi reactor near Detroit in 1966, but has not willingly published other "abnormal occurrences." It stressed the low standards of emission, but not the fact that these are standards only and are not always followed, or reported when not followed. The government says it will be several years before the radiation health data it has finally begun to collect will be sufficient to interpret, yet research to date warns that damage already inflicted to workers, and inadvertently, to the public by low-level radiation may be much greater than heretofore suspected. If it proves true that the genetic effects of low-level radiation result in an increase in cancer, leukemia and other major disease susceptibility, who will pay the staggering cost? Meanwhile, until sufficient time passes and the questions are finally answered, we keep running the experiment.



Susanna Natti/from No Nukes

Having considered and weighed all these factors, are you sufficiently prepared to make up your mind? Wait! There's a basic assumption you've probably made—that all the information you need for a decision is available to you. Yet the Nuclear Regulatory Commission has not willingly furnished it. According to the Union of Concerned Scientists, which used the Freedom of Information Act to obtain the necessary documents, this government bureau has deliberately withheld information concerning safety problems considered damaging to the nuclear industry, has not mandated necessary record-keeping and health studies, has waived its own safety regulations because they would prove too costly, and when intervenors have forced it by lawsuit to change its procedures, it has been extremely slow in doing so. In the opinions of Bridenbaugh, Hubbard and Miner, the three General Electric nuclear engineers who resigned in 1976 to protest the lack of safety in nuclear plants, "the tremendous cost, schedule, and political pressures experienced make unbiased decisions with true evaluations of the consequences impossible to achieve. This is the ultimate deficiency of our nuclear program."

But there is also another basic assumption operating here: that the decision is yours to make. Is it really? Although you may balance all the factors in your own mind and decide that there is a very low probability of these very high-consequence accidents or leakages and that the promised gain is worth it, you yourself will not be taking most of the risk. Your decision, or your refusal to make one, will affect all future generations. Nuclear power may make it possible for us to maintain our standard of living and for the Third World to follow in our footsteps (hopefully avoiding our mistakes), but the greatest part of the risks of a nuclear energy commitment will be borne by our children and grandchildren, and their children, and theirs, for hundreds of thousands of years. The potential to alter the genetic make-up of

humankind as presently known will be abroad in the world. Are we and our descendants equal to the task of guarding our heritage?

And so at last we come to the crux: the balance of the moral equation. The heart of the matter lies here, not in economics or fear or statistics, but in the social and moral question: Do we have the right to jeopardize the future of humanity; to require those generations to pay the social and economic cost of our temerity? Dr. Rosalie Bertell of Buffalo's Roswell Park Memorial Institute reminds us that:

> *We begin with fragile, already damaged, and not-too-careful human beings. Nuclear technology is not compatible with the human condition as we know it.... The prognosis for human beings now living, and for future generations, relative to this gigantic experimentation, is very poor. Since the experiment is being conducted without adequate monitoring of the human situation, it will have to reach monumental proportions in terms of negative human health effects before it is recognized as the cause of such effects.*

Is our love and concern for people, here and to come, implemented by "possibly compromising the Earth as an habitable place" in Dr. Gofman's words?

Dr. Weinberg considers that "we nuclear people have made a Faustian bargain with society." Yet it is not too late to refuse full commitment. It isn't a case of "do or do without;" there are alternatives, third ways. The rate of nuclear plant proliferation has slowed as their costs have risen. Dr. Pollard insists that, because of less-than-expected electrical demand, we have time to institute a moratorium on the operation and licensing of these plants until we know all unresolved safety problems (he knows of 200) are solved, and until sufficient biological data are gathered, better to judge the risk. With the time, money, and human energy freed, we could push development of alternate energy technologies as we pushed nuclear development. The Energy Policy of the Ford Foundation reports that it can be done. Amory Lovins, British representative of Friends of the Earth, has proposed a plan.

It would not be easy. William Rodgers, Jr. of the Council on Environmental Quality, commented: "Once the technology is turned on and incorporated into the nation's commercial fabric, turning it off calls for economic disruption, political strife, and governmental vacillation."

Yet the choice must be made. What kind of world do we want our children to inherit? Can we prepare to deal adequately with the possible consequences of a nuclear catastrophe? Can we forge institutions equal to the task of guarding the integrity of our environment and our genetic heritage? Are we willing to experiment with the world's children, who are especially vulnerable to radiation damage?

Reduce it to the concrete: to export solar technology, for example, seems to me to be more loving and caring than to sell reactors and potential bombs, and is probably more suited to Third World needs. It might even be good economics for us to get in on that particular ground floor.

To get back to basics, this is God's world. What kind of arrogance would risk the destruction of it? We are avowed pacifists. Since we abhor bombs, should we not also resist potential bombs? Should we countenance the "seeds of war" against all humankind?

To help Friends ponder this choice, I offer the following suggestion: Would Friends past breeding age, but still physically able, be willing to offer themselves for training as a nuclear emergency corps, to do whatever is necessary to ease suffering? Such a commitment, made in our society's tradition of caring with our very selves, could remind the falcon once again that its purpose, too, is to serve. □

William Butler Yeats' quotation is from his poem, "The Second Coming."

Dr. Irwin Bross has written on genetic damage from diagnostic radiation (30 May 1977) and on leukemia from low-level radiation (20 July 1972) in the Journal of the American Medical Association. *He is now head of research for Roswell Park Memorial Institute, Buffalo, NY.*

Dr. Thomas Mancuso worked for the Energy Research and Development Administration in 1977 on radiation effects on worker's health.

Drs. John Gofman and Arthur Tamplin are authors of Poisoned Power.

Dr. J. Rotblat wrote on risks for radiation workers in The Bulletin of Atomic Scientists *in September, 1978. Also in that issue was Dr. Karl Z. Morgan's article on cancer and low-level ionizing radiation.*

Data from Pollard, Bridenbaugh, Hubbard and Miner are available from the Union of Concerned Scientists, 1208 Massachusstts Ave., Cambridge, MA 02138. This organization has been, for me, the best source of technical data. Send for their publications list.

The American Nuclear Society, 244 Ogden Ave., Hinsdale, Ill., 60521, publishes a booklet "Nuclear Power and the Environment", March 1974.

Dr. Alvin Weinberg was director of Oak Ridge National Laboratory, when he wrote on nuclear power in Science, *July 7, 1972.*

Amory B. Lovins' best book is The Energy Controversy.

Title of the Ford Foundation report: A Time To Choose America's Energy Policy.

Dr. Rosalie Bertell, of Roswell Park Memorial Institute, spoke at the public forum on nuclear power held by the Ulster Co., NY, legislature at Kingston, March 11, 1977. Text available from Nuclear Hazards Information Center, P.O. Box 619, Woodstock, NY 12498.

Citizens Energy Project, 1413 K St. NW, 8th Floor, Washington, D.C. 20005, publishes Nuclear Power, the Invisible Killer, *a summary of the undesirable side of nuclear power.*

The Power Of Nonviolent Action At Diablo Canyon

by David Hartsough

Around the country there has been tremendous growth of nonviolent direct action in the anti-nuclear movement. In response, the courts, in conjunction with the nuclear industry, seem to be doing all they can to intimidate the anti-nuclear movement in order to prevent further civil disobedience actions. In recent months, some of us have found an effective way to respond to these intimidation tactics.

In California the courts have come down particularly hard on the "No Nukers" as we came to be called in jail by the other prisoners. The courts have threatened all of us who participated in civil disobedience actions in 1977 or 1978 with up to six months in jail, $500 fines, and two years' probation. This has been pretty scary to people. A lot of us have felt paralyzed, and unable to engage in further nonviolent actions because we already have such a weight on our shoulders. Many feel they cannot risk even further jail time and fines.

Last fall a trial took place for a representative group of twenty Abalone Alliance members, the trial lasting six weeks and costing about $15,000. While we were not allowed to put nukes themselves on trial or bring in any of our expert witnesses, the twenty Abalone members were found guilty and sentenced to ninety days suspended jail sentence, $400 fines and two years' probation. If the defendants refused to sign the probation papers or to pay the fines, they faced being sentenced to ninety days in jail and would still owe the $400.

All members of the Abalone Alliance were offered this same sentence. But for many of us, to take the sentence seemed like signing the death warrant of the Alliance. This would add up collectively to a $200,000 fine, with all of us promising not to do any civil disobedience for two years.

Many in the Abalone wanted to appeal the trial, which would cost an additional $15,000. The court cleverly proposed that if we appealed, we could be out on our own recognizance but if we broke any law, we would be arrested and would have to post bail or serve our suspended sentence. The appeal might take a year or a year-and-a-half. If we lost the appeal, we would still be on probation an additional two years. Thus we would need to be on our "good behavior" for three to three-and-a-half years—pretty difficult for an alliance committed to nonviolent direct action to stop nukes.

A number of us felt the Alliance was being incapacitated by the courts, and we could not allow this to happen. On January 11, twenty-three of us went to court in San Luis Obispo, where we stated to the judge that we could not in good conscience sign probation papers or pay the fines, and were, therefore, ready to begin serving our ninety-day jail terms. We told the judge, "We would rather have our bodies in jail than our consciences in prison."

Obviously, this was a very difficult decision for us. We wanted to be with our families, some of us would lose our jobs or drop out of school for a semester, and there was a lot of organizing work to be done outside. Nevertheless, we decided to "face the music," and get the aftermath of our last action out of the way so we could go forward as free human beings and organize futher actions to stop the activities of the Diablo Canyon nuclear power plant.

Each of us had prepared a statement for the court explaining why we had committed civil disobedience, and our concerns about the dangers of nuclear power. On January 11, the first four defendants changed their plea to "No Contest," making powerful statements about their love of life and humanity which had motivated their action. The judge sentenced each of them to ninety days in jail.

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The next morning, when the court convened, the judge apologized for having given too harsh a sentence and reduced the sentence to fifteen days in jail for refusal to sign probation papers. The reduced sentence would apply to all the other 487 demostrators as well.

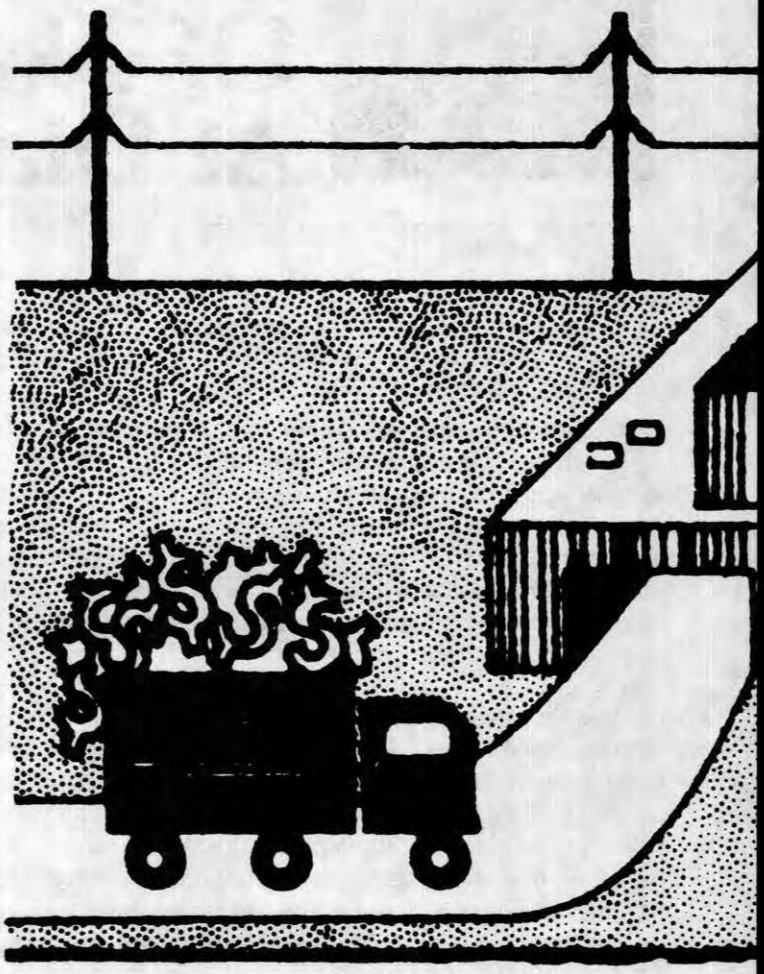
We had spoken Truth to Power. We do not know for sure what moved the judge. Had our acts of conscience reached his conscience? Had he used his pocket calculator to figure out what it would cost to put us in jail for ninety days at a reputed cost to the county of twenty dollars per person per day? Had he decided that ninety days in jail would not stop us from further "criminal" activity? Were the court's intimidation tactics backfiring, hurting only the county? Had he gotten a phone call from the jail saying it was already full?

What we realized was that there was power in nonviolent resistance and solidarity. We refused to be intimidated and said, "We did what we deeply believed is right. We are ready to go to jail, if need be, and when we get out, we will continue to do everything in our power to nonviolently stop nuclear power." Even just twenty-three of us had somehow caused the court to reconsider its intimidation tactics against the anti-nuke movement.

We went to jail on January 12, along with ten others who joined us. Most were released a week later, being given credit for our time in jail in August and "good time." We are still refusing to pay the fines (reduced to $300 at the time of writing), and have the August 6 action and its repercussions behind us, and are feeling liberated in more ways than one. We no longer have the fear of lengthy sentences hanging around our necks. We also know jail is not so bad. We can use jail as a time for a needed change of pace—personal support, doing some reading and writing, and getting to know the other people in jail who daily experience the "criminal injustice system." We are now free psychologically as well as physically to continue doing the important organizing work which needs to be done.

In planning future nonviolent direct actions involving civil disobedience, I would suggest we consider a policy of encouraging all arrested to stay in jail until they are arraigned and people have either pled "No Contest" or have had a trial and are sentenced. They can then serve their time and leave the jail as free people. This might mean a little additional time in jail initially, but would force the judicial system to deal with the whole group at once, rather than breaking us up into small groups and keeping us on the defensive for months or even years. Our attention and energies need to be on stopping nukes, not defending ourselves from past actions.

Looking back on the action, it was exciting to rediscover the tremendous power of nonviolent resistance and solidarity. When we refuse to be intimidated, "the system" has no power over us. □

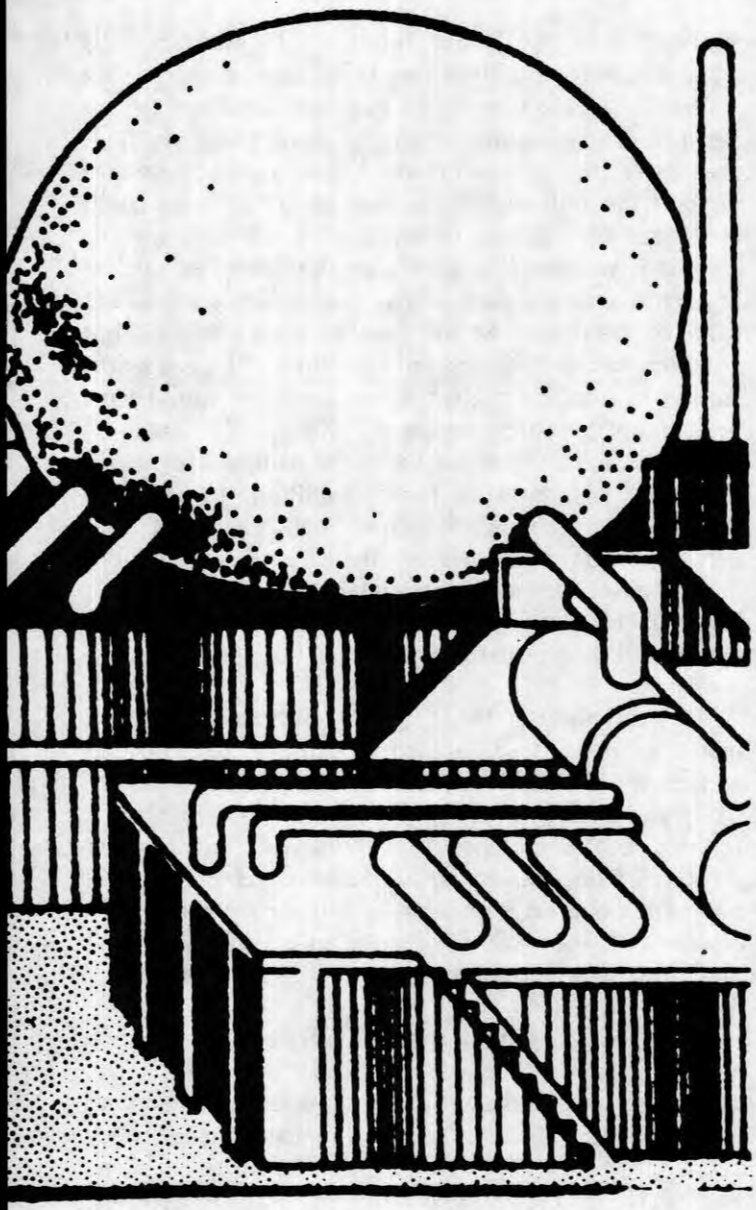


Consider The

by Thomas Hill

Nuclear power is a much discussed issue these days, even though we have been in a "nuclear age" for twenty to thirty years. In spite of the length of time that it has been with us, many of the dangers and costs of nuclear power are still not known to the

Thomas Hill is an engineer and mechanic who works as a peacemaker doing nonviolent training. On the board of Friends Military Counseling Service, he is also a member of the Keystone Alliance (Safe Energy Group). He is a member of Lehigh Valley (PA) Meeting.



Environmental Action Foundation/from Nuclear Power: The Bargain We Can't Afford

Social Costs

public—the people who will benefit or lose from it.

To further throw the issue out of perspective, most of the discussions of nuclear power focus on the technological aspects; very few deal with the social, economic, or political impact it will have on our lives. This reflects the fact that many of the decisions which are made regarding its future are done so on the basis of profit, rather than by the needs of the society the solution is supposed to serve.

To achieve the kind of society which we want to have—one which is marked by justice, honesty, and concern and caring (loving) for each other—we must make some basic decisions. What kind of society do we want to have? What are the problems we face in getting to that new society and maintaining it? How will we solve these problems and at what price to ourselves and future generations? The rich and powerful few should not make the decisions for the society, because that concentrates the control of our society in the hands of a few persons who do not have the needs of the society as their main goal, but rather are focusing on the return on their investments. They all too often cannot see the non-quantifiable values of the society they are "serving." A good example of this is the "solution" the U.S. has found to defend our country—the nuclear bomb. The bomb is "defending" us; it also is threatening our very existence on this planet, even if it is used in a defensive fashion. We citizens of this country and the world were not consulted in these decisions, and were not given the information to make an intelligent decision. We did not choose these weapons: the military leaders did. Nuclear weapons continue to be produced because they are profitable to a few, even though they expose us to the most serious danger.

Nuclear power is similar—the solution proposed to solve the energy problem threatens our lives and the kind of free and just society in which we would like to live.

The Barton Report[1] (commissioned by the NRC) studied the potential threat to civil liberties in light of nuclear theft, terrorism, and the "nuclear economy." This study says that the ability to detain suspects, without charges, to perform unlimited searches, to use torture to gain information, and the establishment of a national nuclear police force will be necessities in a nuclear-powered society. The report says we would need a "nationwide guard force, greater surveillance of dissenting political groups, searches in the event of a loss of materials, and creation of new barriers of secrecy around parts of the nuclear program."

The report also says that the existence of nuclear plants could cause a severe curtailment or elimination of freedom of association and discussion. Especially hard hit would be the nuclear plant employees who would have to have extensive background clearances, body searches, and other investigations aimed at detecting unstable employees who might act out of opposition to U.S. policies. It would be difficult to maintain a line between examination for disloyalty and examination for political dissent in granting clearances.

The Report provides us with a scenario of what would happen in the event of a plutonium theft, sabotage, or explosion (threat or actual). It outlines the end of the civil liberties as guaranteed in the Constitution:

One can readily conclude that searches designed for the physical recovery of plutonium dispersed on the property of innocent residents will be constitu-

tional.... Authorities might attempt wide sweeping searches in order to isolate the area in which the plutonium is believed located.... Wiretapping during a nuclear emergency would almost certainly be upheld.... Dissidents might be seized and detained after a plutonium theft. Detention might be justified as a way to isolate and immobilize persons capable of fashioning the material into an explosive device. Conceivably—although the interrogation issue has not been researched for this paper—detention could also be used as a step in a very troubling interrogation scheme—perhaps employing lie detectors or even torture. The normal deterrent to such practices—inadmissability of evidence in court—would be ineffective under the conditions of a nuclear emergency.

The report finally says that "the chilling effect on political debate could be substantial and a sense of public polarization against potential terrorists intensified." A nuclear program might "infringe on traditional freedoms in areas such as torture of a person believed to know where the lost nuclear material is located." (Plutonium is the most deadly substance on Earth. One pound, evenly distributed could give everyone on Earth cancer. Fifteen pounds are needed to make a crude atomic bomb. Plutonium is the fuel which would be produced in the breeder reactor.)

The police state tactics have already begun. For example:

In 1977 Georgia Power and Light spent $750,000 of ratepayers' money operating a nine-member plain clothes security and intelligence unit to spy on anti-nuclear and environmental groups. They employed former government agents to work in this unit.

Pacific Gas and Electric and Potomac Electric Power have compiled "anti" files on environmental activists, including people who write letters to local editors.

Pacific Gas and Electric has employed the services of "Research West" to conduct investigations of anti-nuclear groups, including the use of burglaries to gather information. They also try to dig out information about "leftists" and their sympathizers.

It is all summed up well by Dennis Hayes, author of *Nuclear Power: the Fifth Horseman:* "Commercial nuclear power is viable only under the social conditions of absolute stability and predictability.... Reliance upon nuclear power as its principle source of energy is probably possible only in a totalitarian state."[2]

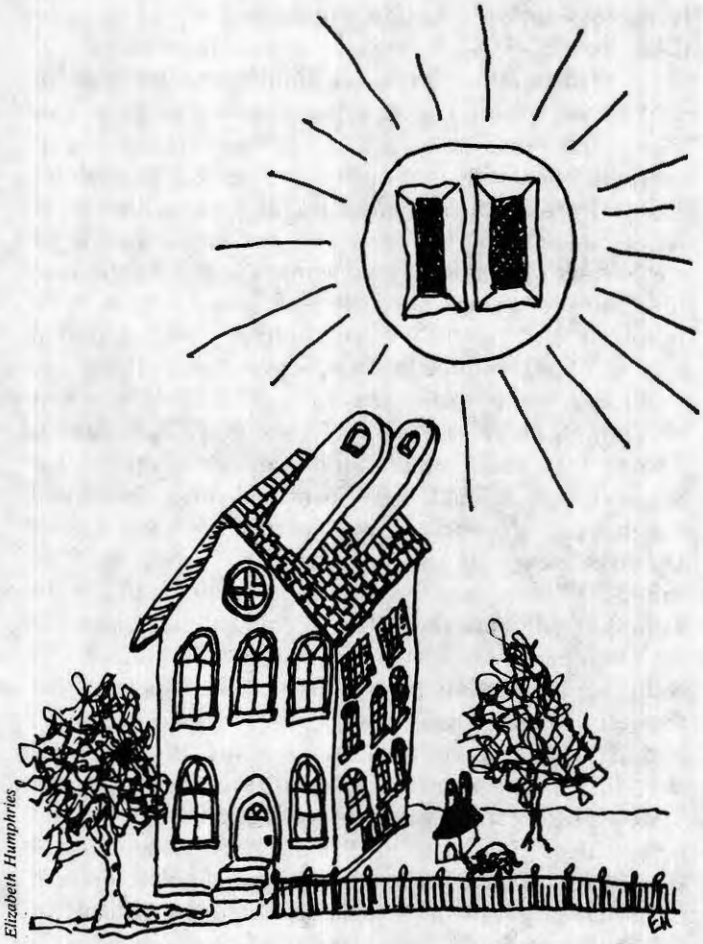
We all know that the insurance industry is both a conservative business and one which is very familiar with statistics and the probability of things, especially accidents, occurring. It is very significant, then, that the insurance industry routinely excludes coverage for an accident in which radiation contaminates property. (This is easily verified by looking at a homeowners's insurance policy.) The only way the electric utility industry could even consider building nuclear reactors was to get the federal government to limit their liabililty for nuclear accidents, since the private insurance industry would not offer coverage for the full possible damages. Without government intervention in the form of the Price-Anderson Act, the nuclear power program would have been stopped before it began.

The Price-Anderson Act limits the damages for which the utility is responsible to $560 million. In 1957 the Brookhaven National Research Lab estimated that damages from an accident could easily reach $7 billion. (Larger plant sizes and inflation would push today's cost higher.) This would mean that most people would only recover a few cents on the dollar, even if they lost all their property.

The options for the property owner look bleak. Insurance policies will not cover damage from nuclear accidents; life and health insurance companies will very likely go bankrupt as the claims mount up. The electric utilities and companies that built the reactors are protected from lawsuits by the Price-Anderson Act. An appeal to Congress is possible, as it is for any victim of a disaster, but the victims will have to get in line behind past flood and earthquake victims, who are still waiting for such payments.

This leaves us hoping that the advice of the nuclear establishment on the issue of nuclear safety is correct. The people who make and run the nuclear plants assure us that there will never be a major catastrophe. They don't tell us that they have already had many accidents which have almost gotten out of control. (These include partial meltdowns at Idaho Falls in 1955; at a breeder reactor outside of Detroit in 1966; at Hanford, Washington in 1970; an explosion in a reactor at Idaho Falls in 1961 which killed its three operators; a fire in a reactor in Alabama in 1975 which destroyed the control cables and almost sent the plant out of control; and the accident at Three Mile Island outside of Harrisburg a few weeks ago which kept most of the nation's headlines for over a week. There have been other accidents outside of this country which include partial meltdown and radioactivity release at Windscale in the British Isles, and an explosion at what is believed to be a nuclear dump in the USSR.) Considering their past performance, are nuclear reactors safe? Should we trust them?

These questions lead to another disturbing question—what kind of government would force its citizens to



risk their lives and their life's work (property, etc.) to further the growth of technology which has dubious benefits and grave dangers? Whose interest is the government serving in guaranteeing no financial loss to large companies, while allowing its citizens to bear the full load of pain and suffering?

To give the reader an idea of the financial viability of the nuclear power program, I cite a Congressional study entitled *Nuclear Power Costs*. The report examined the "...costs—not the environmental, health, or social costs in general—but the economic costs in particular—to energy producers, consumers, and taxpayers." In summary:

> *Contrary to widespread belief, nuclear power is no longer a cheap energy. In fact, when the still unknown costs of radioactive waste and spent nuclear fuel management, decommissioning and perpetual care are finally included in the rate base, nuclear power may prove to be much more expensive than conventional energy sources such as coal, and may well not be economically competitive with safe, renewable resource energy alternatives such as solar power.... The subcommittee found that solar energy used for space heating and hot water is already economically competitive with nuclear power throughout most of the United States and that solar electricity from photovoltaics could be economically produced in many areas of the United States as early as five years from today [1978].... through more efficient use of energy—combined with solar and wind power—the need for many, if not all, new nuclear plants could be obviated without any reduction in living standards. In addition, more jobs—skilled and unskilled—would be generated by these methods than by concentrating on nuclear power as the chief energy source after oil and gas.*[3]

Supporting these conclusions is an investment banker and specialist in risk analysis, Saunders Miller, whose book on the subject *The Economics of Nuclear and Coal Power* says it very well: "....from an economic standpoint alone, to rely upon nuclear fission as the primary source of our stationary energy supplies will constitute economic lunacy on a scale unparalleled in recorded history, and may lead to the economic Waterloo of the United States."[4]

There are two main reasons for the bad economic risk which nuclear power poses. The first is the as yet unsolved problem of what to do with nuclear wastes. To protect the safety of the public, these wastes must be kept *perfectly* isolated from the environment for up to 250,000 years. Several solutions have been proposed. The current solution under consideration is burial of the wastes in salt beds. "The target for initial operation in 1985 of a National Waste Repository (NWR) for the permanent disposal of commercial HLW (high level waste) or spent fuel may not be met...."[5] It could well be the 1990s before the long-range solution is decided upon, and even then we have no way of guaranteeing the stability of these wastes for thousands and thousands of years.

The second major cost is the need for constant maintenance, repair, and modification for safety reasons. The Three Mile Island Nuclear Plant near Harrisburg suffered a series of mechanical breakdowns and human operational errors which resulted in, possibly, over a billion dollars in cost, massive dislocation of the local population, and long-range risks of cancer and genetic mutations at which we can only guess now. As we learn more about nuclear power, the need for better design and control become apparent, driving the cost of nuclear power even higher.

Since the utilities determine the rates they charge their customers from a formula based on the amount of capital they have invested in equipment and facilities, they make

more profit from the more expensive ways of generating power. This certainly has a heavy bearing on why they chose nuclear power, which is the most expensive way to generate electricity. They are in business primarily to make money for their stockholders.

There are alternative sources for the energy which we need. The first is to improve our efforts to conserve what traditional non-nuclear fuels we have and use now. It is not necessary to waste energy to build up our standard of living.

Conservation has already had an effect on our energy use in just the past five years, in spite of enormous political and institutional barriers. This trend could be multiplied greatly by the removal of these barriers, which include beneficial rates to large users of energy and lack of concern by banks and contractors for the efficiency of the buildings they are financing and building, to mention two. Several cities have, or estimate they could, cut their electric consumption by fifteen to twenty-five percent in a relatively short period of time by instituting many energy-saving methods which are part of an overall energy-saving plan. This plan could include reduction of unnecessary and overtly wasteful energy use, co-generation (i.e., using "waste" heat from a generator to heat a home or an industrial process), introduction of more energy-efficient industrial processes which would use less energy, insulation to prevent heat loss, low grade heat for low temperature applications, thereby saving the high grade sources of energy for the needed high temperature applications.

If we immediately set up conservation programs of this scope, we would be able to shut down all of our nuclear power plants, which now provide thirteen percent of our electric power, and not be forced to the "Stone Age" as the utilities imply.

The long-range solution to replacing the traditional sources of power which we are using now would come from the use of renewable energy—wind, solar, and bio-mass conversion (conversion of biological material into methane gas by controlled decomposition). These energies are safe, clean and nonpolluting, relying on sources which are abundant, dependable, and free. Because of its small, decentralized nature, it eliminates the costs of distribution, transportation, and the long lead times required for the building of the traditional power plants. It is also well suited to mass production. Solar energy can be used for many purposes including space heating, cooling and air conditioning, crop drying, cooking, desalinization, and the operation of mechanical devices. Some of these applications have been in use now for over 2,000 years.

One of the newer of the solar applications is the photovoltaic cell. It has no moving parts, no pollution, a long lifetime, and requires little maintenance. The present cost of a unit of electricity from solar cells is about five times that of conventional generation, but the photovoltaic cell's costs are steadily decreasing due to improvements in technology and production while the costs of conventional power, especially nuclear, are rising steadily.

All of these above proposed sources and methods of use of energy should be included in an energy plan. This plan could prove to be the key to our efficient use of energy. If we decide that our society needs a dependable means of travel, then we must decide how, and invest in the most efficient public transit systems available or conceivable. The same is true with regard to decisions in the food-processing and packaging industries, chemical fertilizers and agriculture, etc. Energy systems should meet our need with the least impact on our environment.

Nuclear power grew out of our nuclear weapons program. It provides a peaceful, helpful, friendly face to a technology which, up until the inception of the nuclear power program, had been identified with death and destruction. President Eisenhower's advisor, Robert Donovan, said of the president in 1956, "A way must be found, he felt, to raise the speech [he was going to give] to a plane of sober understanding, combined with hope that the atom might serve man and not destroy him."[6] The thrust for the creation of the nuclear industry came from the desire to give rest to the anxieties the American people had about nuclear research and weapons by showing a peaceful, people-oriented side to the industry. The "Atoms for Peace" speech given to the United Nations by President Eisenhower in 1953 marked the beginning of the large-scale government funding for the development of nuclear power plants to generate electricity. Because of the insurance liability limitations, of the government's financial support through research and development, and the ignoring of the costs of dealing with radioactive wastes, we can see the nuclear power program would not have developed if left on its own.

Friends must seriously consider what course of action we wish to encourage—a safe and non-polluting energy program, or a nuclear power program which has its roots in weaponry and death. □

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[1] Intensified Nuclear Safeguards and Civil Liberties, *John H. Barton, October 31, 1975, Prepared under NRC contract NO. AT(49-24)-0190.*

[2] Nuclear Power: The Fifth Horseman, *Denis Hayes, Worldwatch Institute, 1776 Massachusetts Ave., NW, Washington, DC, 20036.*

[3] Nuclear Power Costs, *U.S. Gov't Printing Office, Washington, DC, 1978, House Report No. 95-1090.*

[4] *Barron's, Barron's on Books, May 30, 1977 (reviewing* The Economics of Nuclear and Coal Power, *Saunders Miller, assisted by Craig Severance, Praeger Publishers, Inc., $16.50).*

[5] Report of the Task Force for Review of Nuclear Waste Management, *U.S. Dept. of Energy, February, 1978, DOE/ER-0004/D.*

[6] Win Magazine, *Atoms for Peace: The True Story, Henry Etzkowitz, April 12, 1979.*

FRIENDS AROUND THE WORLD

Once again, Geneva Summer School, July 5-17, 1979, welcomes students, particularly those interested in international affairs, to its program as organized by the Quaker United Nations Office. Applicants aged eighteen to twenty-five may write to Stephanie Ramamurthy, Assistant Personnel Secretary at Friends House, Euston Road, London NW1 2BJ, England.

The cost for accommodation this year is expected to be 400 Swiss Francs ($235.00). English is the language used throughout.

The program includes attending meetings of the U.N. Economic and Social Council, visits to international institutions and U.N. specialized agencies, talks and discussions with those working in the U.N. community, as well as two mountain excursions and other leisure activities.

Disturbed by the fact that the White House and the Pentagon are switching from a deterrence policy to planning the strategy for waging actual "limited" war, and feeling that the present situation is "not the time for Quaker Peace Testimony to be kept in a safe place," Northwest Quarterly Meeting (Bennington VT) has written to AFSC, FCNL and FWCC urging that they send a small delegation to talk personally and privately with President Carter.

PLEASE NOTE: The "Meeting Directory" in which the locations and times of worship of many local meetings are listed will appear *once a month only,* on the first of the month. Look for it then in our back pages.

"What do we say to our host when, wine bottle in hand, he or she says: 'Oh, of course, you are a Quaker, I suppose you don't drink?' "

Enid Bloomfield asks the question in the *New Zealand Friends Newsletter,* pointing out in a persuasive article on "The Use and Abuse of Alcohol" that a second look at this subject might be timely. Herself one of those "who enjoy an occasional glass of wine with a meal and accept one at a party," she wonders whether she may not be guilty of a double standard. Of Friends' weddings she says "champagne is definitely out." She believes Friends would be "horrified" if, after yearly meeting sessions, members were to "dash out and revive themselves with beer." She admits that at a summer gathering, "if a few Friends were to slip away to the nearest pub, it might be considered acceptable but a bit naughty." As a medical social worker she knows how easy it is for teenagers and rejected spouses to seek solace or companionship in a glass of something and how strong social pressures can be, but she also knows how many hospital beds are occupied by patients—many of them drivers or their victims—with alcohol-related problems. She concludes with a plea to Friends to consider whether, individually or corporately, they can make a positive contribution to the solution of this problem.

Unbeknownst to most U.S. citizens, whose newspapers didn't consider the item newsworthy, Canada's prime minister, Pierre Trudeau, announced at the U.N. Disarmament Conference that his country is phasing out all nuclear weapons, reports Baltimore Friends Newsletter. Canada is the first nuclear-capable nation to propose such a divestiture. Trudeau urged nations to seek a "balance of confidence" which would be conducive to general disarmament and to reject continued reliance on the "balance of terror" as a deterrent to war.

Pax World Fund, now well known as a mutual fund for social responsibility, has passed the 1,000-shareholder mark and has qualified for listing in the *Wall Street Journal.*

Concentration on life-supportive products and services characterizes the Pax portfolio. The Fund is committed to investing in: 1) non war-related industries; 2) firms with fair employment practices; 3) some international development. Pax focuses its investment on such industries as: health care, education, pollution control, food, building supplies, leisure time.

Now seven years of age, the Pax Fund paid out a yield of six and one-half percent last year. This is based on fifty-six cents distributed to shareholders in income and capital gains dividends during 1978 and an average of monthly net asset value of $8.66 per share. PWF headquarters are located at 224 State Street, Portsmouth, New Hampshire 03801.

A while ago we mentioned in this column the founding of a Quaker Social Workers organization with Fran Dreisbach, R.D. 4, Box 471, Easton, PA 18042 as secretary and editor of the newsletter, a second issue of which has just arrived.

It seems that the process of getting Quaker social workers acquainted with each other and with each others' problems is getting under way, slowly but steadily. The second issue of the newsletter contains brief biographies submitted by two individuals, together with excerpts from other respondents, and also evidence that the new organization has attracted the interest of the AFSC as well as that of Baltimore and Philadelphia Yearly meetings. Quaker social workers, active or retired, are encouraged to write to the address above and make themselves known.

Interested in hosting students, age sixteen and seventeen from Sweden, Norway, Denmark, and Finland? Five hundred such Scandinavian high school students will be arriving in the United States in late August, 1979 to stay until June, 1980. They are fluent in English, have been screened by their school representatives at home, and have medical insurance and pocket money.

The American Scandinavian Student Exchange (ASSE) which sponsors this program is looking for U.S. families, particularly with small children, who would be interested in taking some of these students into their homes. Such families in the eastern sector should contact Joy Joyce, 902 Winding Lane, Media, PA 19063; Tel. (215) 565-6605. ASSE, which is under the auspices of the Swedish Royal Board of Education, is located at 7728 Lookout Dr., La Jolla, CA 92037, (714) 459-9516.

United States students, aged sixteen to eighteen, who would like to spend a high school year with a Scandinavian family or participate in a five-week family stay in the summer of 1979, should also contact Joy Joyce at the above address.

Persons interested in either program should be sure to give their home phone number.

ANNOUNCEMENTS

Births

Marshall—On October 30, 1978, *Benjamin Jeffrey Marshall.* He is the son of Kenneth Scott and Janice Larivee Marshall of Middlesex, NJ. Ben's father and paternal grandmother, Lillian Michener Marshall, are members of Plainfield (NJ) Meeting.

Marriages

Isern-Post—On March 31, 1979, *Janet W. Post* and *William R. Isern* in Pensacola, FL. The bride is the daughter of Mr. and Mrs. A. Willis Post and granddaughter of Mrs. Arthur W. Post, members of Westbury (NY) Meeting.

Deaths

Braddock—On February 12, *Fred Braddock,* aged eighty-two years, near Waynesville, OH. He was a birthright member of Miami (OH) Meeting. He spent his entire adult life farming the farm which was his home when he died. He is survived by one son, Robert; one daughter, Diana Rogers; three grandchildren; and two brothers, Warren and Raymond.

Davis—On April 6, in Woodstown, NJ, *Walter Davis,* aged eighty-nine. Walter is survived by his wife Rachel; daughter Miriam Davis Speer; son Walter Davis, Jr.; a sister, Rachel Davis Dubois; all of Woodstown, NJ, and sister Amy Davis Sinnichson of Long Island, NY.

Furnas—On March 28, *David Furnas,* aged fifty-six, at Kettering Medical Center, Dayton, OH.

He was a birthright member of Miami (OH) Meeting. He was born on the farm near Waynesville which he owned and operated at the time of his death. He had a deep concern for farming as a way of life and worked to better the quality of and interest in agricultural life among young people and adults.

Survivors are his wife, Marilyn; daughter, Pamela; two sisters, Evelyn and Jane; and nieces and nephews.

Furnas—On March 27, *Eli Furnas* at Edward H. White Memorial Hospital, St. Petersburg, FL, aged eighty years. He was a birthright member of Miami (OH) Meeting. Until his retirement he farmed the farm on which he was born. He is survived by his wife, Lucile; two sons, Roy and Stephen; two daughters, Sue Wert and Anne Johnson; and one stepson, Rendell Oglesbee; twelve grandchildren; and one great grandchild.

Gefvert—On March 11, at Allentown, PA, Hospital, *Ruth Hunt Gefvert,* aged sixty-six.

Ruth was a prolific writer. She joined the American Friends Service Committee in Philadelphia as a writer of children's education projects in 1937. She published religious and children's pamphlets and stories, and she wrote a history of Richland (PA) Friends Meeting.

Surviving are her husband Arthur Gefvert and two of her three children, Lisa of Pittsburgh and Peter of Quakertown. Memorial Services were held at Richland Meeting.

Keever—On December 30, 1978, *Edward Keever* at Dayton, OH, aged eighty-nine years. He was a birthright member of the Society of Friends. He worked in the editorial department of the *Dayton Journal Herald* and was author of *Shorty in the Tank Corps.*

He is survived by his brother, S. Wynne Keever, of Dayton, OH, and nieces and nephews.

Reagan—On March 18, at Friends Fellowship Community, Richmond, IN, *Florence Lindley Reagan,* aged ninety-seven, a member of First Friends' Church, Richmond, IN.

After receiving a B.A. from Earlham College, Florence taught at the Bloomingdale Academy, marrying the principal, William Reagan, in 1908. Florence served as hostess at the Oakwood School in Poughkeepsie for thirty-two years.

She is survived by three sons, James, Lindley and Bob; one daughter, Agnus Reagan Kuhn; nine granddaughters; fourteen great-grandsons; and nine great-granddaughters.

Contributions to a memorial fund may be sent in care of Wilmer Tjossem, American Friends Service Committee, 1501 Cherry Street, Philadelphia, PA 19102.

Sharan—On March 10, *Dr. Bisnambhar Sharan,* aged eighty-two.

Bisnambhar was the adopted father of Linda Cope, a member of Westfield (NJ) Meeting. In 1970-71 he was a student at Pendle Hill.

Strauss—In April, at age seventy-nine, *Anna Lord Strauss* who was one of the first members of New Town Preparative Meeting, now Housatonic (CT) Meeting.

She made her home in New York City, fulfilling many national and international activities. But her love for people and all things growing was most reflected in her home in New Town, graciously open to visitors from near and abroad. Anna's home was filled often with those who shared her love of the open spaces, the joy of her gardens, and the warmth of her presence.

Often charged with high responsibility, she gave greatly of herself and of her insights into the human condition.

VanderVoort—On March 31 *Alice Gons VanderVoort* at Clinton Memorial Hospital. She was seventy-three years old. She was a member of Miami (OH) Meeting of Friends. During her teaching career she taught for some time at Guilford College, NC, and at Wilmington College, Wilmington, OH. Following her retirement from teaching, she pursued her wide ranging interests.

Surviving are two nieces; two great-nephews; and a great-niece.

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The Shaker Messenger, a quarterly publication devoted to the Shaker lifestyle past and present with articles about Shaker endeavors and current events at villages and museums. One year $6.00. Two years $10.00. P.O. Box 45, Dept. FJ, Holland, Michigan 49423.

The Peculiar Mission of a Quaker School, by Douglas Heath. Finding the source of Friends education in the meeting for worship. $1.10 plus 30¢ hdl. Pendle Hill Publications, Wallingford, PA 19086.

Communities

Greening Life Community. Established 7 years. Intentional, rural, residential. Perry County, central Pennsylvania. Concerns: Peace, work/play, family life, searching, responsible relations, individuality, consensus, good life. If interested contact: Box 262, Shermans Dale, PA 17090.

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Hand-built house, woods, isolated, hills, ten acres near Albany. $175/month; less if you repair. Flanders-Morrison, 433 Clinton Ave., Albany, NY 12206.

On Long Beach Island, Surf City, NJ. Two bedroom apartment available by the week, 2 blocks to ocean or bay. Walk to stores. Call Neil Hartman 609-235-4507 or Warren Sawyer 609-235-7480 evenings.

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Woodstock, Vermont 60-Acre Mini-Estate. All season, unpretentious architectural-gem guesthouse, plus eight additional field and forest building sites, including flat to rolling meadow and woodland, picturesque winding trail road beyond auto road providing privately protected natural world. A delightfully designed New England preserve of quiet beauty, amazingly secluded yet near social luxuries and necessities, including historic Woodstock village, elite shops, Woodstock Inn, Rockefeller Country Club, Green Mountain Horse Association, Vermont Institute of Natural Science, public and private schools, select ski areas; half hour from Dartmouth College, Friends Meeting House, Medical Center, Performing Arts, Airport, gourmet restaurants. Remote from industrial, urban, atomic, military complexities. This intimate wild-life sanctuary's first thirty acres with guesthouse $265,000; second thirty acres without structure $180,000. Special consideration for total estate. Box C-731, Friends Journal. Friends Journal.

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Librarian/bibliographer, Quaker Collection, Haverford College. Responsibilities include cataloguing, reference, book selection, staff supervision. Knowledge of Society of Friends essential. M.L.S. degree or equivalent required. Salary range, $10,500-$14,000, generous fringe benefits. Reply by June 1, 1979 to Librarian, Haverford College, Haverford, PA 19041. Applications from minority group members and women are encouraged.

Psychiatric social worker, M.S.W., for small suburban transitional center for former psychiatric hospital patients to direct day work and Transitional Employment Placement programs. Additional responsibilities and opportunity for growth. Please call 215-626-6400.

Quaker couple seeking Friends-affiliated employment in compatible setting. Husband is family physician; wife is health educator/medical technologist. Open to other possibilities. Available early fall 1979. Walter VomLehn, M.D., 705 Park St., Friday Harbor, Washington 98250. (206) 378-4129.

Teacher/director and assistant to help establish a Quaker care center for children 2-4 years old. B.A./M.A. in child development, also some knowledge of Friends' beliefs. Write: Quaker House, 2121 Decatur Place, Washington, DC 20008.

Wanted: Person capable of motivating emotionally disturbed and delinquent teenagers to raise food in boarding school. Willing to do physical work. Knowledge of gardening, chickens, and fruit trees required. Interest in constructing greenhouse, drying and freezing food. Object: to give high school students practical experience. Write: Grounds Committee, Glaydin School, Box 143, Route 4, Leesburg, Virginia 22075.

Positions Wanted

Earlham student available for summer vacation or home job. Likes all ages, swimming, licensed driver, bread maker, embroidery, singing, clarinetist, experienced tutor, bookkeeping skills. References available.Victoria White, Box E-1296, Earlham College, Richmond, IN 47374.

Friend seeks challenging position in D.C. area. Thirteen years experience in community development, rehabilitation, project management, building, and in business. Need to relocate for family reasons. Adrian Bishop, 133 Toronto ST., Kingston, Ontario, Canada K7L 4A8. 613-549-7521.

Rehabilitation Counselor, M.A. Recent supervisory experience with elderly families in health-related agencies. Would consider related employment or other enriching challenge. B.A in business studies. Jane Hughes, 115 High Street, Cambridge Springs, PA 16403. 814-398-2024.

Schools

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Health Enrichment Programs: residential semesters of spirit-mind-body education through nutrition, meditation, exercise, organic gardening, stress reduction, spiritual healing, more. Spiritual power that heals is within! Develop your healthful lifestyle. Write: **Koinonia,** 1400 Greenspring Valley Road, Stevenson, Maryland 21153.

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South Newfane/Marlboro, Vermont. 200 year old farmhouse and barn surrounded by hayfields and stream. Four bedrooms, fully equipped. Music Festival, Putney Friends Meeting, swimming, horseback riding, canoeing, sailing, tennis and all summer enjoyments nearby. Minimum rental—two weeks. $100 a week plus cutting the grass. Malcolm Smith, 65 Castle Heights Ave., Tarrytown, NY 10591.

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Summer in Oregon? Furnished, attractive Portland home, three bedrooms. June 15-September 30. Jump, 3027 N.E. Ainsworth, Portland, OR 97211.

Wanted

Wanted: Unpublished book manuscripts. Also poems for anthology. Send for details. Literati Press, Dept. FJ, P.O. Box 153, Freeport, NY 11520.

Treasure Valley, Idaho. Anyone interested in forming an unprogrammed Quaker worship group in southwestern Idaho contact Kate O'Neall, 2405 W. Idaho, Boise 83706, 208-342-2503.

New England Friends Home is looking for a live-in intern to start late summer, and help us care for our thirteen elderly residents. Some knowledge of maintenance desirable; some knowledge of cooking helpful. Another intern vacancy will occur in late fall. Write: Director, New England Friends Home, 86 Turkey Hill Lane, Hingham, MA 02043.

Stable gay male couple, early 30's, seeks communal or professional situations in which earth-murder is not practiced. One is painter and cook; one is poet experienced as English teacher and inventory controller. We are vegetarian and spiritually oriented, with wide experience in religious and social activism. Art, nature, and love are necessities in our home. Can you help us find that home? Write Ken or Bob, 6796 Brookline Drive, Hialeah, Florida 33015.

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