mittee on Japan. "Whether it will result in creating an innovative venue for research and development is not assured."

For now, physicists in Japan have adopted a cautious attitude. "There is plenty of disagreement among Japanese physicists concerning the value of these changes," observes Victor Rehn, a physicist who is director of the Office of Naval Research's Asian Office in Tokyo. "While there is unanimity in the feeling that the science bureaucracy is overgrown and inefficient, there is no unanimity in what to do to fix it."

Hiroshi Ezawa and Fumiko Yonezawa, the outgoing and incoming presidents of the Physical Society of Japan, told PHYSICS TODAY that "we have to wait [and] see how the Science and Technology Basic Plan affects physics and physicists in Japan in general." They point out that although the proposed increases for basic research in FY 1997 are large, "the number of projects to be benefited is not." And this year, they add, "the extra funding was distributed hastily, by a top-down strategy."

Shuji Abe, head of the fundamental physics section at the Electrotechnical Laboratory, a MITI-run facility in Tsukuba, worries that new research will be funded at the expense of existing programs. And because the new funding schemes are mostly "project oriented," Abe says, they tend to favor scientists "in some currently fashionable areas. . . . I'm afraid that within a few years, there will be a few 'rich' researchers and many 'poor' researchers in Japan."

For all its faults, the Japanese government's centralized approach to R&D does have at least one advantage: stability. Yoichi Okabe, a neural networks expert at the University of Tokyo, recalls that in the 1980s, a number of Japanese companies leapt into neural networks development, only to retreat once "the big wave had passed in the US." Government-funded research, on the other hand, has continued and will likely expand, with sizable efforts at RIKEN (which next year will open an Institute for Brain Science), the University of Tokyo and Kyushu Institute of Technology.

Robert Lewis, associate director of the Tsukuba Research Consortium, calls the government's increased support "quite natural and even desirable considering [Japan's] low level of government funding compared to the West." But what will happen, he wonders, when the new science begins to pay off in new technologies and then new products? Most likely, he says, "the West will begin a new series of complaints that Japan is unfairly using government funding to promote business."

It may take some time for the basic plan to work itself out, but OSTP's Gerald Hane believes there is reason for optimism. "If you look at Japan's history, you see that things change very slowly," he says. "But they do change."

JEAN KUMAGAI

Recommended Reading On-line

NSF's Tokyo office maintains a World Wide Web site at http://www.twics.com/~nsftokyo/home.html. The Asian Office of the Office of Naval Research also has a Web site, http://www.itd.nrl.navy.mil/ONRA. Both sites contain reports on Japanese R&D efforts as well as links to other sources of information on Japan. An unofficial English translation of the Science and Technology Basic Plan can be found on the STA's Web site, http://www.sta.go.jp/welcome-en.html.

Caltech Hands Its Solar Observatories to NJIT

A changing of the guards is occurring in ground-based solar physics: While some university programs are on the wane, others are stepping in to fill the gaps.

Caltech's decision last year to put its efforts wholly behind nighttime astronomy, thereby abandoning its strong solar physics program, left solar physicists worried. But most are satisfied with the outcome: Since July, Caltech and the New Jersey Institute of Technology (NJIT) have been collaborating on programs and proposals while they finalize an agreement for NJIT to take over Big Bear Solar Observatory (BBSO) and the solar array at Owens Valley Radio Observatory (OVRO) next summer. During this transition year, NJIT is setting up a consortium of universities to participate in running and financing the observatories.

For more than 25 years, Caltech has operated these outstanding solar observatories—two of only a handful run by US universities. Both BBSO and the solar array at OVRO are dedicated (rather than shared) facilities, and observe the Sun all day, every day, thereby making it possible to study unpredictable phenomena. The image quality, or seeing, at BBSO is exceptionally good. The observatory sits on a causeway in the middle of Big Bear Lake in the San Bernardino Mountains in California (see photo on page 62). The lake acts as a heat sink, stabilizing the local temperature and thus minimizing atmospheric turbulence due to solar heating of Earth. And, at OVRO, an array of five antennas images and analyzes spectra of small regions of the Sun's corona at radio frequencies (86 frequencies in the 1–18 GHz range). Both observatories—individually and in collaboration—emphasize magnetic structure and activity of the Sun. They are also used as ground-based observation support for space-based studies, and BBSO is the US mainland site of the Taiwan Oscillation Network (TON) and of the Global Oscillation Network Group (GONG) for helioseismology (see PHYSICS TODAY, October 1995, page 32).

The driving force behind Caltech's solar observatories has always been Harold Zirin, director of BBSO. Now Zirin is approaching retirement, and many in the solar physics community are surprised and disappointed by Caltech's decision not to hire another solar physicist to replace him. They see it as symbolic of a more widespread neglect of the field: "The perverse reality is that solar does best when it's not part of an astronomy department," says Barry LaBonte, a solar physicist at the Institute for Astronomy at the University of Hawaii at Manoa. NJIT solar physicist Haimin Wang, who spent 12 years at Caltech, says that Caltech—whose founder, George Ellery Hale, was a solar astronomer—is downsizing its solar physics program "to concentrate on Keck." (Located on the island of Hawaii, the two Keck telescopes are the world's largest and most powerful for optical and infrared astronomy.) Zirin agrees, and laments "the low standing of research on the Sun in the US."

The state of ground-based solar research also concerns investigators involved in space-based solar research. "The success of ongoing and anticipated space missions depends on the unique partnership with ground-based research," says William Wagner, who is in charge of solar physics at NASA. Wagner emphasizes that now is a particularly exciting time for solar research: "We are beginning to probe the very core of a star and learn how its engine works—how it uses magnetic fields to throttle the neutrino and

ANDERS JOHANNESSON

THE SOLAR OBSERVATORY on Big Bear Lake in California. To the left of the main observatory, underneath the cube-shaped cover, is a 3.5-inch telescope belonging to the Taiwan Oscillation Network project.

luminosity variations and drive a solar wind at 100 million degrees."

By all accounts, solar physics is thriving scientifically. But concerns about university observatories shutting down and about the future of the National Solar Observatory have spurred plans for a review of US ground-based solar physics, to be conducted in the next year by the National Research Council. Also prompting interest in such a review are concerns that further erosion of the infrastructure of solar physics may jeopardize the success of space missions, according to Wagner.

Charles Peck, chair of Caltech's physics, mathematics and astronomy division, acknowledges that the faculty "decided to withdraw" from BBSO and the OVRO solar array because "it wishes to consolidate its astronomical observatories around a smaller number of observatories." The decision was influenced by Caltech's policy of keeping the total number of members on its faculty low. But, Peck says, Caltech is keen "to ensure the continued excellence and high scientific productivity at these world-class solar facilities."

NJIT's Phil Goode and Wang responded quickly to Caltech's call last December for proposals to take over the observatories, and they are very enthusiastic about the prospect. Goode, BBSO's future director, and his colleagues are particularly eager to apply instrumentation developed at NJIT, such as Walter Kosonocky's infrared and ultrafast cameras, to the existing equipment, which, they expect, will significantly enhance the capabilities of the optical telescope at Big Bear. They also look forward to continued collaborations with Zirin and his group at Caltech. "We are anxious to do this, it's an area where we can make an impact," says Robert Pfeffer, NJIT's vice president for research and graduate studies, and one of the key negotiators for the transfer from Caltech.

"Caltech will retain ownership of the land and some of the buildings, and most of the equipment will be NJIT's," says Goode. Under the agreement, Wang will become BBSO's associate director, and Dale Gary, who runs the OVRO solar array, will become its director and join the NJIT faculty. "Issues like liability and transfer of staff still need to be ironed out," continues Goode. Peck, who is overseeing the negotiations for Caltech, confirms. "We expect to have a final agreement before the end of the year."

The NJIT team will bear full responsibility for funding and operating BBSO and the solar array at OVRO, which have a combined annual budget of about $1.1 million. The observatories will function "as long as there is external funding," says Goode. (They have always been funded by grants to Zirin and a few colleagues.) He adds that the structure and composition of the planned university consortium have not yet been worked out.

Consortium members—except Caltech—will contribute to the operating costs, and all will have to obtain grants to support their own projects. "We want to hire someone to perform experiments and help with data analysis," says George Fisher, a theoretical physicist at the University of California, Berkeley, who is eager to "make observations that could help tie down parameters" of his calculations of magnetic flux tubes rising from the poorly understood depths of the Sun's interior.

Richard Canfield recently left Ha-

Meanwhile, at Mees Solar Observatory . . .

Recent events at the University of Hawaii at Manoa's Mees Solar Observatory—like Big Bear, one of the world's foremost facilities for observing the Sun—have left the observatory working at reduced capacity, and have compounded the feeling among many solar physicists that they get short shrift compared to nighttime astronomers.

What happened? The solar physics group shrank dramatically and abruptly when Richard Canfield, who was key in building up the Mees group, left last May. With him went grant money and scientists, and the greater part of collaborations with Japan's Yohkoh satellite program was lost.

Canfield says he left Mees "because the solar group's exceptional research and teaching programs were being made moot." He says resources were being directed almost exclusively to nighttime astronomy, making conditions intolerable.

Donald Hall, director of the university's Institute for Astronomy, of which Mees is a part, counters that "one has to make value judgments about where to put resources. Solar is a small fraction of the overall program, and the program emphasis has changed." He adds that he'd like to reinvigorate the solar physics program, and that he's actively recruiting someone to head the institute's Haleakala Observatories, which include Mees. "But so far only a single solar astronomer has applied. If we can't find someone, then the solar program will dwindle."

The changes at Mees are affecting the entire solar physics community. The observatory remains open, but at greatly reduced capacity. So, for example, Barry LaBonte, Mees's one remaining tenured solar physicist (there were four), explains that the reduced staff—where there were three professional observers, there is now one, and the technical staff has dropped from three to about one-quarter—can no longer make observations every sunlit hour, and there are delays in getting data onto the World Wide Web for general access. "The best thing I can do is hang in here and try to keep Mees going," says LaBonte. TF

waii's Institute for Astronomy after what he says were "years of infighting" (see box below) to join Montana State University's physics department, which has a growing solar physics program but no observatory. He hopes "to use Big Bear to determine the topological evolution of magnetic fields that leads to coronal mass ejections, and to thereby improve prediction of space weather."

NJIT is founding a Center for Solar Research to facilitate running BBSO and the OVRO solar array remotely, and as a base for the interdisciplinary solar physics program it is building up. A 6-inch telescope (a loan from Zirin) has been mounted on the roof of the NJIT physics building in Newark so that detectors and filters, for example, can be tested and debugged there before being installed at BBSO. And Gary is considering installing a small radio antenna on-site, for testing new instrumentation and also as an educational tool for NJIT students. "Some in the solar physics community are bemoaning the fact that Caltech is unloading its solar observatories, but they will still be active and university run," says Goode. "We look at this as a unique opportunity to create an interdisciplinary scientific and instrumentation program at an observatory with superb weather and seeing."

Toni Feder

UK Research Council Supports Part-Time PhD Work

In the United Kingdom, graduate students in the physical sciences can now receive financial aid to pursue their doctorates part-time. These part-time "studentships," which cover tuition and living expenses, have been introduced by the UK's Engineering and Physical Sciences Research Council (EPSRC) to encourage men and women to return to their graduate studies after taking a career break to raise a family, says the EPSRC's Geoff Heaford.

Though the EPSRC, whose purview includes atomic, optical, condensed-matter and nuclear physics, has not widely publicized the new studentships, they in fact represent a noteworthy change in the country's graduate training system. Unlike the US approach, where students receive funding from various sources and for varying lengths of time, the typical physics doctoral student in the UK is supported full-time for only three years and is expected to complete all required research during that period. Under the new part-time studentships, which have the same total value as the full-time awards, stipends are spread out over five years instead of three. Just how many part-time awards will be made will depend on the demand. To qualify, the student must first be nominated by the head of his or her department.

At present, it is not common for physics students in the UK to return to school after raising a family, notes Michael Springford, head of the physics department at the University of Bristol. "It is hard to imagine a student pursuing an experimental PhD program part-time," he says. "For theory, however, I believe [the part-time studentship] could be a good option for a woman with a baby or small children."

Clivia Sotomayor Torres, a condensed-matter physicist who recently moved from the University of Glasgow to the University of Wuppertal in Germany, agrees that experimental research would be difficult, given the number of hours one must spend in the lab. She herself didn't have a child until after her career was under way; even then, she felt obligated to return to the lab after just six weeks off.

A part-time studentship would cover only a portion of one's living expenses, Sotomayor points out, and so it would need to be supplemented with a loan or some other form of outside support. But she does not rule out combining family and graduate studies, provided that "you have no financial pressures and can afford child care, have a warm and comfortable home, with your own study room and a modem." Beyond that, she adds, "You also need an understanding thesis director."

Jean Kumagai

APS E-print Server Is Now On-line

This month the American Physical Society launches the APS E-print Server. The server, which uses the World Wide Web, operates in two modes. One provides an electronic means for the submission and editorial handling of manuscripts for APS journals; the other is for distributing electronic preprints—which may also be simultaneously submitted to APS journals. E-print's two modes are based on the same software, but whereas papers submitted to the journals can be accessed only by the authors, editors and referees, the preprint archive is accessible to all. Partly inspired by the Los Alamos National Laboratory e-Print archive, the APS E-print Server is intended primarily to rapidly disseminate research results.

A key feature of the APS E-print Server is that it can handle most commonly used text and graphics formats. "Electronic handling of manuscripts should speed up time to publication, and save money," says Arthur P. Smith, the key designer and implementer of the APS E-print Server. (Creation of such a server was recommended by APS's network publishing task force about a year ago.)

Submissions in all areas of physics are accepted. Readers can search for preprints by keywords or by APS PACS–number categories. Eventually, says Smith, links will be added to connect related submissions to each other and to published papers, and a forum for reader response to preprints may also be introduced. A number of other options, such as restricting access to preprints in some topics to smaller groups, are under discussion. The APS E-print Server may be accessed on the Web at http://aps.org/eprint.

In Brief

Erick Weinberg, a professor of physics at Columbia University, has assumed the editorship of *Physical Review D*, a journal of the American Physical Society. On 1 June he succeeded Lowell Brown of the University of Washington, whose term expired at the end of 1995.

On 1 January 1997, Colin G. Orton will become editor of *Medical Physics*, published by the American Association of Physicists in Medicine. Orton is a professor of radiation oncology and radiology at the Karmanos Cancer Institute of Wayne State University. John S. Laughlin of Memorial Sloan-Kettering Cancer Center in New York City is the journal's current editor.

The American Physical Society has established the Joseph F. Keithley Award in honor of the founder of Keithley Instruments, a manufacturer of measurement, test and control instrumentation. In creating the award, APS noted Keithley's "outstanding contributions and numerous accomplishments in precision instrument development and advancement in measurement techniques." The award will be given annually beginning in 1998 to recognize physicists who have developed new measurement techniques or equipment. The award was endowed by members of the APS instrument and measurement science topical group and by Keithley Instruments. ■