RANDOM SAMPLES

edited by CONSTANCE HOLDEN

New Spin on Trout Ailment

Scientists, fishermen, and scientist-fishermen have banded together to open a research center on the campus of Montana State University (MSU) to save Montana trout, now being devastated by a plague called whirling disease.

The Wild Trout Research Laboratory, to open next week on the university's campus in Bozeman, will conduct controlled studies of an obscure parasite, *Myxobolus cerebralis*, that cripples rainbow and other trout by devouring their cartilage. As the fishes' spines are destroyed, they swim in circles until their death.

"We're not trying to find a magic bullet that will eliminate the disease," says MSU biologist and avid fisherman Daniel Goodman, a center organizer. Scientists instead hope to find some weak spot in the parasite's life cycle, where a slight change in water conditions could tip the balance in favor of the fish.

The disease first showed up in Montana lakes and rivers in 1994, but scientists believe the parasite itself arrived in the United States nearly 40 years ago in fish imported from Europe. In the past 2 years the disease has afflicted rainbow trout along an 80-kilometer stretch of the Madison River, reducing the population from almost 2000 per kilometer to fewer than 200. Scientists have now discovered the parasite in at least nine other major rivers.

ROGNLIE/MONTANA STATE UNIV.

Possible target. The whirling disease parasite spends part of its life cycle in the tubifex worm.

The research coalition, including federal, state, and university scientists, has obtained $200,000 from public and private sources, including the Whirling Disease Foundation established last year in Bozeman, to help mobilize a counterattack. Scientists plan to set up holding tanks and small aquaria so they can conduct experiments on infection rates and processes, says William Tietz, a veterinary scientist and former MSU president. Tietz says the new facilities will "move us past the string-and-sealing-wax phase of science."

The problem is too widespread, says Goodman, to even think about treating the water or inoculating fish to staunch the epidemic. The best hope might come from a better understanding of the life cycles of the parasite, the trout, and the tubifex worm, where the parasite undergoes part of its development.

White Paper for Evolution

It's getting to be de rigueur for biological disciplines to formulate grand plans designed to emphasize the utility and fundworthiness of their fields. Following the lead of systematists, microbiologists, neuroscientists, and ecologists, evolutionary biologists are the latest to put out a manifesto.

A draft of *Evolution, Science, and Society* will be posted on the Internet for comment some time in the coming months, but first the document must be trimmed from a dense 70-page report to a slick eight pages or so, notes biologist Douglas Futuyma of the State University of New York, Stony Brook, one of 20 biologists, paleontologists, and educators who put together the fat version.

Parts of the document were well received when they were presented at a meeting of ecologists that was held in August, says Thomas Meagher of Rutgers University. He explains that some researchers see such a statement—which ticks off evolutionary biology's contributions in areas such as epidemiology, agriculture, conservation, and even bioremediation—as an antidote to the growing influence of creationists in school systems. "Linking evolutionary biology to economic development is something that could be very useful," says Meagher.

Meagher says announcements will appear in relevant journals directing scientists to Web sites where they can read the draft.

Astronomy for All

Astronomy students and amateurs all over Europe will get a chance this fall to design and carry out observations on some of the world's most powerful telescopes—via the World Wide Web. Part of the annual European Week for Scientific and Technological Culture to be held in November, "Astronomy On-Line" is offering a structure for students, teachers, and astronomers to form teams and design experiments. The effort will culminate in a frenzy of observational activity on donated telescope time from 20 to 22 November.

For 6 weeks prior to the actual observations, participants will get familiar with all the resources available on the Web—including the archives of the European Southern Observatory (ESO)—plan their experiments, and do interactive Web exercises that are being designed by national and international com-

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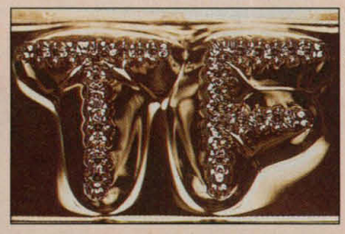
NSF Supports "Affectionate Technology"

With these computer-controlled sculptures of magnetic fluids and iron filings, artist and computer scientist David Durlach is pushing technology into the murky world of feelings. And he has convinced the National Science Foundation (NSF) to support these efforts. TechnoFrolics, his Somerville, Massachusetts–based company, has just received a 2-year, $300,000 grant from the NSF to merge art with the latest in computer science.



D. DURLACH

Feel-good science. A TechnoFrolics "Living Logo" *(above)* emerges from a pool of magnetic fluid. "Dancing Trees" *(left)* are iron filings that bob, sway, and pulsate to music.

Durlach got his grant through the Small Business Innovation Research program, which supports innovative, high-risk projects deemed to have commercial potential (*Science*, 17 May, p. 942). He plans to use the money to develop novel science exhibits and "visual instruments"—malleable, movable forms, made out of magnetic fluids and other unorthodox media, that can be manipulated or "played" as visual analogs to musical instruments.

After struggling on a shoestring budget for years, Durlach is elated by the award. "Most art grants don't provide nearly enough money, while most science agencies consider my work outside their domain," he says. The award may raise eyebrows among some scientists, but NSF grants officer Tony Centodocati argues that "we're supposed to sponsor innovative work"—and Durlach's "should have high commercial value" both for museum displays and in advertising.

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mittees of astronomers. They'll also observe a partial solar eclipse on 12 October.

A small committee of astronomers will judge the feasibility of the research proposals that emerge from these activities, says ESO astronomer Richard West, co-chair of the International Steering Committee. So far about 10 telescopes in Europe and Chile have agreed to donate one or more nights of viewing time to Astronomy On-Line projects, which will deliver data to investigators over the Web. That should leave time to realize about 100 projects: Likely subjects in mid-November include comet Hale-Bopp and, from Chile, the Magellanic clouds.

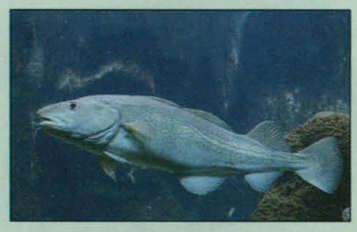
West says this fall's project will be open only to Europeans, but the organizers see a bigger future for Astronomy On-line. They want to preserve the structures and resources created for it on the Web so that eventually people all over the world can get in on the game.

Astronomy On-Line has two home pages: http://www.eso.org/astronomyonline/ and http://www.algonet.se/~sirius/eaae.htm.

Cold Fish Help Preserve Platelets

The same molecules that keep fish from freezing in frigid polar waters may one day enable blood banks to refrigerate platelets for weeks at a time.

Platelets are disc-shaped cell fragments that help clot blood after injury and are often given to surgery patients to limit bleeding. But unlike red blood cells, they cannot be frozen and must be used within 5 days. Now a team at the University of California (UC), Davis, has found that platelets kept in a solution containing glycoproteins derived from the blood of certain Antarctic or Arctic fish last up to 21 days at 5°C. "[That] is really a fascinating observation," comments hematologist Richard Aster of the Blood Center of Southeastern Wisconsin in Milwaukee. "It's a completely new and innovative approach to the long-term storage [problem]."



Platelet preserver? Atlantic cod.

LABAT-LANCEAU/JACANA/PHOTO RESEARCHERS

UC Davis cell biologist Fern Tablin explains that platelet phospholipids—molecules in cell membranes—ordinarily exist in a liquid crystalline state. But as the temperature drops below 18°C, the bonds between hydrogen and carbon atoms stiffen, making the phospholipids gellike. Some molecules make this transition faster than others, resulting in mismatches that can make membranes leaky and allow key molecules such as calcium to escape.

The Davis group hypothesized from their work with the fish that the compounds might prevent this leakage, possibly by lowering the temperature of the cold-initiated transition. And the protective effect was clear when they combined the fish glycoproteins with platelets, Tablin, John Crowe, and colleagues report in the August *Journal of Cellular Physiology*. The mechanism, though, is still unclear because the glycoproteins did not change the transition temperature.

Aster cautions that further tests are needed to show that the glycoprotein-soaked platelets will work in the body. Even then, health authorities might be wary of the technique for fear of contamination or immune reactions. But, he says, "it's something that needs to be followed up on."

More Neutrino Mystery

The mystery of the solar neutrinos just keeps getting deeper. The sun's nuclear reactions generate these elusive particles, which can pass unscathed through the Earth. But scientists capturing them in giant underground detectors detect only about a third as many as expected from theoretical calculations of solar nuclear reactions. Now Peter Sturrock and Guenther Walther of Stanford University may have added another puzzle: a regular fluctuation in the neutrino counts.

When they examined more than 20 years of data from the detector in the Homestake mine in South Dakota, they found that the number of solar neutrinos peaks every 21.3 days. Shorter data sets from the GALLEX detector in Italy and the Kamiokande detector in Japan, when combined, suggest the same periodicity. The peaks imply that the flux of neutrinos varies by as much as 30% to 100%.

One possible explanation, says Sturrock, is that the neutrinos interact with some component of the magnetic field in the solar interior that rotates or oscillates every 21.3 days. The interaction could only take place if neutrinos, sometimes thought to be massless, actually have mass, as some recent experiments have hinted. The other possibility is that nuclear burning in the sun's core is not a steady process, as theorists usually assume, but a cyclic one, like combustion in the cylinders of a gasoline engine.

Either way, says Jeffrey Scargle, an astronomer at NASA's Ames Research Center, "if the periodicity is real, it flies in the face of the standard picture of what goes on in the solar core." And Scargle, who specializes in statistical analysis, thinks Sturrock and Walther "have done a careful job on the statistics and made a good case for the periodicity."

But not everyone is convinced. "I don't think the periodicity is statistically significant enough for me to believe it," says Douglas Gough, a solar theorist at Cambridge University in England. Nonetheless, "it is interesting enough to worry about."

Will-o'-the-Wisp Nabbed

After 25 years in hot pursuit, atmospheric chemists recently nailed their quarry in a German cornfield. It only lives a second or two and hides among 10 trillion other molecules, but the fleeting hydroxyl radical is a much-wanted target. It is the atmosphere's Mr. Clean, a molecule of hydrogen and oxygen that is constantly being created and destroyed as it scrubs out pollutants.

Hydroxyl's rarity and short life-span have frustrated researchers looking for a practicable way to measure it. But in the 1 September issue of *Geophysical Research Letters* a group from the Institute for Atmospheric Chemistry in Jülich, Germany, reports that it successfully tested in northern Germany a compact, accurate means of measuring hydroxyl.

The scientists, led by Hans-Peter Dorn and Andreas Hofzumahaus, combined two analytical techniques. One is a scaled-down version of a reliably calibrated technique—aiming a laser beam at the hydroxyl and looking for its unique absorption signature—that can corral hydroxyl but can't pin it down to one spot. The beam has to travel through 10 kilometers of atmosphere to yield reliable measurements, making comparisons difficult with instruments that collect samples at only one point. By bouncing the beam between mirrors, however, the team was able to achieve a well-calibrated measurement over a distance of 40 meters.

They then could readily compare the laser absorption result with readings from an even more compact but less well-calibrated instrument employing laser-induced fluorescence spectroscopy. The two techniques agreed, confirming that laser-fluorescence instruments can be trusted.

Atmospheric chemist George Mount of the National Oceanic and Atmospheric Administration's Aeronomy Laboratory in Boulder, Colorado, says researchers now "have the technique you want to fly in a plane agreeing with one that everyone says is a well-calibrated technique." With that added confidence, researchers will be able to use laser-induced fluorescence to pursue their quarry wherever they please, exploring its functions and monitoring its fate as pollutant levels increase.