SCIENCE POLICY

Clinton Picks His Science Adviser

John "Jack" Gibbons, a physicist-turned-Washington insider, has been tapped by President-elect Bill Clinton to be the next White House science adviser. Clinton said he chose Gibbons, who has been the director of the congressional Office of Technology Assessment (OTA) since 1979, because he has a proven track record in giving reliable science and technology advice to Congress and in soliciting it from the scientific community.

Changing clients. OTA head John Gibbons.

Gibbons' selection was made public on Christmas Eve along with the names of the last members of Clinton's Cabinet. It is the earliest an incoming president has picked a science adviser since John F. Kennedy created the forerunner to the White House Office of Science and Technology Policy (OSTP) in 1962. Clinton, according to aides who participated in Gibbons' selection, ranks the position on a par with the director of the Central Intelligence Agency and the national security adviser, and they say Clinton intended the early selection to send a signal that science and technology are high on his priority list.

One of Gibbons' strengths is expected to be his ability to work well with Vice President-elect Al Gore. Gibbons comes from Gore's home state of Tennessee and has known the Gore family for years. Clinton announced during the campaign that Gore would take over much of the Administration's policy making in science and technology. That suggests Gibbons will play more of an advisory role, much like the one he has played at OTA.

In an interview with *Science*, Gibbons described his new job as one with two hats and two masters. As science adviser to the president he will work mostly with Clinton, but as OSTP director, he expects his principal working relationship will be with Gore. He says he has spent only an hour with Clinton since the election, and no time at all with Gore, so he has had little opportunity to discuss the incoming Administration's plans for science and technology. But the advantage of such an early appointment, he says, is that it allows him to "get in while the concrete is still being poured."

Ellis Mottur, deputy political director for the Clinton transition team, suggests that Clinton also brought Gibbons on board early to give him a role in selecting other science and technology appointees. That could be a long list, Mottur says. "Clinton intends to bring in fresh people—I wouldn't expect too many [incumbents] to stick around," he adds. Clinton is expected to announce another seven or eight high-level science and technology appointments by the end of January.

Scientists, like almost everybody else, were caught off guard by the announcement. Gibbons was on few short lists and is not well known outside Washington. His career as a scientist was spent mostly at the Oak Ridge National Laboratory, where between 1954 and 1969 he did work on nuclear reactions and stellar evolution. He then largely gave up research to focus on environmental and energy conservation policy, a shift that eventually brought him to Washington and OTA.

In his 13 years at OTA, Gibbons developed a reputation as a nonpartisan straight-shooter. He took over the agency just 7 years after its establishment, a period during which it was still struggling to gain respect and avoid being co-opted by partisan politics. Representative George Brown (D–CA), the chairman of the OTA board, says Gibbons rescued OTA by resisting congressional pressure to take on global science and technology policy issues, focusing instead on specific advice on specific top ics. "He's been a pragmatist, and I think he'll be one in the White House, too," Brown says.

Richard Bradshaw, a Clinton adviser on science issues, notes that Gibbons, like Clinton, favors more federal involvement in industrial research and better linkages between basic and applied research. Gibbons' appointment "is sending a strong signal to the research community that this president is going to put an emphasis on technology," rather than more basic research, Bradshaw says. Researchers, he concedes, may find that threatening. "They may see [Gibbons] as a creation of Congress and there's a lot of paranoia about that," mostly due to Congress's recent push to get federal science agencies into more industrially relevant research. But he suggests that Gibbons' good congressional relations say a lot about his ability to steer clear of political minefields, something that bodes well for his ability to get along with—and retain access to—Clinton. "Jack's not headstrong," Bradshaw says. "He's a real team player. And that's right at the top of Clinton's agenda."

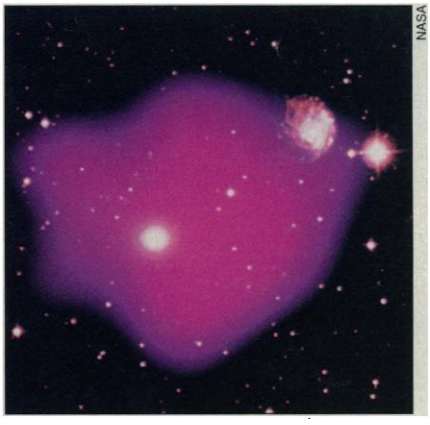
–Christopher Anderson

ASTRONOMY

A Cloud With a Strange Dark Lining

PHOENIX—Astronomers have learned to live with the idea that they can't see most of the universe—that it's made up of some kind of invisible dark matter, detectable only by its gravitational pull. A new x-ray observation of a vast cloud of hot gas surrounding a pair of galaxies may force them to get used to an even more unsettling idea. At this week's meeting of the American Astronomical Society here, the discoverers of the cloud argued that it is anchored by 10 to 30 times more mass than is visible. If other pairs and small groupings of galaxies also swim in that much dark matter, they say, the mysterious material may be made up not of the kinds of particles physicists are familiar with but of some sort of exotic particles whose nature can only be guessed at.

The observation, made with the x-ray satellite ROSAT, was announced by astronomers Richard Mushotzky of the NASA Goddard Space Flight Center and David Burstein of Arizona State University and two graduate students. They are not the first to suggest that the universe may contain more dark matter than can be explained by baryons—ordinary particles like protons and neutrons. And, as with earlier observations, some astronomers believe that this one too can be explained without resorting to hypothetical "nonbaryonic" particles. But Mushotzky thinks the ROSAT finding may be the strongest evidence yet for this sort of exotic dark matter.



Steadied by dark matter. A composite image shows ROSAT's hot cloud and nearby galaxies.

Evidence of some sort of unseen mass started coming in the 1970s, when Vera Rubin and Kent Ford of the Carnegie Institution of Washington discovered that the outer parts of galaxies rotate too fast for the visible matter of the galaxies to be holding them in orbit. Some sort of dark matter had to be present—maybe comets, dim stars, or planets. Later observations of clusters of galaxies, and of large flows

of galaxies toward unseen masses, suggested much larger amounts of dark matter—more than 10 times the amount of visible matter. If the universe as a whole contained that much dark matter, the dark matter would have to consist of exotic particles. The reason: Based on the mixture of elements in the universe, theorists calculate that the Big Bang could not have produced more than 10 times as much ordinary matter as is visible.

But there was still room to argue that the clusters and flows were exceptional—that dark matter was scarcer elsewhere in the universe. In that case nonluminous ordinary matter could be bulking up the large clusters and flows. Mushotzky thinks the new observation will be harder to explain away, however. His 1.3 million light-year-wide gas cloud reveals at least as much dark matter as the large clusters, and it lies in a small cluster of galaxies—a structure far more typical of the universe as a whole.

His colleague Burstein stumbled on the first hint of invisible matter when he was using a ground-based telescope to examine a pair of galaxies belonging to an ordinary small cluster. One of the two galaxies looked crushed, as if it was running into a wall of gas. A look with ROSAT, which picks up the x-rays emitted by hot gas, confirmed the suspicion by revealing the cloud. And the cloud, in turn, pointed to the presence of additional, invisible mass.

The cloud didn't seem to have been produced by a recent explosion, which meant that it was either stable or in the midst of a slow collapse. The couple of little galaxies by themselves didn't have nearly enough mass to hold such a cloud steady. Based on the size and temperature of the cloud, Mushotzky and his colleagues were able to calculate just how much extra, unseen matter had to be lurking.

But Harvard University x-ray astronomer Jonathan Grindlay, while impressed, sees some weak links in the argument. He's not convinced that Mushotzky and his colleagues have ruled out the possibility that the gas is still expanding after an explosion. And he adds that there's a slight risk that the cloud of gas is really a much smaller one associated with a more distant cluster of galaxies. Either way, the amount of dark matter would be much lower—with less need for exotic particles.

Theorist James Peebles of Princeton University also warns against jumping to conclusions about fancy forms of matter. "I don't see how the observation of one clump can tell you about the kind of matter in the whole universe," he says. Though the region looks representative, he says, there's no way to know without taking a wider sample.

But dark matter expert Anthony Tyson of AT&T Bell Laboratories thinks the evidence for exotic dark matter was strong even before the latest observation. "I like baryons myself," he says, but the weight of evidence has convinced him to accept something else. Nonbaryonic matter may seem far-fetched, adds Mushotzky, but it would be even stranger to find a swarm of stray planets or burned-out stars in the region of the gas cloud. "Where would they have come from?" he asks. "These other candidates are even more bizarre."

–Faye Flam

GENE THERAPY

Healy Approves an Unproven Treatment

Last week, National Institutes of Health (NIH) Director Bernadine Healy gave the go-ahead for a patient suffering from advanced brain cancer to be treated with an experimental gene therapy that has not yet been sanctioned by NIH's own review procedures. The decision immediately drew protests from members of the NIH advisory committee that is supposed to vet all gene therapy proposals. They complained that it makes a mockery of NIH's process for ensuring that such experiments are approved only on the basis of safety and good science. And they may have still more to complain about in the future, if—as Healy apparently intends—the case leads to guidelines that will permit similar compassionate exemptions from full review to be granted on a more regular basis.

The case involves a last-ditch effort to save a San Diego woman whose plight had been brought to Healy's attention by Senator Tom Harkin (D–IA). Last fall, Harkin, who chairs the Senate appropriations subcommittee that handles NIH's budget, asked Healy to allow exemptions to the NIH review process when the treatment might aid a dying patient. To launch a gene therapy trial, scientists normally must win approval from both NIH's Recombinant DNA Advisory Committee (RAC) and the Food and Drug Administration (FDA), a process that can take months. Harkin worried that this delay would preclude treatment, advocated by Ivor Royston, president of the San Diego Regional Cancer Center, for the 51-year-old California woman, who did not have months to live.

Healy initially wrote back to Harkin saying that "there have not...been enough studies on this proposed treatment to even begin consideration on a compassionate plea basis." Because nearly every patient treated with gene therapy so far is dying and would qualify for the same consideration, she wrote, "it is not possible to make decisions as to which case is more worthy than others.... Attempting such kinds of decisions would compromise the review process and not be in the best interests of such patients."

On 28 December, however, Healy did a startling about-face. She approved treatment for the woman and called for an emergency meeting of the RAC on 14 January to draft guidelines for the compassionate use of unapproved gene therapies. She did not publicly explain her change of mind.

Healy's decision paves the way for Royston to treat the woman with a vaccine made from her own cancer cells that have been genetically altered to make interleukin-2, an immune stimulant. Animal studies suggest that IL-2-producing cancer cells boost an immune attack on tumors anywhere in the body. Royston filed a single-patient protocol for the treatment with NIH on 7 December.

Now RAC will not get a chance to review Royston's protocol, and members are fuming. "This is the worst thing I have seen," said Dusty Miller, a RAC member from the Fred Hutchinson Cancer Research Center in Seattle, Washington. "It throws the RAC review to the wind. The implications of this are that the RAC is no longer needed. If somebody wants to put recombinant split pea soup into people, that's fine." E. Peter Geiduschek, a RAC member from the University of California, San Diego, wondered whether the "P in PHS (Public Health Service) stood for political, privilege, or public. I think the way things were done reflects no credit on the Department of Health and Human Services and NIH." And John H. Barton, a RAC member from Stanford Law School, worried that Healy's decision may have violated NIH's own guidelines for RAC.

Healy was not available for comment last week, but NIH deputy director Lance A. Liotta sought to justify the decision. He pointed out that RAC has already approved the vector used to transfer the IL-2 gene—it's being provided by Bernd Gansbacher of Memorial Sloan-Kettering Cancer Center, who has won RAC approval for his own gene therapy experiments. Royston has also received the go-ahead from his own institutional review board and biosafety committee, and FDA has approved the treatment as safe. Moreover, RAC has sanctioned a small number of human tests by research groups that pioneered the idea, although they are using different target cells.

"This is a unique situation, based on a moral dilemma. We decided not to penalize this one patient," Liotta said. He quickly added, however, that "our intent is to have this never happen again. All future requests will have to follow the new guidelines set up by the RAC." Given the reaction of some RAC members to Healy's decision, however, they may have a difficult time agreeing to new guidelines when the committee meets next week.

–Larry Thompson

Larry Thompson is a science writer living in Bethesda, Maryland.