even a thin ocean—would have temporarily heated its interior, expanded the ocean, and flexed a weakened crust. That flexing and the warmth of the ocean could have renewed and brightened the surface, or, as luck would have it, only half of it. Once beyond the resonance, Ganymede would have cooled again, stuck in its two-faced look. –RICHARD A. KERR

EMBRYO RESEARCH

British Parliament Approves New Rules

The British House of Commons has overwhelmingly approved new rules governing research on embryos in the United Kingdom. If the regulation passes the House of Lords, it would allow British scientists to derive and use stem cells from human embryos and to conduct nuclear transfer experiments—the same technology that produced Dolly the sheep—with human cells.

Opponents in Britain and elsewhere in Europe have called the 19 December vote a step down a slippery slope toward human cloning. But supporters deny that, claiming that the new rules ensure strict ethical oversight of this research, which could eventually help treat or even cure such devastating diseases as Parkinson's or diabetes.

The measure passed by 366 to 174 in a "free" vote, in which members were allowed to vote their consciences rather than adhere to a party line. "We had no idea" how the vote would fall, says Robin Lovell-Badge, a developmental geneticist at the National Institute for Medical Research in London who works with mouse embryonic stem cells. "We were very surprised at how strong the support was." The House of Lords is expected to vote on the measure in mid-January.

Current British law, passed in 1990, allows researchers in the United Kingdom to conduct experiments with embryos up to 14 days old, but only for research into infertility, the causes of miscarriage, genetic or congenital diseases, or new methods of contraception. The new regulation would permit research aimed at developing treatments for disease as well.

All such work will be regulated by the Human Fertilisation and Embryology Authority (HFEA), which oversees fertility treatments and also reviews research proposals for scientific and ethical merit before issuing licenses to work with human embryos. Unlike in the United States, where embryo research conducted by private companies is not regulated by the federal government, British researchers who attempt to do embryo research without a license would face criminal penalties, including prison.

The HFEA has already granted several licenses for the derivation of stem cells from embryos, says developmental biologist Anne McLaren of the Wellcome/CRC Institute in Cambridge, U.K. The scientists granted these licenses specified that the cells would be used to study blastocyst quality to better understand infertility.

CREDIT: JEFF MILLER/UNIVERSITY OF WISCONSIN, MADISON

New rules. The British House of Commons passed a measure allowing scientists to derive human embryonic stem cells for potential disease treatments.

Some opponents of the new regulation wanted a ban on research involving nuclear transfer techniques in human cells. Such work would attempt to create human embryonic cells with the same nuclear DNA as a patient. Those cells could then be used to derive genetically matched stem cells that might be coaxed to produce specific types of cells for treating disease. Last year, a U.K. government panel said that nuclear transfer experiments could be ethically justified if they were used to produce cells for disease treatment (*Science*, 25 August 2000, p. 1269), but opponents have argued that the work could lead to human cloning. "I fear that if we proceed as we are doing, we will open the floodgates," said Edward Leigh (C–Gainsborough) during the parliamentary debate.

German leaders have also expressed dismay about the vote. Minister for research Edelgard Bulmahn told the newspaper *Frankfurter Allegemeine Zeitung* that allowing nuclear transfer experiments in human cells was "breaking an ethical border." German research should focus on exploring alternatives to the cloning of human embryos, Bulmahn said, such as stem cells derived from adult tissues. Health Minister Andrea Fischer agreed. Chancellor Gerhard Schroeder also expressed reservations. He wrote in a statement that Germany "should not yield to calls to relax the ban on the use of embryo stem cells until the potential of adult stem cells in medicine has been properly investigated." –GRETCHEN VOGEL

With reporting by Ohad Parnes in Berlin.

GERMANY

Chipping Away at Feudal Vestiges in Academe

BERLIN—Any young German scientist hoping to carve out an academic career faces a daunting barrier: the notorious post-Ph.D. Habilitation requirement. To be eligible for tenure, young scholars are required to work for 6 years or more as a kind of academic apprentice, dependent on a senior professor for support. Now, this centuries-old academic peculiarity may finally be on the way out.

Last week, the DFG, Germany's central research foundation, announced a new program of "junior professorships" that will provide independent support for young researchers. Beginning in the next few months, young scientists will be able to apply for 3-year support for their own research or group projects they head. At the same time, the German Donor's Association—the country's major private science-funding body—announced that it is starting a program of "research professorships." These will fund university positions for researchers under age 35, with 150,000 DM (about $72,000) annually for a period of 4 years, for independent studies. Priority will be given to new and interdisciplinary areas of research.

Both these new programs present a direct challenge to the hegemony of senior professors, and they are being viewed as key steps in the eventual elimination of the Habilitation requirement. A blue-ribbon committee of scientists and government of-

ficials advocated such a move last spring, arguing that Germany's academic research system should move toward the U.S. model, with "junior professor" slots replacing the Habilitation positions (*Science*, 21 April 2000, p. 413).

The Habilitation system is widely seen as a disincentive for young scientists, especially women, to remain in academic research. "There is every reason to get rid of the Habilitation, and to create a new position for young scholars and scientists that gives them more autonomy," says Lorraine Daston, an American historian who directs the Max Planck Institute for the History of Science in Berlin. The best young scholars are moving to academic positions abroad, where they do not suffer "the indignity of a system they consider feudal," as Daston puts it.

The German federal government backs the new initiatives. Edelgard Bulmahn, minister for education and research, has put reform of the state-governed higher education system at the top of her agenda. "It is urgently necessary that the laws which regulate the employment of professors, which were passed in the 19th century, be adapted to the new reality," she said in a statement last fall.

But these new initiatives are just the first step, and even they are controversial. A coalition of university professors has opposed doing away with the Habilitation because it could erode the quality of academic training. Others have argued that simply renaming the postdoctoral track from "Habilitation" to "junior professorship" will do little to alter dependency relations within the universities.

Gerhard Sagerer, a computer scientist and dean of the technical faculty of the University of Bielefeld, argues that the system is already changing fast. He says the Habilitation has lost its importance in some fields of science and that there will be fewer fixed professorships in the future. Instead, department heads will have much more freedom to allocate resources.

Marc Schalenberg, a young historian who has just started his Habilitation at Humboldt University in Berlin, hopes to be one of the first to profit from the new initiatives. Instead of "hanging completely in the air after my Habilitation," he says, "I could now try and apply for a junior professorship," which could put him on the road to a permanent academic position more quickly. But this revolution may come too late for those who are already at a relatively advanced stage of their Habilitation: Today, the average German academic is 44 by the time he or she is eligible for a tenured position.

–OHAD PARNES

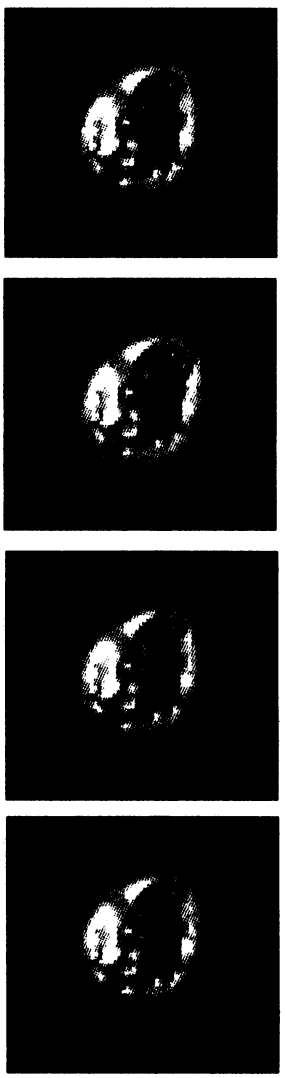
With additional reporting by Janina Wellman. Parnes and Wellman are writers in Berlin.

MALARIA

Old Movie Spawns a New Discovery

Tired of Hollywood's bland holiday fare? Check out a movie showing this week on *Science*'s Web site—a mystery thriller with a cast of two.* True, it's not a first-run film: The 87-second clip, featuring a human liver cell and a malaria parasite, was shot at a New York University (NYU) lab more than 10 years ago. But a series of recent experiments by NYU researchers, reported on page 141 of this issue, reveals a whole new story behind the video fragment.

The movie catches a so-called sporozoite (a stage in the life cycle of the malaria-causing *Plasmodium* parasite) entering a human liver cell, apparently jostling its way right through, then exiting at the cell's other end and moving away as if nothing had happened. That's strange behavior for a sporozoite. Most researchers thought that after being delivered via a mosquito bite, these needlelike cells quickly traveled to the liver to infect a single cell. Inside that host cell, the sporozoite produces tens of thousands of so-called merozoites, each of which can then go on to infect red blood cells. The fact that sporozoites may travel through as many as four other liver cells before settling down in one, as the new study suggests, comes as a surprise. "This parasite is not obeying the textbooks," says Rudolph Entzeroth, a parasitologist at the University of Technology in Dresden, Germany.



In and out. In a surprise move, a malaria parasite travels through a liver cell.

CREDIT: M. MOTA ET AL.

The textbooks also assume that, as they enter a cell, *Plasmodium* sporozoites induce the cell's plasma membrane to encapsulate the parasite inside a vacuole—a trick employed by most parasites. But, as the movie shows, when the parasite enters and exits liver cells during its quick passage through them, it rudely punches small holes in the cell membrane, like a well-working Votomatic machine piercing an election ballot.

NYU researcher Jerome Vanderberg, who shot the movie in 1989, was convinced all along that sporozoites didn't always follow parasitological doctrine when they invaded. Ten years ago, he published a paper showing that sporozoites could travel through a type of immune cell called a macrophage. He and several others also produced electron microscopy images showing malaria parasites inside host cells but without the typical vacuole surrounding them. But most researchers didn't know what to make of those findings, and some thought the behavior displayed in the short movie might be an artifact: The parasite might be swimming underneath the human cell, rather than passing through it. So the clip was never published, and Vanderberg's research eventually took another direction.

But when cell biologist Ana Rodríguez came to the department last year, she took a closer look at the old footage. "I really felt that it was not an artifact," she says. Together with her colleague Maria Mota, Rodríguez designed a series of experiments to find out what was happening. For instance, they used a test that can detect when cell membranes are wounded and repaired. When mosquito saliva containing *Plasmodium yoelii* sporozoites was added to cultured mouse liver cells, they found that 10% to 30% of the cells showed signs of wounding; these were wounds that would not be expected with an ordinary infection. This didn't happen when they added saliva from uninfected mosquitoes to the cells. The sporozoites also caused the liver cells to spill some of their contents—another sign that their membranes were punched.

The team went on to show that the parasites causing this damage didn't form a vacuole inside the cell and that their passage didn't result in an infection. Rather, their repeated stealthy invasions, followed by a rapid exit, seemed to mark a prelude to the final, classical invasion, with the formation of a vacuole. The team also found that liver cells in mice infected with malaria also showed signs of wounding, reassuring researchers that this wasn't just happening in the test tube. "All in all, I think it's a very elegant demonstration of a new phase in the

* www.sciencemag.org/cgi/content/full/291/5501/141/DC1