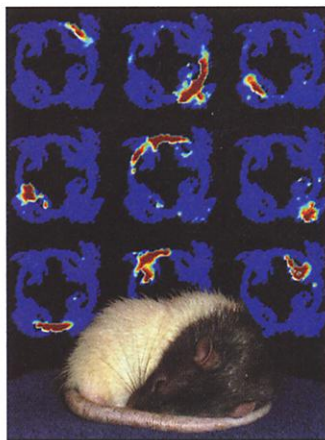


Mammalian Dreaming

Watching Rover whimper and twitch while he snoozes in front of the fireplace, you may think it obvious that animals dream. But among scientists, it's still an open question. Electrical evidence from the brains of snoozing rats, however, indicates that they may well be dreaming.

Brain researcher Matthew Wilson of the Massachusetts Institute of Technology and biology grad student Kenway Louie trained rats to run a circular maze with stops for food rewards. Then they monitored a tiny handful of 10 to 12 neurons in the rat hippocampus—the seat of learning and memory—while the rats ran their rounds and while they slept. They report in the 25 January issue of *Neuron* that in most of the 40 trials, the



Rat catches some z's by pictures of firing neurons.

hippocampal neurons lit up in the same patterns during the running task and during REM (rapid eye movement) sleep, the phase that marks dreaming in humans.

The experiment shows that rats can replay memories of long sequences of events lasting several minutes, says Wilson:

"This is the first evidence of such memory at the neural level." It also shows that the replay occurs at pretty much the same pace as in reality. In fact, Wilson says the cells' firing made it possible to tell just where a dreaming rat is in the maze.

One thing the study shows, says dream researcher Robert Stickgold of Harvard Medical School in Boston, is that it takes time for an experience to become dream material. He notes that the REM patterns that correlated with maze-running more often occurred right before the exercise rather than right after it, suggesting they were replaying previous maze-running sessions and that new ones are not installed in memory immediately. It looks like dreaming, adds Stickgold, but we can't be absolutely sure—"We still have no way of knowing whether rats form mental images."

Searching for Alien Rays

When the biggest optical telescope in the eastern United States starts scanning the sky early next year, it won't be distracted by supernovas or gamma ray bursts. Instead, it will hunt for bright laser pulses, as part of the Search for Extraterrestrial Intelligence (SETI). The new project, announced last week, is a 1.8-meter scope, funded with \$350,000 from The Planetary Society, to be built at Oak Ridge Observatory in Harvard, Massachusetts. Most SETI researchers look for radio signals, which entails la-

borious filtering at millions of wavelengths. A laser beam tightly focused by a telescope could greatly outshine a planet's host star at a particular wavelength. Harvard astronomer Paul Horowitz, who's in charge of the project, says it will detect optical pulses as brief as 1 billionth of a second. Any up-to-date aliens should have no trouble making contact, he says: "Lasers have grown so powerful that using today's technology, we could outshine our own star by a factor of 5000."

French Mathematician Wins Crafoord Prize

This year's half-million-dollar Crafoord Prize will go to one of the world's top mathematicians, Alain Connes, it was announced last week by the Royal Swedish Academy of Sciences. The Crafoord Prize pays tribute to fields not covered by the Nobel Prizes.

Connes, a professor at Collège de France and Institut des Hautes Études Scientifiques near Paris, is being honored for his "penetrating work" on the theory of operator algebra and his role as a founder of the new field of noncommutative geometry.

Connes, 53, is a veritable Chopin of math, hailed for the power, richness, depth, and innovativeness of his work. He's an "extraordinarily original" thinker, says mathematician Enrico Bombieri of the Institute for Advanced Study in Princeton, New Jersey. In 1983, Connes won the Fields Medal—mathematics' biggest honor—for solving major problems in operator algebra, which plays a central part in describing quantum mechanics. He then moved into noncommutative geometry, where he has created new tools useable in theoretical physics, as well as for probing math's most famous unsolved problem: the Riemann hypothesis (*Science*, 26 May 2000, p. 1328). One reviewer of Connes's 1994 book, *Noncommutative Geometry*, said his work produced a "feeling of intense jubilation."

The prize will be presented at a 26 September ceremony in Stockholm.



Forget about long, hot summers. We may be in for a long, hot eon. If his calculations are right, "increased violence can be added to the list of negative social consequences of global warming," predicts Craig

Frayed Tempers and Global Warming

Anderson, a psychologist at Iowa State University, Ames. "Heat-induced discomfort makes people cranky," explains Anderson. He has pored over 48 years of climate records from 50 U.S. cities and has found that the hottest summers bring the most murders and assaults. The violent crime rate in the United States—about 400 a year per 100,000 people—could go up by 4.58 with each 0.5°C rise in global temperature, Anderson reports in the February issue of *Current Directions in Psychological Science*. The Intergovernmental Panel on Climate Change (*Science*, 26 January, p. 566) says temperatures may rise as much as 5.8°C in the next 100 years.

