urged Fitzpatrick to read the paper. "I told him that the guy who wrote the paper was right up there in his neck of the woods, and that the victims in that paper were all homicide victims, in my opinion," says Norton.

After Fitzpatrick became the district attorney for Onondaga County in 1992, he pulled Steinschneider's paper from his files and called Robert J. Simpson, district attorney for Tioga County, where Mrs. Hoyt lives. An investigation was launched. M.H. and N.H. were identified through death records. Last week, Waneta Hoyt was charged with murder after she had signed a confession. Her attorney, public defender Raymond Urbanski, told the *New York Times*, however, that she signed the confession under duress, and that she "absolutely and categorically denies the charges."

Fitzpatrick has harsh words to say about Steinschneider's role in the events. In an interview with *Science*, he contended that Molly and Noah might have been saved if Steinschneider had alerted the police rather than treating the case as a medical-scientific matter. Steinschneider bristles at the suggestion. He says he asked independent researchers to review autopsy records for Molly and later for Noah because he was aware their siblings had also died. He even consulted with Valdes-Dapena. They "found nothing," and public health nurses observed no signs of abuse in the Hoyt home, he says.

Steinschneider, in fact, stands by his 1972 publication. "This is a good paper," he says. If the case goes to trial, he may be called to defend its 22-year-old conclusions.

–Ginger Pinholster

Ginger Pinholster is a science writer based in Wilmington, Delaware.

ASTROPHYSICS

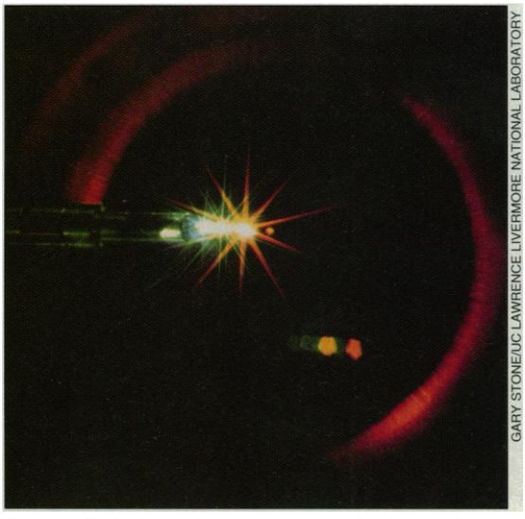
Livermore Physicists Ask for the Sun

And you thought Dr. Strangelove was scary. How about a proposal for "Creating Stars, Supernovae, and the Big Bang in the Laboratory"? Grant Mathews of the Lawrence Livermore National Laboratory, who gave a talk with this title at the American Chemical Society Meeting in San Diego last month, isn't kidding. All he needs, he says, is a proposed new laser—the largest ever built—and some pellets of hydrogen and helium the size of grains of sand.

Actually, Mathews' cosmic cataclysms would be so small and fleeting—less than a millimeter across and lasting just a billionth of a second—that nobody outside the laser facility would notice. And they are just an extension of something investigators at the weapons lab have done for years: using a firing squad of laser beams to squeeze tiny samples of hydrogen to such high temperatures and pressures that they undergo nuclear fusion. In the past, investigators studied this laser-induced fusion for clues to nuclear weapons design and as a possible energy source. But the new laser, the National Ignition Facility (NIF), say Mathews and his colleagues, could make laser fusion a window on the stars.

NIF, a $500-million successor to Livermore's Nova laser (currently the world's largest), is designed to achieve the long-sought goal of fusion research: exceeding the "break-even" point, which implies gaining more energy from the fusion of a hydrogen pellet than it takes to heat and compress it (*Science*, 3 December 1993, p. 1504). Doing so, NIF's designers figure, will take about 200 beams, each with about a quarter of Nova's total power. That should also be enough power, says Livermore researcher John Castor, "to produce conditions very similar to those in the centers of stars—temperatures of 50 million degrees or so and densities of 100 grams per [cubic centimeter]." By varying the makeup of the lasers' targets, Mathews and Castor say they should be able to simulate the nuclear processes of stars and the early universe as they look for clues to astrophysical puzzles. Among those puzzles:

■ **The solar neutrino problem.** Debate rages about whether the apparent shortage of the sub-atomic particles called neutrinos coming from the sun stems from a misunderstanding of the sun's nuclear reactions or some new particle physics involving neutrinos. Castor, Mathews, and colleagues think they might tip the debate by substituting pellets of helium-3 for the heavy-hydrogen pellets used in fusion research. Astrophysicists believe reactions among helium-3 nuclei are the source of solar neutrinos, so researchers could trigger these reactions under sun-like conditions and see if they produce neutrinos at the expected rates.



GARY STONE/UC LAWRENCE LIVERMORE NATIONAL LABORATORY

Star stuff. An incandescent target at the focus of Livermore's Nova laser is a preview of astrophysics experiments proposed for Nova's successor.

■ **The existence of brown dwarfs.** Astronomers know from the motions of stars and galaxies that the universe is full of invisible—and so far unknown—"dark matter." One candidate for the dark matter is the material in brown dwarfs, which are planet-sized globes that glow briefly as they condense, but soon grow dark because they are too small to undergo fusion. Brown dwarf searches, however, have turned up next to nothing. One explanation, says Castor, is that the dwarfs cool off and vanish faster than expected. By subjecting a mix of star ingredients (mostly hydrogen with bits of heavier elements) to pressures and temperatures comparable to those inside brown-dwarf–sized stars, says Castor, he and his colleagues could study the cooling rate and test this theory.

■ **The "neutron capture"** process, a poorly known series of reactions that builds successively heavier nuclei in bloated red giant stars. To simulate the material of the pre-collapse giant, says Mathews, he and colleagues could shine the lasers on a mixture of protons and helium. If they get the conditions in the mini-star just right, these starting materials would fuse into middleweight nuclei, such as carbon and oxygen, releasing free neutrons; the neutrons would trigger a chain reaction that would build up still heavier elements.

To astrophysicists outside Livermore, those are tempting prospects, though by themselves they might not justify NIF's $500-million price tag, says University of California, Berkeley, astrophysicist Steve Kahn. But "if it exists already, then it seems like a very attractive opportunity." Kahn warns, however, that outside astrophysicists like him probably wouldn't be able to afford time on the pricey facility. He notes that Livermore is considering a proposal to guarantee time on NIF to outside astrophysicists.

Inside the fence at Livermore, the experiments promise some researchers a welcome return to their roots. Says Livermore scientist David London, "Quite a few of us [on the laser fusion program] are astrophysicists." Compared with weapons simulation, he says, starmaking "would be fun." But none of this can happen unless the Department of Energy approves the project and secures the necessary funds from Congress. That could take several years, and adding another 5 years for construction means the fun won't begin before 2001.

–Faye Flam