

Astronomy

A 'normal' galaxy that goes the distance

In the 1960s, astronomers identified a group of objects that rank among the most distant in the observable universe — quasars that glow brilliantly in visible light and at radio wavelengths. Two decades later, researchers detected very distant galaxies that broadcast radio waves at high intensity. Now scientists have added a more mundane, less luminous object to their list of faraway bodies — a faint, radio-quiet galaxy that could be the youthful counterpart of such run-of-the-mill galaxies as our own Milky Way.

David Turnshek of the University of Pittsburgh and his colleagues spied the faint galaxy using the European Southern Observatory's 3.6-meter telescope at La Serena, Chile. Since looking into deep space is the same as peering back in time, the galaxy's great distance from Earth — 11.4 billion light-years, according to one model — indicates that astronomers are viewing the body as it appeared when the universe was just 13 percent of its current age. Moreover, the galaxy appears to reside amid a cluster of other bodies, including a huge cloud of hydrogen gas previously discovered by Cyril Hazard, also at Pittsburgh. Turnshek suspects the gas cloud, as glimpsed through the telescope, had just begun forming a new galaxy.

Other surveys that have scanned large regions of the sky for distant, quiescent galaxies have failed to find them because the faraway bodies appear extremely faint, Turnshek says. Rather than looking at a big swath of the sky, Turnshek and his team limited their study to the vicinity of the large, distant hydrogen cloud. He suggests that distant hydrogen clouds may be part of galactic clusters and are probably associated with faint, run-of-the-mill galaxies.

If further observations reveal that clusters of "normal" galaxies were at least as common as quasars in the early universe, Turnshek notes, then cosmologists will have to explain how so many different galaxy types formed relatively soon after the Big Bang — the giant explosion believed to have begun the expansion of the cosmos.

Turnshek described his group's work earlier this month at an American Astronomical Society meeting in Columbus, Ohio.

Scientists gasp at snapshot of Gasptra

The Galileo spacecraft recently sent back the best pictures yet of the asteroid Gasptra, snapped during the spacecraft's brief encounter with the asteroid last October. The new images have three times the resolution of previous images, providing scientists with more provocative clues about the asteroid's origin and its habitat.

In the new photos, deep grooves crisscross Gasptra's surface. Galileo team member Joseph Veverka of Cornell University suspects that the scrapes, which are about 10 to 20 meters deep, resulted from impacts with other objects. When considered along with Gasptra's highly irregular shape, the scrapes suggest the asteroid was splintered off from a much larger rock after several violent collisions.

NASA scientists also confirmed that Gasptra is pitted with several hundred craters, suggesting that the asteroid encounters mostly small objects in its orbital path around the sun. Planetary scientists calculate that the craters accumulated in just 200 million years. And they say they will require more time to decipher the story these pictures tell. "There are still lots of things we don't understand," Veverka notes.



NASA

Biology

Taste protein relays bitter signal

Molecular neurobiologists have discovered a new protein, gustducin, that seems to reside only in the taste buds and may act as a messenger for bitter-taste signals.

This protein contains 354 amino acids, and it is the first found to be specific to taste cells, report Susan K. McLaughlin and her colleagues at the Roche Institute of Molecular Biology in Nutley, N.J.

Gustducin represents a new variant of the G proteins, molecules known to relay sensory signals by setting off the cascade of chemical reactions that leads to the stimulation of a nerve cell.

The researchers were surprised at how much this new molecule looks like the transducins, G proteins in the eye's rods and cones, notes Robert F. Margolskee, who heads the Roche Institute group. Based on this similarity, the researchers infer that gustducin activates a particular enzyme known to be involved in the sensation of bitter.

The Roche researchers, who did their work in rats, found no gustducin in other parts of the tongue or in other tissue studied, they report in the June 18 NATURE. They hope to use this protein to help them find the receptor molecule that latches on to bitter substances in the mouth. "Our long-term plan is to try to recreate taste [perception] in a test-tube," Margolskee says.

The perils of a tropical crow

What's so special about the Hawaiian crow called Alala? Only 11 adults and one nestling exist in the wild — a number that puts the bird in extreme jeopardy of extinction, according to a new report.

The Hawaiian crow (*Corvus hawaiiensis*) may die out in the next decade or two if its numbers don't increase, warns a report issued last month by the National Research Council (NRC). "This species is going to be right on the edge for a number of years," says Scott Derrickson of the National Zoological Park's research center in Front Royal, Va., one member of a scientific panel appointed by the NRC to study the endangered crow.

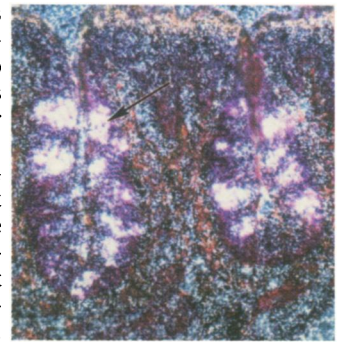
The panel advises against trying to breed adult birds in captivity. Instead, it recommends boosting the crow population by removing eggs from nests in the wild. Biologists would then nurse those eggs in laboratory incubators and release young birds into the forest.

That strategy would not deprive wild birds of their offspring, because once scientists filch the eggs, mother birds simply lay another batch, the report notes.

The NRC report recommends setting aside at least one new forest preserve in the Kona District, on the west side of the island of Hawaii. The panel blames deforestation as a major cause of the extinction threat faced by the Hawaiian crow, which builds its nest in tall trees and eats native fruits.

Hawaii has the distinction of being the "extinction capital of the world," according to the report. Native Hawaiian plants and animals make up a substantial portion of the U.S. list of endangered species, the NRC adds.

What good does it do to save one species of crow? "It's very important," says Derrickson, noting that efforts to help Alala might help other native Hawaiian species as well. "If habitats can be preserved on the Kona coast, that's going to benefit a lot of other endangered plants and animals," he says.



McLaughlin et al./NATURE

Gustducin (white spots) exists only in taste buds (purple).