

physics teacher at Choate. "My girls' section was probably the roughest I've ever taught here." Even so, as the year progressed, Stowe and his colleagues saw a rise in the girls' interest in physics careers.

As might be expected, all-girls schools also seem to do a better job in getting girls interested in physics. According to figures from the National Coalition of Girls' Schools, about two-thirds of the students at girls schools take physics, compared to about one-fifth of girls elsewhere.

Questions

Apart from the educational advantages they may offer, single-sex classes also raise some legal, developmental and ethical questions, and groups such as the National Organization for Women and the American Civil Liberties Union have argued against their presence in public schools. Under title IX of the Education Amendment of 1972, which bans sexual and racial discrimination in federally funded programs, single-sex classes in public schools would seem illegal. Schools have been getting around this by theoretically allowing boys to enroll.

Another nontrivial consideration in creating a girls-only class is the scheduling difficulty it presents, especially in smaller schools. For that reason, Yvette Van Hise, a physics teacher at the 200-student High Technology High School in Lincroft, New Jersey, doesn't see her school offering single-sex classes. But at her previous job, teaching at a large public high school elsewhere in Monmouth County, where the students weren't particularly science oriented, Van Hise believes an all-girl physics class might have been useful.

"When you start people off in this artificial environment, what happens when they leave and go out into the real world?" AIP's Michael Neuschatz asks. "And what is the impact on boys?" But the real issue, he believes, is that "single-sex classrooms cannot substitute for confronting head-on gender prejudice in physics education."

Carole Greene, a science teacher at Bronx High School of Science in New York City, agrees. She and her colleagues met last spring with members of the school's Student Pugwash chapter to discuss gender issues. "There was a general consensus that if all teachers were sensitive to the concerns of young women, then it wouldn't matter if the class were coed or single-sex, or if a man or a woman were teaching."

JEAN KUMAGAI

Dirac To Be Given an Honored Place Beside Newton in Westminster Abbey

London's Westminster Abbey, where kings and queens from William the Conqueror to Elizabeth II were crowned and where other royals and distinguished Britons are buried or commemorated with stone plaques, will get its newest memorial this month honoring Paul Adrien Maurice Dirac. Implanted in the abbey's floor and touching the top edge of Sir Isaac Newton's gravestone, the two-foot-square tablet will be dedicated on 13 November—the same day the Royal Society will conduct a daylong evocation of Dirac's contributions to physics.

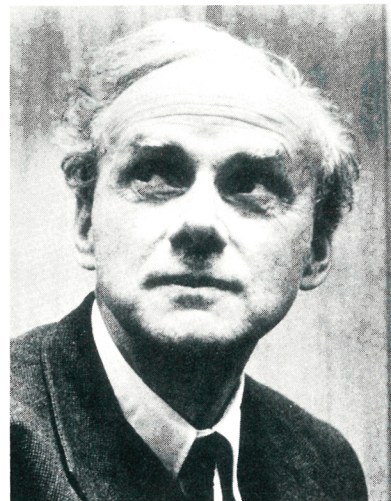
In its place in the abbey, which bears the official name of the College Church of St. Peter at Westminster, Dirac's memorial joins those of other preeminent British scientists—namely, Michael Faraday, George Green, James Clerk Maxwell, William Thomson (Lord Kelvin), J. J. Thomson and New Zealand-born Ernest Rutherford. Their tablets, all the same size as Dirac's, surround Newton's marble plaque, immediately in front of a large monument showing Newton lounging in a chair with the obligatory cherubim hovering around him. Newton's statue and gravesite are behind the main altar of the nave and roped off to keep out visitors, parishioners and clerics. Even the choirboys avoid treading on Newton's grave and the nearby markers as they take their places for religious services.

Dirac's immortalization in the abbey was initiated by physicists at Cambridge and Oxford, the Institute of Physics and the Royal Society. Dirac was Lucasian Professor of Physics at Cambridge (the chair once occupied by Newton and currently held by Stephen Hawking) from 1932 until his retirement in 1968. Dirac later became a physics research professor at Florida State University, remaining there until his death in 1984 in Tallahassee, where his remains are buried.

Born in Bristol, England, in 1902, the son of a Swiss teacher of French at a private school and his English wife, Dirac earned his PhD in 1926 from Cambridge University with a thesis on the newly devised and mathematically baffling physics of quantum mechanics. Only two years later Dirac invented his elegant yet simple relativistic equation for the electron, which predicted such properties as spin and magnetic moment.

The equation also suggested what many at the time thought to be a far-fetched concept: that an electron could have two different charge states—one negative, the other positive. Dirac's theory of oppositely charged antiparticles was confirmed in 1932 by Carl Anderson's discovery of the antielectron, named the positron. The next year Dirac shared the Nobel Prize in physics with Erwin Schrödinger. Dirac's prediction that other particles, particularly the proton, would have antimatter counterparts was eventually confirmed experimentally in 1955 by Owen Chamberlain and Emilio Segrè, who were awarded the Nobel Prize for this work in 1959.

Dirac's memorial day will commemorate his genius. The program



PAUL ADRIEN MAURICE DIRAC

at the Royal Society building in London will begin with a talk by Sir Michael Atiyah, president of the society and master of Trinity College, Cambridge, on Dirac's equation, followed by David Olive of the University of Wales discussing monopoles. After lunch Maurice Jacob of CERN will speak about antimatter, and Abraham Pais of Rockefeller University will examine Dirac's life and work. After tea at the Royal Society, the participants will proceed to the abbey for the evensong service and the unveiling of Dirac's memorial plaque. This will be followed by brief remarks on the occasion from several physicists, including Hawking.

IRWIN GOODWIN

Proposed UNESCO Satellite Generates More Heat than Light

A proposed United Nations Educational, Scientific and Cultural Organization space project, intended to promote tolerance, has instead provoked controversy before getting off the ground. The "Star of Tolerance" satellite, to consist of two inflatable, light-reflecting balloons connected by a cable, is designed to be highly visible from Earth in the dusk and dawn twilights each day. Fearing something like previous suggestions of a glaring billboard in space, US and European astronomers have protested the project, which is scheduled for launch sometime next year. The American Astronomical Society's executive director, Robert Milkey, sent a letter expressing concern to Federico Mayor, the director general of UNESCO.

Patrick Crane, the chair of the AAS committee on light pollution, radio interference and space debris, told PHYSICS TODAY that UNESCO has since provided the height of the orbit (about 1200 km) and estimates of the brightnesses of the two balloons. Assuming homogeneous reflection, the balloon with a radius of 30 meters would have an apparent astronomical magnitude of about -0.5 and the 50-meter balloon's would be about -1.6, approximately that of Sirius, the brightest star in Earth's sky.

Although such average brightness alone may not be a problem, Crane said that other issues have to be considered. For example, will the balloons' surfaces permit glancing reflections that will produce occasional bright bursts of light? Can the orbit be predicted accurately enough throughout the satellite's lifetime so that the Hubble Space Telescope can avoid looking at it?

Crane said that the whole affair shows the need for greater coordination and consultation on issues such as this one, and he pointed to the example of radioastronomers. Tomas Gergely, the electromagnetic spectrum manager at the National Science Foundation, said coordination of radio communication has been viewed as an international concern since the *Titanic* disaster in 1912. National and international agencies to regulate and allocate use of the radio spectrum have been in place since shortly after that time.

In fact, in addition to making its presence known through the satellite's visual appearance in the sky, UNESCO plans to have the satellite send radio messages to countries over which it will

pass. With demands on the radio spectrum increasing, UNESCO may face an uphill battle obtaining permission for these transmissions from all the countries involved.

DENIS F. CIOFFI

Thomas Elected to Lead AAPM in 1997

On 1 January Stephen R. Thomas will become president-elect of the American Association of Physicists in Medicine. He will succeed to the presidency in 1997, following Guy H. Simmons.

Thomas earned a BS in physics from Williams College in 1963 and then spent three years as a US Peace Corps volunteer in Ghana. He did his doctoral work at Purdue University, earning a PhD in solid-state physics in 1973. Thomas has been a faculty member at the University of Cincinnati since 1975; currently he is professor of radiology and director of the medical physics division. His research has centered on the biomedical applications of fluorine-19 nuclear magnetic resonance and on radiopharmaceutical dosimetry.

In addition to selecting Thomas, the AAPM membership reelected Charles W. Coffey II of Vanderbilt University Medical Center as secretary. James M. Galvin of the New York University Medical Center, Wendell R. Lutz of the University of Arizona, Jatinder R. Palta of the University of Florida, Gainesville, and Joe P. Windham of Henry Ford Hospital in Detroit were elected board members at large.

New Sandia Director and Deputy Director

On 15 August C. Paul Robinson became director of Sandia National Laboratories. He succeeded Albert Narath, who is now president of the newly created energy and environment sector of Lockheed Martin Corp, which operates Sandia for the Department of Energy.

Prior to his appointment Robinson had been vice president for laboratory development at Sandia, leading the labs' programs in industrial partnerships and technology transfer and initiating alliances between Sandia and US industry.

Robinson earned a BS in physics from Christian Brothers College in 1963 and a PhD in physics from Florida State University in 1967. He then joined Los Alamos National Laboratory, where he headed the lab's defense-related programs from 1980 to 1985. Robinson left Los Alamos in

1985 to become senior vice president and principal scientist of Ebasco Services, a New York-based engineering and construction firm that specializes in nuclear power and other energy systems. In February 1988 President Reagan appointed Robinson the chief negotiator and head of the US delegation to the talks on nuclear testing held in Geneva, Switzerland, where the US and the USSR eventually agreed to protocols for the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty.

Sandia also has a new deputy director, John Crawford, previously the labs' vice president and manager of its California operations. Crawford has been with Sandia since 1962, serving as director of weapon development from 1984 to 1987. He holds a BA in mathematics and physics from Phillips University and an MS and PhD in physics from Kansas State University. Last November Crawford became chairman of the Clean Car Coordinating Committee, which coordinates DOE's work in the Partnership for a New Generation of Vehicles (see PHYSICS TODAY, April, page 73).

Bjorklund is OSA Vice President for 1996

Members of the Optical Society of America recently elected Gary C. Bjorklund to be the OSA vice president for 1996. He succeeds Janet S. Fender, who will become president-elect. The 1996 president of OSA is Duncan T. Moore.

Bjorklund is director of advanced development at Optivision Inc, a high-tech start-up company in Palo Alto, California. After earning a bachelor's degree in physics from MIT in 1968, he went on to graduate work in applied physics at Stanford University, receiving an MS in 1969 and a PhD in 1974. He then joined AT&T Bell Laboratories in Holmdel, New Jersey. In 1979 he moved to the IBM Corp's research division in San Jose, California, where he held various research management positions and did work on basic laser science, optical storage, laser materials interactions and polymeric nonlinear optical materials and devices. In 1994 he joined Optivision, where he works on guided-wave photonics and photonic processing and interconnects.

In other results of the OSA election, Alastair Glass of AT&T Bell Laboratories, Erich Ippen of MIT and David R. Williams of the University of Rochester were elected to three-year terms as directors at large. ■