agreement which gave them close to exclusive access to the data," says Claude Lenfant, the institute director. "We could not go along with that." He says that the institute was willing to make concessions, such as giving the company exclusive rights to data for the first 2 years, but this proved insufficient. Company officials could not be reached for comment. "The rationale was good, but the methodology was not," says Jay Lander, a Framingham attorney and vice chair of Friends of Framingham Heart Study, which represents participants.

Now, the challenge is to find a new way to pay for the database. Lenfant envisions a cooperative agreement among companies, nonprofits, and other interested groups. He said he intends to draft a plan this year, after BU's contract to conduct the study is renewed in the next couple of months. But he insists that the raw data should be available to everyone, and that only refined data should be private property. Chobanian agrees that that approach is now the way to go. "It's a slower and less effective way," he adds, "but probably better in the long term." **–ANDREW LAWLER**

ASTROPHYSICS

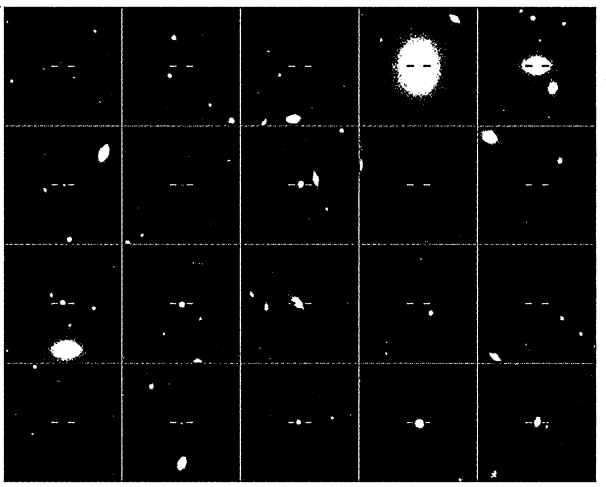
Ravenous Black Holes Never Say Diet

AUSTIN, TEXAS—As more and more observations confirm that supermassive black holes stud galactic centers like celestial Starbucks, astronomers are starting to puzzle out the dark giants' life cycles. Now, a pair of new methods for probing the secret hearts of galaxies, presented here at a recent meeting,* is overturning a widely held assumption that supermassive black holes stopped growing after forming in the early universe. And the new methods could soon enable astronomers to tell the entire life story of a black hole.

For years, astronomers could estimate the mass of a black hole only by laboriously clocking the motion of individual stars in the surrounding galaxy. Six months ago, however, teams led by astronomers Karl Gebhardt of the University of Texas, Austin, and Laura Ferrarese of Rutgers University in New Brunswick, New Jersey, made a crucial discovery: The mass of the black holes, as determined from individual star motions, is exactly proportional to the *overall* motion of the stars in the galaxy's central bulge.

"It is a perfect line," Ferrarese says. For nearby galaxies, astronomers can calculate that overall motion, or velocity dispersion, by studying the Doppler shift of light from the bulge. "It just takes an hour on a ground-based 4-meter telescope," Ferrarese says. Then the linear relationship makes it easy to weigh the black hole.

Unfortunately, the oldest, most active supermassive black holes lurk in host galaxies too far away for astronomers to measure their velocity dispersions. So Gebhardt has calibrated a previously suggested way to calculate mass at even greater distances, by studying the light from quasars—the unimaginably powerful energy fountains that issue from many galactic black holes.



Bright idea. Light from x-ray sources reveals black holes.

Gebhardt starts by creating a "reverberation map" that relates the daily fluctuations in a quasar's brightness to corresponding flickers in light reflected from clouds orbiting the black hole. From the time delays between the arrival of the quasar's light and the reflected cloud light, he calculates how far the clouds are from the quasar. Combining that distance with Doppler measurements of the reflected light tells how fast the clouds are orbiting the black hole. That velocity, in turn, reveals the black hole's mass.

When Gebhardt compared his reverberation-map estimates of black hole masses with velocity-dispersion measurements from several nearby galaxies, they agreed beautifully. "Right now, we are confident we can measure the black hole mass within a factor of 2," Gebhardt says, "and that should soon improve to an accuracy of 30% to 40%." Because the method works for even the most distant quasars, Gebhardt hopes to use it to map the entire growth history of supermassive black holes. "This opens a region far beyond the reach of stellar dynamics," Ferrarese agrees.

Not all the action is in the distant universe. As many as 10% of the black holes in neighboring galaxies are still gobbling up gas and putting on weight, a team of astronomers led by Amy Barger of the University of Hawaii, Manoa, reported here last week. To find the active black holes, Barger's team first pointed the Chandra X-ray Telescope at an empty patch of sky, where they found 20 new high-energy x-ray sources. Follow-up optical observations showed that the x-ray sources came from a larger group of hundreds of optically bright galaxies. Applying a variation of the mass-velocity dispersion relationship that says the optical luminosity of a galaxy is proportional to the black hole's mass, the Barger team concluded that the unusually bright nearby galaxies contain supermassive black holes.

To produce so many dust-penetrating x-rays, the resident black holes must be chowing down on galactic gas, the team reports. Extrapolating from the researchers' sample, Barger concludes that as many as 10% of all supermassive black holes are still active today.

"They have done a beautiful job," says astrophysicist Andy Fabian of the Institute of Astronomy in Cambridge, U.K. But 20 galaxies aren't enough to convince Fabian and others that so many supermassive black holes are still active, and eating, today. Barger's team expects to glean more examples from Chandra observations scheduled this year. **–MARK SINCELL**

Mark Sincell is a science writer in Houston.

INDIA

Scientist Restored to Top Agriculture Post

NEW DELHI—The Indian government's top agricultural scientist has regained his post after being removed during an inquiry into financial irregularities at his agency (*Science*, 24 November 2000, p. 1477). The move is being applauded by scientists, who felt that the government's action against R. S. Paroda, director-general of the Indian Council of Agricultural Research, was unwarranted.

Paroda was taken off the job on 16 November as part of a probe into the diversion of computers purchased on a World Bank–funded technology project. On 24 December, Agriculture Minister Nitish Kumar said that Paroda was being reinstated because he "is not related to the matters on which the inquiry was ordered."

Scientists had been particularly upset that the action came just before the annual Indian Science Congress, a megaevent held in early January over which Paroda is presiding. It was the first time that a secretary of any of the science departments had been removed so abruptly in a matter involving possible corruption, and also the first time the government had reversed itself so quickly. **–PALLAVA BAGLA**

CREDIT: A. J. BARGER AND L. L. COWIE, INSTITUTE FOR ASTRONOMY (UNIVERSITY OF HAWAII)/CHANDRA

* Texas Symposium on Relativistic Astrophysics, 10 to 15 December 2000.