ton must and will continue to play a preeminent role in international fusion research," he says, and predicts Princeton will stake out "an increasingly prominent role in influencing national [fusion] policy."

NASA Plugs Leaky Shuttles—At Last

After a long summer and autumn of discontent, NASA engineers finally say they've found and fixed persistent hydrogen leaks that grounded the space shuttle fleet from May to October.

Engineers even think they know what caused the leaks. An analysis of the shuttle *Atlantis*'s fuel system revealed that microscopic glass beads somehow migrated into fuel-line seals a decade ago during the assemblage of a key component. As for *Columbia*, a NASA spokesperson says leaks were probably introduced early this year when engineers took apart the shuttle's fuel system to look for suspected contamination. While putting it back together, they managed to crush important seals.

While these crucial mysteries may at last be solved, NASA's skies are not yet clear—through no fault of the agency. Prepared to launch *Atlantis* and its secret military payload on 9 November, NASA learned that the satellite payload—which is said to be a spy satellite aimed at the Persian Gulf—has developed unspecified problems that may delay the launch as much as 2 weeks. That will once more push back the long-postponed Astro-1 astrophysical mission, which now probably won't see orbit until next year.

Bailing out of the Bomb Business

The Department of Energy decided last month not to reopen the Plutonium-Uranium Extraction (PUREX) plant at its Hanford Reservation near Richland, Washington—a chemical processing plant used to separate plutonium and unused uranium from the nuclear waste produced by DOE reactors. The decision effectively ends the federal government's production of plutonium for nuclear weapons.

DOE first closed down PUREX in late 1988 because of accumulating environmental and safety problems. But the next year, the facility's contractor, the Westinghouse Hanford Company, recommended restarting it—not to recover weapons-grade fissionables (although they would, in fact, be recovered), but to process 2096 metric tons of irradiated nuclear fuel held in short-term storage at Hanford. On the strength of that report, DOE planned to restart PUREX in 1991.

That decision led to a fresh round of protest by the Hanford Education Action League, a Washington State environmental group, which said that liquid radioactive waste produced by the extraction process might explode while stored in underground tanks. Last June, the General Accounting Office also criticized a PUREX restart as being unjustified on either environmental or national security grounds. Since DOE plans to obtain plutonium for nuclear weapons from retired warheads, GAO observed that "the national defense need for PUREX appears to have been largely eliminated." GAO also opposed restarting PUREX for waste reprocessing, arguing that better alternatives may exist.

Race into the Crust

German researchers in September re-started an attempt to drill the world's deepest hole—up to 14 kilometers—after a 4-month halt to re-evaluate the surprise-filled venture.

The project, aimed at gaining a better understanding of the deep layers of the earth's crust, began in 1987 with a pilot hole near the Czech border. Drillers were expecting to find a 3-kilometer deep boundary between two plates that collided 320 million years ago. The project was scaled back from 14 to 10 kilometers last year when the drill bit encountered a lot of hot, salty water at 3200 meters (see *Science*, 4 August 1989, p. 468). At 3600 meters, another setback occurred when the core revealed layers of alternating rock types, showing major deviations from the geological model. By last April, at 4000 meters, drillers stopped when they had still not penetrated the bottom of the overlying plate.

Now they're at it again, in a new hole. The German government plans to sink DM 498 million ($325 million) into the venture, and the goal is to reach 10 kilometers by 1994. Then, it's on to between 12 and 14 kilometers—past the Soviets' 12-kilometer Kola well in Murmansk. The United States still lags far behind in scientific drilling, with only a 3500-meter hole.

Missouri Botanical Garden

Missouri Botanical Garden's English Woodland garden.

Botanical Splice

One of the "most important centers of plant conservation and research in the world" will come into being next year. In January, the Center for Plant Conservation in Jamaica Plain, Massachusetts, will move its administrative offices to St. Louis to join the Missouri Botanical Garden, the country's oldest botanical garden and one of the world's largest.

The Center, which manages the National Collection of Endangered Plants, is a membership organization of 20 botanical gardens around the country which has as its central mission the conservation of endangered flora of the United States. The Garden's director Peter Raven says the linkage of the two organizations will give the Garden a large plant conservation component while offering the Center a strong institutional and research base. The direct linkage of the institutions' databanks will also enable monitoring of all the available information on the conservation and management status of U.S. plants. Center director Donald A. Falk adds that the bureaucratic streamlining will free up resources to expand conservation and restoration programs. "Any time I can replace a bookkeeper with a botanist, that makes me feel we're moving in the right direction," he says.

The merger will also put under one roof the Flora of North America program, coordinated at the Garden, which is a 12-year effort to catalog all the plants on the continent along with information on their management.