RANDOM SAMPLES

edited by CONSTANCE HOLDEN

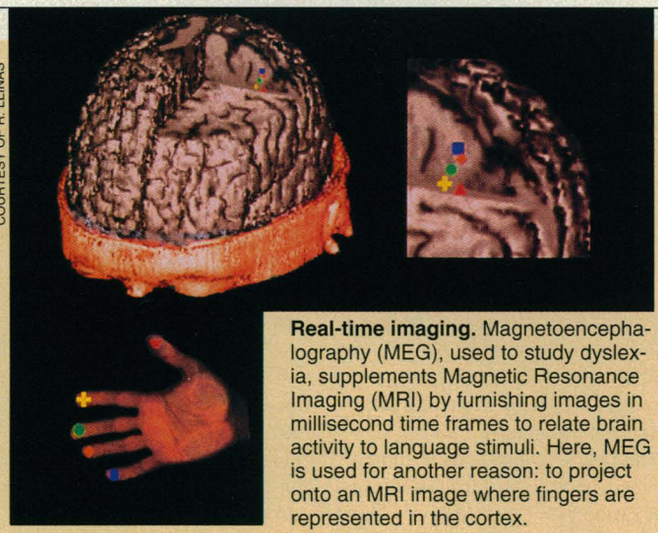
Miraculous Astronomy

On a hill 8700 feet above sea level in New Mexico's Jemez Mountains, in a reservoir containing 5 million gallons of water, the Department of Energy and the National Science Foundation will create a miracle—a unique astrophysical observatory called Milagro (Spanish for miracle), named after the nearby site immortalized in the film *The Milagro Beanfield War*.

The $2.5 million observatory will detect the very high-energy gamma rays that are caused, in theory, by the most violent events in the universe, such as exploding black holes. And it will use a new approach: observing them underwater via flashes of blue light. When high-energy gamma rays slam into particles in the atmosphere, they create a shower of debris—mainly photons, electrons, and positrons—which, upon hitting water molecules, creates a ghostly blue glow called Cerenkov radiation. The shimmers will be detected by more than 700 photomultipliers distributed throughout an artificial reservoir, says Cy Hoffman of nearby Los Alamos National Laboratory, one of seven institutions collaborating on Milagro.

Milagro is being built to complement orbiting instruments like the Compton Observatory that make sky surveys for low-energy gamma rays. The new facility, slated for completion in 1997, will pick up where Compton leaves off, helping to determine at what energies satellite-identified sources stop emitting radiation. NASA astronomer Neil Gehrels says that "understanding where the cutoff occurs is of fundamental importance" in illuminating some of the violent physics involved.

Milagro's task will demand some fancy data analysis, since background cosmic rays also cause Cerenkov radiation (the pool is covered to screen out other light). "It's sort of like doing optical astronomy during the daytime," says Hoffman.



COURTESY OF R. LLINAS

Real-time imaging. Magnetoencephalography (MEG), used to study dyslexia, supplements Magnetic Resonance Imaging (MRI) by furnishing images in millisecond time frames to relate brain activity to language stimuli. Here, MEG is used for another reason: to project onto an MRI image where fingers are represented in the cortex.

Neuroscientists Band to Study Dyslexia

To speed progress in understanding the neural mechanisms behind dyslexia, the Charles A. Dana Foundation in New York has funded a research consortium on "language-based learning disabilities." The foundation announced on 8 March that five institutions will be receiving $2.3 million over the next 3 years.

Lead investigator in the group is psychologist Paula Tallal of the Center for Molecular and Behavioral Neuroscience at Rutgers University. Tallal says that what is commonly perceived as dyslexia is really only the most marked symptom of a "developmental language disorder." Her research—with brain imaging as well as experiments with rats and with children—has led her to theorize this disorder is not a linguistic problem, as it is commonly regarded, but a "more basic neuroprocessing problem" that has to do with the inability to process sensory information rapidly (in the millisecond range). "Speech requires more than any other event the really rapid integration and transmission of information," notes Tallal.

Most people with developmental language disorders (perhaps 3% to 7% of the population) appear merely to have trouble reading or spelling. But it's "really a perceptual disability as well," says New York University neuroscientist Rodolfo Llinas, a consortium member. The deficit may be subtle, but in today's world, "these things become absolutely deadly." Other consortium members are Margaret Livingstone and Albert Galaburda of Harvard, Michael Merzenich of the University of California, San Diego, and Marcus Raichle of Washington University, St. Louis.

Hopping to Extinction

In a deep freeze at the Smithsonian's National Zoo in Washington, D.C., there lies a tiny carcass—the mortal remains of the last known Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*), which died, unsung, last year.

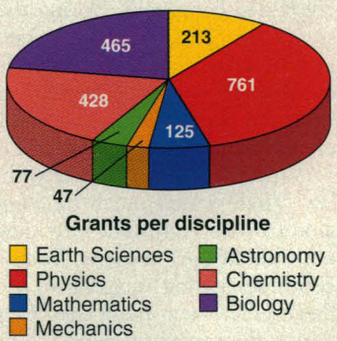
The hopping rodent has been on the federal endangered species list since 1970. But that hasn't prevented erosion of its habitat around Morro Bay, California, or a stalemate in a land dispute that probably spells the animal's doom.

In 1987 scientists estimated that only 50 of the animals remained on 37 acres of private land surrounded by housing developments. After the owner, Morro Palisades Corp., turned down a state bid for the property, negotiations stalled. If the company tries to develop the land, the U.S. Fish and Wildlife Service (FWS) threatens to invoke the Endangered Species Act, which would require the habitat to be set aside. So the company is waiting for the animals to die out, meanwhile refusing to let scientists in to see if any are left.

In 1992, on the chance that a breeding pair might become available (the Smithsonian's animals were by then too old), the FWS set up a captive breeding program for the rats. As a stand-in, they used a close cousin of the Morro Bay creature, *D. h. arenae*. The going was tricky—the nasty-tempered rodents tend to kill each other in captivity. But last May, Sonja Yoerg at the University of California, Berkeley, induced five to produce litters.

This success has probably come too late for the Morro Bay rat. But, says Miles Roberts, head of the National Zoo's research department, Yoerg's efforts may save some of the six other currently endangered species of kangaroo rat from the same fate.

Keeping Russian Science Afloat



Some 2100 scientists in the former Soviet Union are $32 million richer thanks to the International Science Foundation (ISF), which earlier this week in Moscow announced the results of its first competition for 2-year grants. Half the funding went to 515 researchers who won more than $10,000 each. The rest received $5,000 or $10,000 grants. This round of awards drew more than 9000 proposals; ISF has already received 5000 for the next round, to be announced in the fall. The ISF, established last year by billionaire financier George Soros, plans to give out up to $100 million to keep scientists working until economies stabilize or other aid programs are up and running.