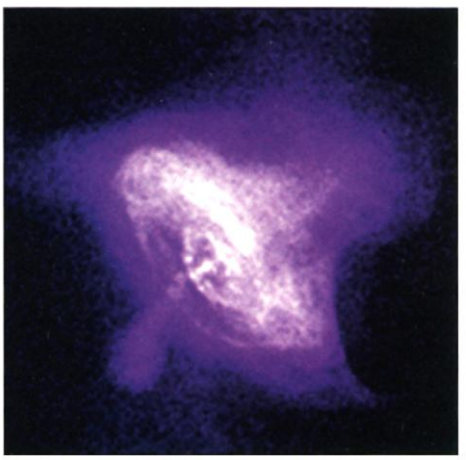
Jewels in the Crown I: Astrophysical Observatory

CAMBRIDGE, MASSACHUSETTS—With its formidable staff of 240 scientists, a bevy of cutting-edge instruments, and a long-standing partnership with one of the world's great universities, the Harvard-Smithsonian Center for Astrophysics is one of the Smithsonian's—and one of the world's—premier research facilities. But the 111-year-old center is embroiled in a quiet institutional crisis.

Cost overruns are straining a tightening budget, while rising salaries and a severe lack of office space limit new hires and new programs. At the same time, researchers are up in arms about director Irwin Shapiro's plan to increase Harvard's influence at the center. "This is a pivotal time for us," says Andrea Dupree, a longtime center researcher and past president of the American Astronomical Society. "We need to make decisions about our future, and there's a sense we are going to be left out."

The center is the result of a 1973 merger of Harvard's and the Smithsonian's observatory programs. Since 1985, shortly after Shapiro became chief, it has doubled its staff and more than tripled its budget. Facilities range from the Multiple Mirror Telescope (MMT) on Mount Hopkins in Arizona—currently being upgraded—to the Submillimeter Array (SMA) now under construction on Mauna Kea in Hawaii. A committee of outside scholars who reviewed the center in 2000 was "uniformly impressed" by the state of its operations and science, according to a copy obtained by *Science*.

But there are signs of strain. In 1984, the SMA was to cost $25 million and take 6 years to build; the most recent estimate is $70 million in current dollars, and a series of technical troubles has delayed the effort by several years. The MMT conversion to a more powerful set of telescopes also has encountered technical troubles and is short-staffed. Other projects, such as NASA's Chandra X-ray Observatory which is operated by the center, are running smoothly. But a stagnant budget in recent years has left Shapiro with little flexibility. Travel, support, and computer system funds have suffered. "Such a pattern cannot continue indefinitely, as it will eventually strangle the institution," warns the committee, which urged Shapiro to come up with a long-term plan—and hinted that it is time for new leadership. Shapiro, who says the plan will be ready by December, insists that he has no plans to retire.



High impact. Crab Nebula as seen by NASA's Chandra spacecraft, operated by the Harvard-Smithsonian center.

The tight budget is not Shapiro's only difficulty. He wants to increase the number of center scientists who have joint appointments at Harvard and give the university a greater say in appointing them. He contends that reviving the tradition of appointing joint researchers—the last of whom was hired 13 years ago—is essential to maintain Smithsonian representation on the Harvard faculty. Many center astronomers say it will make second-class citizens of those paid purely by the Smithsonian.

Smithsonian Secretary Lawrence M. Small likely will have to wade into the center's issues in the coming months. Although he has other fish to fry as he revamps the institution, he will have plenty of work to do to keep one of the Smithsonian's jewels well polished.

–A.L.

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tropical and marine ecology.

STRI, SERC, and the astrophysical observatory have managed to weather the fiscal drought in recent years and remain strong. They are focusing on "hot" research fields and have been able to attract considerable outside support (see chart, p. 198). But the NMNH hasn't done as well. "We've had several years of very marginal funding in this museum, and we've never been able to break out of it," says Smithsonian anthropologist Donald Ortner. And museum scientists have had a tough time generating outside support, in part because the National Science Foundation traditionally funds research involving other government-supported scientists only if they team up as co-investigators with university researchers.

The museum has also suffered chronic leadership problems. While STRI and the astrophysical observatory have had long-term, stable leadership, NMNH has had eight in the past 20 years alone. Larry Abele, a systematist at Florida State University in Tallahassee, realized the seriousness of the situation when it took two tries for the museum to find a new director in 1995. It seemed clear then that "the national museum was really losing its position as a leader in the world of systematic and evolutionary biology," he recalls.

Trouble at Natural History

The same perception troubled the man who eventually took the job, Fri, a soft-spoken energy expert. In 1998, Fri instituted a series of reviews of the museum's science. Panels of outside experts evaluated the life, human, and earth sciences programs. Then a committee headed by Jack Gibbons, President Clinton's first science adviser, and entomologist May Berenbaum of the University of Illinois, Urbana-Champaign, worked with the chairs of the three expert panels—Abele, Jane Buikstra of the University of New Mexico, Albuquerque, and Alfred Fischer of the University of Southern California in Los Angeles—to integrate their findings into a report recommending change in the museum as a whole. The panels found a mixed bag and problems that go beyond the budget squeeze.

The Berenbaum-Gibbons panel pointed to many strengths across the museum. The museum's life scientists "have significantly contributed to our fundamental knowledge of numbers and kinds of macroorganisms on earth," it said. The geological and paleontological collections are "second to none in the world." The gems and minerals collection and the scholarship associated with it "are particularly notable." Work on volcanism "sets a standard for excellence." The human science program has developed "an incomparable resource documenting the history of humankind in North America" and "advanced our knowledge of significant issues ranging from the origins of agriculture to human origins."

However, the panel continued, "the NMNH is not known institutionally for having developed great principles and theory, particularly in life sciences, nor has it as yet established a noteworthy position in the ecological and evolutionary sides of systematics and natural history." It complained about "departmental insularity and fragmented vision, in which curators seemed to be more concerned with their turf than in crossing departmental boundaries to pursue such matters as global change, biocomplexity, and conservation."

The panel urged the museum to turn more toward synthesizing data, developing broad concepts, and addressing the impact of human history on the natural world. It also called for more stringent evaluations of research productivity and expressed concern about lack of staff turnover, noting that the number of curators over 65—about 25%—