

Letters

Nuclear Weapons: Wartime Bomb Projects

Deborah Shapley's article on Japan's wartime atomic bomb projects (News and Comment, 13 Jan., p. 152) caused much concern and dismay in some circles of Japan when it was reported in major newspapers here. To me the article was not as maliciously written as one might have thought from Japan's newspaper coverage. Shapley's conclusion that Japan "would not have hesitated to use the bomb against the United States" is essentially correct and holds for any other country as she so suggests. What worries me is the impression this article might give to the American public—that the Japanese covered up this story and appealed to the guilt feelings of Americans: In short, Americans have been deceived.

I would like to argue against her claim that this story "in Japan [of today], has become a social secret." Of course, right after the war, Professor Nishina and his associates had every reason to fear their possible arrest and prosecution for their wartime effort and naturally would not talk about it. As a young boy growing up during the postwar period, I have a clear recollection of reading about this project in a major magazine for boys. Admittedly, the Japanese would not like to discuss it nowadays and, as a consequence, many of them are not aware of it. This is certainly one side of the story to which we as Japanese must give serious consideration. Still, for those of us who have a rather vivid memory of the last war, this story is a fact and we Japanese have not deliberately concealed it.

Perhaps the feelings of most Japanese on nuclear weapons is best expressed in the epitaph inscribed on the monument in the Peace Memorial Park in Hiroshima. It reads: "Rest in peace. [We] will not make a mistake again." Literally the subject "we" is absent, a common mode of expression in Japanese. It is our understanding that this implicit "we" are the human beings of the world, ourselves included.

NORIO HAYAKAWA

*Chugoku Institute of Industrial
Technology, Kure,
Hiroshima 737-01, Japan*

It is astonishing how Shapley distorts the historical facts in her article of 13 January. Regardless of whether Japan had an atomic bomb project or not, it is historical fact that Japan was the only victim, and the government of the United States is the only authority who used the bomb against humanity. Moreover, I must emphasize that any nation whose survival was threatened would use every available means of defense, including the atomic bomb.

I have discussed the subject for many years with many Americans of varied ethnic backgrounds. Most of them were horrified at what America did to their fellow human beings. However, there are some who refuse to recognize America's grave error. There are many excuses for covering up. Shapley adds another one.

NOBUYUKI NAKAJIMA

*5115 Lake Road,
Sheffield Lake, Ohio 44054*

One theme of Shapley's article on Japan's wartime bomb project is that the attempt of the Japanese to *develop* the bomb justifies our *use* of the bomb. This point is made most explicitly in the quote from de Solla Price but is also implied by Shapley.

We fail to see how Japan's attempt to develop the bomb relates to the morality of the United States' use of the bomb at the time and in the manner in which we did so. We do not mean to belittle the historical significance of the interesting facts disclosed in the article, but we do not feel it affects the moral issue. We regard it as a truism that Japan, as well as any of the warring nations, would have developed the bomb if she could have.

The morality of its use has been defended by spokesmen for the United States government on more relevant grounds, for example, that its use saved tens of thousands of lives, the American lives that would have been expended in an invasion of Japan. It is important to examine the validity of this statement.

At the time the bomb was dropped the Japanese were beaten. We had complete control of the sea and air and were systematically eliminating her capability of waging war. There is reason to believe that the Japanese would have surrendered if we had not, by insisting on un-

conditional surrender, opened the possibility that the Emperor would have to be tried as a war criminal. The single concession of the inviolability of the Emperor would, probably, have brought the war to an immediate end.

That the United States did not, as far as we are aware, make any attempt to end the war by such a concession to Japanese pride, or even, as suggested by some, a demonstration of the bomb's power in some way which would not have cost so many lives, suggests that moral considerations played no part in the decision to use the bomb. In fact, the use of the plutonium bomb on Nagasaki, before the Japanese had adequate time to react to the uranium-235 bomb dropped over Hiroshima, suggests something quite different. It suggests, rather, that the momentum of the Manhattan District Project was so great that it almost had to roll to its inevitable conclusion. The attempts on the part of those few, as exemplified by Szilard, who tried to brake this juggernaut by the use of moral consideration, were almost inevitably ineffectual.

A. THEODORE FORRESTER

*Departments of Physics and
Engineering, University of California,
Los Angeles 90024*

WILLIAM C. FORRESTER

*10140 North Sepulveda Boulevard,
Mission Hills, California 91345*

I found Deborah Shapley's News and Comment article on the Japanese efforts to build an atomic bomb during World War II of considerable interest. Along with a number of other graduate students working in Ernest Lawrence's Radiation Laboratory, I became involved with what later evolved into the Manhattan Project just after Christmas in 1941, three weeks after the bombing of Pearl Harbor. The work at Berkeley resulted ultimately in the construction of the large electromagnetic separation plants in Oak Ridge, Tennessee. Most of the uranium-235 for the Hiroshima bomb was separated by these spectrographs—the Calutrons (1).

One of the most difficult problems of the electromagnetic separation method involved the space-charge forces acting between ions in the ion beams. A simple calculation shows that, in the absence of any mitigating mechanism, space-charge forces would destroy any coherent beam whose magnitude might be of practical interest for separation of uranium-235.

During the fall of 1941, using the 37-inch cyclotron magnet, Lawrence and others found experimental evidence indicating that the space charge in a urani-

Yes, friend,
but have you
heard about
the new
Pine-Dri™?



Much of what you've said over there (←) about Ab-Sorb-Dri applies to Pine-Dri also, except that it's made exclusively of Northern White Pine. Same heat-treating to reduce moisture content, and aspiration to remove dust. And contamination is also minimal and the additives absent. In use it's similar, too. Some differences: it's somewhat easier to handle and tends to last longer because it's more absorbent (absorbs 2.5 times its own weight in liquid). Available from those same distributors in 27 lb., 3-ply, autoclavable, heat-sealed bags containing 3 cu. ft. of bedding.

For more Pine-Dri information and your distributor's name, write or call Lab Products Inc., 365 W. Passaic St., Rochelle Park, N.J. 07662 (phone: 201/843-4600).

lab products
inc a BioMedic company

**Lab Products...not just
plastic cages, metal cages,
custom fabrication, laminar
flow systems, bedding,
automatic watering systems,
accessories...**

Copyright © BioMedic Corporation 1976

Circle No. 238 on Readers' Service Card

1288

um beam might be undergoing neutralization by some unknown process. This finding encouraged our subsequent intensive work on the electromagnetic method.

By the summer of 1942 we had moved our work to the new, larger magnet that had been intended for the 184-inch cyclotron. There we were able to try out much larger spectrographs, which were more nearly of practical size for a full-scale plant.

Unfortunately, the space charge was not neutralized under all operating conditions. We studied elusive neutralization phenomenon ad nauseum, and it often seemed that we would have to abandon the whole method.

The space-charge problem was more serious with the larger machines, but ultimately we learned the sensitive operating conditions required for its neutralization. Although the major features of the neutralization mechanism were explained, some details apparently remain obscure even today (2).

In February 1972, I lectured in Munich about my own experiences on the Manhattan Project, including a discussion of the space-charge problem. Afterward, H. Morinaga mentioned to me that the Japanese physicists abandoned efforts to separate uranium-235 by the electromagnetic method because they anticipated the space-charge problem. It was the first time I was aware of any project in Japan, but it did not surprise me.

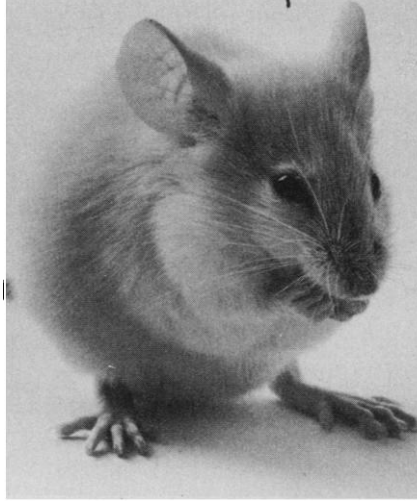
Shapley states that "Takeuchi . . . gave up on electromagnetic separation because he couldn't have Miyamoto around to help." It seems more likely, in view of Morinaga's remark to me, that it was at the "Physics Colloquium" in 1942-43 that theoretical calculations on space-charge effects arrested any serious Japanese attempts at electromagnetic separation. The Germans in their project were also discouraged from attempting electromagnetic separation by space charge (3).

It was Ernest Lawrence's conviction that the electromagnetic method could be made to work which helped carry the project to success. Although the gaseous diffusion method ultimately proved very much superior for separating uranium isotopes, it played very little role in World War II.

Today, a large fraction of the world's separated stable isotopes for research are produced in the still-remaining portion of the Calutron mass spectrographs. But, as pointed out by L. O. Love (2), space-charge "blowup" occasionally is still a plague to proper beam separation.

Although opinions certainly differ as

Ab-Sorb-Dri™
is my
favorite
bedding!



Ab-Sorb-Dri consists only of hardwood chips that have been heat-treated and aspirated under the most exacting sanitary conditions. Low moisture. Minimal dust. Minimal contamination. Free of additives. Highly waste and odor absorbent. I can move it easily to expose new, dry surfaces . . . providing a long cage life. Doesn't mound under bottles or hide me or my associates. Easily removed from my cage without scraping. Available from distributors in 40 lb., 3-ply, autoclavable, heat-sealed bags containing 3 cu. ft. of bedding.

For more information about Ab-Sorb-dri and the name of your local distributor, write or call Lab Products Inc., 365 W. Passaic St., Rochelle Park, N.J. 07662 (phone: 201/843-4600).

lab products
inc a BioMedic company

**Lab Products...not just
plastic cages, metal cages,
custom fabrication, laminar
flow systems, bedding,
automatic watering systems,
accessories...**

Copyright © BioMedic Corporation 1976

Circle No. 239 on Readers' Service Card

SCIENCE, VOL. 199



THE MOST CORROSION RESISTANT FREEZE-DRYING SYSTEM AVAILABLE DURA-DRY®

Complete Systems to 20 Liters.
Condenser Temperatures to -84°C .

Complete Accessories for

- Manifold Drying
- Bulk/Tray Drying
- Automatic Stoppering
- Combinations



RESEARCH ANY FREEZE-DRY PROGRAM... MATCH ANY FREEZE-DRYING TECHNIQUE

Let us show you our DURA-DRY corrosion-resistant Freeze-Dry Package... It will give you something to ask our competitors about.

RESEARCH FREEZE-DRYERS ... with a BUILT-IN future.

FTS SYSTEMS, INC.

P.O. B. 158, STONE RIDGE, NY 12484
(914) 687-7664

Circle No. 141 on Readers' Service Card

1290

to whether the bombing of Hiroshima was necessary for hastening the end of the war, it would be hard to contest that today a tribute is due the Japanese for their museum in Hiroshima, whose message is clear: There should never again be atomic bombing, or for that matter, any other kind of bombing.

F. H. SCHMIDT

Department of Physics, University of
Washington, Seattle 98195

References and Notes

1. R. G. Hewlett and O. E. Anderson, Jr., *The New World* (Univ. of Pennsylvania Press, Philadelphia, 1962), see particularly p. 374. Reprinted as *USAEC Rep. WASH 1214* (1972).
2. L. O. Love, *Science* **182**, 343 (1973).
3. D. Irving, *The German Atomic Bomb* (Simon & Schuster, New York, 1967).

Energy Facility Siting

The California Coastal Commission is attempting to solve the kind of agonizing problems associated with coastal energy facility siting that are raised by Luther J. Carter in his article on the Hampton Roads Energy Company refinery and oil terminal proposed for Virginia's Elizabeth River (News and Comment, 10 Feb., p. 668). The California gas utilities have been seeking approvals for a liquefied natural gas (LNG) terminal site on the coast for 4 years. Confidence in the utilities' site selection has been low because they originally chose a site in Los Angeles Harbor, near a major earthquake fault. Their current choice, a remote area on the western end of the Santa Barbara Channel near rich kelp beds, expensive ranches, and excellent surfing spots, has aroused intense opposition. Frustrated with the uncoordinated permit processes and suspicious of the companies' site selections, the California legislature has required the Coastal Commission to determine the least objectionable site for an LNG terminal.

This is an uncomfortable technical role for a coastal management and land use planning agency. The commission has evaluated 82 possible sites. The public nominated 16 of them. Woodward and Clyde geotechnical consultants, H. J. Degenkolb and Associates structural engineers, and John J. McMullen Associates maritime consultants assisted the commission in evaluating the sites, and, after a public hearing, the commission eliminated 77 of the sites and retained five for a final ranking (1). The California Liquefied Natural Gas Terminal Act of 1977 requires the commission to base this site ranking primarily on protection of coastal resources, but the costs of the

ranked sites must be reasonable. This site selection process is completely open. The gas utilities are major participants in the process, but so are the Sierra Club, the Western Surfing Association, and property owners near the five candidate sites.

This is an experiment worth watching. The final site ranking must be submitted to the California Public Utilities Commission by 31 May 1978, and that commission determines whether the terminal is needed and whether to approve it at the site ranked number one by the Coastal Commission. Carter asks, "Is there no better way by which sites for refineries and other major energy facilities could be selected and approved?" Perhaps there is, but this LNG terminal siting exercise may alienate natural supporters of the Coastal Commission, because it has an active role in siting a facility with unavoidable, large, and adverse coastal impacts. In addition, the commission will be in that uncomfortable position heretofore reserved for energy companies, when a site is selected and a few years later an unknown earthquake fault is found nearby or a massive oil spill occurs, threatening valuable coastal resources, hundreds of millions of dollars of investment, and the agency's credibility and confidence (2).

WILLIAM R. AHERN

California Coastal Commission,
631 Howard Street,
San Francisco 94105

References

1. California Coastal Commission, "Preliminary and final staff recommendations on proposed liquefied natural gas terminal sites to be retained for further study and ranking" (San Francisco, 11 January 1978 and 26 January 1978).
2. W. R. Ahern, in *Proceedings of the Symposium on Technical, Environmental, Socioeconomic and Regulatory Aspects of Coastal Zone Management* (American Society of Civil Engineers, New York, 1978).

Coal Liquefaction: Cost Estimates

Lest your readers think pioneer coal liquefaction plants are a bargain, I should note that the estimated cost for a pioneer coal liquefaction plant capable of processing 10,000 tons of coal per day, as given in my article "Liquid fuels from coal: From R & D to an industry" (10 Feb., p. 621), is a misprint. Current estimates are around \$750 million (1976 dollars), not \$75 million.

L. E. SWABB, JR.

Synthetic Fuels Research,
Exxon Research and Engineering
Company, Post Office Box 101,
Florham Park, New Jersey 07932

SCIENCE, VOL. 199