RANDOM SAMPLES

edited by CONSTANCE HOLDEN

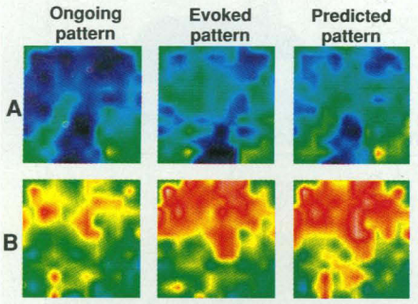
Getting a Picture of Sight

By using a brain imaging technique in which active neurons emit flashes of light, scientists in Israel have been able to zero in on small groups of cells that work in concert—"coherent neuronal assemblies." Identifying such assemblies has been "the Holy Grail" of brain theoreticians, says neuroscientist Terrance Sejnowski of the Salk Institute in San Diego: Tracking them should enable scientists to decipher neuronal firing patterns—responses to particular stimuli—that have previously been obscured by the brain's ongoing self-generated activity.

Scientists at Israel's Weizmann Institute have been able to home in on these assemblies in the visual systems of cats with the aid of a technique called Real-Time Optical Imaging (R-TOI), which yields far finer spatial and temporal resolution than that afforded by other brain imaging methods. Amos Arieli, Amiram Grinvald, and colleagues at the institute's Grodetsky Center for Research on Higher Brain Functions applied voltage-sensitive dyes to the brain surfaces of anesthetized cats. The dyes, taken up by cell membranes, converted neuronal discharges into flashes of light. A photodiode array "camera" recorded the flashes while the cats were exposed to pictures of moving vertical and horizontal lines. In a new twist on the technique, the researchers also inserted an electrode into one neuron to record the precise timing of its firing, and used the optical readings to spot neurons that fired in concert with it.

The team, including Alexander Sterkin and Ad Aertsen, reported in November, at the annual meeting of the Society for Neuroscience in San Diego, that by monitoring the ongoing activity and by averaging the response patterns from many presentations of the visual stimulus, they were able to predict—for the first time—how a cell group would respond in both space and time to a given stimulus each time it was presented.

Eric Kandel of Columbia University calls the work "a substantial advance," because "it allows one to record the electrical activity of many cells and at the same time actually visualize them in space." Says Sejnowski: "The exciting news from optical recording is that these neural assemblies are alive and have much to tell us."



Cracking neural codes. Activity in a 2-mm-square area of cat visual cortex during two trials (A and B) showing the same picture to the same animal. Evoked pattern is different every time owing to differences in ongoing activity. Scientists have separated the two patterns, thus gaining the ability to predict the evoked pattern.

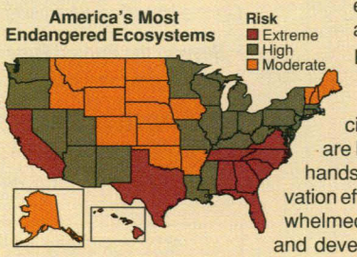
Supercomputing Program Superseded

Rapid advances in computer technology, such as powerful desktop machines, have caught up with the National Science Foundation's (NSF's) supercomputing program. Since 1985, it's supported four heavyweight centers, in San Diego, Urbana-Champaign, Ithaca, and Pittsburgh. But following the recommendations of an expert panel, NSF's governing body, the National Science Board, last month decreed that the program will turn into a broader one called Partnerships for Advanced Computational Infrastructure.

Two or three "leading edge" centers will probably be selected next year, each of which must form alliances with smaller centers run by universities, industry, and the military (*Science*, 1 September, p. 1213). The arrangement is designed to give more researchers access to supercomputing facilities and facilitate optimal use of mid-level computers in the network.

The centers will be funded—if budgets allow—at the current rate of $65 million a year for 5 years. The current centers, which get about 50% of their funding from NSF, will likely be top contenders, although at least one is going to be scrambling for other sources of funds. Preliminary proposals are due 1 April.

Eco-Alert. This map of the United States reflects "the most comprehensive effort ever undertaken" to assess the health of ecosystems state by state, according to Rodger Schlickeisen, president of Defenders of Wildlife. The group made a list of the top 10 states in ecoperil, factoring in the number of endangered ecosystems, numbers of endangered species, and the rates at which both are losing ground. Florida was the hands-down leader. Despite conservation efforts, advances are being overwhelmed by rapid population growth and development, says Defenders' biologist Robert L. Peters. The Southeast, from its longleaf pine forests to its coastal wetlands, is in particular jeopardy. The Defenders' report, *Endangered Ecosystems: A Status Report on America's Vanishing Habitat and Wildlife*, is available for $15. Call 202-682-9400.



SOME COSTS OF WHISTLEBLOWING

Action	# of Whistleblowers
Fired	8
Not renewed	8
Raise denied	8
Promotion denied	5
Research support reduced	14
Loss of desirable assignment	10
"Pressure to drop allegations"	29
"Counterallegation"	27
"Lawsuit threatened"	10
"Ostracism"	17

SOURCE: RESEARCH TRIANGLE INST.

Whistleblower Woes

Blowing the misconduct whistle isn't easy: More than two thirds of scientific whistleblowers experience negative consequences of their actions, including, for 1 in 4, loss of a job. So says a study conducted for the Office of Research Integrity (ORI) at the U.S. Department of Health and Human Services by the Research Triangle Institute in North Carolina.

The report, released last month, is based on mailed surveys answered by 68 of the 127 whistleblowers in ORI's files of misconduct investigations completed since 1987. Most vulnerable to reprisals, it says, are students and lower level faculty involved in high-profile cases in the basic sciences. Institutions hate "notoriety" and will close ranks against the whistleblower, notes the report. ORI Director Lyle Bivens adds that some whistleblowers "become consumed" by their causes and "can destroy their lives in the process of seeking justice." Nonetheless, he says, despite the price whistleblowers pay, "I was struck by the percentage of people—approaching 80%—who said they would do it again." Bivens says a federal regulation to be issued in preliminary form next summer should give whistleblowers more protection. It will be along the lines of existing voluntary guidelines that urge institutions to respond to allegations of retaliation with either a formal investigation or independent arbitration.

Walter Stewart of the National Institutes of Health, a longtime critic of his employer's handling of whistleblowers, says trying to prevent retaliation isn't enough. There should also be provision to "reward or make whole" careers that have been damaged, he says.