



unclear on ethical issues such as consent forms for egg donors and the tracking of research materials. Kriegstein and others are not writing off collaboration with the Koreans, however, and they acknowledge that Hwang's published findings are not in doubt. "It's not a blow to the field but to him personally," says Kriegstein.

In the United Kingdom, scientists have generally voiced sorrow about Hwang's mistake and pride in their own system of safeguards. "This highlights why the tough regulatory climate in the U.K. is protection rather than a problem," said biologist Steven Minger of King's College in London.

The future of the hub is now uncertain. On 15 November, the Korean government laid out plans to invest 11.5 billion won (\$11 million) in the venture and make it independent from Seoul National University. There will be no subhub in San Francisco, at least for now. It has been rebuffed by both UCSF and the new California Institute for Regenerative Medicine. And the San Francisco-based Pacific Fertility Clinic, which had agreed to help with egg collection, said last week that it had severed ties with Hwang. Ian Wilmut of the University of Edinburgh, which the hub was eyeing as its European outpost, said "we are saddened" by the events, but "I hope that we can develop col-

laborative links" with the Koreans.

Ironically, some maintain that Hwang now has an operation second to none in its ethical safeguards. This week, *The American Journal of Ethics* published an article by Hyun describing in detail the guidelines now used by Hwang's group for egg procurement, along with a commentary by Mildred Cho and David Magnus of Stanford University in Palo Alto, California, who say that if the outlined procedure is followed, it is "a major step toward meeting the highest standards of ethical oversight for oocyte donation." —CONSTANCE HOLDEN
With reporting by Gretchen Vogel and Dennis Normile.

GLOBAL CLIMATE CHANGE

The Atlantic Conveyor May Have Slowed, But Don't Panic Yet

The ponderous churning of the North Atlantic Ocean that carries warm water northward and returns deep, cold water to the south appears to have slowed in the past decade or two. That would mean that this oceanic radiator is bringing less heat to warm Europe and, if global warming is behind the slowdown, will carry less and less heat to high latitudes in the future. But the slowing is hardly larger than the uncertainty of the observations. And "we don't know enough about the ocean to know whether this represents a trend" that will persist, says physical oceanographer Harry Bryden of the National Oceanography Centre (NOC) in Southampton, U.K. Bryden and NOC colleagues report detection of the slowdown this week in *Nature*.

Oceanographers only last year put down a string of instrumented moorings spanning the Atlantic from West Africa to the Bahamas, so for a long conveyor record, the NOC group had to draw on five oceanographic surveys across that stretch of the Atlantic between 1957 and 2004. During ship crossings of a month or two, researchers measured seawater temperature and salinity from the surface to near the bottom. The NOC group used seawater densities calculated from those observations, plus current measurements of the Gulf Stream passing by Florida and a few

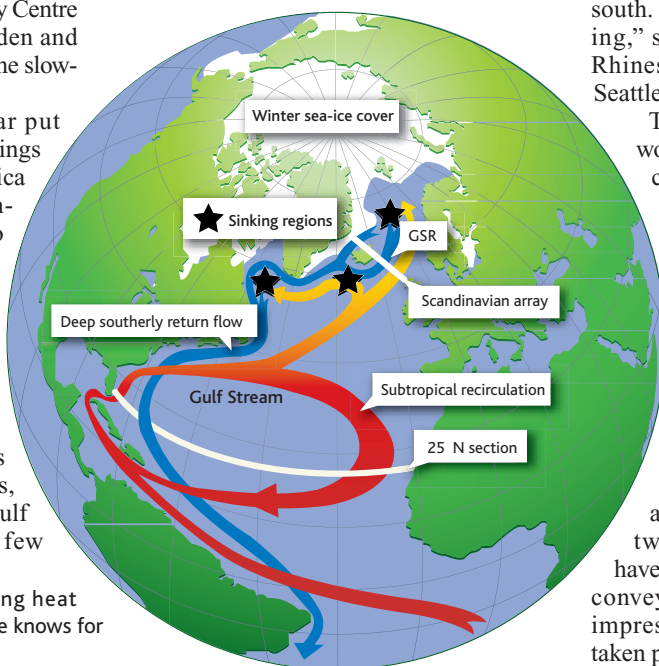
standard assumptions, to estimate the currents heading north and south through the depth of the Atlantic.

The Gulf Stream remained steady through the 47-year period, and Atlantic flows remained much the same through the 1992 survey. But according to the NOC group's analysis, the conveyor appears to have slowed dramatically in 1998 and 2004. Fifty percent more Gulf Stream near-surface waters were turning back southward before reaching very far to the north, whereas part of the deep southward flow of

cold water had decreased by 50%. All in all, the conveyor had slowed by 30%.

The slowing, although sizable, is comparable to the estimated uncertainty of the observations, Bryden notes. Still, "it's real variability," he says. Observed temperature changes driving the conveyor slowdown in shallower waters in the west and in deeper waters are just what he would expect from salinity and circulation changes previously reported in the far north (*Science*, 16 April 2004, p. 371). That's where the conveyor turns down from the surface and heads back south. "The pattern is reasonably convincing," says physical oceanographer Peter Rhines of the University of Washington, Seattle. "It's a pretty nice picture."

The picture is still fuzzy, however. "It would be dangerous to jump to the conclusion that there's a persistent weakening" of the conveyor circulation, says ocean and climate modeler Richard Wood of the Hadley Centre for Climate Prediction and Research in Exeter, U.K. Wood, Rhines, and Bryden all worry that the near-instantaneous snapshots taken by the ocean surveys might have been misleading. Like any part of the complex climate system, the conveyor is bound to slow down at times and speed up at others. The two latest surveys, Wood says, may have happened to catch the Atlantic as the conveyor slowed temporarily, giving the impression that a permanent change had taken place.



A slowdown? Currents (red) carrying heat northward may have slowed, but no one knows for how long.

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On the other hand, the NOC analysis may not have even captured what happened in the past decade or so. Climate models simulating the conveyor in a warming world don't call for such a large slowdown until sometime in the next century, Wood notes. In fact, climate researcher Jeff Knight of the Hadley Centre and colleagues recently reported that changing sea surface temperatures suggest that the conveyor has speeded up a bit since the 1970s (*Science*, 1 July, p. 41). And physical oceanographers Carl Wunsch and Patrick Heimbach of the Massachusetts Institute of

Technology have just crunched far more oceanographic data from a variety of sources over the interval of dramatic change (1993 to 2004) in the NOC analysis. In a paper submitted for publication, they report a small slowdown, a quarter the size of the NOC group's. The change in heat transported northward is negligible, they calculate.

So has the conveyor slowed? Might it continue to slow? "We don't know," says Wunsch. And it may take a decade or two more of watching and waiting to know for sure.

—RICHARD A. KERR

CANADA

Animal Rules Keep Grad Students Out of the Lab

OTTAWA—Twenty graduate students are suing Laurentian University in Sudbury, Canada, this week in hopes of regaining access to their rat labs. The students are caught in the middle of a dispute between their high-profile adviser, neuropsychologist Michael Persinger, and the institution over Persinger's compliance with animal-welfare rules, a battle that his supporters say is fueled by the university's desire to make room for its new medical school.

Laurentian's associate vice-president (research) Liette Vasseur says that the school changed old locks on 9 November and didn't give new keys to the students because the university's animal-welfare committee had not approved seven of Persinger's research protocols. Until the protocols are approved, the experiments cannot be performed, and the students "have no need to go in the building if they don't do research there," says Vasseur.

But that explanation didn't placate the students. "You don't come in and just lock doors. That's draconian and barbaric," says Robert Brouillette, lawyer for the students, who since 9 November have been unable to conduct various obesity, epilepsy, cancer, aging, and behavioral studies under the unapproved protocols.

Persinger is considered a maverick for work on inducing religious or quasi-mystical states in human patients via magnetic stimulation of their left temporal lobes. In addition to that research, in a field tabbed neurotheology, he and his students use some 800 rats for a variety of experiments that occupy 70% of the school's animal-care facility.

The dispute between Persinger's group and Laurentian's animal-care committee involves the interpretation of two Canadian Council on Animal Care (CCAC) requirements: that rats be housed in plastic rather than steel cages and that they be euthanized at

the end of an experiment. CCAC Executive Director Clement Gauthier says rats in steel units develop lesions on their feet and that euthanasia is recommended if experiments are invasive or yield "chronically ill" rodents. But Persinger says he's not convinced that plastic cages are better—one of his studies compares the long-term effects on animals of plastic and wire cages—and he believes that



Rats! Laurentian's Martin Persinger and graduate students are fighting the university's animal-care policies.

it's more humane and appropriate to treat sick rats after the experiment. Ian Duncan, chair of animal welfare at the University of Guelph, says neither plastic cages nor euthanasia are obligatory and that there can be sound reasons for alternative practices.

The battle escalated this fall, say observers, when Laurentian became the country's 17th medical school. That expansion prompted an agreement with the nation's three granting councils promising full compliance with CCAC guidelines and increased the pressure for space on the university's limited animal-care facilities.

But Persinger says the university has negotiated in bad faith. "You answer this and this and then they come back, well, now you need that and that," he says. "It's an infinite progression."

—WAYNE KONDRO

Wayne Kondro writes from Ottawa, Canada.

No to GMO, Say Swiss

Pharma and agrochemical companies may "take their research out of the country" now that growing genetically modified (GM) plants is illegal in Switzerland, says Bernd Schips, director of the Swiss Institute for Business Cycle Research. This week, Swiss voters approved a 5-year moratorium on the cultivation of GM organisms (GMOs) and the import of transgenic animals. GM field trials and GM food imports are still permitted. "[We] hope Switzerland's rejection of [GM] crops inspires others around the world to ... say no," said Greenpeace's Geert Ritsema. Swiss agbiotech firm Syngenta said its U.S.-based GMO research would be unaffected.

—XAVIER BOSCH

NSF Gender Snoops on Campus

The National Science Foundation is investigating four institutions that receive NSF research funds to determine whether they are in violation of Title IX—the law that prohibits sex discrimination by any school receiving federal dollars. The move follows a 2004 Government Accountability Office report that charged NSF and two other science agencies with failing to track Title IX compliance.

The agency declined to disclose the sites being investigated. Chemist Debra Rolison of the Naval Research Laboratory in Washington, D.C., calls the reviews a "good first step" toward using Title IX to improve the gender ratio in technical fields, in the same way that the law has transformed college athletics.

—YUDHIJIT BHATTACHARJEE

Researchers Get Hippocratic

Scientists must do no harm, say 68 of the world's science academies. The InterAcademy Panel on International Issues this week released principles for drafting codes of conduct at biology labs. The panel's statement on biosecurity recommends that scientists refuse to do research deemed "only harmful," take steps to "secure" laboratories, and report activities that violate the 1972 Biological and Toxin Weapons Convention. "Do no harm is an excellent starting point," says bioweapons expert Ronald Atlas of the University of Louisville, Kentucky, but he acknowledges that certain provisions will be controversial. A call for whistleblowing, for example, could raise questions about where researchers should report violations and how they will be protected, he says.

—MICHAEL SCHIRBER