LETTERS

Fusion Program

I was very interested in Mark Crawford's article "Hard times in magnetic fusion" (News and Comment, 31 May, p. 1069), and I thought it deserved a perspective from the cognizant authorizing committee in the House of Representatives. I chair the Subcommittee on Energy Research and Production of the House Science and Technology Committee, which authorizes the Department of Energy (DOE) Magnetic Fusion Energy (MFE) program, and I believe several points should be made so that your readers will better understand what has happened with the MFE program. The MFE funding cuts are typical of budget reductions in energy technology development programs, for example, nuclear fission and electric energy R&D, but they have lagged behind the program cuts in these other areas by about 2 years. Many members on the Science and Technology Committee recognized the realities of dimmer fusion budget prospects shortly after the passage of the MFE Engineering Act of 1980 and thought it was imprudent to think in terms of such a goal-oriented program toward a demonstration reactor in the 1980's. However, the major reason that the MFE program has suffered significant budget cuts is the fact that there are no champions on the appropriations committees in either the House or the Senate. In fairness, I should point out that certain House members have been preoccupied with appropriation priorities for the Tennessee Valley Authority's nonpower activities and entities such as the Appalachian Regional Commission, two programs where very drastic cuts have been recommended recently by the Reagan Administration. Nevertheless, I believe the positive aspect of the budget crunch has been that DOE is looking at smaller, less costly concepts and, in particular, at a lower cost, that is, under $500 million, fusion ignition device. It is unfortunate that DOE has not been able to convince the appropriations committees that, even at a reduced funding level (in the neighborhood of $400 million), it is still important to maintain a focus in the U.S. MFE program and that a lower cost ignition device will do precisely that. It is regrettable that machines such as the MFTF-B cannot be operated as designed, but the community consensus is that it is much more important to retain a program thrust that provides meaningful near-term goals for the mainline program than to heavily support a backup concept given the limited resources.

It is also important to recognize the climate for international cooperation in magnetic fusion. The Technical Working Party of the Versailles Summit has recently issued a statement of strong support for the U.S. lower cost ignition experiment. It should be emphasized, however, that the United States cannot expect major cost-sharing in such a device from either the Joint European Torus group or Japan. I believe that the revised strategy for the U.S. MFE program should be to embrace a lower cost ignition device in the near term with plans for the United States to "leap frog" the Japanese Fusion Energy Reactor and the European Community's Next European Torus device in the early part of the next century. Certainly we must keep in mind that the MFE program, although now on a stretched-out timetable relative to the very ambitious Engineering Act, must not lose its focus. I think this is particularly important in the sense that Congress should not support a diffuse, unfocused program at a constant level of effort, such as in the case with the so-called "national trust" programs in high energy and nuclear physics. The pressures to hold down federal spending will continue, but I believe that if DOE makes its case, a strong, focused effort can go forward at a budget level of roughly $400 million, allowing for inflation.

MARILYN LLOYD
Subcommittee on Energy Research and Production, Committee on Science and Technology, U.S. House of Representatives, Washington, D.C. 20515

Medicinal Plants

While I was pleased with the useful compilation of "Natural plant chemicals" by Manuel F. Balandrin *et al.* (Articles, 7 June, p. 1154), I fear one statement might further discourage investigations of medicinal plants here in the United States.

Balandrin writes that "The development of new medicinals from higher plants is costly and time-consuming because those readily available plants having pronounced pharmacological effects . . . have been known for centuries and have been thoroughly investigated." Casual readers might take this to imply that further developments of new medicines from higher plants are unlikely.

Science has just published reports of two exciting new botanical drugs from long-established medicinal plants with pronounced pharmacological effects, qinghaosu from *Artemisia*—an old Chinese folk remedy for malaria (Articles, 31 May, p. 1049); and etoposide, a semisynthetic antitumor compound from *Podophyllum peltatum*—an old Indian folk remedy for cancerous conditions (Articles, 7 June, p. 1154).

Papaya's digestive properties have been known for centuries, but only in this decade was chymopapain approved by the Food and Drug Administration for lower back problems. And it was in this decade that the FDA approved the use of *Lobelia* in pills to help curb the smoking habit. *Lobelia* was used by the Amerindians for just that purpose. These recent breakthroughs should alert the American pharmaceutical industry to the fact that there are many more useful compounds awaiting discovery among the tens of thousands of existing folk medicines, many in the disappearing forests of Latin America.

Whole plant utilization—extracting medicines, leaf proteins, vitamins, polyphenols, essential oils, and chemurgics and using the residues for alcohol production for energy—could move us from the petrochemical to the phytochemical era, with the possible fringe benefits of slowing the "greenhouse effect" and making us more self-sufficient.

JAMES A. DUKE
Germplasm Resources Laboratory, Beltsville Agricultural Research Center, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland 20705

Duke touches on an important point. We did not mean to imply that further drug development from higher plants is unlikely. As we repeatedly pointed out, higher plants and their secondary metabolites continue to be important as sources and models of drugs, food additives, and a plethora of other specialty products. In addition to the examples mentioned in our article and in Duke's letter, we can cite the recent discovery, isolation, and structure elucidation of the natural plant-derived sweetener, hernandulcin (*1*), and the medicinally active sulfur compounds of garlic and onions (*2*). Furthermore, nabilone (Cesamet), a synthetic cannabinoid related in chemical structure to delta-9-tetrahydrocannabinol (the main active principle of marijuana), has recently been approved for commercial marketing by the Food and Drug Administration (FDA). This com-