Astronomy

Ron Cowen reports from Tucson at the annual meeting of the American Astronomical Society's Division of Planetary Sciences

Explaining a lunar mystery

As far back as the Middle Ages, sky watchers have reported seeing bright flashes, red and blue glows, and patches of mist or fog emanating from certain sites on the moon.

Researchers have proposed several theories to explain these mysterious sightings, including volcanic activity, bombardment of the moon by high-energy cosmic rays, release of gases from beneath the lunar surface, and moonquakes. Most lunar geologists and professional astronomers, however, remain doubtful about these unconfirmed observations, known as lunar transient phenomena.

Although Bonnie Buratti of NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif., considers herself a skeptic, she and colleagues Kenneth Herkenhoff of JPL and Timothy McConnochie of Williams College in Williamstown, Mass., decided to explore the origin of the controversial phenomena. Using close-up images taken by Clementine, the spacecraft that orbited the moon for 71 days in 1994, the team sought to determine whether the sites most often associated with the glows, flashes, and mist have any common features, such as composition or age.

In agreement with a suggestion in 1972 by astronomer Winifred Cameron of Flagstaff, Ariz., the team found that most reliable sightings—those reported since 1900, including some from a ground-based observation campaign organized to coincide with the Clementine mission—trace to the edges of dark, vast lava flows known as maria. At the edges of maria, the lunar phenomena were often associated with craters, such as Alphonsus and Picard, whose bluish spectra indicate that they contain unusually fresh deposits of material.

Buratti and her colleagues suggest that these craters have suffered recent landslides, in which material from the walls or rims has slumped toward the center of the cavities. Dust kicked into the lunar atmosphere or volatile gases escaping from the moon's surface in the aftermath of a landslide might account for many of the mystery sightings, they propose.

News from Neptune

The story beings in 1846, when two astronomers spied a new planet that they knew should be there. Predicted on the basis of tiny irregularities in the orbit of Uranus, the discovery of Neptune represented a triumph for mathematicians and astronomers. Tracking changes in the giant planet's turbulent atmosphere has proven far more difficult.

In 1994, Heidi B. Hammel of the Massachusetts Institute of Technology and G. Wesley Lockwood of Lowell Observatory in Flagstaff, Ariz., began yearly observations of Neptune with the Hubble Space Telescope. That first year, they were astonished to find that Neptune's Great Dark Spot, the dominant feature seen by the Voyager spacecraft, had vanished (SN: 10/30/93, p. 144). Even more surprising, a new, equally large dark spot had emerged in the northern hemisphere.

The new blemish continued to show up on images in 1995, and Hammel and Lockwood saw hints of it during a short observing run early this year. In August, a series of Hubble pictures taken by Lawrence Sromovsky of the University of Wisconsin-Madison and his colleagues showed a dark feature in the northern hemisphere that could be the same spot.

The persistence of the new spot in the face of Neptune's strong winds adds a new twist to the planet's ever-changing plotline.

Sromovsky/NASA

In this Hubble image, a powerful jet of wind is centered in the dark blue belt just south of Neptune's equator.

Environment

Oil seals contaminated birds' fates

Television and newspaper pictures of people carefully bathing and feeding seabirds caught in oil spills probably relieve many viewers concerned about the animals' fates.

Not Daniel W. Anderson, Brian E. Sharp, and their colleagues. Birds cleaned and released have short life spans and generally fail to breed, the scientists assert in two separate reports. Other researchers monitoring bird colonies had suspected this, but few had tracked birds to demonstrate it, says Anderson, a conservation biologist at the University of California, Davis.

Two years after oil spills in California in 1990 and 1991, only about 10 percent of the oiled brown pelicans that received treatment could be accounted for, compared to about 55 percent of breeding-age pelicans that avoided the oil, Anderson's team reports in the October MARINE POLLUTION BULLETIN. The team tracked 112 treated pelicans and 19 uncontaminated ones.

During the birds' 2- to 3-week treatment to combat exposure to the oil, Anderson's group marked all of them and attached radio transmitters to some. When released, the birds had a healthy body weight, blood chemistry, and plumage.

They also behaved normally. Many had even found mates while in captivity. These couples broke up after their release, however, and none of the birds bred, the authors report.

"We think they were immunosuppressed from ingesting the oil," causing subtle, long-term health problems, says Anderson. Earlier studies had shown that oil suppresses animals' immune systems, disrupts endocrine function, and damages organs. The stress of being handled during rehabilitation could also have contributed to the birds' early demise.

"We thought [the pelicans] had a good chance of surviving . . . they are pretty tough birds," says Anderson. However, "they are not as adaptable to stress as we thought."

Since studying the pelicans, Anderson's group has discovered that oil-contaminated coots, which live in marshes, fare no better after rehabilitation, even when released into a protected area.

Rehabilitated common murres, western grebes, and white-winged scoters had even less success than the coots or the pelicans. They lived a median of 6 to 11 days, reported Sharp in the April IBIS. Formerly with the U.S. Fish and Wildlife Service (FWS), Sharp is an independent ornithologist in Portland, Ore. Uncontaminated birds of these species captured for use in a variety of other studies survived a median of over 200 days after release.

Sharp examined recovery records kept by the FWS' bird-banding laboratory in Laurel, Md., for 127 North American seabirds contaminated with oil. The birds were cleaned, banded, and released between 1969 and 1994.

Despite the birds' short life spans, Anderson says he "wouldn't throw the towel in [on rehabilitation] at this point." He hopes the techniques can be improved, although he wonders whether the money involved in cleaning the birds could be spent in more efficient ways.

Sharp doesn't wonder. Rehabilitation for 800 birds and a few hundred sea otters after the *Exxon Valdez* oil spill cost $41 million, he points out (SN: 2/20/93, p. 126). Because of their great expense and poor success rates, such programs "cannot be considered as even partial restoration of damage," he says. The money should go to preventing oil spill damage "rather than focusing on ineffective attempts at rehabilitation after the damage has occurred."

D.M. Fry

A rehabilitated brown pelican before release.