Astronomy

Another planet for the solar system?

Two new studies hint—but by no means prove—that the solar system could harbor a 10th planet. The object, roughly the mass of Jupiter, would lie far beyond Pluto in a distant reservoir of comets known as the Oort cloud.

In his study, John B. Murray of the Open University in Milton Keynes, England, analyzed the orbits of comets in the inner solar system that are believed to have emigrated from the Oort cloud. He finds that a subset originates from a region in the cloud shaped like an arc stretching across the sky.

One explanation for the unusual pattern, according to Murray, is that it marks the wake of a massive body moving through the outer part of the Oort cloud. As the object travels, its gravity would kick comets from the arc-shaped region. To provide the required kick, the object needs to be at least as massive as Jupiter, Murray calculates. He argues, however, that it must be less than 10 times Jupiter's weight. Otherwise, it would be so bright that astronomers would have already detected it.

The object probably orbits the sun at a distance 32,000 times farther away than the Earth does, Murray reports in the Oct. 11 Monthly Notices of the Royal Astronomical Society. Computer models show that it couldn't have resided in the cloud since the beginning of the solar system but must have been captured in its current orbit later on, he notes.

Analyzing the same data, another team also finds evidence of clustering within the cloud that may signify the presence of an unseen planet. The researchers report that the object orbits the sun at an average distance 25,000 times as far as Earth does and has a mass between 1.5 and 6.0 times that of Jupiter.

John J. Matese, P.G. Whitman, and Daniel P. Whitmire of the University of Southwestern Louisiana in Lafayette presented their findings last month at a meeting of the American Astronomical Society in Padua, Italy, and will publish them in an upcoming Icarus.

Harold F. Levison of the Southwest Research Institute in Boulder, Colo., is skeptical of both studies. He notes that the two teams assume, as planetary scientists often do, that comets are distributed uniformly throughout the Oort cloud. In fact, new simulations by Levison and his colleagues suggest that comets in the cloud naturally form clusters. If more extensive simulations bear that out, an unseen planet need not be invoked to explain the clustering, he says. —*R.C.*

Moon crash comes up dry

Last July 31, with the Lunar Prospector spacecraft nearly out of fuel, NASA ended the mission with a bang. Directing the craft to plow kamikaze-style into the moon, scientists hoped the controlled collision would reveal the presence of lunar water. An extensive review of observations made after the crash, however, hasn't found evidence of a single drop.

If the crash site, a permanently shadowed crater at the moon's south pole, contains ice, the collision could have sent up plumes of water vapor or hydroxyl molecules. In theory, the plumes could be detected by a slew of telescopes in space and on Earth.

It was immediately obvious that the crash had not made a major splash (SN: 8/7/99, p. 84). Several months of analysis show no sign of water, says Edwin S. Barker of the University of Texas at Austin. His team reported the findings Oct. 13 at a meeting of the American Astronomical Society in Padua, Italy.

The negative finding does not suggest that the moon has no water, the team emphasizes. Lunar Prospector may have missed its target and crashed into solid rock rather than an icy crater. Alternatively, water vapor created during the collision may not have risen far enough above the crater wall for telescopes to detect it. Some of the dozen or so telescopes that the astronomers used didn't gaze at the moon soon enough after the crash or weren't pointed properly, the researchers note. —*R.C.*

Behavior

When monkeys play dumb

Rhesus monkeys jockey fiercely for power and social position in their colonies. Some become big shots, while others end up as small fry. When individuals in a colony face experimental challenges in front of their comrades, big shots exhibit what looks like much greater intelligence than small fry.

However, the big shots aren't blessed with a surplus of smarts, a new study finds. Their advantage lies in intimidation.

Low-ranking monkeys display as keen a learning capacity as their social superiors when the two groups undergo separate testing, report Christine M. Drea of Duke University in Durham, N.C., and Kim Wallen of Emory University in Atlanta. Small fry do poorly on a learning task only if they see dominant monkeys hanging around, the researchers hold.

They suspect that low-ranking monkeys selectively play dumb, probably to avoid rising above their humble social status and attracting retaliation from dominant animals.

People behave in similar ways, Drea and Wallen argue. For example, evidence suggests that many teenage girls do better academically in same-sex rather than co-ed classrooms. Also, black college students score lower on standardized tests after being prompted with a negative stereotype (SN: 10/30/99, p. 280).

Drea and Wallen studied a colony of 55 rhesus monkeys housed in an outdoor research facility. The researchers identified 27 dominant and 28 subordinate animals.

All of them first had opportunities to learn that they could dig up peanuts buried in four blue boxes but not in four red boxes. Each monkey got a chance to check out the boxes undisturbed as the rest of the colony waited nearby. Animals then were split into high- and low-status groups for individual assessment. In further trials, members of the two social groups separately explored yellow boxes with peanuts and green boxes with none. Learning tests then occurred in the presence of the entire colony.

In these joint learning and testing sessions, dominant monkeys retrieved the most peanuts and spent the most time near peanut-holding boxes, the researchers report in the Oct. 26 Proceedings of the National Academy of Sciences. In split groups, small fry got as many peanuts as big shots did. Still, higher-ranking monkeys in each group did better than the rest.

Drea and Wallen say that dominant animals rarely threatened subordinates in joint trials, indicating that low-ranking monkeys were not overtly bullied into playing dumb. —*B.B.*

The politics of scale

Subtle changes in the rating scales used by pollsters may markedly affect not only the extent to which people report liking a political candidate but also their ensuing estimates of how effective that person will be once elected.

Geoffrey Haddock and Rachael Carrick, both psychologists at the University of Exeter in England, asked 101 college students to rate British prime minister candidate Tony Blair on either of two scales for intelligence, honesty, and other personal characteristics the day before the 1997 general election. Regardless of prior political views, volunteers rated Blair much more favorably on a scale of –5 to +5 than on a scale of 0 to10. Several days after Blair's election, students described in general terms their expectations. Those who had rated Blair on the –5 to +5 scale predicted that the new prime minister would do better than did students who had used the 0 to 10 scale, Haddock and Carrick report in the fall issue of Social Cognition.

People may interpret negative numbers as describing a trait's opposite, such as the presence of dishonesty when asked about honesty. If so, on the –5 to +5 scale, any level of honesty gets rated from 0 to 5, yielding higher ratings than on a 0 to 10 scale, where numbers under 5 still imply honesty. This manipulation nudges other attitudes toward the politician in a positive direction, at least for a short while, the researchers assert. —*B.B.*