minimum diameter. By tracing the orbits of the 20-odd fragments back in time, the astronomers infer that the parent body had a diameter of 2 kilometers. Thus the largest fragments might measure just 1 kilometer across and impart only one-thousandth the energy proposed in earlier studies.

At the meeting, Paul Chodas, Zdenek Sekanina, and Donald K. Yeomans of NASA's Jet Propulsion Laboratory in Pasadena, Calif., reported that their orbital calculations — based on a larger set of data — indicate that the parent body might have a diameter of 9 kilometers, consistent with the Hubble study. They predict that the Jovian collisions will take place over about five days, centered on July 21, 1994.

How often does a comet break into a string of pieces near Jupiter? According to Melosh and Paul Schenk of the Lunar and Planetary Institute in Houston, the answer may lie in Voyager 1 images of the large Jovian moon Callisto, which show 13 straight-line chains of craters. They say a string of cometary fragments sequentially striking the moon best explain these crater chains, as well as three others identified on the Jovian moon Ganymede. Schenk and Melosh estimate that comets with a diameter of a few kilometers break up near Jupiter once every 80 years. *— R. Cowen*

# From Antarctica: The Elvis of dinosaurs

While it couldn't have crooned "Love Me Tender" or gyrated its hips, a new type of dinosaur discovered in Antarctica could have passed as a reptilian Elvis impersonator. This as-yet-unnamed beast from the Jurassic period sported an unusual head crest that swept upward in a style resembling the King's famous pompadour, according to the paleontologist who found the animal's skull as well as bones of another type of dinosaur during a 1991 expedition to the frozen continent.

"I called it 'the Elvis Presley of the Jurassic' because that's just what it looks like," says William R. Hammer of Augustana College in Rock Island, Ill. The dinosaurs found by Hammer and his colleagues are the first ones identified on the Antarctic mainland. Researchers have previously uncovered dinosaur specimens along the Antarctic Peninsula, which stretches toward the tip of South America.

Hammer described the discoveries last week at the annual meeting of the Society for Vertebrate Paleontology in Albuquerque, N.M. He collected the fossils from the flank of Mt. Kirkpatrick in the Transantarctic Mountains, about 650 kilometers from the present-day South Pole.

The Elvis look-alike belonged to a group of carnivorous bipedal dinosaurs known as theropods, which included the infamous *Tyrannosaurus rex*. The Antarctic animal's head crest was a thin layer of grooved bone that most likely served as a display, much like the tail of a male peacock, says Hammer. Although some theropods had crests running lengthwise along the snout, no other known theropod had a crest running perpendicularly across the skull.

William J. Hickerson

*A rough illustration of the crested theropod discovered in Antarctica. Approximately 8 meters in length, the animal would have walked upright.*

"It's one of the most bizarre theropods I've ever seen. That thing is really important," says Philip J. Currie of the Tyrrell Museum of Paleontology in Drumheller, Alberta.

Besides the crested theropod, Hammer and his colleagues also discovered the foot of a prosauropod dinosaur and the arm of a flying reptile called a pterosaur. The fossils date from the early Jurassic, sometime between 200 million and 175 million years ago. At that time, Antarctica had a far balmier climate and was farther away from the pole, although perhaps still within the Antarctic circle, says Hammer. *— R. Monastersky*

# Avalanche dynamics: Dripping water drops

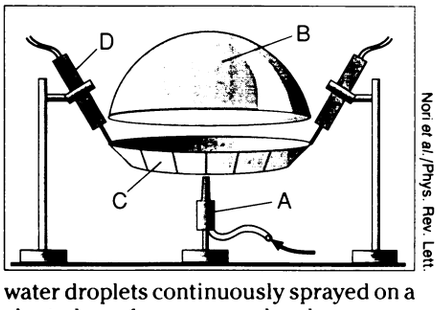
A hot shower in a cold bathroom can generate a thick mist of water droplets. Those droplets that collect on the bathroom window or mirror initially form a thin film on the surface. But over time, these droplets grow larger, coalesce, and begin to drip downward, engulfing other drops along the way.

Now, researchers have taken a closer look at this commonplace but rarely studied phenomenon of water-droplet "avalanches." The experiment was "the first of its kind," says physicist Franco M. Nori of the University of Michigan in Ann Arbor.

Nori and Michigan colleagues Britton Plourde and Michael Bretz describe their results in a paper scheduled for publication in the Oct. 25 PHYSICAL REVIEW LETTERS.

In recent years, researchers have studied avalanches and other collective effects in a variety of systems ranging from sandpiles (SN: 7/15/89, p.40) to regions of a material magnetized in different directions (SN: 3/31/90, p.207). But in these systems, the avalanches involved well-defined individual units, such as sand grains or magnetic domains.

Nori and his co-workers were interested in the dynamics of avalanches in which the units could grow in size. For water droplets continuously sprayed on a slanted surface, an avalanche occurs when individual droplets reach a critical mass, at which point they begin to run down the surface, capturing other droplets stationed along their paths.




Nori et al./Phys. Rev. Lett.

*A forced-air mister (A) sprays distilled water upward into a transparent plastic dome (B). Spray droplets collect on the dome's inner surface, producing streams that run down and eventually drip off the rim. The falling droplets then hit and immediately run off a flexible, sloped ring (C) suspended beneath the dome. Pressure-sensitive detectors (D) measure how much each droplet impact stretches the ring.*

It took the researchers nearly two years to design and construct an apparatus (see diagram) for measuring the size and duration of water droplet avalanches and the time between successive avalanches. In the end, they clearly demonstrated that their system shows the same kind of loading-unloading cycles that typify sandpile avalanches. Although water droplets are continuously deposited on a slanted surface, water runs off the surface at irregular intervals rather than continuously.

This effect proved particularly strong when the researchers used low spray rates and water chilled to near freezing. The lower temperature makes the water more viscous, which provides more cohesion between droplets, Nori says. This allows the droplets to gather into larger clusters, setting the stage for occasional huge avalanches that practically clear the surface. *— I. Peterson*