Belt, a flux calculated to be five times that from the Oort Cloud. Stern and McKinnon told a workshop* last month that Triton now appears to have been resurfacing itself fast enough to make the average age of its surface around 100 million years old.

The most likely implication of such youthfulness, says planetary scientist Jeffrey Kargel of the U.S. Geological Survey in Flagstaff, Arizona, is that "Triton has been very active [geologically] through 98% of its history. ... If it was active 100 million years ago, it probably still is active."

Most researchers would agree with Kargel, but another pair of planetary scientists is offering evidence of an even younger age for Triton's surface. Kevin Zahnle of NASA's Ames Research Center in Mountain View, California, and Paul Schenk of the Lunar and Planetary Institute in Houston factored in the Kuiper Belt, too, but Schenk also took another look at Voyager images and counted craters again. This time, Schenk sharpened the images with the same mathematical technique used to clarify flawed images from the Hubble Space Telescope. Now he could more easily recognize true impact craters in previously cryptic terrain.

Surprisingly, Schenk found that "all the craters are on one side of the satellite." As Triton orbits Neptune, it sweeps up debris "like a car driving through a rainstorm," says Schenk, "so the raindrops all hit on one side of the car." Where the debris came from is a mystery, but Zahnle thinks the best bet is the destruction of an inner satellite in a collision with a comet. If that's all true, Zahnle and Schenk told the workshop, Triton has been resurfaced so rapidly of late that few or no KBOs have had a chance to pock it; therefore, its surface would clearly be less than 100 million years old and quite possibly less than 10 million years old. That would make it as geologically young as Europa.

Whichever age is correct, "the important thing is Triton's surface really is relatively young," says McKinnon. Given its meager supply of heat, its youthfulness requires a resurfacing agent so easily mobilized that it can modify Triton's 37-kelvin surface. Lavas of water plus agents like ammonia or methanol that lower water's melting point are a possibility, says McKinnon. They may be rising from an "ocean" 150 kilometers down, bounded above and below by water ice, he says.

Whatever has kept Triton looking young over the eons may have been at work in recent years. Astronomers Michael Hicks and Bonnie J. Buratti of the Jet Propulsion Laboratory in Pasadena reported at the workshop that telescopic observations show Triton taking on a strong reddish tint for a few months at a time. Somehow, Buratti says, "most of the surface" is being altered. "It looks like there's something geological going on." Maybe it's just Triton freshening up once again.

–RICHARD A. KERR

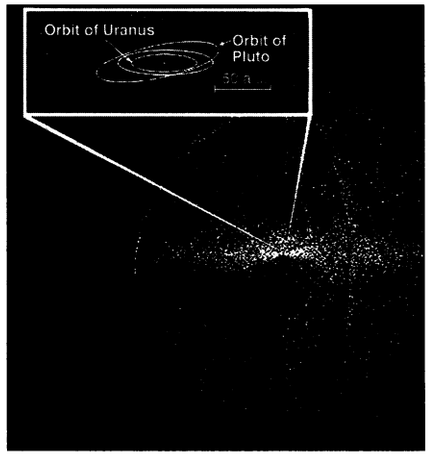
* Pluto and Triton: Comparisons and Evolution Over Time, held from 23 to 24 September in Flagstaff, Arizona. See www.lowell.edu/workshop

CREDITS: (TOP) R. STONE; (BOTTOM) DONALD YEOMANS/JPL

PLANETARY SCIENCE

Another Distant Consort for the Sun?

The age of discovery for planet-size bodies in this solar system would seem to have ended in 1930 with the discovery of Pluto. That tiny body turns out to be just the largest bit of debris remaining from the formation of the planets. Most of the smaller bits ring the sun in the asteroid belt or in the Oort Cloud, the spherical swarm of distant comets far beyond Pluto. Astronomers therefore generally take Pluto to be the end of the line for planet formation. But a small band of astronomers has kept up the search for a tenth planet, and this week, researchers announced two independent proposals for the location of yet another companion to the sun. And if they are right, it would be no Pluto-sized midget.



A tenth companion? The huge Oort Cloud of comets may harbor a relatively massive planet.

Both proposals suggest that, out among the comets of the Oort Cloud, an object several times more massive than Jupiter is orbiting some 25,000 to 30,000 times farther from the sun than Earth. Both groups argue that this unseen behemoth gravitationally perturbs Oort Cloud comets, sending them toward Earth along a distinctive sky-girdling band. But the evidence doesn't impress many other researchers. "I just don't believe it," says planetary dynamicist Harold Levison of the Boulder, Colorado, office of the Southwest Research Institute.

Attempts to track down unseen objects through their gravitational effects "has a long and not very honorable tradition," says astro-

ScienceScope

Thin ice Now may not be the best time to borrow money in Russia, but don't tell that to the Russian Antarctic Expedition (RAE). Crippled by the ruble's collapse last year, the RAE has won approval to take out an emergency loan to fund its operations during the coming austral summer.

During the Cold War, the Soviet Union maintained a vast antarctic operation, with several year-round coastal bases and the inland Vostok station. But the post-Soviet days have been bruising: The RAE must use 61% of its $5.6 million budget to finance the research ship *Academik Fedorov* and spend most of the remainder on supplies from overseas vendors. Following the ruble's plunge in August 1998, the RAE had to raid its 1999 budget to pay for last season's operations.

Vostok.

Now the government says it doesn't have the funds to keep its promise of maintaining four year-round bases. So it has authorized RAE to take out a $2.3 million loan at high interest, promising to come up with the principal by February. RAE will cobble together the interest payments from money it receives ferrying Scandinavian researchers. Says vexed RAE chief Valery Lukin, "It's a crazy situation."

Supplemental science Japan's scientists once again stand to gain from the government's efforts to stimulate the economy. Last week, the cabinet instructed ministries to draw up plans for $33 billion in additional spending on public works and "emerging technologies."

The $7.3 billion Science and Technology Agency, for example, is asking for $1.9 billion more to sweeten its efforts in information technologies, life sciences, and the environment. It also wants to accelerate work on such large projects as an ocean drilling ship and an Earth simulator for modeling climate change. Other science agencies will also request funds and it is likely that some new lab buildings and other research facilities will be financed from a pot earmarked for public works.

The ministries' requests are part of a $100 billion economic revitalization package that includes loan guarantees, local government spending, and tax cuts. The spending plan is expected to be finalized by mid-November and put into effect before the next fiscal year beginning on 1 April.

and the full $36 million for a terascale computer. The conferees ratified both the Senate's $10 million boost to a $50 million plant genome program and its support for a $50 million biocomplexity initiative that the House had trimmed by $15 million. They also removed Senate language that would have shifted $25 million in logistical support for Arctic research—a boost of $3 million over the request—from NSF to the independent Arctic Research Commission (*Science*, 1 October, p. 24). "I guess it was a tempest in a teapot," says commission director Garrett Brass, "and we appreciate their continued support for Arctic logistics." **–ANDREW LAWLER**

With reporting by Jeffrey Mervis.

ARMS CONTROL

Scientific Groups Endorse Test Ban

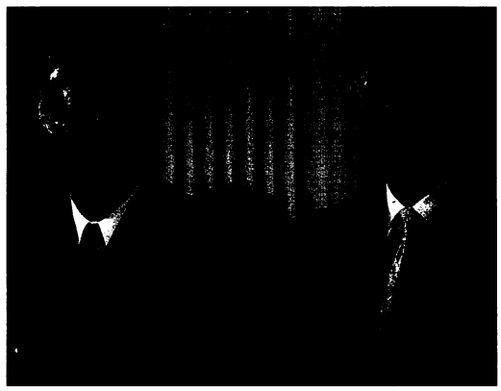
Physicists took center stage in Washington, D.C., last week for a quick reprise of the military debates of the 1980s. President Clinton appeared with a group of scientists and military leaders on 6 October for a spirited defense of the Comprehensive Test Ban Treaty (CTBT), which would ban all nuclear testing. Opponents of the treaty, who regard it as a threat to national security, cited their own technical experts. They also mixed in the carefully worded testimony of the heads of the three U.S. weapons laboratories about the limitations of any treaty, which were also aired at a congressional hearing held 1 day after the White House event.

This Cold War–era rhetoric was the result of a surprise 30 September announcement by Senate Majority Leader Trent Lott (R–MS) that the treaty, which President Clinton sent to the Senate 2 years ago, would be brought up for a vote by mid-October after 2 days of debate. (A two-thirds majority is required for approval.) Recognizing that he lacks the votes to win, Clinton at press time was negotiating for an indefinite delay.

The eight pro-CTBT physicists who participated in the White House event represented a group of 32 Nobel laureates who signed a statement arguing that it is "imperative" that Congress approve the treaty to "halt the spread of nuclear weapons." Charles Townes, a University of California, Berkeley, physicist who co-invented the laser, noted that the United States began a unilateral moratorium on nuclear testing under President George Bush in 1992. "My colleagues and I ... have concluded that continued nuclear testing is simply not required to retain confidence in America's nuclear deterrent," he said. On the same day, two other scientific societies, the American Geophysical Union (AGU) and the Seismological Society of America (SSA), released an unprecedented joint statement expressing confidence in the treaty's verification scheme.

The CTBT forbids parties from conducting or helping others conduct "any nuclear weapon test explosion," and it establishes a complex administrative system to keep everyone honest. It would create an analytical center to collect data from a global network of sensors: 170 seismic stations (more than 70 of which are now functioning), 80 radionuclide sensors, 60 infrasound detectors of low-frequency blast waves, and 11 hydroacoustic ocean detectors. Under the CTBT, any nation that suspects another of conducting a test could demand, and presumably get, an on-site inspection. A challenger could also use evidence from its own "national technical means," such as spy satellites. Clinton agreed to these terms and signed the treaty in 1996, sending it to the Senate for ratification in 1997. Fifty-one other countries, including Britain and France, have now ratified it.

Lott opposes ratification, as do many Republican senators, including John Warner (R–VA), chair of the Armed Services Committee, and Jesse Helms (R–NC), chair of the Foreign Relations Committee. Warner, for example, has said he's concerned that the treaty would deprive scientists of the best means—actual nuclear explosions—of checking the safety and reliability of U.S. weapons. Other opponents doubt the monitoring network is good enough to prevent cheating.



Side by side. Charles Townes, left, and other Nobelists support President Clinton's defense of test ban treaty.

CREDIT: SAM KITTNER

Treaty opponents trumpeted a 3 October story in *The Washington Post* in which unnamed "senior officials" said the Central Intelligence Agency has "concluded that it cannot monitor low-level nuclear tests by Russia precisely enough to ensure compliance" with the treaty. CIA spokesperson Bill Harlow says this is a simplification of the CIA's report but declines to clarify the CIA's view. The effect was "devastating," says one physicist lobbying for the treaty.

ScienceScope

Gender shift It took 25 years for a woman to break into the upper echelon of the male-dominated National Science Foundation (NSF). And it was only last year that Rita Colwell became the first woman to head the $3.8 billion agency. But next year, as NSF marks its 50th anniversary, women will hold the balance of power.

Women will hold five of the nine top slots at NSF in January, when University of Rhode Island oceanographer Margaret Leinen will succeed Robert Corell as head of geosciences, one of NSF's seven research directorates. Indeed, all three of Colwell's assistant director picks have been women—starting last fall with Ruzena Bajcsy to lead computer sciences and continuing with the appointment in August of Judith Sunley as acting head of education and human resources. They join Mary Clutter, who has headed the biology directorate since 1991.

"I'm delighted that NSF is appointing a significant number of women to high positions," says Betsy Clark, a biologist at Bowling Green State University in Ohio, who in 1975 became the first female assistant NSF director and who, perhaps not coincidentally, recruited Clutter. "Good women have been available for a long time, but many haven't gotten the chance to be leaders."

Less taxing A major cut in Australia's capital gains tax could spur investment in biotech and other fields. The new rates are intended to open the door to outside sources of venture capital and encourage Australians to keep their funds in-country. The tax break "will remove a major barrier," predicts John Mattick, director of Queensland's Institute of Molecular Bioscience.

The new rates are part of a top-to-bottom government overhaul. The current 48% capital gains tax would be cut in half for individual Australians and erased for overseas pension funds that commit cash to Australian projects for at least 1 year. Skeptics note that the breaks don't apply to Australian investment funds. Still, some research centers are taking advantage of the change: Sydney's Garvan Institute, for example, has already spun off investor-ready mental health and diabetes research firms. Legislators still must approve the changes, which a recent review deemed critical to raising Australian's international science standing (*Science*, 21 May, p. 1248).

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