

fait accompli, and opposition quickly dwindled to a small proportion of the population. A similar fate is forecast for today's protesters by Hans Rühle, one of Helmut Kohl's top advisers in the Ministry of Defense. "There is nothing as successful as success and nothing as disappointing as not having success," he says simply. "I think [that by] mid-1984, the peace movement will be down to 5 percent."

Leaders of Die Grünen, or Greens, which led the protest, disagree. "The mood is one of resignation," concedes Sabine Bard, one of the Green's 28 parliamentary delegates. "We are just now working on our long-term strategy." But already demonstrations are planned for 22 April, Easter Sunday, and a European-wide peace referendum is being organized for 17 June. Activists point out that European deployments of the Pershing and the cruise will not be completed until 1986, and that each new shipment will

provide a fresh opportunity for public protest.

In Denmark, the parliament recently voted to disassociate itself from the missile deployments. There is also little support in Greece, and substantial opposition in Belgium. In Norway, NATO funding was approved by a single vote in November 1982. In the Netherlands, the government of Rudolphus Lubbers has forecast unofficially that parliament will reject the deployment in June, unless the United States offers concessions so that the negotiations in Geneva can resume. Additional pressure for concessions has come even from the government of Helmut Kohl. As Hans-Dietrich Genscher, Germany's foreign minister, recently noted, "the Soviet Union has been engaged in a reassessment of the international situation, and . . . a review of its policy, since November. In such a situation, the West must not simply stare like a rabbit stares at the snake—its duty is to

influence the process constructively."

There is a temptation in the United States to dismiss these complaints as arrogant, insincere or temporary, and to simply write them off. Under Secretary of State Lawrence Eagleburger, for example, recently chastised the Europeans for being "consumed by their own problems" and unwilling to look outside their own borders. As a result, he said, "the center of gravity of American foreign policy [is shifting] from the transatlantic relationship toward the Pacific Basin and particularly Japan," where anti-American protests have lately been infrequent. But Europe *has* been looking outside its own borders, and lately it is not attracted by what it sees in the West. The United States ignores at the peril of the Western alliance the increasing signs of European disaffection.—R. JEFFREY SMITH

*This is the third article in a series on the European missile deployments.*

## Renewed Interest in Food Irradiation

### *FDA ponders approval as proponents push it as an alternative to pesticides*

By any other name, irradiation of food would probably have been sanctioned by the federal government years ago. But because "irradiation" mistakenly conjures up visions of glowing food, food manufacturers, unsure of consumer acceptance, have not vigorously pressed for federal approval. As a result, the Food and Drug Administration (FDA) has been less than swift to authorize the use of irradiation. However, with increasing concern about the presence of ethylene dibromide residues in food, there is renewed interest in irradiation as an alternative to the fumigation of fruits and vegetables.

Although the technology has been feasible since the 1950's, it was only last year that the FDA sent a recommendation to the Department of Health and Human Services to expand the use of irradiation. But Secretary Margaret Heckler has yet to sign off on the proposed regulation and even then, FDA would have to solicit public comment on the proposal before granting final approval. In November, Representative Sid Morrison (R-Wash.), whose constituency includes apple growers, introduced legislation that would speed up FDA approval.

FDA has already permitted some applications of irradiation of food but to a very minor extent. For years, astronauts have consumed irradiated food as have individuals who suffer from immune deficiencies and must eat sterilized food. Last summer, FDA authorized the use of irradiation to clean up spices, which are often contaminated with insect parts and bacteria in their natural state.

Proponents of irradiation envision much wider use of the treatment, contending that it can offer a significantly better food product. Irradiation has been successfully used to inhibit sprouting, kill larvae in harvested fruit and vegetables, and destroy contaminants such as salmonellas in chicken and trichinae in pork. The treatment can also kill *Clostridium botulinum* and eliminate the need for nitrite in bacon. The Department of Commerce speculates that irradiation could improve the quality of domestic meat and fruit for export, which could lead to a better balance of trade. And the U.S. military, which has been a principal researcher of irradiation, has long advocated it in order to provide troops with food that tastes fresher and has a longer shelf life than canned groceries.

The United States has lagged behind

international acceptance of irradiation and critics of FDA say that the agency has been unduly cautious. In 1977, a joint committee of the World Health Organization, the International Atomic Energy Agency, and the Food and Agriculture Organization reviewed a multitude of studies and concluded that irradiation is safe and effective for several foodstuffs. In 1981, the same committee issued virtually unconditional approval of irradiation when applied at medium energy levels. About 20 countries now allow irradiation for various applications, processing a total amount of 2000 tons annually. The Japanese, for example, irradiate thousands of pounds of potatoes every year to prevent sprouting. Despite the international committee's recommendations, the United States still has not adopted the committee's standard. Ironically, a senior FDA scientist was a member of the joint committee that voted unanimously for the standard.

Irradiation suffers from a terrible public image in the United States. FDA has received numerous handwritten letters by individuals who have little understanding of the process, but object to it nonetheless. Irradiation uses ionizing en-

ergy to preserve food at levels that do not produce radioactivity. "It is a total misconception that you can produce radioactivity [from food irradiation]," says Thomas Cochran, a physicist at the Natural Resources Defense Council. (The council, however, has not taken an official position on irradiation per se.)

The process uses gamma rays from a cobalt-60 or a cesium-137 source, or high energy electrons from an electron accelerator. Doses up to 100 kilorads (krad) kill insects such as the Medfly and control sprouting. Medium doses of 100 to 1000 krad reduce bacterial counts. Higher levels sterilize food and eliminate viruses, so that the food, such as pre-cooked meats, have a shelf life of up to 7 years. The shelf life of canned foods is only about 2 years.

FDA and others are concerned that irradiation might form harmful compounds after food is treated, but so far testing has uncovered nothing unusual. Sidney Wolfe, director of the Health Research Group, would like to see more through evaluation of these by-products. He says there is "still a need to identify what's in irradiated food." On the other hand, FDA has pinpointed 65 by-products of irradiated food and all of them can be found in other non-irradiated food. Debra Schechter, a spokeswoman for the Center for Science in the Public Interest, says that the group has not done an in-depth study of irradiation, but so far it "is not concerned about irradiation. We don't think there is anything wrong with it."

In 1981, the international joint committee ruled that the use of 1000 krad was safe and acceptable. But higher levels may prove to be acceptable as well. Dean Cliver, a microbiologist at the University of Wisconsin's Food Research Institute and a U.S. delegate to the joint committee, wrote FDA that "a good deal of evidence" suggests that levels of at least 5000 krad do not pose any threat. This point is apparently further supported by recent research conducted by the U.S. Department of Agriculture (USDA). Department scientists will soon submit to FDA the results of a massive study in which more than 300,000 pounds of sterilized chicken were fed to numerous experimental animal species. The chickens were irradiated using the various energy sources and then fed for 2 years to mice, rats, rabbits, and beagles. Donald Thayer, who directed the study and is head of the USDA's Eastern Regional Food Safety Laboratory, says the studies, which evaluated toxicological, birth and reproductive effects, demonstrated that irradiation is safe.

Despite the endorsement of the international committee of 1000-krad doses, the FDA in 1981 gave notice that it would consider a limit of only 100 krad for most foods. (The agency does permit doses of 1000 krad to irradiate spices.) Herbert Blumenthal, who is director of toxicology in FDA's bureau of foods and was a member of the international committee, says the agency took this position because studies of food treated at 100 krad or less have showed no adverse effects. According to FDA, foods irradiated at doses greater than 100 krad and comprise more than 0.01 percent of the diet may contain a sufficient quantity of unique by-products to warrant further toxicity testing. Blumenthal defends



*The Netherlands, which permits food irradiation, handled the labeling problem by requiring packages to carry the symbol shown above to designate irradiation.*

FDA's 100-krad limit, saying that it introduces a greater margin of error should any risks be present.

But FDA's proposal has perplexed many food specialists. Edward Josephson, who headed the Army's research on irradiation for 15 years, wrote FDA that numerous long-term animal feeding studies conducted over the past 20 years have not demonstrated any confirmed ill effects.

The difference could mean success or failure for companies interested in the process. According to Commerce Department estimates, companies investing in an irradiation plant must process several million pounds of product to be profitable. At FDA's proposed 100-krad dose, food processors are limited to killing fruit flies in food and inhibiting sprouting. This use of irradiation cannot generate enough volume of food to justify the investment, a point that Blumenthal acknowledges. The higher dose would allow broader applications of irradiation and make the venture profitable.

Proponents say that irradiation can be used successfully with a wide variety of foods, but perhaps not all. Some foods that were previously fumigated with EDB, such as papayas, do well when irradiated. Papayas are a significant export crop for Hawaii. The Environmen-

tal Protection Agency says that citrus fruit can be successfully irradiated. But Florida's department of citrus and the California Citrus Council both claim that irradiation at the levels required to destroy fruit flies in fresh citrus cause blemishes in the peel and also make the pulp mushy.

FDA approval of food irradiation has become hampered in part because Congress ruled in 1958 that irradiation must be considered a food additive, rather than a process such as heating, freezing, or canning. This designation immediately threw up several barriers to approval and "has made us the laughing stock of the world," says Cliver of the University of Wisconsin.

According to federal law, food additives cannot be used until their safety is established. This principle seems reasonable in theory, but in practice it makes testing of irradiation very difficult. The classic way to test food additives, such as saccharin or other chemicals, is to subject laboratory animals to concentrated doses of the substance. But irradiation cannot be evaluated in the same manner, so over the years FDA has labored to meet congressional wishes with limited success.

The classification of irradiation as a food additive also means that irradiated food must be labeled. This requirement threw cold water on whatever interest major food processors previously had. The international committee explicitly addressed the issue in its report and said, "It was . . . not thought necessary on scientific grounds to envisage special requirements for the labelling of irradiated foods."

In the United States, manufacturers of spices and pet foods so far have shown the most interest in pushing approval of irradiation. But until FDA comes up with a solution to the labeling problem that will not alarm the consumer, the technology is not likely to be widely used. Representative Morrison's bill would overturn the 1958 legislation, changing irradiation's classification as a food additive to a food process. The change would free food processors from the labeling requirement and also subject the process to testing requirements that canning and other methods must pass. The House health and environment subcommittee chaired by Henry Waxman (D-Calif.) has jurisdiction over the legislation and a subcommittee aide says that the bill will probably not be reviewed until after May, when consideration of the budget is completed. Maybe by then, FDA will have reconsidered its limit of 100 krad.

—MARJORIE SUN