frog's native habitat—show no response," says Solomon. Results of the Carr study and the South African field studies are to be presented at the Society of Environmental Toxicology and Chemistry annual meeting in Salt Lake City, Utah, 16 to 20 November.

The EPA atrazine docket, a publicly available record of comments about atrazine reregistration, reveals that the Hayes and Carr teams have been swapping detailed and pointed critiques about each other's studies. But an amphibian toxicologist not involved in either effort suggests that the complexity of long-term amphibian studies might account for some of the discrepancies. "These three studies are from good labs," he says, adding, "there's a lot that we don't understand about simple things." The researcher says that it's not clear if any of the seemingly minor differences between the Hayes and Carr protocols matter, such as the different strains of frogs, densities of tadpoles, or materials used to build the tanks. Such is the witches' brew of ingredients that the EPA panel will ponder. **–REBECCA RENNER**

Rebecca Renner is a writer in Williamsport, Pennsylvania.

FISHERIES SCIENCE

Scientists Recommend Ban on North Sea Cod

CAMBRIDGE, U.K.—In what could prove to be a serious blow to Europe's ailing cod-fishing industry, fisheries scientists last week advised the European Union (E.U.) to ban cod fishing in the North Sea and several other historic regional trawling grounds. But economic pressures might lead politicians to tone down the advice.

The recommendation is based on surveys suggesting that major cod stocks in the northeast Atlantic are at historic lows. European fishing quotas for 2003 are due next month, and scientists say that a ban is the only way to protect future stocks. "Populations will collapse if there are not drastic reductions in fishing," says Robin Cook, director of the Fisheries Research Services Marine Laboratory in Aberdeen, United Kingdom.

But some researchers wonder whether politics will trump science, noting that a ban could cost 20,000 jobs in the United Kingdom alone. "I would be delighted but shocked if [the European Commission] agrees to all the needed restrictions," says Andrew Rosenberg, a former chief fisheries regulator in the United States and now a dean at the University of New Hampshire, Durham. Other researchers predict that even quick action might not restore healthy stocks soon.

Europe's cod drama reprises one that gripped North America in the last decade, when groundfish stocks collapsed in the western North Atlantic and subsequent fishing bans devastated U.S. and Canadian fleets. European fishers are now following the same chart, says the Copenhagen-based International Council for the Exploration of the Sea (ICES), which advises the European Commission on fisheries. According to scientific surveys and catch statistics, the North Sea's cod spawning schools have dropped to just 15% of what they were in the early 1970s. "The stock is half of the absolute minimum" needed to sustain healthy populations, says Hans Lassen, ICES's fisheries adviser.

Even with a ban, hard-hit stocks might not bounce back quickly. Some Canadian populations haven't recovered even after a decade of restrictions, notes fisheries scientist Jeffrey Hutchings of Dalhousie University in Halifax, Nova Scotia, Canada. U.S. stocks have fared better, as the fisheries were closed before populations plummeted to unsustainable levels and the fish mature faster than their northern cousins.

The European stocks appear to share some of that robustness, says Hutchings, although dwindling numbers "raise major worries." The U.K.'s Cook agrees: "We're right on the end of the graph," he says, predicting that it will take at least 4 years to rebuild fishable cod populations.

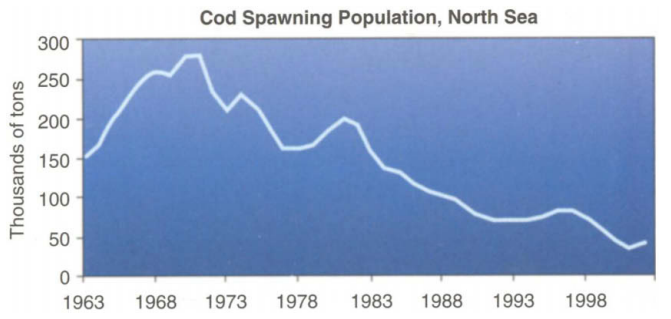
A cod ban could also harm other fleets. That's because ICES has recommended banning vessels that target other species—such as haddock or shrimp—but also net cod as so-called bycatch. "You cannot look at the cod in isolation," says Lassen.

Rosenberg is skeptical that politicians will crack down on bycatch. The enormous economic implications of that move, he notes, have led policy-makers to ignore ICES recommendations in the past, "making the hole they are in now even deeper." Still, he hopes that E.U. officials will create some "closed areas that are big enough to provide the fish with a substantial refuge."

Off the menu? Atlantic cod was once a staple of European diets.

Industry is pleading for less drastic steps. George MacRae of the Scottish white fish producers association told *The Guardian* last week that a sweeping ban "is the doomsday scenario." Policy-makers now face the slippery task of balancing the future of the fish against that of the fishers.

–DAVID MALAKOFF AND RICHARD STONE



Smaller schools. The number of spawning cod in the North Sea has sunk to record lows, imperiling the fishery.

CREDITS: (TOP TO BOTTOM) LAWSON WOOD/CORBIS; SOURCE: ICES

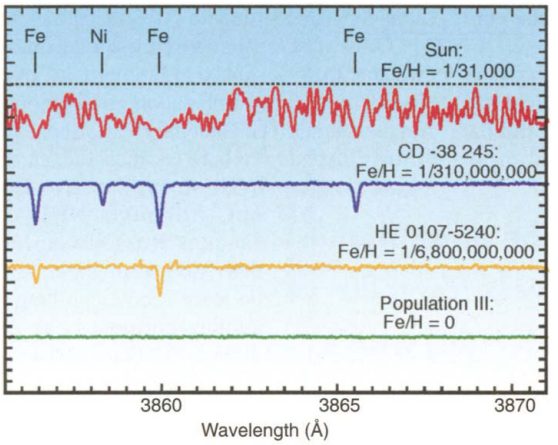
ASTRONOMY

Iron Deficiency Reveals Nearly Pristine Star

Astronomers have found an ancient star that preserves a chemical record of the infant cosmos. The little star, just now facing the end of its long life, suggests that the first stars in the universe might not all have been the colossi that models predict. "It's astounding that we can glimpse such an early stage of the universe through the composition of this star," says astronomer Catherine Pilachowski of Indiana University, Bloomington.

Stars are relentless element factories,

transforming hydrogen and helium (products of the big bang) into heavier elements such as carbon, oxygen, silicon, and iron. Massive elements also form in the fires of supernova explosions, which spray the rich mixtures into space. Generations of stars have seeded our Milky Way galaxy in this way, altering its primordial composition into a potpourri more conducive to rocky planets and computer chips.



Clean slate. Ultraviolet spectral lines of iron and nickel reveal that a newly found ancient star (third from top) contains the lowest proportion of heavy elements yet seen.

Ancestral stars might persist, burning slowly on the Milky Way's sparse outskirts where new stars no longer arise. Astronomers have scoured space for those objects for more than 2 decades. Previously, the most primitive star found in such searches contained about one 10-thousandth as much iron as the sun. Some researchers speculated that they would never come closer to the so-called Population III—the first stars, born with no heavy elements (*Science*, 4 January, p. 66).

However, an ambitious survey of more remote parts of the galaxy has uncovered a star 20 times as anemic. Astronomer Norbert Christlieb of the University of Hamburg, Germany, and his colleagues scrutinized the star in December 2001 with one of the four 8-meter telescopes in the European Southern Observatory's Very Large Telescope array in Paranal, Chile. Analysis of the light from the star, called HE0107-5240, shows that its atmosphere is a strikingly unspoiled broth of hydrogen and helium with the barest dash of heavy elements: just one iron atom for every 7 billion atoms of hydrogen. The team's results appear in the 31 October issue of *Nature*.

HE0107-5240 might record an imprint of the first supernovas, says co-author Timothy Beers, an astronomer at Michigan State University in East Lansing. For instance, dollops of nickel are evident in the previous most iron-poor star, but HE0107-5240 is nearly nickel-free (see figure). That absence might reflect a basic difference in how the earliest supernovas forged elements, because even a single modern supernova would have supplied enough nickel to pollute the star. "This may be the first example of a true second-generation star," Beers says. "It's our best look at the starting recipe that led to the rest of the periodic table [of the elements]."

The star is now a red giant: the bloated end stage of a star that has fused most of its hydrogen fuel. However, Beers notes, it lived for at least 12 billion years as a small star just 80% as massive as our sun. Current models maintain that primitive gas clouds with almost no heavy elements could not have formed tiny stars, because hydrogen alone can't cool clouds to the frigid temperatures needed for small clumps of gas to collapse. Rather, theories hold, the first stars were enormous—perhaps 100 to 1000 times larger than our sun. HE0107-5240 suggests that little stars were in the initial mix as well or were born soon thereafter. Some tiny stars might have formed as companions to gigantic ones and survive as relics to this day, Pilachowski notes.

The Hamburg survey might reveal more primitive stars to help fill in the tale. Christlieb's team has analyzed just one-quarter of its most promising candidates so far.

—ROBERT IRION

CREDIT: N. CHRISTLIEB *ET AL.*/ESO/VLT-UVES

HUMAN GENOME

HapMap Launched With Pledges of $100 Million

A consortium of six nations is diving into a massive new genomics project it hopes will pinpoint the genes behind common diseases. After months of passing the hat among countries and private companies, the U.S. National Institutes of Health (NIH) announced earlier this week that it's garnered the $100 million the 3-year effort to construct a so-called haplotype map is likely to cost. But even as the project was announced with considerable fanfare, many details remained sketchy.

The idea for the HapMap, as it's informally known, arose soon after scientists discovered that the human genome has a surprisingly structured architecture. Thousands of DNA bases, and the patterns of single-base variations among them, fall into roughly the same order in many people. A popular theory is that slight tweaks in those DNA blocks, or haplotypes, could mean the difference between health and ailments ranging from cancer to diabetes. Researchers plan to

ScienceScope

France's Space Crunch French researchers are calling on the head of CNES, the nation's space agency, to resign—and they aren't satisfied by a government promise to review the beleaguered bureaucracy. Research minister Claudie Haigneré last week said she would appoint a committee to study French space policy and the future of the Paris-based CNES.

Some CNES staff members have publicly called on agency chief Alain Bensoussan to resign, saying that he has failed to adequately address financial problems that threaten to squeeze space science programs. Budget shortfalls have already stalled several major projects, including an Earth-observing mission and planning for Mars exploration. And staff members worry that pressure to find funds for the ailing Ariane-space satellite launch company and other ventures will further bleed science efforts.

In a bid to mollify critics, Haigneré's panel will study the situation and report back by the end of the year. But Hubert Rodriguez, a union representative at the agency's Toulouse center, vows to keep up the pressure. He says that "in view of our disastrous financial situation, this does not reassure us in the slightest."

Ozone Debate Over? The U.S. Environmental Protection Agency (EPA) will soon lay to rest a 5-year debate over the potential health benefits of "bad" ozone. The agency is expected this month to issue a new air pollution rule that concludes that the benefits of reducing ground-level ozone outweigh possible skin cancer risks.

Ground-level ozone from cars and other pollution sources is known to cause severe respiratory ailments. But like ozone high in the stratosphere, it can also protect people against the ultraviolet radiation that causes skin cancer and cataracts. Indeed, in the late 1990s, two EPA reports estimated that tougher ground-level ozone standards could result in roughly 700 new U.S. skin cancer cases annually. Industry groups seized on such predictions in a court challenge to the tougher standards, and 3 years ago a federal judge ordered EPA to consider the science on ozone's possible health benefits before moving ahead.

Some environmentalists decried the decision. But Randall Lutter, a scholar at the American Enterprise Institute in Washington, D.C., says that ignoring the science was a "serious flaw" that smacked of political bias. The controversy apparently hasn't changed EPA's mind, however. Although agency officials can't discuss details, they say the science is still "too uncertain" to warrant delaying the tougher rules.