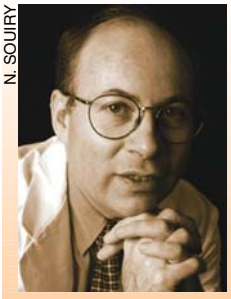
to help unravel disorders affecting white matter—the fibers that connect different regions of the brain—such as dyslexia, multiple sclerosis, and schizophrenia.

Another approach, MRI and spectroscopy of heavier nuclei such as sodium, phosphorus, carbon, or oxygen—instead of hydrogen, the MRI workhorse—opens the way for broader study of brain metabolism, neurotransmission, and disease. "We use carbon-13 and oxygen-17," says Le Bihan. "The abundance of those nuclei is very low, hence the need for very high fields."


N. SQUIRY

Le Bihan

"I think [NeuroSpin] is a wonderful facility," says Kamil Ugurbil, director of the Center for Magnetic Resonance Research at the University of Minnesota. "They are trying to combine and facilitate interactions between many different types of scientists. Such efforts go on already, but it's based on individual efforts. By consciously planning this, both in terms of building design and in terms of organization, they may be able to achieve much better results."

Toni Feder

Visas Extended for Students, Scientists

After months of trying to strike a balance between openness and security, State Department officials have changed immigration rules to allow foreign researchers and students in science and technology fields classified as "sensitive" to maintain their US visa clearances for up to four years.

"This change will ensure that the US continues to have access to the world's best and brightest scientists, and that's good for science and for security," said Representative Sherwood Boehlert (R-NY), chairman of the House Committee on Science.

The Visas Mantis program was established in 1998 to prevent scientists from transferring protected technology out of the US. In the wake of the September 11th attacks, the program was tightened, and foreign scientists and many students were required to undergo complete security reviews every time they left the US and wanted to return. The reviews were cumbersome and often took months. As a result, many of the students and scientists found it risky to leave the US for any reason.

In 2003 a one-year clearance period was implemented, but that was of little help to foreign students, researchers, and scholars involved in multiyear programs. The new policy grants clearances of two years to researchers and scholars, and four years to students. The extended clearances apply only to those returning to the same program or activity for which the visa was originally granted.

The relaxation of standards came after George Atkinson, science adviser to the secretary of state, joined the consular affairs and nonproliferation bureaus to negotiate for the change with

Statue Hid Hipparchus Star Catalog

Since Alexandria's great library was ransacked 1600 years ago, astronomers have searched in vain for a copy of the Hipparchus star catalog, the earliest sky map known to have used a coordinate system. Now, an astrophysicist vacationing in Naples, Italy, believes he has found a copy sitting in plain view on a statue of Atlas, the Greek god sentenced to bear the weight of the heavens.

The two-meter-tall statue, called the Farnese Atlas, was unearthed in the 1400s and is in the National Archaeological Museum in Naples. It is believed to be a second-century-AD Roman copy of an earlier Greek original. For years historians had speculated that the globe on the giant's shoulders, which is marked with 41 Greek constellations and with lines indicating the celestial equator, tropics, and ecliptic, contained an accurate sky map.

But no one with technical training had published anything about the Farnese Atlas until Bradley Schaefer of Louisiana State University, Baton Rouge, came along last year. "I have a nice fun result simply because I am the first astrophysicist to run an analysis," he says. His research will appear in the *Journal for the History of Astronomy* next month. The sky map Schaefer identified will help astronomers and historians determine how much of Hipparchus's work was used in later star catalogs. In addition to creating the sky map, the second-century-BC astronomer discovered the wobble of Earth's axis, recorded the first observations of a nova, calculated the length of the year to within six minutes, and is said to have devised the magnitude scale for star brightness still used by astronomers today.

Schaefer dated the statue's sky map by taking advantage of one of Hipparchus's observations: Stars and constellations move slowly over time with respect to the celestial equator, tropics, and meridian lines. By digitizing high-precision photographs of the globe, Schaefer was able to mathematically match locations of constellations to a date. According to his calculations, the map rendered on the globe was created in 125 BC, give or take 55 years. The positions of the constellations on the globe are too accurate to be an artistic interpretation, says Schaefer. The date, plus the shapes of the constellations, clinch the mapmaker as Hipparchus, and rule out other potential sources, such as verbal descriptions of the night sky by Aratus (275 BC), Eudoxus (366 BC), or the Assyrian observer (1130 BC), and Ptolemy's later catalog from about AD 128.

"Schaefer's given a pretty convincing argument, and the real ingenuity here is working out the star positions just from the pictures," says Owen Gingerich, a Harvard University astronomy historian. "Perhaps the most fascinating part of this discovery," Schaefer says, "is simply that we have recovered one of the most famous known examples of 'lost ancient wisdom.' "

Paul Guinnessy


GERRY PICUS/GRIFFITH OBSERVATORY

The Farnese Atlas (above). Compensating for the slow movement of stars across the sky was the key in dating the constellations on the globe (right) to 125 BC.

officials at the departments of Homeland Security and Justice. While the science and technology communities have long been concerned about the problems the Visas Mantis restrictions have caused, Atkinson said, government officials concerned with security have been worried about just that: security. (See the article by Amy Flatten, PHYSICS TODAY, February 2005, page 49.)

"It is a balance," he said. "There is much to be appreciated about the changes, but there is more to be done."

Jim Dawson

Nobelist Garners Religion Prize

Charles Hard Townes is this year's winner of the Templeton Prize for Progress Toward Research or Discoveries About Spiritual Realities. The prize comes with $1.5 million—an amount that purposely exceeds the Nobel Prize purse. He joins Mother Teresa and Aleksandr Solzhenitsyn as recipients of both the Templeton and Nobel Prizes.

In 1964, Townes shared the Nobel Prize in Physics for his work in quantum electronics, which led to the invention of masers and lasers. That same year, a talk he gave at Riverside Church in New York City launched a parallel, informal career as an advocate for the convergence of science and religion.

Townes

"Early in the game, I was willing to speak up about the interactions between science and religion, and what they could learn from each other," says Townes. "Science tries to understand how the universe works. Religion tries to understand the purpose. Is there a purpose? What is it? The structure must be arranged for that purpose." In both religion and science, he adds, "we use our intuition, logic, experiments, observations, emotions, inspiration, even revelation, to try to understand."

Townes points to the missing matter in the universe and to human consciousness and free will as holding mysteries. Above all, he says, "science and religion need to be talking openly with each other, and trying to understand their consistencies or inconsistencies. And where there are inconsistencies or mysteries, we must work to understand why."

Townes, who turns 90 this year, is an active member of the University of California, Berkeley, physics department. His current focus is on using infrared telescopes to watch stars change; he also supports the search for extraterrestrial life. Townes says he will give away most of his Templeton award money, with the largest chunk to go to his alma mater, Furman University in Greenville, South Carolina.

Toni Feder

No Leaky Pipeline for Women in Physics, but Discrimination Persists

The pipeline of women in US physics academe is not as leaky as is commonly supposed, according to a recent report by the American Institute of Physics.

Rather than women leaving physics throughout the path to a full professorship, AIP finds that attrition occurs mainly between high school and college: Nearly half of high-school physics students are women, but in 2003, women earned only 22% of physics bachelor's degrees. At more advanced career stages, the report says, "women are represented at about the levels we would expect based on degree production in the past. There appears to be no leak in the pipeline at the faculty level in either physics or astronomy."

"The [notion of a] leaky pipeline has been around for awhile," says report author Rachel Ivie, "and you would expect to find evidence for it. We don't. And it did surprise me."

Among entering physics PhD students in the years 1981–97, men and women dropped out in similar proportions. In 2003, women earned a record 18% of physics PhDs. From 1985 to 2002, the fraction of PhD-granting physics departments that counted women among their faculty members rose from less than half to more than three-quarters.

Still, women haven't achieved equality in physics. Across all employment sectors, women with comparable experience working in the same sector as men earn $3050 less a year on average. And while the 18% of new tenure-track hires in physics in 2003–04 who were women was commensurate with supply, the percentages were higher for women hired for temporary (20%) and part-time (22%) work. Despite improvements, physics, along with engineering, is the slowest among the sciences to attract more women.

The representation of minority women in physics remains tiny. In the period 1976–2003, only 35 African American and 57 Hispanic women earned physics PhDs in the US. The total number of US physics PhDs awarded annually now exceeds 1100.

Although the data poke holes in the leaky pipeline theory, says Ivie, "there are other problems. A lot of women have experiences that seem not to fit with our data. The issue of discrimination is still there."

The report, *Women in Physics and Astronomy, 2005*, may be obtained free of charge from AIP, Statistical Research Center, One Physics Ellipse, College Park, MD 20740; e-mail stats@aip.org; website http://www.aip.org/statistics/trends/gendertrends.html.

Toni Feder

News Notes

New NASA head. The White House has nominated Michael Griffin, head of the space department of the Johns Hopkins Applied Physics Laboratory in Maryland, to be NASA's 11th administrator. If confirmed, he will succeed Sean O'Keefe, who stepped down in February.

Griffin was NASA's chief engineer and associate administrator of exploration under former President George H. W. Bush. Later he moved to Orbital Sciences Corp in Virginia, and then was president of In-Q-Tel, the CIA's nonprofit foundation that invests in companies developing technologies with national security applications (see PHYSICS TODAY, January 2004, page 25).

Griffin

Griffin appears to have bipartisan support and is expected to fly through his congressional confirmation hearings. Last year, he gave evidence to Congress in favor of the president's Moon/Mars vision, but he questioned support for the *International Space Station* and the space shuttle. "Circling endlessly in lower Earth orbit does not qualify as a theme" for human space flight, he said.

Initial reactions from scientists are also positive—not least because Griffin comes from their ranks. He has a bachelor's in physics, a PhD in aerospace engineering, and five master's degrees. Louis Lanzerotti of Lucent Technologies' Bell Labs, who recently chaired a National Research Council committee on servicing the *Hubble Space Telescope*, says Griffin "is an ideal choice