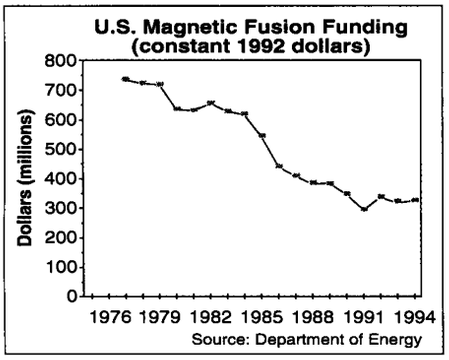


Cash flow. Fusion has fallen on hard times.

to mothball it (*Science*, 14 December 1990, p. 1501). Although ATF has run sporadically since then, it will be shut down next month. The funding roller coaster also took its toll on the scientific work force: Of the 300 fusion scientists and engineers at Oak Ridge when ATF began operations in 1989, only half remain.

What happens next

DOE officials say they have no plans to discard the Princeton lab, regardless of what happens to TPX. "They made a monumental effort over the past few years to get TFTR up and running," says Davies. "It's not a reflection on Princeton—their capability, or their importance to the program—that they're going to be without a major operating facility for some years."

In the meantime, DOE wants to focus its fusion research on the sort of problems that commercial power reactors face. "One of the things I'm not very happy about is that ITER is going to have to be built out of today's materials, which will become very, very radioactive" when exposed to the neutron radiation from the fusion reaction, she says. "That's because we haven't developed the low-activation materials that all of us expect will make fusion an environmentally attractive energy source." DOE hopes to be able to fund a proposed international particle accelerator that could bombard materials with neutrons to simulate fusion radiation.

But even with this restricted portfolio, the fusion program faces serious political hurdles. Last year, Senator J. Bennett Johnston (D–LA), chairman of both the appropriations subcommittee that funds DOE and the committee that authorizes its programs, warned DOE that he would not provide funding to start building TPX this year until the Administration assured him that it was committed to ITER. His stance was an effort to avoid the political wavering that led to the cancellation of the Superconducting Super Collider. Davies says the Clinton Administration intends to give Johnston some sort of assurance, but it is "premature for the United States to make an unqualified commitment to the construction of ITER. We don't have a good cost estimate and we don't have a good set design."

Among the options DOE is considering, says Krebs, is a proposal by Princeton's Davidson for a presidentially appointed special negotiator for discussions on ITER, for ITER to be part of July's meeting of the G-7 countries, and for a high-level interagency task force to coordinate ITER planning. White House science adviser John Gibbons says the Administration is weighing its response but that the President supports ITER and fusion in general. Clinton "was very impressed with the TFTR results," Gibbons says.

However, it will not be easy to reconcile the short attention span of politicians with the generation-long program of fusion researchers. "The difficulty with fusion is that it is a 100-year project, and politicians don't think in that way," says Krebs. International collaboration eases the cost for the United States, but it adds the nightmarish complexity of international negotiations.

Whatever happens, fusion researchers expect continued uncertainty and turmoil. But they are kept going by a belief that politicians will find it impossible to resist the lure of limitless energy.

–Christopher Anderson

ENDANGERED SPECIES

Fire Threatens Galápagos Tortoises

"Slow but steady" has carried tortoises to victory in some races. But now, as fire sweeps across an island in the Galápagos, that strategy will not save one of two remaining populations of an endangered species of giant tortoise called *Geochelone guntheri*. Human help is on the way, however. The Ecuadorian army is on alert to coordinate evacuation of the threatened group of about 20 giant tortoises if fire breaks fail to contain the fire raging on Isabela Island in the Galápagos Archipelago off the coast of Ecuador.

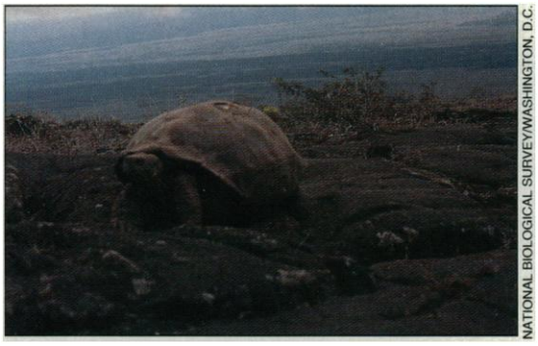
"The *Geochelone guntheri* is one of the most precarious species [of Galápagos tortoise] at the present time," says tortoise specialist Thomas Fritts of the National Biological Survey in Washington, D.C. Hence the contingency plans for evacuating the 40- to 225-kilogram specimens if the fire gets too close. The rescue team, which includes members of the Ecuadorian park service, will have to carry the tortoises out by hand, because the rocky volcanic terrain of Isabela island is too rough for vehicles.

A preview of the maneuvers was offered the last time the tortoises needed to be put out of harm's way (during a 1985 fire), when "teams of two men tied each tortoise to a pole and carried it slowly across the lava and the crevices" to the shore, says Fritts. There, the tortoises were housed in rock pens until the fire burned out.

The reason many of the 11 or so species of giant tortoises need to be handled with such care now is that they haven't always been treated with respect. During the 18th and 19th centuries, they were hunted almost to extinction by whalers and settlers who used them as a source of meat and oil. Now, the decimated tortoise populations' major threats are nonnative animals—goats that compete for food, as well as dogs and pigs that eat tortoise eggs and baby tortoises—along with periodic fires triggered by cyclical changes in climate.

Approximately every 7 years, the warm waters of El Niño displace the cooler Humboldt currents, changing the Galápagos' dry climate to a wet, tropical one. This spawns luxuriant plant growth that becomes tinder for forest fires when dry weather returns.

The fire also points up the importance of a breeding program under development by the Charles Darwin Foundation of Washington, D.C., on Isabela Island. Before the fire, the foundation had started to collect *G. guntheri* for captive breeding. Those plans are on hold, but after the fire the Foundation "will probably accelerate the program so that we don't have to go through this every time we have a fire," says Fritts.



NATIONAL BIOLOGICAL SURVEY/WASHINGTON, D.C.

On the brink. Will the giant tortoises of Isabela Island escape the fiery inferno?

In the meantime, any losses of this species of giant tortoises from the fire now raging could seriously interfere with further restoration efforts. Looking ahead to when the fire is vanquished, the secretary general of the Charles Darwin Foundation, Alfredo Carrasco, is appealing to foreign governments, conservation organizations, and private donors to help fund restoration of Isabela Island. Even then, the slow-moving reptiles will still be in a race against time.

–Rachel Nowak