edited by CONSTANCE HOLDEN

Sex and the Granular Layer

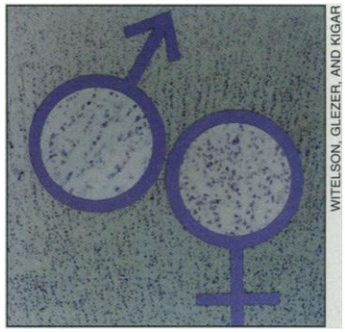
Women's brains are roughly 10% smaller than men's brains—which has long puzzled scientists in view of the fact that the sexes are equal in intelligence. Because there is no reason to believe females possess fewer brain cells, some scientists have hypothesized that their neurons may be packed more tightly.

Now this idea has gained support from a study led by neuroscientist Sandra Witelson of McMaster University in Ontario. She and her colleagues report in the May *Journal of Neuroscience* that a post-mortem study of brain tissue from five women and four men shows that in females, the neurons in both hemispheres are more tightly packed in a part of the temporal lobe—the planum temporale—that is related to language and auditory functions.

The investigators used a light microscope to determine the density of neurons in cubic-millimeter samples of tissue and found that tissue from women's cortex held 11% more neurons. But the difference is a selective one, concentrated in two of the six cortical layers, known as the granular layers. In these two layers, female neuronal density was 17% higher.

Witelson says this study shows that "the female brain is not just a scaled-down version of the male brain. If cell-packing density is different, some microscopic feature [relating to either cell connectivity or cell size] must also be different." She says the increased density in the granular layers is particularly interesting in view of observed female advantages in language acquisition and expressivity. That's because these layers get input from the thalamus, a major relay station for incoming auditory and language information. A possible "greater thalamocortical flow" might be related to sex differences in auditory discrimination and perception.

Other researchers say the findings are an important contribution in a fledgling area of research. Janice Juraska of the University of Illinois, Urbana, who has found sex differences in neuronal density in the rat visual cortex, says it suggests that in the brain as everywhere else, "the sexes are put together a little bit differently." She adds, "We'll have to know a whole lot more about them before we can understand [sex] differences in behavior." Witelson and her colleagues are now taking their investigations into other cortical regions, to find out if sex differences in neuronal density apply only in certain areas or are "a function of the whole brain."



WITELSON, GLEZER, AND KIGAR

Tightly packed. Inside the male and female symbols are high-power photos of cortical layer IV showing higher cell density in women.

Dueling Over Dinos

Paleontology funds generated by the "dinomania" following the film *Jurassic Park* are the quarry in a high-stakes lawsuit. The East Islip, New York–based Dinosaur Society, which will spend $300,000 this year to support excavations on six continents, is fighting a $1.3 million action brought to trial last week in Bristol County, Massachusetts. Plaintiffs are two former marketing contractors who claim the society unjustly fired them right before proceeds from a traveling dinosaur exhibit began rolling in, denying them their share. Society executives call the suit "frivolous" but nonetheless fear that it will cast a shadow on the group's success.

The society, with 3000 members, was founded in 1991 by science writer Donald Lessem to raise money for field studies and to harness kids' fascination with dinosaurs to teach them about science. In 1992, Steven Spielberg's studio allowed the society to sponsor an exhibit, "The Dinosaurs of Jurassic Park," which last year supplied 86% of its $2.28 million in revenues.

But Joseph Donnelly of Hyannis, Massachusetts, who with Coleman Blodgett ran the now-defunct marketing firm Seibold-Hann, claims it was they who initiated talks on the dinosaur exhibit. In addition to a cut of the profits, Donnelly wants to recoup the $250,000 his firm spent to recruit new members before its contract was terminated 2 years ago.

Lessem says he has documentation to prove that it was Dinosaur Society executives who set up the exhibit deal. As for the $250,000, society president Steven Gittelman says the contractors were fired because they had recruited only 3000 out of 30,000 promised new members. The society is countersuing the pair for $200,000 that it claims they made on unauthorized sales of its *Dino Times* newspaper.

Researchers are following the

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Long Voyage for Loggerheads

Off the coast of Baja California thousands of young loggerhead turtles, an endangered species, can be found year-round gorging on red ocean crabs. Where these turtles come from has been a mystery to scientists, as the nearest known nesting place is 10,000 miles miles away in Japan. And while loggerheads are known to migrate across the Atlantic, a Japan-to-California journey is four times as long. "The belief was that they couldn't last that long out there," says Brian Bowen, a conservation geneticist at the University of Florida, Gainesville, who estimates the trip could take 2 to 3 years.

ALBERTO ABREU-GROBOIS

Long way home. Well-traveled loggerhead hauled aboard for a blood sample.

But now Bowen and colleagues from Japan, Australia, and Hawaii say they have genetic proof that the loggerheads do indeed make the trans-Pacific journey. They compared the mitochondrial DNA of loggerheads nesting in Japan and Australia to that of the Baja crowd. Similarities prove that the Baja turtles are actually members of both western Pacific populations, Bowen reports in the 25 April issue of the *Proceedings of the National Academy of Sciences*.

"People have wondered for years where those turtles were coming from," says Kenneth Lohmann, a marine biologist at the University of North Carolina, Chapel Hill. "Now we have some hard evidence." Ocean currents carry young turtles across the Pacific, explains Bowen, and they return to their birthplaces 10 to 15 years later to mate.

The itinerant life takes its toll: Normally only one in 10,000 of the loggerheads survives into adulthood. They are further threatened by drift-net fishing, which snags and kills "what should be the survivors," says Bowen. He hopes his evidence will bring the turtles under the protection of a 1983 United Nations convention which outlaws the taking of endangered species during migrations on the high seas. UN rules could also allow countries where the turtles nest to protect them as a national resource even in international waters. And rules protecting turtles, conservationists hope, could provide some muscle to help rein in the drift nets.

Paleoclimate Workers Honored by Crafoord

Years spent mucking about with cores of ancient ice and sea floor mud have paid off big time for paleoclimatologists Willi Dansgaard and Nicholas Shackleton. The Royal Swedish Academy of Sciences, the folks who bring you the Nobel prizes, last month announced that Dansgaard, of the University of Copenhagen, and Shackleton, of the University of Cambridge, will share the 1995 Crafoord Prize, which brings with it $380,000.

Dansgaard's name is attached to the abrupt temperature fluctuations of the 100,000 years of the last ice age, recorded in changing ratios of oxygen isotopes trapped in Greenland ice. Shackleton has recovered climate records from deep-sea sediments that contain the comings and goings of many ice ages. He has also shown how to use Earth's orbital variations, etched in the isotopic climate record, as a geologic clock. This has made it possible for paleoclimatologists working both on land and sea "to talk within the same time framework," he says.

The Crafoord Prize, established in 1980, honors fields neglected by the Nobel awards, but a novel beneficiary this time around is musicology. Shackleton, who collects old clarinets and publishes scholarly papers on the instrument, says "the clarinet will benefit in some way" from the prize.

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case with trepidation. Vertebrate paleontologist Richard Stuckey of the Denver Museum of Natural History says the Dinosaur Society "has played an extremely crucial role in dinosaur paleontology." According to Gittelman, field studies in dinosaur paleontology have been getting less than $1 million a year worldwide from other sources: "We've increased that by 30%."

EMF Suit Runs Out of Power

For California, at least, it may spell the end of an era. Last month, plaintiffs from the city of Fresno dropped a highly publicized lawsuit—and the largest one ever—alleging that electromagnetic fields (EMFs) from power lines cause cancer.

The 33 plaintiffs—16 with cancer, two who feared cancer, and 15 who alleged loss of "consortium" because their spouses had cancer—had claimed that power lines running near Slater Elementary School in Fresno, where the cancer victims were employed, caused the disease. So they sued Pacific Gas & Electric, the local power company, for "hundreds of millions of dollars," according to their lawyer, Joe Davis.

The case was made famous in a 1992 *New Yorker* article written by investigative journalist Paul Brodeur and later in his book *The Great Power-Line Cover up*. But the scientific evidence was dubious at best, says epidemiologist Philip Cole of the University of Alabama, Birmingham, who says magnetic field readings taken at the school showed levels no higher than those found in most homes. And a recent state health department study found that the school staff got no more cancer than might be expected by chance.

The case was dropped, however, for nonscientific reasons. In late March a California Court of Appeals ruled that an unrelated EMF suit should be handled by the California Public Utilities Commission—which has the authority to modify power lines for public safety reasons—and not the courts. But the commission, as a rule, can't award money damages. The plaintiffs therefore have agreed to a deal whereby the company will pay its own legal expenses (otherwise, the plaintiffs might be stuck with the bill), and the lawsuit will not be refiled. Says lawyer Davis: "The very thought of anyone's case ... sent over to the [commission] spells the demise of the case."

Major Undersea Volcano Chain Sighted

Every wrinkle of Earth's mountain ranges is known to mapmakers by now. But much of the ocean floor, 71% of the Earth's surface, is still terra incognita. In late March, an international team of scientists returned from a 2-month cruise in the South Pacific with a major piece of that murky picture: confirmation of the existence of a 2000-kilometer-long chain of undersea volcanoes southwest of Easter Island.

The chain—known as the Foundation Seamounts—is "one of largest structures on the sea floor yet to be discovered," says Jacqueline Mammerickx, emeritus scientist at the Scripps Institution of Oceanography in California. Her analysis of radar scanning data from U.S. Navy satellites a few years ago produced the first solid hints of the volcanoes' existence. Variations in the height of ocean surfaces indicate gravitational anomalies caused by undersea structures. But a visit to the site was needed to see if they were really there, says Roger Hekinian of the French ocean research agency IFREMER, who co-led the expedition aboard the German oceanographic ship *Sonne*. Using underwater cameras and sampling equipment, the scientists identified some 37 volcanoes, ranging as high as 4000 meters. What's more, they found evidence that the volcanoes were formed by a "hot spot"—a plume of magma originating 100 or more kilometers beneath the ocean floor. Most undersea volcanoes are formed from shallower magma in the ridges between spreading continental plates, but this chain extends well into the Pacific plate. Because magma from the hot spot probably comes from very deep in Earth's mantle, Hekinian says analysis of samples—if the team can pinpoint the hot spot when they return next winter—should provide valuable information about the interior of the planet.

The Mosquito and the Marigold

Gardeners have long known that the pungent marigold contains substances that repel nematodes and other pests. Now scientists in India have reported zeroing in on two of the marigold's secret ingredients—which might lead to the development of new eco-friendly pesticides.

Scientists led by Harish Goel at the Indian defense ministry's Institute of Nuclear Medicine and Allied Sciences in Delhi have successfully deployed two marigold phototoxins—poisons that depend on light for their expression—against the larvae of mosquitoes that cause malaria and Japanese encephalitis. The work is reported in the October 1994 issue of the Indian *Journal of Experimental Biology*.

Of the two toxins, erythrosin-B and alpha-terthiophene or alpha-T, the latter showed some toxicity even in dim light and even in small quantities killed *Anopheles* larvae—doing in 20% of a brood within 4 days of application. Alpha-T didn't work on *Anopheles* past the larval stage, but it also proved lethal for pupae of *Culex*, the encephalitis mosquito.

The scientists are now planning toxicity testing and genetic studies to see if Alpha-T is safe for mammals. Goel says it looks safer than either chemical pesticides or the pyrethrums, neurotoxins isolated from chrysanthemums that work only on adult mosquitoes.

RUNK/SCHOENBERGER/GRANT HEILMAN

Pretty poison. Marigold.

Isao Kubo, a chemical ecologist at the University of California, Berkeley, says marigolds contain sulfur, abhorred by flies and worms, but beyond that "no one has characterized the active ingredients." Successful taming of the volatile phototoxins, he says, might lead to a valuable new compound for spraying mosquito breeding ponds. It is "very difficult to find a compound that is toxic only to the mosquitoes," says Kubo.