Jovian comet crash: Data trickles in still

Among all the instruments that stared at Jupiter during last month's comet crash, just one had the right equipment and the right location to directly view the initial fireworks. Because each fragment of Comet Shoemaker-Levy 9 hit the far side of Jupiter, just out of view of Earth, only the Galileo spacecraft could view the pieces as they entered the Jovian atmosphere, flashing like shooting stars.

Last week, astronomers finally received the first trickle of imaging data from the craft, which has a broken communications antenna. One image sequence, taken as the last large fragment, known as W, struck Jupiter, shows a point of light brightening and fading. But scientists aren't sure if Galileo caught the impact coming or going: The 7-second flash could have accompanied the fragment's entry into Jupiter, or it could represent part of the fireball that rocketed from Jupiter just after W exploded.

Determining the correct explanation may help pinpoint the energy of the impacts and might indicate how high in the upper atmosphere the fragments exploded. Further images in the same sequence, expected to arrive at Earth in September, may solve the puzzle, says Clark R. Chapman of the Planetary Science Institute in Tucson. For instance, if the later images show a dark interval followed by another, longer period of brightening, scientists may attribute the first flash to the fragment's entry and the second to the fireball.

In another development, scientists now report the presence of water in Jupiter's upper atmosphere within minutes of several of the explosions. Some researchers assert that the water most likely comes from the fragments rather than material exhumed from the planet.

Using an infrared spectrometer aboard the Kuiper Airborne Observatory, Gordon Bjoraker of NASA's Goddard Space Flight Center in Greenbelt, Md., and his colleagues identified emissions from water vapor immediately after the fireballs from the G and K impacts became visible. The emissions all but disappeared within 15 minutes. The team announces its results in an Aug. 13 circular of the International Astronomical Union.

Using the same flying observatory, Ann L. Sprague of the University of Arizona in Tucson and her coworkers found water vapor 15 minutes after the R impact; the emissions lasted for about 10 minutes, Sprague told SCIENCE NEWS. In contrast, she notes, enhanced emissions from ammonia, thought to come from Jupiter's upper cloud layers, didn't appear for another hour.

In interpreting their results, Sprague and Bjoraker assume that the fragments exploded well above the planet's proposed water cloud layer. If so, then the immediate presence and short duration of the water vapor suggests that it originates from the exploded fragments, they assert. Had the water instead come from Jupiter, it should have appeared later, along with ammonia and other hydrocarbons that rise like a hot bubble about 90 minutes after each explosion.

NASA/Jet Propulsion Laboratory

Sequence of images shows the impact of the last large fragment of Comet Shoemaker-Levy 9 that hit Jupiter.

Bjoraker says that the water is evidence that Shoemaker-Levy 9 was indeed an icy comet, rather than an asteroid. But Harold A. Weaver of the Space Telescope Science Institute in Baltimore notes that the heat generated by each blast vaporized all material in the fragments, breaking molecules into their atomic constituents. As some of the atoms cool, they might recombine into water. Alas, says Weaver, asteroids and comets have roughly similar abundances at the atomic level, so that the presence of small amounts of water can't offer a distinction between the two. *– R. Cowen*

Twins yield clues to love's shared origins

Some people find enduring love with one romantic partner; others conduct one affair after another, or several at once, with gusto. Some get feverish and hysterical with love; others move methodically from extended friendship to romantic involvement.

The first twin study of attitudes about love now indicates that siblings' shared observations of their parents' relationship and cultural practices, as well as parent and peer experiences unique to each sibling, largely shape a person's romantic style. Genes, however, play virtually no part in producing individual differences in the approach to ardor, report Niels G. Waller and Phillip R. Shaver, both psychologists at the University of California, Davis.

"Humans might be wired to pay particular attention to the relational styles they're exposed to beginning early on," Waller contends. "Learned orientations to love may subsequently play out in romantic relationships."

Previous twin studies have found consistently large effects of genes and unique environmental influences in shaping an individual's intelligence, emotional dispositions, and personality traits (SN: 12/7/91, p.376). Common family experiences of siblings make little impact in these areas, investigators have found.

Unlike individual capacities that reflect inherited variations in brain function, romantic attitudes focus on social relations, Waller asserts. Thus, for the first time in a twin study, siblings' shared environments loom large.

Waller and Shaver studied 338 female and 107 male twin pairs contacted through the California Twin Registry. Identical twins (who share all the same genes) comprised about three-quarters of the sample; fraternal twins (who share, on average, half the same genes) made up the remainder. Participants averaged about 36 years old. The spouses of 172 of the twins also took part in the study.

As part of a battery of personality and attitude tests, twins and spouses completed a survey that measures the degree of adherence to six "love styles." These consist of a passionate, self-confident approach in which love develops quickly; an emphasis on excitement, many romantic partners, and lack of commitment; striving for close friendship and reliable affection; a focus on practical aspects of a relationship, such as a lover's job prospects; intense yearnings for and conflicts about love; and an orientation toward helping a romantic partner, rather than deriving benefits from a relationship.

Identical twin pairs report about the same degree of similarity in romantic attitudes as do fraternal twins, suggesting that genes exert little influence in this arena, Waller and Shaver contend in the September PSYCHOLOGICAL SCIENCE. Identical twins displayed substantial similarity on three love styles; fraternal twins and married couples cited four similar love attitudes.

A mix of common family interactions and unique experiences of each twin mold love styles, the researchers argue.

Additional unpublished twin data indicate that personality factors influence importantly men's mate preferences, whereas ethnic and cultural norms appear more critical to women's, Waller says. Researchers already have found that men worldwide tend to favor younger wives and women often seek unions with slightly older men (SN: 10/12/91, p.232).

Compared to their peers, men who most prefer younger women are more persuasive, socially assertive, emotionally stable, and likely to seek and hold positions of status, Waller finds.

Asian, Hispanic, and black women prefer markedly older mates than do white women, he adds, apparently reflecting various cultural differences. However, genes partially affect female preferences for men capable of acquiring social status and resources, Waller holds. *– B. Bower*