guage, that they didn't know what they would have done.

And on 31 December when Lee DuBridge, director of the M.I.T. Radiation Laboratory, wrote to the acting secretary of war on behalf of the scientific community, suggesting that U.S. scientists restore "at least Dr. Nishina's 60-inch instrument" in view of the great loss to physics and the world, Acting Secretary of War Kenneth C. Royall replied:

> It is unsound to intimate that scientists are citizens of the world alone, are internationalist and not loyal to their native lands and are never willing participants in the ambitions of dictators or tyrants. The evidence to the contrary is too overwhelming for the American public to accept this thesis, for modern war is scientific and total war in toto. Without the scientist or the technical worker the terrible instruments of destruction of the present day would not have been possible.
>
> In the interests of the country and of the American scientists themselves, I believe you should exert your influence to prevent any campaign for the restoration of a cyclotron to the Japs at this time. . . .

The end of the story concerns the fate of the Riken and Japanese physics after the war. Both the Japanese historians, Hirosige, and the anonymous narrator of the science and technology history, note that in America, "the bomb project was opportunity and gathering of scientists, and marriage of science to large scale technology and engineering and production," and that other nations, particularly America, "positioned themselves and physics" for the postwar period.

But in Japan the result was the opposite. The Riken was dissolved "as a result of the defeat," although Nishina later raised money to reestablish it on a different footing. Elsewhere in Japan, physicists were restrained from atomic research, and allowed only to work on applications to biology and medicine. But without the big equipment to support pioneering work, Japanese physics did not reattain the prominence it had had in the 1930's. As the historians conclude, the physicists and their laboratories were "victims" of the war.

Could the Japanese have had an atomic bomb in World War II? All the historians, Japanese and American, echo the conclusion of the Physics Colloquium, that Japan did not have the uranium, resources, or organization for a full-scale Manhattan-style project. So the danger—as turned out to be the case with the Germans—was not a real one.

But the historical importance of the project lies not in the fact that Japan failed but that she tried, and that Japan's postwar attitude, that she, as the one nation victimized by atomic weapons, is above seeking to acquire them for herself, is not historically accurate. The historical record shows—on the basis of the eagerness of her military and the willing cooperation of her scientists—that if other factors had made a bomb possible, the leadership—which by the end of the war were placing their own youth in torpedoes to home them on the advancing U.S. fleet—would not have hesitated to use the bomb against the United States.—DEBORAH SHAPLEY

Pollution: Chemical Company's Effort to Sue Its Accuser Fails

In a quiet country courtroom in the small Eastern Shore town of Denton, Maryland, a conclusion that is sure to please environmentalists was reached last month in an obscure court case with potentially far-reaching implications. For what appears to be the first time in this country, a firm accused of pollution had sued its principal accuser for defamation after the firm had been forced to close as a result of massive adverse publicity. A jury, however, dismissed the suit, concluding in effect that the physician who had publicized the firm's pollution problems had merely fulfilled his responsibilities as a scientist by making his discoveries known. The story of the battle between company and physician contains no small touch of irony, moreover, because the company itself was originally founded to alleviate another pollution problem.

Paul J. Mraz was a chemical engineer with the Dupont Company when he observed that Dupont and other chemical companies in the Northeast corridor were forced to dump spent solvents because it was not economical for each of them to recycle the relatively small amounts each produced. He reasoned, probably accurately, that a tidy profit could be turned and an environmental problem eliminated if solvents from each of the companies were collected and distilled together, and then the purified solvents were sold back to the companies. His big mistake seems to have been in choosing a Maryland valley as the place for his plant.

Solvent recycling was never destined to be an immensely profitable business, so Mraz chose an inexpensive location, a burned-out paper mill in the bucolic Little Elk Valley near Elkton, Maryland. He installed distilling equipment, christened the firm Galaxy Chemical Company, and began operating on weekends in 1961. By 1965, Mraz was able to quit his job at Dupont and devote all his time to the fledgling company. Between 1965 and 1977, the company processed more than 8 million gallons of solvents; its income peaked at $438,000 in 1974.

Mraz traces the beginning of his problems to 1967, when pathologist Pietro U. Capurro took a position at the Union Hospital of Cecil County in Elkton and purchased a home in the valley. Shortly thereafter, Capurro noticed in the valley a frequent odor that has been described at different times as "gluelike," "disagreeable," "pungent," "vomitlike," "skunklike," and "peppermintlike." The chemicals responsible for the odors collected in pockets in the valley and lingered there much longer than they might have in the open. He soon found, moreover, that members of his own family and more than a quarter of the 200 or so residents of the valley had become mysteriously ill, complaining of eye and nose problems, headaches, indigestion, abdominal pain, weight loss, nausea, fatigue, and other ailments.

Physicians visited individually by citizens of the valley were at a loss to explain the ailments, presumably because they saw only one or two of the residents of the valley and were not familiar with the conditions there. Ultimately, a number of residents were examined by Capurro or by Eloise W. Kailin, then an allergist in Silver Spring, Maryland. Each recognized the classic symptoms of poisoning by chemical fumes.

Both physicians alerted the Maryland State Health Department to the problem, but that department was slow to act. Capurro and other residents began a letter-writing campaign to local and state offi-

0036-8075/78/0113-0157$00.50/0

cials and to local media. Eventually the Health Department took Galaxy to court, and in September 1970 the plant was ordered closed until pollution control devices were installed. Cecil County Circuit Court Judge H. Kenneth Mackey also ordered the company to refrain from using a wastewater lagoon for disposal of wastes left over at the end of a distillation.

Initially, Mraz refused to install the pollution devices and threatened to move the plant to another state—a response that might have been his best bet. The move did not materialize, however, and Mraz then began installing some of the equipment. Early in 1971, Judge Mackey allowed the plant to be open on a part-time basis to test the new pollution-abatement devices. Mraz's finances were very shaky because of the closure, and at one point a sheriff's sale was scheduled to auction off the plant's assets for repayment of more than $100,000 in outstanding company debts. Ultimately, Mraz obtained financing, the rest of the pollution equipment was installed, and the plant reopened on a full-time basis.

Apparently the pollution-abatement equipment was not sufficiently effective, for valley residents continued to complain about the odors and their physical symptoms. Galaxy was shut down briefly again later in 1971 when Judge Mackey concluded that clean-up procedures hadn't been proceeding fast enough, but it reopened and the Circuit Court subsequently seemed satisfied with the company's efforts. Valley residents were not, however, and in 1972 Capurro, his wife, and eight other valley residents sued Galaxy, alleging that fumes from the company had made them ill. The ten complainants shared an award of $34,932.

Meanwhile, Capurro was collecting data about the health of valley residents and maintaining a running dialogue with the media. He documented, for example, more than 40 cases of pancreatitis, an acute inflammation of the pancreas that frequently results from exposure to toxic chemicals, among the residents of the valley. He also cataloged a variety of other ailments.

Most crucial, Capurro observed eight cases of cancer among 120 individuals who had lived in the valley for 6 years or longer. He seemed to tie these cases directly to Galaxy when he wrote, in an unpublished paper distributed to reporters: "In a community where the residents

Briefing

Congress Eases Capitation Punishment

Congress seems to have settled the year-long wrangle over a provision requiring U.S. medical schools to accept transfers of some American students studying in foreign medical schools as a condition of receiving a form of federal aid known as capitation grants. Medical schools had opposed the measure, arguing that it interfered with their right to apply their own selection criteria; the issue had set the House and Senate at odds. A compromise reached just before Congress adjourned for the holidays effectively reduced the number of students the schools will be obliged to take and cut the life of the measure to a single year from the 3-year term in the original bill.

The major residual effect of the tussle may well be the bringing of the whole mechanism of capitation grants under closer and perhaps unfriendly scrutiny. Representative Paul G. Rogers (D–Fla.), chairman of the House subcommittee with jurisdiction over most legislation affecting medical schools and sponsor of the measure benefiting Americans studying medicine abroad, has asked the General Accounting Office to study the usefulness of the grants. Decisions by some 15 U.S. medical schools to forego the grants if it meant accepting students who did not meet the school's admission requirements reportedly led Rogers to question whether the schools really needed the capitation funds (currently about $1050 per student). Rogers was not alone in wanting a review of the grant program. The House-Senate conference report on the amendment includes an agreement to carry out such a review this spring.

Medical schools have consistently argued in recent years that they are hard-pressed financially and need increased federal funding. The discussion has been tinged with tensions because the schools have sought support with a minimum of strings attached while Congress has tended to offer funding on condition that the schools take actions it favors, such as increasing enrollments or creating programs for primary care specialties.

It is not yet clear how many of the schools which renounced the capitation grants will go along with the compromise, the main feature of which is a requirement that a medical school expand its third-year enrollment by 5 percent to accommodate the transfers from abroad. A final decision can be deferred until a February deadline, and several schools are known to be waiting to see the final form of the regulations issued by the Department of Health, Education, and Welfare.

On Capitol Hill scant enthusiasm is detectable for carrying the measure beyond this year. The compromise is regarded as discharging the commitment to the group of students now in the pipeline made in the original amendment to the manpower bill. But second thoughts about the necessity and fairness of the measure appear to have contributed to a general desire to end the episode. The amendment was tacked onto the bill in special circumstances (*Science*, 12 November 1976). It didn't seem to be a bad idea at the time. Now, it appears to affirm the wisdom of holding the debate before you legislate.

Laetrile Tops FDA's Most Unwanted List

Laetrile is the target of the Food and Drug Administration's own media blitz. The centerfold of the November-December issue of the FDA's *Drug Bulletin* is a poster warning that Laetrile is toxic. The FDA is already on record as strongly rejecting claims that the substance is beneficial in cancer therapy.

The *Bulletin* is sent to a million physicians, dentists, nurses, and other health professionals and is said to have the largest circulation of any health publication in the world. The poster was prepared in the hope that the professionals will take note and display it where the public will see it. About 10,000 copies of a blow-up version of the poster are being sent to post offices.

Distribution of the poster is unusual though not unprecedented for the FDA. In the 1950's a similar poster was employed to warn against a quack cancer cure then in vogue—the so-called Hox-

0036-8075/78/0113-0158/0

were chronically exposed to a mixture of solvent vapors in the atmosphere, the annual death rate due to malignancies appears to be about seven times the rate otherwise expected. The total death rate in the community is thereby doubled." Three of the malignancies were lymphomas, a relatively rare form of cancer not expected to occur with that great a frequency. It was notable, Capurro wrote, that the "people who died of lymphoma had all lived within about a kilometer of the plant, two being within perhaps 100 meters."

This paper and others prepared by Capurro received national attention in the press and led to a 2-year study of the health of valley residents by the Maryland State Health Department. That study, released last November just before the start of the trial, confirmed Capurro's estimate that the overall death rate in the valley was about 2.2 times the national average. It also found that the occurrence of lymphomas in all of Cecil County was about twice the national average. The study stopped short, however, of attributing these effects to any specific cause.

Another effect of the media attention, Mraz says, was that Galaxy began to receive bomb threats, abusive letters, and irate phone calls, and many of his best customers became reluctant to do business with him. From a peak of $438,000 in 1974, Galaxy's revenues plummeted to $22,000 in 1976, the year the firm's creditors foreclosed. Mraz formed a small new company, Solvent Distillers Inc., and leased back the facilities, and began to operate on a small scale again. But the damage had clearly been done, and Mraz decided to sue Capurro for $2.1 million.

The jury trial focused not on the odors that emanated from the plant but on Mraz's belief that Capurro had associated the excess cancer deaths in the valley with emissions from Galaxy. "I can't think of any greater calumny," said Galaxy's lawyer, George W. Constable, "than saying that somebody's killing people." Capurro "showed an obsessive desire to get Galaxy," Constable said, and in doing so, "he ignored facts which contradicted his theory." This narrow focus of the trial largely ignored the serious problems associated with the breathing of chemical fumes and directed attention to a complex scientific problem on which there is not even agreement among experts in the field.

Galaxy's star witness was environ-

sey cancer cure. And in 1970 the hazards of an electrical apparatus called the Relaxacisor, which sometimes accidentally imparted a strong electrical shock to users, were the subject of a poster. The Laetrile poster notes that "Laetrile can be

LAETRILE WARNING

Cancer patients and their families are warned that

LAETRILE IS WORTHLESS

Whether sold as a drug (amygdalin) or as a "vitamin" (B-17) Laetrile is worthless in the prevention, treatment or cure of cancer. The substance has no therapeutic or nutritional value.

LAETRILE IS DANGEROUS

Laetrile can be fatal for cancer patients who delay or give up regular medical treatment and take Laetrile instead.

Laetrile contains cyanide and can cause poisoning and death when taken by mouth. One infant is known dead of cyanide poisoning after swallowing fewer than five Laetrile tablets. At least 16 other deaths have been documented from ingestion of Laetrile ingredients (apricot and similar fruit pits).

Laetrile is especially hazardous if the injection form is taken by mouth. This can cause sudden death.

LAETRILE MAY BE CONTAMINATED

Laetrile is not routinely subject to FDA inspection for quality and purity as are all other drugs.
Analysis has shown some Laetrile to contain toxic contaminants.
Ampules of Laetrile for injection have been found with mold and other adulterants which can be dangerous when injected.

Those who persist in the use of Laetrile or its ingredients should:

- Be prepared to deal promptly with acute cyanide poisoning if the oral product is used. Vigorous medical treatment must be started immediately or death can result.
- Watch for early symptoms of chronic cyanide poisoning, including weakness in the arms and legs and disorders of the nervous system.
- Keep the drug out of reach of children.

GET THE FACTS

For full details about the hazards of Laetrile, see your family physician or a cancer specialist or write the Food and Drug Administration, Laetrile, HFG 20, 5600 Fishers Lane, Rockville, Maryland 20857.

Donald Kennedy
Commissioner of Food and Drugs

fatal for cancer patients who delay or give up regular medical treatment and take Laetrile instead." The toxicity warnings in the *Bulletin* and on the poster say that Laetrile, which is made of apricot pits, contains cyanide and "can cause poisoning and death when taken by mouth." The text adds that Laetrile is not subject to FDA inspections for purity and quality and that toxic contaminants have been found in some samples.

Academy Would Send Observer to Dissident's Trial

The Soviet government will apparently go ahead with the trial on treason charges of a dissident computer scientist on whose behalf the National Academy of Sciences recently sought to intervene. The Academy announced on Christmas day that NAS president Philip Handler had cabled Soviet President Leonid Brezhnev for permission to send a legal observer to the expected trial of Anatoly B. Shcharansky, who has been accused in the Soviet press of involvement with the U.S. Central Intelligence Agency. The Academy request is the first such action taken in its public and private presentations in behalf of Soviet dissident scientists.

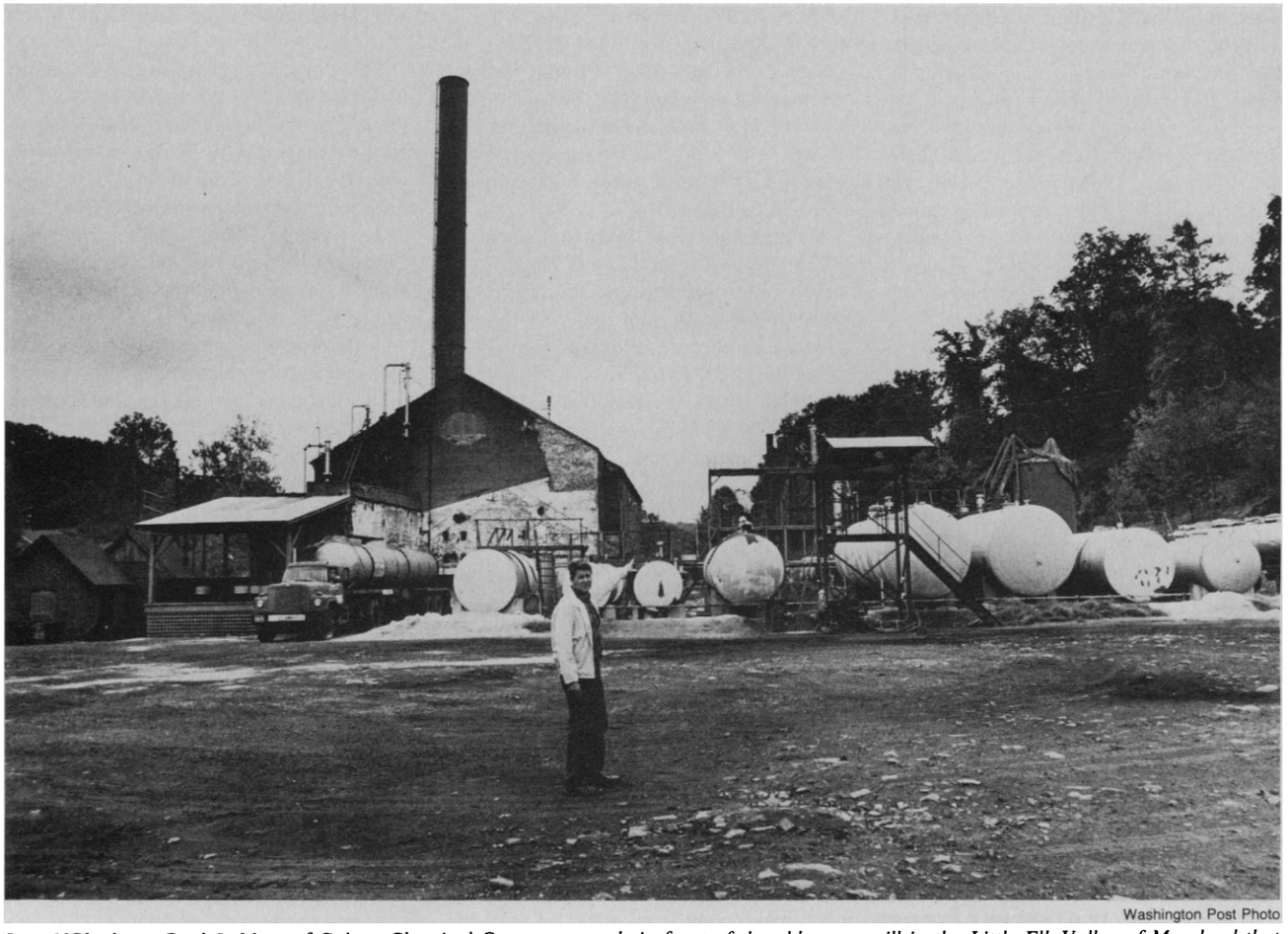
Shcharansky, who is Jewish, worked in a research institute of the Soviet petroleum ministry until 1975 when he was dismissed after repeated applications to emigrate to Israel had been rejected. He has been active both in efforts by "refuseniks" to win greater official receptivity toward requests to emigrate and also in the broader human rights movement in Russia. Shcharansky speaks English and has served as a spokesman to Western reporters.

Shcharansky was arrested in March and reportedly has been held incommunicado since then. Under Soviet law, 9 months is the limit for detention without trial and in mid-December that period expired and was extended for 6 months by special decree. There was speculation that the Soviets wished to avoid action which would exacerbate American feelings at a time when the human rights provisions of the Helsinki accord are under discussion.

President Carter at a recent news conference, commenting on charges in the Soviet press that Shcharansky had worked for the CIA, said that he found no link between the scientist and the U.S. intelligence agency. Soviet press accounts said Shcharansky was being investigated on charges which carry a possible death sentence. A recent article in the Soviet press said that Western protests amounted to blackmail and indicated that Shcharansky would be put on trial.

The Academy request for permission to send a legal observer was based on a statement on the Shcharansky case prepared by the Academy's committee on human rights. The statement also asks that Shcharansky be allowed contact with relatives, friends, and legal counsel of his own choosing and that all legal proceedings be open to the public. Handler's cable repeats the statement's comment that "The widespread reaction to Dr. Shcharansky's detention reflects the grave concern of his colleagues in the United States and elsewhere for his welfare and their fear that further actions against him will severely damage scientific interactions with the USSR." The Academy so far has received no reply from the Kremlin.

—John Walsh



Washington Post Photo

In a 1970 photo, Paul J. Mraz of Galaxy Chemical Company stands in front of the old paper mill in the Little Elk Valley of Maryland that was converted for use in recycling industrial solvents. Fumes from the plant have been an irritant to valley residents.

mental epidemiologist William P. Radford of the University of Pittsburgh. Radford said flatly that it was exceptionally unlikely that emissions from Galaxy were responsible for the increased incidence of lymphomas since the plant simply had not been in operation long enough. Chemically induced lymphomas, he said, generally have an incubation period of at least 10 years, and more often 20 years. Galaxy, in contrast, had been in full-time operation only 2 or 3 years when those lymphomas were observed in 1967 and 1968. If, in fact, the lymphomas were caused by an agent in the environment, he added, the most likely explanation was the paper mill that had operated on the Galaxy site previously. All three lymphoma victims had, in fact, actually worked at the paper mill until it closed more than 20 years ago.

Radford's testimony was rebutted by Samuel S. Epstein of the University of Illinois, who told the jurors that "in my opinion, there is a very high degree of probability that the excess number of lymphomas are directly attributable to the emission of high concentrations of carcinogens from Galaxy. . . ." Epstein further noted that the incubation period for lymphatic cancers could be anywhere from 2 to 15 years, adding that "there is some indication of people getting it in less than 2 years." Epstein specifically cited benzene—one of the more than 30 solvents processed at Galaxy—as a possible cause for the lymphomas. If Capurro had not made his findings known to the public, Epstein concluded, he would have been reckless and "criminally negligent."

Faced with such sharply conflicting testimony, the jury apparently chose the course of least hazard and rejected Galaxy's suit. The significance of their decision is difficult to assess, but the complexities of the case illustrate the problems encountered when a jury of laymen is forced to rule on a complicated scientific issue. Capurro had, apparently, never considered the possibility that the paper mill might be a factor in the development of the lymphomas and had never mentioned the mill in any of his presentations. Both he and his attorney seemed surprised when Radford cited the mill as the probable cause of the malignancies.

Epstein's contention that chemically induced lymphomas can have such short incubation periods, furthermore, is not widely accepted. There is no doubt that lymphomas can appear with explosive speed in immune-suppressed patients given potent anticancer drugs, which are themselves carcinogenic. The risk of lymphoma in such patients increases by a factor of 35 within a year. But the potent immunosuppressive agents used in such cases are generally acknowledged to be the primary cause of the increased risk, and none of the victims in Little Elk Valley had been exposed to such agents. Epidemiologists at the National Cancer Institute contacted by *Science* agreed that such cases of immune suppression are the only instances of such short incubation periods that they are familiar with. It would thus seem that, despite the jury's findings, the most likely cause of the increased cancer incidence was the old paper mill after all. Unfortunately, by addressing this narrow issue of cancer, the trial seems to have obscured the more important effects of Galaxy on the health of valley residents.

—THOMAS MAUGH II