



Save the Cucumbers?

When it comes to overfishing, tuna and sharks tend to hog the limelight. But spare a thought for the sea cucumbers. These elongated, leathery echinoderms, used in Asian soups and medicine, are being rapidly depleted, according to the first quantitative global analysis, published online 30 December in *Fish and Fisheries*.

Marine ecologists Heike Lotze and Sean Anderson of Dalhousie University in Halifax, Canada, and colleagues analyzed global catch data and, where available, management reports from regional authorities. They found that 81% of sea cucumber fisheries have declined, many substantially. Meanwhile, the rising demand for the creatures, which can fetch up to \$400 per kilogram dry weight, has made fisheries start to decline much sooner than before—typically after 6 years rather than the 34 years it took in 1960.

Sea cucumbers are vulnerable to overfishing because they grow and reproduce slowly and aggregate in particular areas, making them easy to catch. Compounding the problem, more than a third of sea cucumber fisheries have no regulations at all, Lotze says—an argument for setting up marine reserves for these unlikely poster animals.

Science and Magic: Mexicans Choose Both

In Mexico, magical beliefs go hand in hand with strong faith in science, a recent survey of public perception of science and technology shows.

The study, compiled by the country's National Council on Science and Technology and the National Institute of Statistics and Geography, found that a large percentage of Mexicans believe in homeopathy, acupuncture, lucky numbers, and ESP. About 38% agree that "space vehicles from other civilizations" visit Earth. At the same time, most Mexicans surveyed also said the country needs more researchers, and more

than eight in 10 agreed that they depend too much on faith over science.

"In developing nations, there is a greater tendency to believe in magic of various kinds," says Jon Miller, director of the International Center for the Advancement of Scientific Literacy at the University of Michigan, Ann Arbor. Miller, who wrote many of the survey questions used, says acceptance of both science and religion is highest in developing countries. "They tend to view them as separate issues," he says.

Mexicans both fear and respect scientists, the survey showed: 57% of people interviewed agreed that "due to their knowledge, scientific researchers have power that makes them dangerous."

Ingenious Engineers

This year, innovations in biotechnology have snatched up two of the three heftiest National Academy of Engineering prizes. The annual Charles Stark Draper Prize goes to Frances H. Arnold, a molecular engineer at the California Institute of Technology, and Willem P. C. Stemmer, founder and CEO of Amunix Inc. in Mountain View, California, for their work on the "directed evolution" method of generating

enzymes with novel properties, which is now used in fields from biofuel research to drug development. Leroy Hood, co-founder and president of the nonprofit Institute for Systems Biology in Seattle, Washington, wins the biennial Fritz J. and Dolores H. Russ Prize for inventing the first DNA and protein sequencers and synthesizers, as well as an ink-jet printer for DNA arrays. The annual Bernard M. Gordon Prize for Innovation in Engineering and Technology Education goes to Edward Crawley of the Massachusetts Institute of Technology, who created the Conceive, Design, Implement, Operate Initiative, an engineering curriculum that emphasizes hands-on learning. Each prize comes with \$500,000 and will be awarded at a ceremony on 22 February.



Clockwise from top left: Arnold, Stemmer, Hood, and Crawley.

SUBATOMIC SHUFFLE

Prefer particle physics to poker? Pick up a deck of the Quark Matter Card Game, and you can have both. Instead of kings and queens, the cards feature quarks (up, down, and strange); muons, electrons, and their neutrinos; and antiparticles for all.

Hungarian high school students Csaba Török and Judit Csörgő invented the deck with Judit's father, Tamás, a physicist at the KFKI Research Institute for Particle and Nuclear Physics in Budapest. The simplest game is "Anti," in which players quickly identify particle and antiparticle combinations, bearing in mind a quantum-mechanical property called "color" indicated by the color of the card. It's an abstract concept, but "even children who cannot read can learn the rules," Tamás says. For adult players, he recommends "Quark Matter," which starts with cards densely piled to represent the quark-gluon plasmas physicists cook up at Brookhaven National Laboratory's

Relativistic Heavy Ion Collider (RHIC), where Tamás works on the PHENIX experiment. Players draw cards according to the physics of how the plasma expands and reforms into particles known as hadrons.

The cards and rule book can be ordered or downloaded from the self-publishing site Lulu (<http://scim.ag/qm-cards>). Now RHIC physicists can play the game while waiting for the beam, Tamás says. In any case, he says, "It's a really nice feeling to walk around with elementary particles in your pocket."

