JOURNAL OF
CIVIL DEFENSE

"ALTHOUGH THE WEAPONS WE HAVE EXAMINED ARE CALLED MASS WEAPONS, WITH THE KNOWLEDGE AND SKILLFUL USE OF MODERN DEFENSE MEASURES THEY WILL NOT AFFECT THE MASSES, BUT ONLY THOSE WHO NEGLECT THE STUDY, MASTERY, AND USE OF THESE MEASURES."

–Marshal V.I.Chuykov
former Soviet Civil Defense Chief

SEE EDITORIAL — BACK COVER

MARCH-APRIL 1977
Vol. 10, No. 2

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UPCOMING

Mar. 5 - 6	— NASAR Spring Conf., Kirkland AFB, N.M.
Mar. 7 - 11	— Aerial Techniques for Environmental Monitoring, ANS Symposium, Las Vegas
Mar. 13 - 17	— USCDC Mid-Year Conf., Washington, D.C.
Apr. 10 - 13	— Transfer of Nucl. Technology Conf., Shiraz, Iran
May 6 - 8	— Washington State SAR Conf., Ellensburg, WA
May 23 - 25	— International Hurricane Conf., Biloxi, MI
Sept. 30 - Oct. 3	— 2nd International Conf. on Disaster Medicine, Mainz, West Germany
Oct. 2 - 6	— USCDC Annual Conf., Long Beach, CA

In 1776 it took 22 hours of work to earn enough money to pay for 100 pounds of flour. Today it takes 4 hours of work.

In 1776 it took 77 work hours to earn the money to buy 100 pounds of sugar, and today it takes 8 hours.

In 1776: 12 hours for a pound of butter. Today: 12 minutes.

from *The American Record*, A Brian Bex Report.

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The **Journal of Civil Defense** presents authentic information relating to civil defense — to the survival of free government, the United States and peace in the nuclear age. Its aim is public education in this field and service as a forum.

Authors are encouraged to submit manuscripts for consideration by the editorial committee for publication (the **Journal**, as a non-profit organization, pays no fees). Articles, preferably illustrated, should be 500 to 1,200 words in length, slanted to the non-technical reader, and oriented toward the civil defense field. Views expressed in contributions to the **Journal** are those of the authors and do not necessarily reflect **Journal** policy.

SPOTLIGHT

-US Rep Jack Brinkley's bill to make extensive changes to the 1950 CD Act gathers momentum with wider endorsements. One thing Brinkley's bill will do is to make CD's dual-purpose role clear and effective. Key to passage is organized fireball support nationwide by local CD directors. "I trust their judgement," says Brinkley.

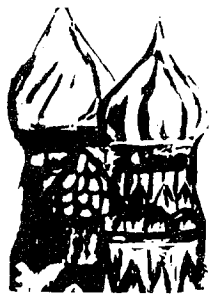
-In Armington, Ill. Andrew Davis got tired of paying 3-digit monthly fuel bills, built his family a masonry house and put 4 feet of dirt over it. His total winter fuel cost: $1.29. It's also stormproof and fireproof. No insurance needed. And "I've got a bomb shelter," he says.

-One civil defense organization whose vital signs are vibrant is the California-based Radiological Defense Officers Association (RDOA). *Info-Ray,* RDOA's newsletter, reports that in the past two years RDOA has grown from 3 chapters to 6, with 2 or 3 more in the offing for 1977. (*Info-Ray* editor M.L. Arnold, 7510 E 4th Pl., Downey, CA 90241.)

-*U.S. News and World Report* Moscow Bureau Chief writes Kremlin reaction to the "unthinkable" is to try to (1) achieve nuclear superiority, (2) maintain a civil defense system that will guarantee survival, and (3) sell the "unthinkable" idea to the West.

-President Jimmy Carter scored a bullseye when he said in his inaugural address: "We are a strong Nation and we will maintain strength so sufficient that it need not be proven in combat." "We are a proud idealistic nation, but let no one confuse our idealism with weakness." The question remained: Can we back that up?

OVER THE IRON CURTAIN



—Ruby N. Thurmer

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In the January-February 1977 issue of the *Journal*, a review was given of the American Security Council's documentary film, "The Price of Peace and Freedom." Mr. R.F. Blodgett, who did the review, stated that "This film should be rated four-star and be seen by every single one of our 215 million Americans." Understandably, the Soviet appraisal (1) of the movie was not quite so favorable:

> "A lie with cockroach's legs: They might break at any moment."
> "... By shouting about the Soviet threat and the Russians' buildup of their military potential the [American Security] Council is seeking an increase in the already colossal U.S. expenditure on militarist needs."
> "... another fable ... intended to be shown on television. The chief idea being promoted in the movie is the United States' tremendous lag behind the USSR in the arms sphere."

A similar unfavorable reaction in the Soviet news media was noted following the November 10th announcement in the *Washington Post* of the organization of the "Committee on Present Danger," a group of former high-ranking U.S. officials who have joined together with the goal of informing the American public regarding Soviet policies.

It began in the Soviet press on November 12th with a TASS headline "Committee — alliance of opponents of Detente." (2) The article states, in part,

> "Certain influential forces in the United States are stepping up their activity against the policy of detente ... This is borne out by the establishment of the so-called 'Committee on Present Danger.' It [the Committee] has been joined by ... E. Rostow, former under-secretary of state; H. Fowler, former secretary of the treasury; P. Nitze, former deputy secretary of defense; not unknown generals as M. Ridgway, L. Lemnitzer, A.L. Goodpaster, M. Taylor; former Chairman of the Joint Cheifs of Staff E. Zumwalt; former CIA chief W. Colby; and H. Packard, head of Hewlett-Packard Company." [Later D. Rusk and J. Schlesinger were included.]

During the entire month of November, this group continued to draw an unusual amount of attention from TASS, PRAVDA, IZVESTIYA, etc. They were called a "flock of hawks," a "committee of exs," "firebrands," and "has-beens." Due to limited space, I have not quoted from individual articles and broadcasts; however, I have included several of them in my reference list. (3-10)

The Chinese also reported on the forming of the Committee on Present Danger but were in agreement that these men were quite right in their efforts to alert the American public to the danger from the USSR. Below is a part of one of the NCNA broadcasts. (11)

> "A policy statement distrubuted at the press conference by E. Rostow, chairman of the executive committee of the new organization, said, 'Our country is in a period of danger, and the danger is increasing. The Soviet drive for dominance based upon an unparalleled military buildup constitutes the principal threat to the United States. The Soviet Union has not altered its long-held goal of a world domination from a single point — Moscow. It continues, with notable persistance, to take advantage of every opportunity to expand its political and military influence throughout the world ..."
>
> "The statement said that the Soviet Union increases military spending by at least 5 percent annually. 'If we continue to drift, we shall become second best to the Soviet Union in overall military strength, our alliances will weaken. Then we would find ourselves isolated in a hostile world, facing the unremitting pressures of Soviet policy backed by overwhelming preponderance of power. Our national survival itself would be in peril, and we should face, one after another, bitter choices between war and acquiescence under pressure ..."

The creation of this "Committee on Present Danger" has caused the Soviets considerable anguish; after all, the men involved constitute an impressive group of knowledgeable leaders in world affairs. Therefore a concentrated effort has been exerted to discredit them. It is amazing that this group could have created such a stir all the way across the ocean and that, right here in the United States, hardly anyone is aware of its existence, much less what its function might be. It seems that somewhere in all of this there is a message. □

*Operated for the U.S. Energy Research and Development Administration by Union Carbide Corporation.

1 D. Sergeyev, "Lies with Cinematographic Legs," *ZA RUBEZHOM* No. 46, Signed to Press 11 Nov 76, p. 24 LD, as reported in *Daily Report, Soviet Union*, FBIS-SOV-76-224, 18 Nov 76, Vol. III, No. 224, pp. B4-5.

2 Moscow TASS International Service in Russian 1133 GMT 12 Nov 76 LD as reported in *Daily Report, Soviet Union*, FBIS-SOV-76-221, Vol. III, No. 221, Nov. 15, 1976, p. B7.

3 Moscow TASS in English 1040 GMT 13 Nov 76 LD

4 Moscow TASS in English 1346 GMT 12 Nov 76 LD

5 Moscow in English to North America 2230 GMT 12 Nov 76 LD

6 Moscow in Czech and Slovak to Czechoslovakia 1700 GMT 13 Nov 76 LD

7 Moscow TASS in English 0835 GMT 14 Nov 76 LD

(3 thru 7 reported in *Daily Report, Soviet Union*, FBIS-SOV-76-221, Vol. III, No. 221, Nov. 15, 1976, B7-B10.)

8 Moscow PRAVDA in Russian 13 Nov 76 LD, Yuriy Shurkov, "Firebrands," as reported in Daily Report, Soviet Union, FBIS-SOV-76-223, Vol. III, No. 223, Nov. 17, 1976, p. B5.

9 Moscow in English to North America 2230 GMT 30 Nov 76 LD, as reported in *Daily Report, Soviet Union*, FBIS-SOV-76-232, Vol. III, No. 232, Dec. 1, 1976, p. B9.

10 Moscow NEDELYA in Russian, No. 47, signed to press 25 Nov 76, p. 15 LD, as reported in *Daily Report, Soviet Union*, FBIS-SOV-76-235, Vol. III, No. 236, Dec. 7, 1976, p. B1.

11 Peking NCNA in English 1835 GMT 12 Nov 76 OW, as reported in *Daily Report, People's Republic of China*, FBIS-CHI-76-221, Vol. I, No. 221, Nov. 15, 1976, p. A4.

CAPITAL COMMENTARY

— by Jerry Strope

The President's Initiative

Every civil defender who knows something about his business is in favor of nuclear arms reduction and disarmament. Yet when President Carter, in his Inaugural Address, took as his goal "the elimination of all nuclear weapons from this earth," most people on the Washington scene passed it off as a bit of utopian rhetoric. What has happened since has a lot people shook up.

In his first interview as President, Jimmy Carter called for an instant ban on all nuclear tests. *That* shook up the bureaucracy! In its last annual report the Arms Control and Disarmament Agency had said, "It has not been possible, despite advances in seismic technology, confidently to distinguish by national technical means between underground nuclear weapons tests and earthquakes." However, as a candidate, Mr. Carter had said, "National verification capabilities over the last 20 years have advanced to the point where we no longer have to rely on on-site inspection to distinguish between earthquakes and even very small weapons tests, so a comprehensive test ban verified by national technical means would be acceptable." Now apparently presidential policy, this position really puts it to the Russians.

The Soviets have called for a comprehensive test ban in the past, possibly never expecting the U.S. to go along with it. Now, they must decide whether they are willing to forego testing while the Chinese continue theirs and whether they are willing to forego "peaceful use of nuclear explosives" since they cannot be distinguished from military testing. So, the Soviet response will be interesting, Meanwhile, the "threshold ban" treaty pending in the Senate is in doubt even though the Administration says it is still in favor of ratification.

Then, about a week after the inauguration, columnists Rowland Evans and Robert Novak broke the story that on January 12, the President-elect had asked senior Defense officials about the requirements for "minimum deterrence" and had ended up asking for studies of arms reductions down to 200 to 250 seaborne ballistic missiles on both sides. The Evans and Novak story was, of course, aghast at the very idea and, after official reactions had confirmed the gist of the story, even liberal commentators were suggesting that the President had not done his strategic homework.

Nonetheless, minimum deterrence is a respectable strategic concept — perhaps more pertinent today than in earlier years. It starts with the commmonsense notion that a single nuclear weapon on New York City is a prodigious threat, and only a few weapons are needed to deter the most warlike leader. The arguments against minimum deterrence are the same as those against major arms reductions. One is that Russia would invade Western Europe unless we can threaten annihilation. But who believes we would initiate our own destruction under those circumstances? Charles DeGaulle built the French "minimum deterrent" because he didn't believe it.

The other major argument against minimum detterrence is that, with nuclear arsenals perhaps one-tenth those of today, the Soviets would be encouraged to cheat. That has a hollow ring also, especially if the U.S. follows the Soviet lead and builds up its civil defense to protect against terrorists, accidental launches, third-party nuclear threats — and cheating.

The President's initiative on arms reduction caught his new SecDef, Harold Brown, moving in the wrong direction. Just recently, in an interview in Los Angeles, Harold opined, "The belief on either side that you can survive a strategic thermonuclear war as a going society — when you can't — is the worst possible situation for the world to be in." There will have to be a bit of rethinking of the MAD theology if President Carter continues to pursue his arms reduction initiative.

Back to the Hearings

One of the little-noted consequences of last year's civil defense "oversight" hearings was a change in the law to require annual authorization of the DCPA program. Since funds can't be appropriated without the prior authorization, the House Armed Services Committee has had to move quickly to schedule hearings. The responsibility was assigned to the Subcommittee on Military Installations and Facilities (!) which held hearings on the 7th, 8th, and 9th of February. The subcommittee, chaired by Lucien Nedzi of Michigan, heard representatives of the General Accounting Office on the first day. The GAO has a new report on civil defense in draft that is as sympathetic to the plight of DCPA as was their last one several years ago. Among other things, they found no overlap in the functions of DCPA, FPA, and FDAA.

On February 8th the subcommittee heard John Hunt, deputy DCPA director. Gov. John Davis, whose resignation is effective February 28, was not available. On the final day came the "outside witnesses": Don Brennan of the Hudson Institute, Dick Laurino, president of the Center for Planning and Research, T.K. Jones of Boeing Aerospace, Pete Scoville of the Arms Control Association, Lea Kungle of the USCDC, and George Jones of the State Directors association. Through it all, the subcommittee exuded sympathy at the plight of civil defense in this country and bemusement at the lack of corrective action on the part of our government. Odds are that they may recommend the restoration of at least some of the $25 million cut from the DoD-recommended civil defense budget by James Lynn, Gerald Ford's budgeteer. □

"As long as there are human beings in the world every kind of miracle is possible."

- Mao Tse-tung

SUICIDE OR SURRENDER .....OR SURVIVAL

— DeWitt S. Snell

Of the many issues confronting our nation today, those which make the headlines — unemployment, inflation, energy crises, government corruption, and so on — are of infinitesimal importance, I think, compared with the seldom-mentioned issue of national survival.

Although many of our intellectuals sometimes condescend to refer to a distant apocalypse, they never permit themselves to believe they might have some responsibility for working to make such an event impossible — or, at least, for striving to mitigate a disaster toward which the world seems presently to be inexorably drifting.

A statement by the late Paul Goodman*, I think, epitomizes this attitude: "Rationally," he says, "I must judge that the Bombs are almost certain to go off in this generation; yet I cannot believe that they will go off, for I do not live my life with this expectation."

Mr. Goodman, like his intellectual colleagues, seemed to feel no responsibility to examine the national and world conditions that led to this crisis, to determine the Free World's witting or unwitting contribution to it, nor to seek its mitigation. Seemingly, his concern for his nation's future was insufficient to cause an examination of the premises on which his own life has been built; possibly for fear of discovering that his own actions and attitudes might have contributed to the crisis which he always preferred to relegate to some distant future.

"... TAKING ORDERS FROM THE SOVIET UNION"

For an authoritative expression of the West's present predicament, I would quote from the editorial in the Winter issue of *Strategic Review*, the journal of the prestigious United States Strategic Institute:

> "The dissolution and weakening of Western alliances, measured against U.S. disinclination to keep up with the pace of weapons deployment set by the Soviets and a propensity for 'negotiations' which further enhance the Soviet military advantage, all point to the likelihood that, within ten years or less, the Free World — including the United States — will be taking orders from the Soviet Union."

In other words, unless a miracle happens, it seems more than likely that within a very few years, the West will be faced with the stark choice of "suicide or surrender."

DeWitt S. Snell, veteran inventor, industrialist, lecturer, writer (author of *Unheeded Warnings*, which attempted in the late thirties to alert America to the threat of World War II) leads a vibrant retirement life in northern New York. His 350 newspaper letters on international affairs are one measure of his prodigious undertakings.

Confirmation of this grim appraisal of our crisis is given by an article in the *New York Times Magazine* of October 17 last, "Hungary 20 Years Later," by a refugee from the 1956 uprising. To quote:

> "These days [in Hungary] there is a self-confident tone to official declarations to the effect that the enemy within poses no more danger because the USSR has become more powerful than the U.S. Solzhenitsyn's warning about the decline of the West is echoed by thoughtful Hungarians. Gone is the belief — the consensus before 1956 — that the West is waiting for a 'suitable opportunity' to rescue the nations of Eastern Europe and that, in the long run, Russian Communism is not viable. There is these days a sinking feeling that the Russians are

*Paul Goodman (1911-1973): American author, poet, educator, sociologist — strong following among college students.

winning on the global chessboard and that democracy has become a vanishing species."

Many similar warnings to the West have been voiced by equally knowledgeable persons over the past few years. *However, those who lead our nation in this critical time, although they must for the sake of public morale seek to assure the nation that every possible measure is being taken to ensure survival, must be totally honest with themselves as to the extreme peril to us in the Soviet challenge — a peril for which American policies over the past half century, together with those of the rest of the Free World, have been largely responsible — so that if our nation is to survive, much harsh self-examination of our institutions and attitudes, and many unwelcome sacrifices, will be required.*

Our Founding Fathers' concern that declining virtue among the masses might render democracy's survival impossible, is indicated in Elliot Richardson's recent book, *The Creative Balance:*

> "In *The Federalist* No. 55, James Madison acknowledged that there are 'qualities in human nature which justify a certain portion of esteem and confidence.' Moreover, 'Republican government presupposes these qualities in a higher degree than in any other form. Were the pictures which have been drawn by the political jealousy of some among us faithful likenesses of the human character, the inference would be that there is not sufficient virtue among men for self-government; and that nothing less than the chains of despotism can restrain them from destroying and devouring one another.'"

A FRANKENSTEIN MONSTER

Because a capitalist economy in an industrial age thrives on society's permissiveness, which is inimical to the promotion of individual character, technology may have created an age in which Madison's fears for the survival of republican government are being realized.

Whittaker Chambers wrote in *Cold Friday:*

> "More and more I incline to a view, not at all original with me, that the whole technological development of civilization was a wrong turning; that we are harvesting its inevitable consequences; that we are at the end of a historical phase for which the only possible solutions are presently to be made by the Bombs. It is difficult at times to see it in any other way. It is difficult to see how there can be anything less drastic than a new beginning; both because the illogic of the current situation has to reach debacle by the play of forces that make it wrong; and because the sheer mass and complexity of historical error is now too great to be coped with by the mind in the form of good intentions. (This leaves out entirely the vast complicating mass of bad intentions.) That is what I mean when I say that the only possible solution will be made by the Bombs."

That technology has created a Frankenstein Monster can no longer be in doubt. Yet we cannot turn the clock back to a pretechnological age without precipitating an economic crisis nearly as destructive as nuclear holocaust. Hence we must, at all costs, find a way to live with technology without being ravaged by it — both physically and spiritually. And although the erosion of mankind's moral sense over the past half century makes Chambers' assumption of nuclear war's inevitability appear unanswerable, nevertheless, the ever-present possibility of mankind's awakening to the self-deception under which it has so long labored, and of asserting its innate capability to express the wisdom sufficient to meet the problem at hand, permits one to "hope against hope" that world catastrophe can be averted.

Facing the greatest crisis since the nation's founding, President Lincoln could declare: "The present is piled high with difficulties; and we must rise to the occasion." There then existed sufficient material and spiritual strength in the North to meet the South's challenge. Today the challenge to national survival is infinitely greater.

"LEVELLING" WITH THE AMERICAN PEOPLE

But since we face a seemingly superhuman challenge, we can only meet it, if at all, by a superhuman effort, evoked by a recognition of values transcending human survival. We might well recall the wisdom of the Chinese Mencius (372-290 B.C.) as cited by our great American philosopher Emerson:

> "I fully understand language," said Mencius, "and nourish well my vast-flowing vigor."
>
> "I beg to ask what you call 'vast-flowing vigor,'" said his companion.
>
> "The explanation," replied Mencius, "is difficult. This vigor is supremely great, and in the highest degree unbending. Nourish it correctly and do it no injury, and it will fill up the vacancy between heaven and earth. This vigor accords with and assists justice and reason, and leaves no hunger."

And a modern Mencius (in his best moments, capable of exalted thought; in his worst, of the greatest of crimes against humanity), Mao Tse-tung, declared:

> "As long as there are human beings in the world, every kind of miracle is possible."

Something of the conviction of the power of the human spirit to master seemingly insurmountable problems as above expressed, will be required, I am convinced, if our nation is to survive the greatest challenge to its existence in its 200-year history. To this end I would challenge our new Administration to make good on its promise "never to deceive the American people" by "levelling" with them as to the reality of the Soviet menace; and to call for their rededication to the moral and spiritual values on which our nation was founded, but which we have, all unwittingly, come to regard as anachronistic. Only this, I feel, can promote that rebirth of a national spirit equal to surmounting the unprecedented crisis now facing us and the rest of the Free World. □

VOICES AGAINST NUCLEAR POWER

—Carsten M. Haaland

Opponents to the development of nuclear power have enjoyed far-reaching publicity freely given by the press and TV to their often misleading and irrational statements. Some of these statements are obviously intended to frighten people, although there remains the possibility that their originators actually believe what they are saying. For example, Ralph Nader was quoted by the *New York Times* (January 14, 1973), in speaking of the nuclear power industry, as follows: "This is the first time that this country has permitted development of an industry that can wipe this country out." Gofman and Tamplin, in their book *Poisoned Power* (Rodale Press, 1971, p 21), wrote, "Yes, a nuclear juggernaut, responsive to no societal need, has been moving across the land, threatening a nightmare for life on earth — forever."

Other opponents have specialized on attacking particular aspects of the nuclear power industry. In his book *The Poverty of Power* (Alfred Knopf, 1976), Barry Commoner has chosen to concentrate on the tactic that capital costs will make nuclear plants impractical within a decade. David Dinsmore Comey, in many articles in the *Bulletin of Atomic Scientists*, has focused on costs, hazards, reliability, and various other topics on nuclear power as these topics become opportune to him. The Union of Concerned Scientists primarily emphasize the hazards of nuclear power. Although the opponents to nuclear power waged an expensive and dramatic campaign to stop nuclear power development in California, climaxing with the highly publicized defection of three engineers from the nuclear power industry, the citizens of that state in June 1976, voted two to one in favor of its continued development. Continued nuclear power development was also approved by all six states voting on the issue in last November's elections.

ARGUMENTS AGAINST NUCLEAR POWER

It is true that the large-scale development of nuclear power will bring about some attendant hazards and problems as would the large-scale development of any power industry. The public should be acquainted with the nature of these hazards and the problems as well as with their relative significance as compared with those generated in other areas of human existence.

The principal issues involved in the arguments against the development of nuclear power are these:

1) The possibility of an accidental core meltdown with subsequent release of large quantities of radioactive materials to the air;
2) the accumulation of large quantities of nuclear wastes which will remain radioactive for thousands of years;
3) the availability by theft or terroristic acts of materials from which atomic weapons can be fabricated; and
4) sabotage and/or blackmail involving the reactors, the fuel reprocessing plants, or the transport of radioactive materials, leading to the release of large amounts of radioactive materials.

Serious problems, possibly affecting many thousands of people could arise if any one of these issues were treated carelessly. Because of the recognition of these potential hazards, the nuclear industry has been tightly regulated, and the efforts spent on safety and reliability surpass those of any major undertaking in the history of mankind. A few of these efforts have been made as a result of just criticisms by opponents to nuclear power, indicating the value of having a free and open society in which critics can speak freely, although many have abused this privilege by unbelievable exaggerations and false statements. Some of these aforementioned issues will become more serious as the nuclear industry grows; however, most of the problems relating to these issues have been solved for the currently existing industry, and solutions are readily in sight for the future industry. A full discussion of each of the issues listed above would require many thousands of words, and they can be treated only superficially in this article. A more thorough discussion of these issues may be found in Peter Beckmann's fascinating and informative book *The Health Hazards of NOT Going Nuclear* (Golem Press, 1976) or in B.L. Cohen's more detailed book *Nuclear Science and Society* (Anchor Press/Doubleday, 1974)

ELOQUENCE AND ERROR

Before discussing the issues brought up by the Union of Concerned Scientists, let us briefly consider the specious arguments of Commoner and Comey. In his book, *The Poverty of Power*, Commoner attempts to prove by eloquent words

*This article is based soley on the author's research and conclusions and does not necessarily reflect policies or opinions of others.

Table 1. Reproduction of Barry Commoner's Energy-Capital Arithmetic (Reproduced from his testimony before Federal Energy Administration Hearings on Project Independence, Chicago, September 12, 1974) with Column "R" added. "R" represents the energy productivity of capital in units of millions of BTU's per dollar of capital.

Table I

Relationship Between Energy Production and Required Capital Investment

	1971			1975			1980			1985		
	BTU[2] (trillion)	Capital ($ million)	R	BTU (trillion)	Capital ($ million)	R	BTU (trillion)	Capital ($ million)	R	BTU (trillion)	Capital ($ million)	R
Petroleum Products	21,048	11,120	1.89	22,789	14,342	1.59	24,323	22,289	1.09	23,405	31,727	0.74
Gas	22,388	2,676	8.37	20,430	3,133	6.52	18,030	19,385	0.93	14,960	34,002	0.44
Coal	13,062	595	21.95	16,310	7,776	2.10	19,928	1,036	19.24	23,150	1,370	16.90
Nuclear Fuel	983	100	9.83	4,000	9,900	0.40	11,349	1,300	8.73	29,810	950	31.38
Other (nonsolar)[3]	7	0[8 1]		120	200	0.60	343	3,277	0.10	514	14,830	0.03
Electric Gen.	——	12,000	——	——	21,270	——	——	42,000	——	——	75,000	——
Totals	57,488	26,500		63,649	40,621		73,973	89,287		91,839	157,879	
Energy Productivity of Capital (1000 BTU/$ Capital)	2.17			1.57			0.83			0.58		

All data are from the National Petroleum Council report "U.S. Energy Outlook," using their data for Case I (maximum production), except for data on Electric Generation which were obtained, by extrapolation from values for 1973 (actual) and 1974-77 (planned), from McGraw-Hill, Department of Economics. The NPC capital values are reported in 1970 dollars. The capital values for Electric Generation reflect expected future costs, as estimated by each reporting utility and therefore include a variable inflation factor, and therefore, to this extent, somewhat overestimate expenditures.

1) Value less than $1 million.

2) These data are for 1970, since data comparable to suceeding years was not available for 1971. The recorded values therefore underestimate the above BTU values by about 3%.

3) Hydroelectric power, which is not expected to change significantly, is excluded.

Notes on Table I: The columns labeled "R" have been added to show the energy productivity of capital for *each* source of energy, in units of *millions* of BTU's per dollar of capital (not 1000 BTU/$ Capital, as Commoner's table erroneously defines it). The most important point to note in this table is that the energy productivity of capital of nuclear fuel shows, according to his table an increase from about 10 in 1971 to 31 in 1985, while all other sources show a decrease. The column for "R" has not been added to the 1975 data because the numbers for capital for coal and nuclear fuel are obviously wrong (compare adjacent years shown; the capital investment in nuclear plants certainly did not increase by a factor of a hundred between 1971 and 1975!) and the total of capital figures shown is 56,621, not 40,621 as shown.

Commoner favors solar energy, but does not list it as an energy source, possibly because the actual data would show that its productivity per dollar capital is much lower than coal or nuclear fuel. The costs per energy source are for capital costs for electric generation, and what Commoner calls "Electric Generation" actually is Electric Transmission! The energy source labeled "Other (nonsolar)" is shown to be over a thousand times less efficient than nuclear fuel in 1985, yet it is not defined or discussed by Commoner.

and mostly qualitative arguments that nuclear power cannot succeed because of lack of capital to meet the rising costs of nuclear power plants and nuclear fuel. He ignores strong evidence to the contrary which exists in the form of extensive and thorough calculations by utility engineers. These calculations typically show enormous projected savings (up to 1.4 trillion dollars through the year 2000) for the nation through the development of nuclear power (e.g., Bertram Wolfe, *Nuclear News,* May 1976). It is unlikely that utility engineers and executives would wish to install nuclear reactors if they were uneconomical but it is quite evident from accounts in magazines and in the press that many journalists have been enchanted by Commoner's eloquence.

A prime example of Commoner's carelessness with numbers is given in his presentation of Table I of his testimony before the Federal Energy Administration Hearings on Project Independence (See Table 1 which is a slightly amplified version of Commoner's Table I.) This table, prepared by Commoner's staff, is a summary of data compiled and prepared by the National Petroleum Council, and it shows the relationship between energy production and required capital investment for the years 1971, 1975, 1980, and 1985. Commoner used this table to argue that the efficiency of capital investment in producing energy will drop sharply from 1971 to 1985, which it does show on the *average*, if one includes petroleum products and gas. What Commoner failed to see, or at least failed to mention, was that this particular table shows that the efficiency of capital investment in producing energy (BTU/$) *increases* by a factor of three specifically for nuclear fuel from 1971 to 1985, a trend completely contrary to Commoner's position in this testimony and in his book *The Poverty of Power.*

David Comey's arguments are characterized by appearing to be thorough to the uninformed, but to be skillfully incomplete to the informed reader. He

specializes in omitting those particular facts which do not support his view and which would put a balanced perspective on the particular aspect of the energy situation under discussion. For example, when he writes that the capital costs of nuclear plants have increased enormously since 1964, implying that nuclear power should be discouraged, he fails to mention the fact that the capital costs of coal plants have increased even more because of environmental restrictions placed on stack discharges which require costly equipment to remove pollutants. His articles are published frequently in the *Bulletin of Atomic Scientists* (e.g., June 1976, p 33), which has become a strongly anti-nuclear journal, and has also nearly always opposed civil defense. Petr Beckmann has highly critical words for both Comey and the *Bulletin* in his book *The Health Hazards of NOT Going Nuclear.* Comey has also been criticized in *Forbes* magazine (September 1, 1975, p 30) in an article titled "Don't Confuse Us With Facts."

SCIENTISTS PRO AND CON

Many professional societies have endorsed nuclear power as the safest form of power generation, including the American Nuclear Society (10,000 members); the Energy Committee of the Institute of Electrical and Electronics Engineers (170,000 members); the Society of Professional Engineers (69,000 members); the National Council of the American Institute of Chemical Engineers (39,000 members); and the Board of Directors of the Health Physics Society (3400 members). A petition to slow down nuclear power, organized by the Union of Concerned Scientists in 1975, was able to obtain only 2300 signatures, less than 0.3% of the 770,000 scientists in the physical and life sciences in the United States. Yet the *Christian Science Monitor*, in March 1976, pointed to this petition and claimed that scientists were "split down the middle" on the issue of nuclear power!

During the past summer, the Union of Concerned Scientists mailed out a form letter, a pamphlet, a survey form, and a copy of the petition mentioned above, for the purpose of soliciting new members and money. Both the letter and the pamphlet are replete with half-truths, faulty logic, exaggerations, and alarms for dangers which do not exist. For example, there is a section in the letter which begins with "These are the facts:" The very first paragraph implies a hazard which hardly exists. It reads as follows:

> "A typical nuclear power plant contains an amount of radioactive material equal to the radioactive fallout from thousands of Hiroshima-size weapons. The fear is not that these plants will explode like an atomic bomb. But much of this radioactive material is gaseous and could easily be carried by the wind for many miles if accidentally released."

Beginning with the first sentence of this paragraph, it should be pointed out that there was hardly any radioactive fallout from the Hiroshima weapon because it was exploded in the air. Consequently the completely vaporized materials of the fireball were rapidly lifted into the stratosphere to such a height that virtually no nuclear radiation from these materials reached the ground. However, if the Hiroshimas weapon *had* been burst on the surface, the pertinent units to indicate what is important are *curies*, and the very different nature of the emitters and their rates of decay are of basic importance. These properties are not simply comparable with the "amount of radioactive material." The number of curies specifies the degree of radioactivity, which is an important measure of the potential hazard. One could have several thousand tons of radioactive material which would be relatively harmless if the level of radioactivity, i.e., the number of curies, were small.

Potassium, widely used in fertilizers, is "radioactive," yet is considered to be entirely harmless, and rightly so. Of course, the fuel of nuclear reactors is more radioactive than potassium but much less so than the material of a freshly exploded bomb.

In terms of the correct and pertinent units for comparison, the number of curies in the radioactive material of a Hiroshima-type surface burst at a reference time of one hour after the burst is approximately 75 billion curies. In comparison, the radioactivity in a typical 3200 MW (thermal) Pressurized Water Reactor after a reasonable time of operation is on the order of 50 billion curies, *less* than the Hiroshima-type weapon, not "thousands" of times *larger* as the Union of Concerned Scientists would have the unthinking and uniformed reader believe.

FACT VS FANTASY

To be fair, however, one must consider the different nature of the emitters. After two days, the radioactivity from the Hiroshima type burst will be reduced a hundred-fold, whereas the radioactivity of the PWR material will be reduced much less, depending on the materials actually used in the core. The total damage which could be inflicted to humans over a period of many years would be greater from the radioactivity of the PWR materials than from that of the Hiroshima-type weapon, but only by factors of tens, not thousands.

Now let us consider the last sentence of the quoted paragraph, which also needs modification. Instead of "much", substitute "about 7%" (primarily radioisotopes of the noble gases krypton and xenon which are not among the most hazardous). What the reader also needs to know here is that the accidental release is about as probable as being struck by a meteor. Furthermore, in the process of being carried a few miles downwind, the "accidentally released" radioactive gas would be diluted with the air to the point of being harmless.

This exercise in refuting just one paragraph gives an indication of what a job it would be to refute the entire letter and the pamphlet put out by

the Union of Concerned Scientists, of whom Ralph Nader has said, "They have performed a public service ... which will go down in history."

These voices against nuclear power, with their specious arguments and unnecessary alarms, will cause the United States to lose uncountable billions of dollars as a result of an inevitable slowed-down availability of electrical energy and the necessity for increased purchases of foreign oil. Futhermore, because each nuclear plant of 1,000 MW (e) capacity that will replace a coal-fired plant in the future will save between 20 and 100 additional lives per year from all causes throughout the fuel cycles, further delay of the development of nuclear power is actually resulting in unnecessary deaths. Using 1974 figures, with 53.1% of all electricity supplied by coal-fired steam, and a total U.S. capacity of almost 500,000 MW, this translates to no less than between *5,000 and 25,000 excess deaths per year* (Beckmann, op. cit.)!

However, it is generally conceded among the energy experts that we need to develop both our coal and nuclear resources for the best solution of our energy problems.

Fortunately, there is evidence that science editors of responsible magazines and newspapers are becoming more knowledgeable of the nuclear industry. Perhaps the day will come when journalists will not make headlines out of irresponsible and sensation-seeking claims against the nuclear industry. □

ADDITIONAL READING

The California Nuclear Initiative, Analysis and Discussion of the Issues, Edited by W.C. Reynolds. A copy may be obtained by sending $3.50 (includes taxes, postage, and handling) to Nuclear Analysis, Institute for Energy Studies, 500A, Stanford, California 94305.

Skeptic Magazine, Issue No. 14, July/August 1976. The entire issue is devoted to the nuclear power debate. *Skeptic* is published bimonthly by Skeptic Magazine, Inc. 812 Presidio Avenue, Santa Barbara, California 93101.

REVIEW

— by R.F. Blodgett

WORLDWIDE EFFECTS OF NUCLEAR WAR ... SOME PERSPECTIVES

U.S. Arms Control and Disarmament Agency, Washington, D.C. 20451

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price 50 cents, Stock Number 022-000-00052-1, 24 pages, 1976

This is an excellent little booklet for both the novice interested in the subject of nuclear warfare or the expert who is well acquainted with the problems of weapon yield, explosive force, and radiation protection factors. For the newcomer there are boxes of digest information explaining in laymen's terms the basics of nuclear weapons yield and design, radioactivity, and nuclear half-life, fission, fusion, etc.

For the expert there are thresholds, seldom thought of, suggesting that the total of 500 megatons of nuclear yield detonated between 1945 and 1971 are insufficient to possibly cause some of the larger catastrophic world-wide effects. Some of these disasterous results, while still frought with a tremendous number of unknowns range from elimination of enough of the ozone to significantly raise the world's ultraviolet exposure to the point of causing more biological problems than the initial fallout from weapons. This, further, could change the earth's temperature by several degrees to greatly alter the agricultural growing regions.

Recommended for anyone and everyone. □

EDITORIAL ...

"ONLY THOSE WHO NEGLECT ..."

Chuykov's words, which are on this issue's cover, were obviously "not for export." They were strictly for Soviet consumption. They were intended to reassure Russians that scare stories about nuclear warfare as the "end of civilization" were poppycock. They warned them that survival depended principally on proper preparations of defensive measures by the people and by their leaders. They were to convince them that surviving a nuclear attack is a matter of before-the-fact choice.

Correctly so. Let the weak and the gullible glut themselves on fantasies of "overkill" and Mutual Assured Destruction. *"Only those who neglect the study, mastery and use"* of protective measures will be destroyed. The better these measures are perfected the more assured is the capability of overcoming the effects of a nuclear attack — and consequently the more remote becomes the possibility of such an attack.

What are these protective measures? No mystery. They include (1) a strong government-backed paramilitary civil defense structure reaching undiluted to the grass roots, (2) planned permanent dispersal of industry and population, (3) planned evacuation, (4) planned blast and fallout shelter, (5) planned emergency stocks of survival equipment and supplies, (6) planned and ready *active* defenses — within treaty limitations — such as the anitballistic missile (ABM), and (7) training and periodic testing of plans.

Thanks to such a posture Russians can hope to submit to an all-out nuclear attack with a very high survival rate, perhaps as high as 98%. What enemy would be foolish enough to attack with only 2% fatalities in the offing?

But where does that leave us — the USA? It leaves us holding the nuclear bag. For twenty years apologists have cleverly pandered the idea that a virile American civil defense would be impossible, exorbitantly expensive, unnecessary, ineffective, dangerous, ridiculous, and a threat to adversaries. They have in this way created what they call a "hostage concept" wherein our people — our women and children — stand naked as proffered nuclear fodder before an aggressor. They have succeeded in scrapping ABM, whose only capability was to intercept incoming missiles and whose only promise was to save American lives and industry. They have made a gutter joke of homeland defense.

They have, in fact, charted for America a course that could lead it to defeat and oblivion.

Unless we can now react — and here we hinge on an awakening that has in the past year gathered surprising momentum. It took root when Congressional "Oversight" hearings played a spotlight on our home defense vacuum. Since then newspapers, periodicals, Congressmen, industrial safety specialists, civic leaders, even television networks, have begun to examine — with no little shock — our predicament.

This opens a new door. Through it the new Administration can, if it chooses, restore to us the dignity of our heritage, the right to protect ourselves — as the Russians now do — against the weapons of an attacker. The right in this manner to discourage aggression through a hard-core in-depth preparedness. The right to opt for best possible odds for peace.

Even the prospect of focussing on a new and workable basis for disarmament.

"Only those who neglect ..."

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