

Howard Hughes to shift focus of support away from institutions

Washington. The Howard Hughes Medical Institute (HHMI) is to stop funding research at US institutions where HHMI-supported investigators lose their grants or move to different institutions, according to officials at the Maryland-based research organization.

The change in policy will allow the organization to withdraw from the partnerships it has formed with universities when it stops funding particular investigators at these institutions. HHMI views this as a logical step in a strategy that it has been following since 1986 of shifting away from making awards only to investigators at universities with which it is already in partnership, and making them to the best-qualified applicants at any institution.

HHMI, which uses the fortune bequeathed by the late eccentric aviation billionaire Howard Hughes to fund research in molecular biology, is the largest non-government supporter of university science in the United States. Last year it spent \$280 million on its investigators, and a further \$50 million on various grants.

Purnell Choppin, the president of HHMI,

said last week that the money that up to now has supported such investigators will revert to a central pool, from where it can be redirected to new investigators anywhere in the United States who are successful in open competition for HHMI awards.

The move will make more HHMI money available for fresh investigators, including those at institutions where the institute has no presence. But the very low level of attrition means it will not lead to a deluge of new grants. Bob Potter, head of communications at HHMI, says the next round of new awards will probably be made in late 1996 or early 1997, adding "ten or twelve" investigators to the current pool of 280. HHMI spends an average of \$1 million a year supporting each member of this élite group.

Part of the rationale for HHMI's previous

policy was a wish to prevent all of its money from following the best researchers into a tiny handful of molecular biology departments. But Choppin says that its recent, open competitions have not caused this to happen; in 1994, when HHMI made 44 new awards in open competition, it added ten new institutions, and its investigators are now spread across 62 institutions.

Choppin says that HHMI researchers may also get more freedom to change institutions and take HHMI money with them. "At the moment we consider this on a case-by-case basis, and in most cases, they are not free to move," he says. "But we may reconsider that."

Colin Macilwain

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Choppin: opening funds to more investigators.

Columbia takes over reins at Biosphere 2

Washington. Columbia University's Lamont-Doherty Earth Observatory at Palisades, New York, is to take over the entire operation of Biosphere 2, the Arizona ecology laboratory built by Texan millionaire Ed Bass, from the beginning of next year, according to officials from the university.

Columbia's take-over of Biosphere 2 completes a period of transition during which Bass ousted the ideologically committed co-founders of the laboratory, and appointed an outside committee of advisers, chaired by Michael McElroy of Harvard University's Earth sciences department, to restore its battered scientific reputation (see *Nature* 368, 577 & 370, 495; 1994).

At the end of next month, Biosphere 2's acting chief executive, Stephen Bannon, will be replaced temporarily by Taro Takahasi, an associate director of Lamont-Doherty. A search will then be made for a permanent director, who could be in place by April.

Michael Crow, vice provost of Columbia University, says that up to eight additional groups of scientists would start working at Biosphere 2, and that a small, self-financing college would open there. "There will be a greatly expanded scientific presence, with people from Lamont-Doherty and from other institutions," he says.

Bass has spent an estimated \$150 million building the huge, hermetically-sealed Biosphere 2 greenhouse in the Arizona desert. The project drew much derision in its early days, when staff tried to survive inside the greenhouse for several months without external support. But it is being increasingly accepted by ecologists and others as a potentially powerful tool for investigating the complex relationship between the earth, the atmosphere and living things.

C. M.

Dirac given his place next to Newton

London. **A mathematical equation that helped to seal the fate of Newtonian mechanics was unveiled next to the tomb of Sir Isaac Newton at a special service at Westminster Abbey in London at the beginning of this week.**

The equation is carved on a 60-centimetre-square slate plaque (right) in memory of the theoretical physicist Paul Dirac. Dirac was Lucasian Professor of Mathematics at the University of Cambridge for 37 years, a chair once occupied by Newton. During the service, an address was given by the current occupant of the chair, Stephen Hawking.

Dirac, born in Bristol and one of the founders of quantum mechanics, developed the mathematics by which Einstein's theory of relativity was brought into the quantum mechanical theory of electrons. The so-called Dirac Equation, $i\gamma \cdot \delta \psi = m\psi$, encapsulates the concept that an electron can have two different energy states, one positive and one negative.

Because electrons are negatively charged, Dirac's logic suggested that a similar particle with a positive charge ought to exist.

Protons were ruled out, as they are 1,836 times as massive as electrons. In 1930, Dirac suggested that electrons must have a positive twin. This idea of antimatter was confirmed in

1932. The following year Dirac shared the Nobel prize for physics with Erwin Schrödinger.

The plaque, made in the Cambridge workshop of the stonemason David Kindersley, represents the first inscription of a mathematical equation inside Westminster Abbey. But the unveiling, performed by Sir Michael Atiyah, president of the Royal Society and Master of Trinity College, Cambridge, had a further twist: whereas Newton, whose mechanics painted a deterministic picture of the world, was a Christian, Dirac, whose sub-atomic world was more difficult to predict, was an obdurate atheist.

Ehsan Masood

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