Afghan archaeologists attended the Kabul meeting, but the rigors of life in modern-day Kabul might discourage prospective students and returning scholars.

The German foreign ministry has promised $350,000 to conserve a number of archaeological sites. One of the most fragile is the Minaret of Jam, the second highest in the world. Built in the 12th century, the structure is leaning because its foundation is weakening. Italy will provide $800,000 for repairs and an additional $500,000 for other conservation projects.

Most of the pledges will be held in trust by UNESCO. But the largest gift—$5 million from the Aga Khan Trust for Culture, a Geneva-based organization—will go directly to the municipal government to recreate the Bagh-e-Babur gardens, planted by the famed first Moghul emperor and the site of his 16th century tomb. The funds also will help rebuild traditional Kabul residences and improve public sanitation.

Interim President Hamid Karzai spoke at length to participants about the importance of rescuing and rebuilding the country's cultural heritage. But any long-term restoration requires an end to chaos and war, leaving scientists at the mercy of the political winds. "No one really knows what will happen," says Bucherer-Dietschi.

–ANDREW LAWLER

EXOPLANETS

'New Jupiter' Turns Up In Strange Company

Planet hunters are expected to announce this week that they have discovered 13 new planets that orbit sunlike stars in our corner of the Milky Way. This new harvest, which brings the total number of known extrasolar planets close to 90, includes an exoplanet that orbits farther from its star than Jupiter orbits the sun—the greatest known star-planet distance of any exoplanet. "This [far-out planet] is the first good evidence that planets actually form where our basic theories say they ought to," says Charles Beichman, a planetary expert at the Jet Propulsion Laboratory in Pasadena, California.

The new planets were discovered by Geoffrey Marcy and Debra Fischer of the University of California, Berkeley; Paul Butler of the Carnegie Institution of Washington in Washington, D.C.; and Steven Vogt of the UC Observatories/Lick Observatory near San Jose, California. The astronomers used telescopes in California, Hawaii, and Australia to measure Doppler shifts in the spectra of light from the planets' stars. The Doppler shifts arise as the orbiting planets tug the stars in different directions.

Like most other extrasolar planetary systems discovered so far, the newcomers include several enormous objects orbiting extremely close to their host stars. It's not surprising that star-hugging super-Jupiters unlike anything in our own solar system were the first to be discovered by the Doppler method, Marcy says. Not only do they exert the greatest gravitational pull on their stars, but their short orbital periods make their effects on starlight show up relatively quickly in astronomers' observations. But that doesn't mean that massive, close-in planets are the rule, Marcy says.

EXOPLANETS WITH LARGEST ORBITAL RADII

Planet	Distance (AU)	Period (Earth years)	Mass (Jupiters)
HD145675	2.9	4.9	≥4.05
EpsEri	3.4	6.9	≥0.88
HD39091	3.5	6.2	≥9.94
HD74156	3.5	6.2	≥7.46
47Uma c	3.8	7.2	≥0.76
Jupiter	5.2	11.9	1.00
55 Cancri c	5.8	14.8	≥4.05

The new far-out planet brings mixed evidence that solar system–like star systems are indeed out there. With a mass at least 4.05 times that of Jupiter (that is, 1290 Earth masses), the planet orbits the star 55 Cancri every 14.8 years at an average distance of 5.8 astronomical units (AU), slightly greater than Jupiter's distance of 5.2 AU. (An astronomical unit is the average distance of Earth's orbit from the sun, about 150 million kilometers.) So far, so familiar. The catch is that 55 Cancri also hosts two large, close-in planets, one just 0.12 AU from the star, the other 0.24 AU.

Planets such as 55 Cancri's inner companions vex astrophysicists with two big questions: How did they get there? And what do they say about the likelihood that planets with Earth-like masses and orbits exist in the same system? Current theories imply that Jupiter-like "fluid giants" must form at least 3 to 4 AU from the star. To explain how they might move closer, Douglas Lin of the University of California, Santa Cruz, and others have proposed that newly formed giant planets follow a shrinking disk of preplanetary material that swirls into the star, drawing the planet inward by tidal interactions. Fred Rasio of Northwestern University in Evanston, Illinois, and others support a planetary pinball game scenario in which a close encounter between two massive planets shoots one into a much tighter orbit and the other into a somewhat larger orbit around the star. If the migration model is correct, Earth-like planets could potentially form after a giant planet had spiraled inward, if additional matter remained in a disk around the star. In the planetary-pinball model, however, the interactions between a close-in and a far-out giant would sweep up or kick out any Earth-like planets orbiting in between them.

The next few years should bring a flood of new data to help resolve these possibilities, says Marcy's longtime collaborator Butler. With 1200 stars now under study and more to come, another half-dozen years of observations should bag several more Jupiter-like planets in Jupiter-like orbits, Butler says—objects that might help determine how hospitable, or hostile, the universe is to planets like our own.

–DONALD GOLDSMITH

Donald Goldsmith, the author of *Connecting With the Cosmos: Nine Ways to Experience the Wonder of the Universe*, is a science writer in Berkeley, California.

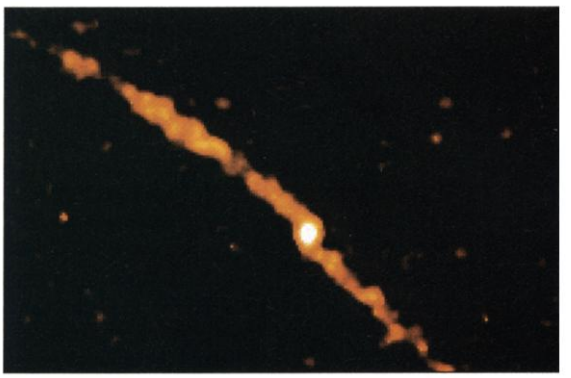
ASTRONOMY

Lucky Catch Identifies Disintegrating Cluster

ALBUQUERQUE, NEW MEXICO—The Milky Way galaxy is tearing apart its oldest inhabitants, and for the first time astronomers are witnessing the slaughter. A striking image presented here 3 June at a meeting of the American Astronomical Society* shows a globular cluster known as Palomar 5 being torn asunder by tidal forces of our home galaxy. Researchers say the observation and others like it could shed new light on the distribution of dark matter in the halo of the Milky Way. "This is a very exciting and beautiful result," says theorist David Spergel of Princeton University.

Globular clusters are large, spherical aggregations of old stars. They probably formed along with the galaxy, some 12 billion to 14 billion years ago. About 150 globulars are known to loop in wide orbits around the Milky Way's center. Some of them contain

* 200th meeting, 2–6 June.



Tails of woe. Streamers of stars from Palomar 5 reveal a globular cluster being torn to shreds.

CREDIT: (BOTTOM) MAX PLANCK INSTITUTE FOR ASTRONOMY