Permanent closure of Brookhaven National Laboratory's High Flux Beam Reactor is lamented: "It is a tragedy that in this important field [of neutron scattering research], which was pioneered in the United States, we are now second- if not third-class citizens compared with Western Europe and Japan." Dietary supplements and their definition, regulation, safety, and manufacture are discussed. Creativity is critical to problem-solving, but the question is raised whether the process of creativity is different for individuals and groups. And the function of the thick wax rims in honeycombs is explained.

A Loss to Science

As a research physicist and the dean of science at the Massachusetts Institute of Technology, I am dismayed by the Department of Energy's decision to shut down permanently the High Flux Beam Reactor at Brookhaven National Laboratory [see the News of the Week article by David Malakoff (26 Nov., p. 1661)]. This research reactor has produced an enormous amount of significant scientific research over its 34-year history and will be sorely missed by the scientific community, as well as by those who have benefited from this research.

Brookhaven's High Flux Beam Reactor has reached the end of the line.

CREDIT: BROOKHAVEN NATIONAL LABORATORY

The reactor has been shut down since January 1997 after the discovery of tritium leaking from the reactor's fuel-storage pool. The Department of Energy and Brookhaven National Laboratory acted responsibly in keeping the reactor closed and informing the community while evaluating the environmental impact of this situation. An environmental impact statement was to be released for public and scientific comment as part of the process of deciding whether to restart the reactor; however, the decision to close the reactor permanently came first.

Energy Secretary Bill Richardson has said the decision was based on economics. That reasoning, however, does not seem take into account the tens of millions of dollars it will cost to dismantle the reactor—not to mention the cost to this nation's place in science.

The United States, led by scientists at Brookhaven, used to be a world leader in neutron scattering research. Using the reactor, U.S. scientists have made pioneering advances in the physics of phase transitions, low-dimensional magnetic systems, and high-temperature superconductors, as well as contributed to the development of a drug that alleviates the pain associated with bone cancer. It is a tragedy that in this important field, which was pioneered in the United States, we are now second- if not third-class citizens compared with Western Europe and Japan.

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Dietary Supplements: What Is in the Public's Best Interest?

In his Policy Forum "Regulation of 'nutraceuticals'" (*Science*'s Compass, 17 Sept., p. 1853), Steven H. Zeisel discusses the Dietary Supplement Health and Education Act (DSHEA) and proposes additional regulations for dietary supplements, or "nutraceuticals" as he defines them. The intent of the DSHEA, passed by the U.S. Congress in 1994, was to establish a framework for the regulation of dietary supplements and to facilitate consumers' access to these products. As vice president of Nutritional and Regulatory Science for the Council for Responsible Nutrition (CRN), I want to comment on several items discussed by Zeisel that warrant clarification.

In the first paragraph, Zeisel uses the phrase "presumed health-enhancing benefits" in defining dietary supplements, implying that no solid evidence supports such health benefits. This is not the case; for example, in 1992, the U.S. Public Health Service recommended that women of child-bearing age consume 400 micrograms of synthetic folic acid every day to prevent neural tube birth defects. Well-established evidence also supports the beneficial use of calcium, vitamin E, chromium, and selenium supplements.

Zeisel later comments, "It is often difficult to distinguish among nutrients, food additives, and drugs"; however, the definitions outlined in the Food, Drug and Cosmetic Act offer adequate criteria to differentiate these products. Definitions depend on the intended use of the substance; for example, a "drug" is defined as a substance that is used to "treat, cure, mitigate and diagnose" disease. If calcium carbonate is used as an antacid, it is a drug; if used as a neutralizing agent in a conventional food, it is a food additive; and if added as a source of calcium, it is a nutrient. According to Zeisel, product potency should serve as the distinction between a drug and a nutrient; however, the Food, Drug and Cosmetic Act prohibits such classification, and multiple exceptions would invalidate the generality of such a scheme. For example, vitamin C has a number of biological activities, with thresholds for effect ranging from 10 milligrams for the prevention of scurvy to more than 1000 milligrams for complete inhibition of carcinogenic nitrosamine production in stomach contents. This range, and the fact that unfortified and unsupplemented diets easily can provide about 1000 milligrams of vitamin C per day, depending on food selection, make any "physiological" versus "pharmacological" distinction related to intake level meaningless.

Zeisel also says that "DSHEA modifies the regulatory environment so that it becomes possible, even likely, that products will be marketed that inadvertently harm people." But prescription and over-the-counter drugs also have an obvious record of harming people.

The CRN agrees with Zeisel that the Food and Drug Administration (FDA) should develop good manufacturing practices (GMPs) for dietary supplements. In fact, CRN petitioned the FDA to do so and provided a set of prototype GMPs that would be appropriate.

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Although Zeisel's proposal for the FDA to increase its oversight of dietary supplements is well intentioned, an added layer of regulation would restrict public access to dietary supplements. In terms of public safety, the DSHEA has encouraged