RANDOM SAMPLES

edited by JOCELYN KAISER

Finding the Hottest Dwarf

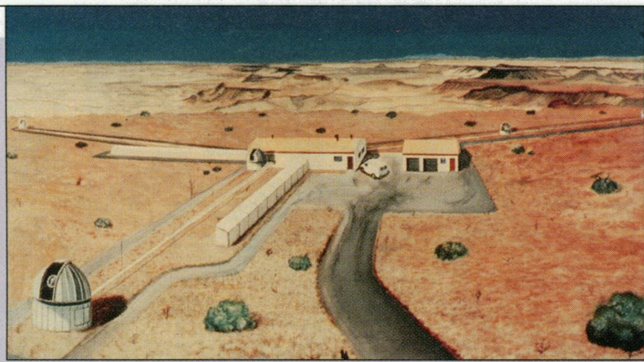
Astronomers from Britain, Germany, and the United States have found a missing link in the evolution of the class of small to medium-sized stars to which our own sun belongs. In November's *Monthly Notices of the Royal Astronomical Society*, a team led by astrophysicist Martin Barstow of the University of Leicester describes a hydrogen-rich white dwarf star with a surface temperature of some 90,000 K—the hottest star of its type yet discovered.

When a sunlike star has burned up its nuclear fuel, it expands to become a bloated red giant. Then it blows away its outer layers, leaving a shrunken star—surrounded by a planetary nebula—that typically has a surface temperature of at least 150,000 K. Over time, the nebula disperses, leaving a gradually cooling star known as a white dwarf. Such stars fall into two classes: those with hydrogen-rich atmospheres and those dominated by helium.

Astronomers have been able to observe a clear progression from hot central nebula stars to cooler white dwarfs for those with helium-rich atmospheres. But until now, the hydrogen-dominated white dwarfs seemed to appear suddenly at a cool 70,000 K or less. "The hydrogen-rich branch really had a gap," says Barstow.

Barstow's team filled that gap using ROSAT, the orbiting Anglo/German/U.S. x-ray and extreme-ultraviolet observatory. White dwarfs radiate strongly at ultraviolet wavelengths, and since its 1990 launch ROSAT has identified almost 70 new examples of the breed. By taking spectra of these stars with ground-based optical telescopes, Barstow's team can determine their temperatures: Stars' spectra contain gaps caused by the absorption of radiation by hydrogen, and these "absorption lines" vary with mass and temperature.

The hottest white dwarf in this survey resolves a heated theoretical debate. To explain the lack of such stars, some theorists had speculated that cooler examples evolved from a subset of helium-rich white dwarfs by the sinking of these stars' helium below their surfaces. "It was a major point of contention," says Edward Sion of Villanova University in Pennsylvania. But now, he says, this rather labored theory can be tossed out.



GEORGIA STATE UNIVERSITY

Strength in numbers. Proposed telescope in lower left of drawing and four others form an array that will outperform much larger scopes.

NSF Grant Boosts Telescope Plan

By the year 2000, perhaps from a desert mesa in the southwestern United States, astronomers will probe the heavens with an instrument that can pick out a nickel from 10,000 miles away. That's the promise contained in last month's announcement by the National Science Foundation (NSF) that it has awarded $5.5 million for the construction of an array of telescopes that will produce the highest resolution optical images ever made.

The money went to the Center for High Angular Resolution Astronomy (CHARA) at Georgia State University. The university plans to raise another $5.8 million to build the facility, which will consist of five 1-meter telescopes laid out in a Y shape. Through an emerging technology called optical interferometry, the light from each telescope will travel through evacuated tubes and then be carefully combined, producing images equivalent to those that could be created by a single 400-meter telescope.

In principle, the array could identify the pitcher in a baseball game played on the moon. Instead, its duties will include looking for extrasolar planets and studying binary systems, in which two stars closely orbit each other. Also, says CHARA director Harold McAlister, "it will be the premier tool to image surface features on stars" such as the spots and flares that also mar our sun. The location for the array has yet to be finalized, says McAlister, but the school is negotiating with the University of New Mexico for a site on a mesa 80 miles west of Albuquerque.

Scientific Resource Center Closes

For 14 years, journalists in need of scientific sources have turned to a New York City organization that provided the names of experts in everything from particle physics to environmental catastrophes. But since May, the Scientists' Institute for Public Information (SIPI) has laid off all but four of its 26 staff members, and last month president Alan McGowan said it is "phasing out of existence" by the year's end.

Established in 1963, SIPI has worked to bridge the gap between the scientific community and the public by publishing reports and pamphlets, and by sponsoring meetings for journalists on topics as diverse as national security and child development. In 1980, it began a media resource service that last year referred 5000 callers to a database of 30,000 scientists.

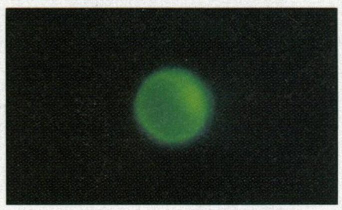
McGowan says the nonprofit, which had an operating budget of $2.6 million, is folding because it lost funds for overhead from corporate backers, even though foundation support continued. "It's too bad," says molecular biologist and publisher of *R&D Innovator* Winston Brill, who has served on a SIPI panel. "SIPI was getting science to the public. That's an important service."

Not all is lost, however. Last week SIPI began discussions to transfer its media resource service to the scientific society Sigma Xi. Renee Keever of Sigma Xi says the move will hinge on whether foundations would continue to fund the service in its new venue.

Lighting Up New Genes

Researchers have found a green light that gives a "go" sign for gene transfer. Geneticist Randall Niedz of the U.S. Agricultural Research Service and a University of Wisconsin team have inserted the gene coding for green fluorescent protein (GFP), found in the bioluminescent jellyfish *Aequorea victoria*, into orange-tree cells as a "reporter." If its glow is turned on, it indicates that other foreign genes inserted into the plant alongside it have been turned on as well. Scientists can use this signal to determine whether foreign genes they've placed in plants—to improve disease resistance, for example—are working, says Niedz. The work will appear in an upcoming issue of *Plant Cell Reports*.

The GFP gene and a gene of interest are both turned on because they lie in a DNA sequence under control of a single promoter, a genetic "on-off" switch. Other reporter genes have been tried with plants, Niedz says, but the assays often destroy the cell or the signals aren't readily visible.



USDA

Bright idea. The glow of a jellyfish protein lights up an orange cell.