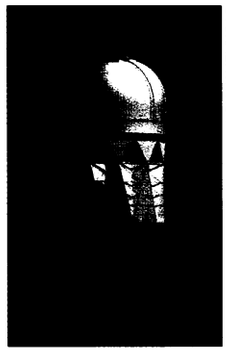
ASTRONOMY

Plan Would Shut Kitt Peak Facilities

Astronomers who use the National Optical Astronomy Observatories' (NOAO's) five telescopes on Kitt Peak in Arizona have known for a few years that money was tight and that some of the instruments might have to be shuttered. But it wasn't until last month that they found out the hit list includes the biggest scope on the mountain—the 4-meter Mayall—and that it could happen as early as 1999. The news has sent a shiver through hundreds of U.S. astronomers, many at small colleges and state universities, who work mostly on these instruments.

One factor behind the crisis at Kitt Peak is a projected flat budget of $26.7 million from NOAO's funding source, the National Science Foundation (NSF), which will dwindle in purchasing power to $22.4 million by 2000. Another is a 1995 National Research Council (NRC) report that gives priority to twin, 8-meter Gemini telescopes under construction in Hawaii and Chile, and NOAO's telescopes in Cerro Tololo, Chile, as well as to larger, unique instruments (*Science*, 20 January 1995, p. 324). The larger telescopes and those in the Southern Hemisphere, the panel said, were less likely to be duplicated by instruments at private observatories.

Working within those constraints, NOAO drew up a plan earlier this year for closing or selling four telescopes at Kitt Peak and two (a 0.6-meter and a 1.0-meter) in Cerro Tololo over the next 3 years. By 1999, if the Mayall telescope were to close, NOAO's only remaining activity on Kitt Peak would be its 40% share of a 3.5-meter telescope that it operates together with three U.S. universities.



J. DU HAMEL/NOAO

Past its peak? Kitt's 4-meter telescope could close in 1999.

The Association of Universities for Research in Astronomy (AURA), which manages the observatory, took these projections to NSF Director Neal Lane in the hope of winning a reprieve. But Lane's reply in March was curt: "In the present budgetary climate we have little alternative." So AURA sent its "budget planning exercise" to its 1000-strong user community to seek suggestions on how to cope with the closings, prompting a stream of alarmed responses. "The concept of taking away a whole national observatory is devastating," says Debra Meloy Elmegreen of Vassar College. Howard Bond, of the Space Telescope Science Institute in Baltimore, is similarly upset: "The plan, if implemented, will devastate U.S. ground-based astronomy."

In particular, many astronomers question the emphasis on south over north and large over small, noting that many scientists study only northern objects or can't afford to bring students to Chile, and that some of the smaller telescopes at Kitt Peak offer a unique wide field of view. "A lot of users are seeing this as pandering to a rather special club of astronomers," say Bill Keel of the University of Alabama.

Keel and others say that contracting out NOAO's software-development work and reducing staff and other support services could buy some time for Kitt Peak. Even the chair of the NRC report, astronomer Richard McCray of the University of Colorado, says that given a grimmer budget outlook than his panel worked with, reassessing the value of small telescopes at Kitt Peak "should be on the table." But Hugh Van Horn, NSF's astronomy division director, says the agency is committed to the report's priorities.

To brighten the grim outlook, NOAO has asked NSF for $21.6 million to build three new, efficient telescopes that would serve some of the same purposes as the instruments to be shut down at Kitt Peak. But short of a rising NSF budget, which is highly unlikely, NOAO may be forced to live within its current allocation. Says Iowa State's Lee Anne Willson, chair of AURA's observatories council, "Unless we can be clever and come up with a substitute, this is the working plan."

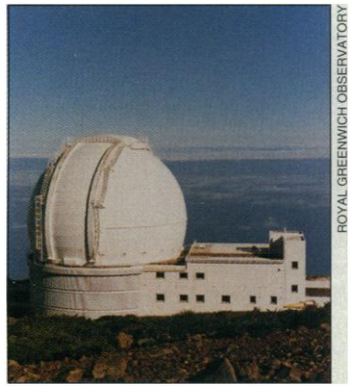
–Jocelyn Kaiser

U.K. ASTRONOMY

Review Threatens Royal Observatories

LONDON—The British government dealt a potentially fatal blow last week to two of Britain's oldest scientific institutions: the Royal Greenwich Observatory (RGO) and the Royal Observatory, Edinburgh (ROE). These two venerable bodies manage most of Britain's ground-based telescopes and develop leading-edge instruments for them. But the government has decided, after a tough review of the observatories' management, that they will now have to compete for this work with other public and private organizations.

The Royal Observatories, which trace their origins to the 17th and 18th centuries, play a key role in Britain's $26-million-a-year ground-based astronomy program. The RGO, now based in Cambridge, manages and builds instruments for the Isaac Newton group of telescopes on Las Palmas, one of Spain's Canary Islands, and the ROE has similar functions at the Joint Astronomy Center (JAC) in Hawaii. But Britain's astronomy budget is under severe strain, in part to pay for Gemini—an international program to build twin telescopes in Hawaii and Chile costing Britain up to $3 million per year—and this has led the government to ask whether the country really needs two separate U.K.-based observatories with a total staff of about 160. "On the basis of current predictions of demand for new instruments, we'd only need about half this number of staff over the next few years," says Ken Pounds, chief executive of the Particle Physics and Astronomy Research Council (PPARC), which has overall responsibility for astronomy research.



ROYAL GREENWICH OBSERVATORY

Changes ahead? RGO's Herschel Telescope at Las Palmas.

One obvious solution would be to merge the two Royal Observatories. Indeed, just such a suggestion was made last year by a committee chaired by astronomer Jim Hough of the University of Hertfordshire, which reviewed the country's optical, infrared, and millimeter-wavelength astronomy options over the next 10 years. Hough argued that merging the two bodies would cut administration costs and release more funds for research. But the suggestion led to a heated Anglo-Scottish squabble and got nowhere.

The observatories were not off the hook, however. The government has since committed itself to a fundamental review of all publicly funded research establishments to determine whether privatization, contracting out work, or closure could save money. The Royal Observatories were one of the first targets of these "prior options" reviews. The report, published last week, endorsed public investment in astronomy, but sees bleak prospects for the observatories as budgets tighten and their workload declines. The review committee, chaired by astronomer Ian Halliday of the University of Wales, Swansea, argues against selling off the overseas telescopes or transferring them to private ownership, but recommends that their management and the provision of their in-

struments should be put up for bids. "We see such competition as desirable and valuable," says Pounds, who was also on the committee.

The report predicts that demand for new instruments will decline over the next 4 years as the Gemini project is completed, resources are transferred from ground-based to space-based astronomy, and overall budgets are squeezed. "The predicted size of the U.K. base makes the sustained existence of two separate support organizations at best questionable," the report says. Astronomer Matt Griffin of London's Queen Mary and Westfield College agrees. "I think the research community recognizes the need to do the same jobs for lower cost if budgets are to be used effectively," he says.

The observatories will be free to compete for the work they currently carry out, but if they lose out, their future would be highly uncertain. Observatory staff fear that the newly formed Central Laboratory of the Research Councils near Oxford, which already plays a key role in the development of instruments for space-based astronomy, may outcompete the observatories. "Our worry is that instruments are science-driven, not technology-driven, and that our approach may be lost," says ROE's head, Stuart Pitt. "The best people to build these instruments are already working in the observatories. I can't see where the private interest will come from," says one astronomer.

The report also recommends changes in management at the Royal Observatories' two overseas sites to strengthen their independence from the U.K. observatories. Noting that Britain is only a 25% partner in Gemini, which will be managed in Hawaii by the JAC, and Spain is planning a new telescope of its own at Las Palmas, the report argues that U.K. interests will best be served by a strong local presence, rather than management by distant officials. It suggests that the U.S. management approach used for some of its telescopes, organized by a consortium of U.S. universities, is a potential model. Indeed, it even raises the idea that a U.S. team could run the British telescopes on the island. At Las Palmas, the report suggests that a team made up of local RGO managers, split from the U.K. base, may be effective.

In anticipation of these recommendations, the two Royal Observatories are already seeking means to secure their future. The report points out that the observatory names and the core skills of staff are valuable assets. ROE is considering a management bid to buy the observatory or encouraging a private university to bid—it shares a site outside Edinburgh with Edinburgh University's astronomy department. The RGO is also neighbor to Cambridge University's Institute of Astronomy and is exploring a bid from a consortium of universities to take over the running of the observatory. "We have to see this as an opportunity to develop a leaner and more effective organization," says the RGO's head, Jasper Wall.

Observatory staff will not know their fate for at least a year. PPARC has set up an evaluation panel to establish the criteria for putting the work up for bids and set a timetable for the new mechanisms to be running in 1997. "We're still living with uncertainty. The report has hit staff ... [but] we've got to do our best to influence the outcome," says Pitt.

–Nigel Williams

EUROPEAN SPACE SCIENCE

Cosmologists Beat Out Mars Explorers

Europe's cosmologists were the winners last week in the competition for the next slot in the European Space Agency's (ESA's) space science program. Following a 3-day meeting at ESA headquarters in Paris, the agency's Space Science Advisory Committee backed COBRAS/SAMBA, a mission to map the cosmic microwave background, a radiation echo of the universe from shortly after the big bang. The decision may, however, spell the end for European scientists' efforts to join international plans to explore Mars.

The meeting to pick the third medium-sized mission in ESA's Horizon 2000 space science program weighed proposals for a trip to the moon, a mission to study stellar evolution, and one to test the equivalence principle (the assertion that different bodies accelerate at the same rate under gravity). But the two favorites were COBRAS/SAMBA and Intermarsnet, a joint ESA/NASA mission to Mars. "It was a difficult decision," says physicist David Southwood of London's Imperial College, a committee member who also chairs ESA's Science Program Committee, which is expected to endorse the decision in June.

Much of the debate centered on the balance within ESA's program between astronomy and solar system exploration. Southwood says the committee picked COBRAS/SAMBA because "it's a wonderful mission." It will pick up where NASA's pioneering COBE spacecraft left off, giving scientists a map of the cosmic background showing spatial structure as a function of frequency with a precision far closer to the fundamental astrophysical limits. But Southwood acknowledges that the Intermarsnet team may see its project as a victim of the agency's budget crisis.

Last November, ministers from ESA's 14 member states froze the science budget. As a result the science directorate has agreed to make the new medium mission a pilot project to try cheaper management methods, for example by streamlining the prototyping and testing phases. Working this out is expected to delay the launch for this mission by a year to 2004—beyond the launch window for Intermarsnet. Also, because Intermarsnet was a joint venture, it would have been hard for ESA to experiment with its management. "Programmatically, COBRAS/SAMBA fits better," says Giacomo Cavallo, head of planning and coordination in ESA's science directorate.

"COBRAS/SAMBA seems to have more impact outside its own community."

—Giacomo Cavallo

ESA staff cite other problems with Intermarsnet. Cavallo says that it would have been difficult to bring the Mars mission's cost below ESA's ceiling of about $240 million for a medium mission. But even if the costs had been the same, "COBRAS/SAMBA seems to have more impact outside its own community," he says. Its data will aid theories of fundamental physics at energies that cannot be tested by accelerators.

Heinrich Wänke, director of the Max Planck Institute for Chemistry in Mainz, Germany, and chair of the International Mars Exploration Working Group, acknowledges the broad international appeal of COBRAS/SAMBA, but argues that the decision is a poor one. First, he says, the cryogenic detector technology of the chosen mission is similar to that for the Far Infrared Space Telescope, one of ESA's four large missions, to be launched in about 2006. "That community will be overcommitted," says Wänke. Moreover, NASA is planning a mission for 2001 to measure anisotropies in the cosmic microwave background, called MAP, although with a lower resolution than COBRAS/SAMBA.

Now that their mission has been picked, researchers principally from Italy, France, Britain, and Denmark will be busy during the next 18 months on plans for the cryogenic coolers and detectors. In the meantime, the International Mars Exploration Working Group meets this week. It will give European planetary scientists a chance to take stock and to assess how they will now fit into international plans for Mars exploration.

–Helen Gavaghan

Helen Gavaghan is a science writer in Hebden Bridge, U.K.