

## Two Penises Are Better Than One

From legs to nostrils to antennae, the external body parts of animals frequently come in pairs.

The penis is usually an exception, but the males of a few animals, among them snakes, lizards, and crustaceans, are doubly endowed. Some earwigs are also blessed with a pair of penises, and new research shows why: If one organ gets severed, the spare comes in handy.

Entomologists assumed that earwigs never used their spare because it usually points inward rather than out. But when ento-

mologist Yoshitaka Kamimura of Tokyo Metropolitan University in Japan studied mating of *Euborelia plebeja* close up, he discovered that both penises are equally functional.

To understand the duplication,



Duplication pays off for male earwigs.

Kamimura's team interrupted the coitus of nine *E. plebeja* males by forcefully lifting them off the female. The dislodgment snapped the penis. But when the semi-

emasculated males were introduced to a new female 2 days later, all successfully inseminated their mate with the remaining member. To confirm the hunch that a spare acts as a crucial back-up, the team then collected 663 specimens of *E. plebeja* and a related species. Three of the males had severed penises, while two females had remains of amputated male genitalia lodged in their vaginas, they report in the 15 November issue of *Naturwissenschaften*. The findings suggest that sexual accidents, while rare, are a risk that evolution has reckoned with.

Richard Shine, an evolutionary biologist at the University of Sydney, Australia, who has studied double penises in snakes, says the hypothesis is "elegant and feasible."

## Priming the Pump

Computer hobbyists have discovered the largest prime number ever, which weighs in at a whopping 4 million digits.

Primes are the basic building blocks of the mathematical world. Every natural number other than one is either prime or is made up of primes multiplied together. The new discovery is the 39th known member of a rare group of primes, known as Mersenne primes after a 17th century French monk. They are of the form  $2^p - 1$ . Because of that exponential  $2^p$ , Mersenne primes rapidly get very, very large. So when a distributed computing project called the Great Internet Mersenne Prime Search (GIMPS) found the new number, nobody was surprised that it topped the scale. The previous record holder,  $2^{6,972,593} - 1$ , is more than 2 million digits long and was found by GIMPS two and a half years ago.

The new prime,  $2^{13,466,917} - 1$ , was found thanks to thousands of volunteers who run a Mersenne-prime-testing algorithm, called the Lucas-Lehmer test, on their computers when the machines would otherwise be idle. In mid-November, one volunteer—20-year-old Canadian Michael Cameron—reported a prime sighting. Tim Cusack of Entropia, a San Diego-based distributed computing company that organizes the search, says he expects the new prime to be confirmed this week by a second test on a supercomputer.

Meanwhile, the search continues. Finding ever-greater Mersenne primes isn't terribly important to number theorists, but GIMPS soldiers on, hoping to set ever-increasing world records. Perhaps, for the participants, the search evokes something primal.

## Union Moves Shake Two Campuses

Graduate students staged a 2-day work stoppage last week at the University of Illinois, Urbana-Champaign (UIUC), the latest move in a 5-year battle between the Graduate Employees' Organization and the university administration over unionization. Meanwhile, some graduate students at Brown University in Providence, Rhode Island, won the right to organize in a 16 November ruling by a regional branch of the National Labor Relations Board (NLRB).

More than two dozen universities in the United States and Canada have officially recognized graduate student unions (*Science*, 26 May 2000, p. 1311). But the Illinois Supreme Court earlier this year affirmed a state labor board ruling that only a small minority of graduate student teaching and research assistants at UIUC were eligible to unionize, prompting last week's walkout. The UIUC group, which picketed five campus buildings and disrupted classes, says that unionization will help them win higher pay, better benefits, and clearer grievance procedures. But



Fighting Illini.

a university official, who termed the stoppage "a non-event," says that a union would disrupt the relationship between faculty and students.

At Brown, the new NLRB ruling applies to about one-third of the school's 1500 graduate students. It excludes those in physical and life sciences whose work is "intimately linked to their Ph.D. research," says Rosemary Pye, regional director of the NLRB's Boston office, a distinction that makes their work an essential part of their educational experience. A union election was scheduled for 6 to 7 December. The university has until 14 December to appeal the ruling.

## CERN Wins Atomic Lab Chess Crown

Fermilab physicists may have discovered the top quark, but CERN's troops are several  $\Sigma$  better in chess: The European nuclear research center's chess team pummeled its American counterpart in an Internet battle last month.

CERN chess officials, however, concede that their 11.5–5.5 victory may not be statistically meaningful. "Fermilab might have actually beaten CERN ... from a theoretical standpoint," jokes CERN club secretary Tibor Simko. And Fermilab's chess brass claim that their weak showing may actually be a sign of science superiority. Chess club president Lenny Spiegel says that "if you're going to be serious at chess, it's at odds with being serious about physics."

