a different way."

While that debate rages on, researchers are jumping on other avenues opened by the Vanderbilt team's findings. They "tell us something new and important about what the visual system can do," says Newsome. And that, adds Heeger, "opens up the opportunity for trying to measure and understand the underlying neural basis. Immediately you think, 'What is it that the neurons are doing; what is the neural code for this?' " A number of labs, he says, are sure to design experiments to search for that neural code.

–MARCIA BARINAGA

PLANETARY SCIENCE

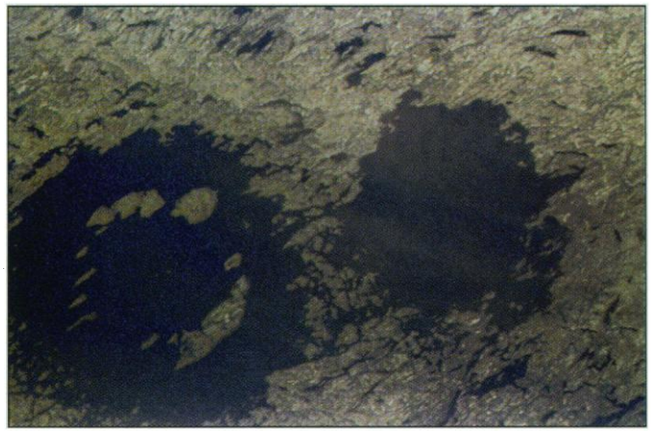
Asteroids Form Rocky Relationships

A run-in with a huge asteroid is bad enough, as movies like *Deep Impact* have made all too graphic. Now there's a scenario for the next round of threat-to-humanity movies: double impacts. Sightings of asteroids with companions—the latest of them just reported on the Web—are convincing astronomers that such pairs are far from rare.

Indirect evidence, such as paired impact craters on Earth, had already hinted that asteroids sometimes come in pairs. In the late 1970s, some astronomers watching stars blink out as asteroids passed in front of them the 214-kilometer asteroid Eugenia.

In a meeting abstract newly posted to the Web (scorpio.tn.cornell.edu/ACM/web_abs.html), astronomer William Merline of Southwest Research Institute in Boulder, Colorado, and his colleagues report that they spotted a 15-kilometer satellite orbiting about 1200 kilometers from Eugenia. Eugenia and its satellite are a single fuzzy spot of light in an ordinary telescope, but late last year, in the course of a 200-asteroid search for satellites, Merline's group was able to separate them with the 3.6-meter Canada-France-Hawaii Telescope (CFHT) on Mauna Kea, Hawaii. The CFHT was equipped with an adaptive optics system that precisely undoes the blurring effects of atmospheric distortion (*Science*, 27 June 1997, p. 1994).

More candidates for binary asteroids are emerging from observations of the pulsating brightness of asteroids that pass near Earth. Most asteroids reflect varying amounts of sunlight as they rotate because of their irregular shapes, but a half-dozen so-called near-Earth asteroids (NEAs) observed by Petr Pravec of Ondrejov Observatory near Prague and his colleagues and by Stefano Mottola of the DLR in Berlin flicker as if one body is periodically passing in front of or behind another perhaps twice its size. Although the Eugenia observations are "pretty hard evidence" for a satellite, says astronomer Alan Harris of the Jet Propulsion Laboratory in Pasadena, California, the light variations of at least a couple of the NEAs are "highly suggestive."



Double trouble. A pair of asteroids traveling together created Clearwater West (36 kilometers in diameter) and East craters in northern Quebec 290 million years ago.

CREDIT: (TOP) NASA/JPL/CALTECH; (BOTTOM) NASA

As satellites of asteroids have proliferated, theoreticians have been trying to explain how they formed. After Dactyl was spotted near Ida, some suggested that the pair came together after a collision shattered a precursor body into a swarm of smaller asteroids, and a larger fragment managed to capture a smaller one gravitationally. But no one has tested this idea with detailed calculations. Noting that smaller collisions may have turned many other asteroids into rubble piles, William Bottke of Cornell University and Jay Melosh of the University of Arizona, Tucson, suggested another scenario in 1996: Earth's gravity, they said, could split a rubble-pile asteroid in two if it passed nearby.

Eugenia's satellite is more perplexing, says Melosh. Although Merline calculates reported extra flickerings that might have been caused by companions—although colleagues remained skeptical (*Science*, 17 July 1987, p. 250). The first direct proof that asteroids can have moons of their own came when the Galileo spacecraft flew by 56-kilometer Ida in 1993 and photographed tiny Dactyl, a 1.5-kilometer body orbiting about 100 kilometers away. And now astronomers observing from the ground have detected a much heftier companion around

ScienceScope

Rocket Science Troubled by a string of commercial and military launch failures, NASA is reexamining its own unmanned rocket program. Over the last 9 months, the Defense Department and communications companies have lost billions of dollars worth of satellites to flawed lift-offs, including three in one recent 8-day span. Although NASA has a mostly unblemished record with its single-use rockets, space agency officials last week delayed the launch of a weather satellite and ordered a review of dozens more scheduled unmanned science flights.

The review "is an extra precaution," says a NASA engineer. "We'd like to stay out of the headlines." He doesn't expect the extra look—which could be finished by next month—to cause delays for scientists with space-bound projects.

Digging In After nearly 30 years of skirmishes among developers, archaeologists, and government officials, France has taken a big step toward regulating "rescue archaeology." Culture minister Catherine Trautman last week unveiled a plan to end what she calls the "quasi-permanent crisis" by creating a new agency to oversee the excavation of ancient remains threatened by development projects.

Last year, archaeologists went on strike to derail a plan to open such projects to competitive bidding, saying it would damage research (*Science*, 16 October 1998, p. 407). But now, scientists are mostly welcoming a proposal to replace a semiprivate archaeological contracting agency with a public entity under the culture and research ministries. Plans to involve government and academic researchers in projects are an "affirmation that rescue archaeology is a scientific activity and a public service," says Françoise Audouze of the Center for Archaeological Research in Nanterre.

But one archaeologists' union is unhappy with a complicated formula that will exempt small developers from paying for digs. It is calling for changes before the government presents the plan to Parliament this fall.

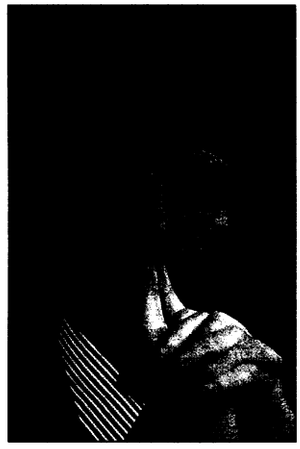
Contributors: Eliot Marshall, Michael Balter, David Malakoff

from the satellite's orbit that Eugenia has a low density and therefore is probably a rubble pile, it is in the main belt of asteroids between Mars and Jupiter and never would have passed close by a planet. Observes Melosh: "That will certainly give us theoreticians something to chew on." —RICHARD A. KERR

HIV

French-Led Therapy Fund Kicks Off in Africa

PARIS—Potent antiviral drugs have begun to cut the death rate from HIV infection in developed countries, allowing many infected people to live longer and relatively normal lives. But in the developing world, where 90% of the world's estimated 35 million HIV-infected people live, the high cost of these drugs makes them virtually unobtainable, and death rates continue to climb (see next story). In December 1997, French health minister Bernard Kouchner, supported by France's president, Jacques Chirac, launched a campaign to reduce this global inequity: He proposed the creation of an international fund to subsidize anti-HIV therapies in the developing world. Last month, after nearly a year and a half of often frustrating toil by Kouchner and his aides to raise money, the fund announced its first projects.



Frustrating toil. French health minister Bernard Kouchner.

The Fund for International Therapeutic Solidarity (FSTI), as it is now called, will provide about $1.7 million over the next 4 years to support therapy and prevention programs for selected groups of patients in the West African nation of Côte d'Ivoire, with emphasis on preventing the transmission of HIV from infected mothers to their infants. In addition to FSTI's contribution, a charitable foundation set up by the French arm of the Glaxo Wellcome drug company will kick in about $250,000 and the Côte d'Ivoire government will supply $1 million. Other partners—including the U.S. Centers for Disease Control and Prevention in Atlanta and UNAIDS, the Geneva-based United Nations AIDS program—will lend logistical support and expertise.

Kouchner has had a tough time raising money for his fund: The sole contributor so far is the French government, which has provided $4 million in start-up money. "It has been a terrible battle" to get the FSTI started, says Eric Chevallier, Kouchner's senior adviser in charge of the effort. "Obviously we have been rather frustrated." On the other hand, Chevallier says, more recently there has been a "noticeable evolution" of positive attitudes from potential donors. For example, an additional $3.3 million may soon be forthcoming from the European Commission, after a vote by the European Parliament last October directing the commission to make a donation. And Chevallier says Kouchner's staff is currently talking with the World Bank about participating in the fund.

Because of the limited funds, the pilot project in Côte d'Ivoire will target a small fraction of the at least 700,000 people estimated to be HIV-positive in that country. It will subsidize "bitherapy"—two drugs that inhibit the key HIV enzyme reverse transcriptase (RT)—for just 500 patients, chosen among infected AIDS prevention activists and patients who have already participated in clinical trials for antiviral agents. A second, larger effort will support testing and therapeutic follow-up for 20,000 pregnant women and their families in Abidjan, the nation's capital. Those who test positive will be offered a "short course" of antiviral drugs to prevent mother-child transmission, and mothers in the advanced stages of HIV infection will be offered triple therapy—generally two RT inhibitors and a protease inhibitor directed at another HIV enzyme.

Although they welcome the program, health officials agree that it will have only a small impact on the explosive AIDS epidemic. Makan Coulibaly, coordinator of the Côte d'Ivoire government's HIV treatment access program, says that with about 90,000 women giving birth each year in Abidjan, the program will catch only a fraction of the potentially infected population. "It is very easy to be paralyzed by the magnitude of the problem," says Joseph Saba, who is in charge of UNAIDS's drug-access initiatives. "But do we wait until everything is perfect and everyone has access, or should we go on a step-by-step basis?"

Despite Kouchner's limited success at raising money for the FSTI, a dozen other countries have lined up to request money from the fund. With the money remaining, new programs in Uganda and Morocco will be starting up soon, and Chevallier says that once the European Commission begins to contribute, the number of recipients should expand considerably. Says Saba: "This initiative has one great merit—it is trying to accomplish something." —MICHAEL BALTER

CREDIT: (TOP) WITT/SIPA; SOURCE: (BOTTOM) WHO

HIV

AIDS Now World's Fourth Biggest Killer

PARIS—AIDS is now the fourth leading cause of death in the world, and the number one killer in Africa, according to figures released this week by the World Health Organization (WHO). The disease has moved up several notches from last year's ranking as seventh leading killer worldwide, according to WHO's latest World Health Report. Only ischemic heart disease, cerebrovascular disease, and acute lower respiratory infections outrank AIDS on the international death list. In Africa, AIDS caused an estimated 1,830,000 mortalities in 1998, twice as many as due to malaria, which is now relegated to the number two spot on the continent's roster of lethal diseases.

Bernhard Schwartländer, senior epidemiologist for UNAIDS, the United Nations AIDS program, says that some of the change in disease ranking is due to new and improved methodologies for estimating disease mortality, which have revised estimates of some diseases downward while AIDS cases have been skyrocketing. Nevertheless, the new figures dramatically vindicate warnings late last year by UNAIDS that the epidemic is still raging out of control (*Science*, 4 December 1998, p. 1790). UNAIDS estimates that new infections by HIV, the virus that causes the disease, are increasing by at least 6 million each year. But a UNAIDS study released last month indicated that donations to international AIDS programs have failed to keep up with the growth of the epidemic.

LEADING CAUSES OF DEATH WORLDWIDE IN 1998
(1997 rank in parentheses)

1. Ischemic heart disease (1)
2. Cerebrovascular disease (2)
3. Acute lower respiratory disease (3)
4. HIV/AIDS (7)
5. Chronic obstructive pulmonary disease (5)
6. Diarrheal diseases (6)
7. Perinatal conditions (new category)
8. Tuberculosis (4)

"AIDS is now the [single] leading infectious disease killer in the world, and the number one killer of Africans," Peter Piot, UNAIDS's executive director, told *Science*. "It's an outrage that the international community is only investing $150 million each year to stem the spread of HIV in Africa."

—MICHAEL BALTER