comments and met with FASEB and other organizations before issuing its final policy. But Pascal says that ORI has stopped the clock to review "both the substance of the policy and the process." A committee staffer says that suspending the rule "is appropriate" and that the panel has not yet decided on its next step. –JOCELYN KAISER

PLANETARY SCIENCE

Cosmic Misfits Elude Star-Formation Theories

TOKYO—Astronomers have become increasingly perplexed over the last few years by a strange new class of celestial body. Too small to fit conventional definitions of brown dwarfs, they nonetheless move through star-forming regions in a manner that separates them from planets orbiting a star. Once seen as anomalies, their growing numbers are forcing astronomers to sit up and take notice (*Science*, 6 October 2000, p. 26). On 14 February, a Japanese team raised the stakes by reporting its discovery of more than 100 of these objects in a star-forming region known as S106. "This poses a big challenge for the standard picture of star formation," says Shu-ichiro Inutsuka, a theorist at Kyoto University.

Yumiko Oasa of the University of Tokyo and colleagues there and at the National Astronomical Observatory of Japan spotted the band of cosmic misfits while using NAOJ's Subaru Telescope on Mauna Kea, Hawaii. They were observing infrared emissions from a region approximately 2000 light-years from Earth in the constellation Cygnus. In addition to hundreds of brown dwarfs, the team spotted more than 100 fainter free-floating objects. Plugging data on luminosity and estimated age into models of how very low-mass stars evolve, the team estimated the objects' masses at 5 to 10 times that of the planet Jupiter. An analysis of their infrared emissions placed the objects within the region.

"Our discovery sheds new light on the ubiquity of isolated planetary-mass objects," says Oasa about her work, the basis for a Ph.D. thesis approved last month. A brief report of the discovery and photos have been posted on the NAOJ Web site (www.nao.ac.jp).

Joan Najita, an astronomer at the U.S. National Optical Astronomy Observatories in Tucson, Arizona, cautions that more work is needed. In particular, spectroscopic analysis of the objects' emissions would determine their temperature, which could be used to confirm their mass. But Najita says the essential message is believable. "I think these kinds of results show that the process that makes stars can also make things that are substellar," she says.

The objects don't neatly fit any conventional definitions. Brown dwarfs are usually smaller than about 75 Jupiter masses, the minimum size needed to ignite the hydrogen stars need to burn, but larger than 13 Jupiter masses, what's necessary to fuse deuterium and produce a faint glow. By failing to reach this lower limit, the new objects are hard to account for. Most astrophysicists believe brown dwarfs and stars condense directly out of vast seas of tenuous gas known as molecular clouds, whereas planets form in disks of matter swirling around nascent stars. Small lone bodies, however, don't mesh well with either scenario.

Mother lode. More than 100 planetlike objects have been found in a star-forming region called S106.

CREDIT: SUBARU TELESCOPE/NATIONAL ASTRONOMICAL OBSERVATORY OF JAPAN

Two theories about the origins of planetary objects shed light on the elusive creations but fall short of supplying a complete answer. One proposes that they are ejected from young stellar systems, the other that they form from molecular cloud cores with masses too low to give birth to stars. But Inutsuka says neither idea can account for the large numbers of smaller objects spotted in S106. "I think [Oasa's report] will prove extremely important for pushing the modification of currently accepted theories of star formation," he says.

Motohide Tamura, an astronomer at NAOJ and Oasa's thesis adviser, says that scientists need to spend more time observing these phenomena. "So far, only a very limited number of [star-forming] regions have been observed," he says, too few to conclude just how common the objects are. With the teams planning to use Subaru to investigate other regions, the number of free-floating objects seems certain to grow.

–DENNIS NORMILE

CHINA

Two Honored, Other Prizes Go Unclaimed

BEIJING—China's newest—and by far richest—prize for lifetime scientific achievement was awarded last week to a mathematician and an agronomist. But the gala state celebration on 19 February was dampened by evidence of how far the country's research community still must go to compete globally: First place in two other major categories of scientific achievement went unclaimed after officials decided that no researchers were worthy of the honor.

The winners of the new State Supreme Science and Technology Award, which comes with a 5 million yuan ($600,000) prize, are Wu Wenjun and Yuan Longping. Wu, 82, is a topologist who developed a computer algorithm for solving a collection of polynomials, the equivalent of proving a geometric hypothesis. It is useful in pattern recognition and other computer tasks. Newspaper reports say that he also may have been the first Chinese scientist to own a personal computer.

Yuan, 72, is considered the father of hybrid-rice technology in China and is credited with helping China achieve a threefold boost in rice production over the past 4 decades. He has also amassed a personal fortune by lending his name to a high-tech seed company formed last year, in exchange for equity in the new company.

The awards, conferred by Chinese President Jiang Zemin, were created to highlight outstanding achievement and demonstrate the importance of science in the nation's economic development. Some 90% of the prize money will be plowed back into research at their former work sites—in Wu's case, the Chinese Academy of Sciences' Institute of Mathematics and System Science in Beijing; for Yuan, the Hunan Academy of Agricultural Sciences. The remainder is for their personal use, or as Wu told reporters: "I think that is my own business."

Wu and Yuan were chosen from among 14 finalists to receive what is expected to be an

State honors. Chinese President Jiang Zemin, center, awards top science prize to Wu Wenjun, left, and Yuan Longping.

annual prize. But the central government declined for the third straight year to pick a first-place winner in two other categories—natural sciences and technological innovation—because none of the nominees met the criteria for having achieved "at the world level."

Members of the selection committee said their decision reflects the fact that China's basic research enterprise still trails the rest of the world and that most projects lack the creative spark needed to achieve fundamental advances in science. Greater investment in large, cooperative basic research projects would help close the gap, says an official with the science and technology ministry.

The top prize for international collaboration went to U.S. physicist Wolfgang Panofsky, former director of the Stanford Linear Accelerator Center in California, and Indian plant geneticist Gurdev Khush of the International Rice Research Institute in the Philippines. Hundreds of Chinese scientists and technicians received awards in one of the five categories, which include scientific and technological advancement. **–DING YIMIN**

Ding Yimin writes for *China Features* in Beijing.

INDIA

Work Starts on First Science Satellite

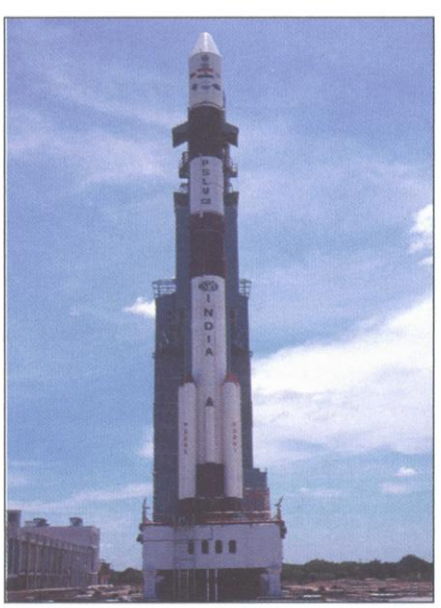
NEW DELHI—Indian astronomers have begun to design the country's first satellite dedicated to basic space science after receiving the green light last month from the Indian government. If successful, the payload will be launched in the second half of the decade on a domestically built rocket.

The project, dubbed Astrosat, aims to orbit four instruments to make broadband observations and surveys in the x-ray and ultraviolet (UV) regions of the spectrum. It would be funded by the Indian Space Research Organization, overseeing work by scientists at ISRO's satellite center, the Indian Institute of Astrophysics in Bangalore, and the Tata Institute of Fundamental Research (TIFR) in Mumbai. No price tag has been put on the mission. "We have to develop the prototype instruments in this period and show that we can indeed successfully make them in India," says Prahlad Chandra Agrawal, an astrophysicist at TIFR.

The instruments include soft x-ray and UV imaging telescopes as well as a large-area xenon-filled proportional counter and a cadmium-zinc-telluride array for long-duration studies over a broad range of spectral bands. The proposed payload is an order of magnitude more complex than one Agrawal's team built for an Indian satellite launched in 1996 to study x-ray sources within binary stars, and scientists say the large-field images should shed light on formation rates for low-redshifted stars. However, it falls well short of the high-resolution imaging and capabilities of the current generation of orbiting x-ray facilities, including NASA's Chandra X-ray Observatory and the European Space Agency's XMM-Newton.

"It's not something that we or the Japanese would be interested in doing at this point," says Peter Serlemitsos of NASA's Goddard Space Flight Center in Greenbelt, Maryland, which in the 1980s developed the foil mirror that the Indians hope to deploy on one of the x-ray instruments. "But if you're going to start a program, this isn't a bad way to do it. It should let them get their foot in the door."

Indian scientists are confident that they can make the mirrors and related optical devices. But they plan to seek outside help in developing other portions of the payload, in particular the photon-counting detector for the UV telescope. ISRO officials say that they hope to have designs completed in 18 months and to launch the satellite in "about 5 years" on ISRO's existing polar satellite



Looking up. India hopes to launch its first basic science satellite on this domestic rocket.

CREDITS: (TOP TO BOTTOM) JU PENG/XINHUA NEWS AGENCY; P. BAGLA

ScienceScope

Abbey Hits the Road One of NASA's top dogs has been sent to the doghouse. Space agency chief Dan Goldin last week removed George Abbey (below) as head of the Johnson Space Center in Houston, Texas, and transferred him to an undefined job at NASA headquarters in Washington, D.C.

Abbey played a key role in choosing Goldin for NASA's top job while he worked at the White House under former President George Bush in the early 1990s. He then served as Goldin's right-hand man in Washington before becoming space center commander in 1996.

The surprise fall from grace comes as NASA is struggling with major space station cost overruns—estimates run as high as $4 billion—which will likely force Goldin to make major cuts in other programs. Abbey and his center play a key role in station development. Goldin says only that it was time "for a change" and "reform." Rumors swirled this week over whether Abbey's removal was approved—or ordered—by the White House. Meanwhile, Goldin is still waiting to hear who his own successor will be.

Egalitarian Elitism The U.K.'s Royal Society is looking to inject more diversity into its hallowed rolls. Society president Sir Robert May this week prepared to announce a change in the nominating process that he hopes will net the elite group more researchers from less prestigious labs outside the biology and physics mainstream.

The society funds select researchers, advises the government, and has recently sought to raise its profile as a communicator in explaining how science shapes society. But May believes the nominating process—which leads to the election of 42 new fellows each year—has favored researchers working in traditional disciplines at science bastions such as Cambridge and Oxford universities. As a result, May notes, the process has missed such worthy candidates as computer scientist Tim Berners-Lee, inventor of the Web.

To "make it easier for us to pick up scientists in newly emerging disciplines," May says, he drafted a letter this week to U.K. university vice chancellors announcing that, from now on, nominees will need endorsements from just two current fellows, not six. This should help the society, May says, "not to overlook the Tim Berners-Lees of tomorrow."

Contributors: Vladimir Pokrovsky and Andrei Allakhverdov, David Malakoff, Andrew Lawler, Richard Stone