BIOLOGY

Zoo holds macaque symposium


Baltimore Zoo

Fifty zoologists and zoo managers, several of them from India, gathered at the Baltimore Zoological Society recently for a symposium on the lion-tailed macaque. The macaque is a rare species of monkey found only in southwestern India. Habitat destruction and hunting have severely reduced its numbers in the wild—no one knows exactly how many remain. One goal of the symposium was to assess the status of wild stocks; the other, according to the Baltimore Zoo's Paul Heltne, was "to develop a strategy for the continued survival of the lion-tailed macaque in the wild and in captivity."

Breeding endangered species is a relatively new role for zoos (SN: 11/28/81, p. 347). At the end of 1981, there were nearly 300 macaques in zoos around the world, most of them born there. "There are nearly as many lion-tailed macaques in captivity as exist in the wild," said Baltimore Zoo director Brian Rutledge. "Zoos have come full circle from being one of the destructive influences with which these animals must contend, to becoming the instrument of insuring their future."

Pollen culture for plant breeding

In traditional plant breeding, it takes time for newly discovered traits to become established in future generations. Gideon W. Schaeffer, a U.S. Department of Agriculture plant physiologist, suggests that culturing pollen can speed this process and provide more variations to work with (because tissue-culture results in "genes changing position within the chromosome").

Speaking at a recent three-day symposium on the use of genetic engineering in agriculture, sponsored by USDA's Beltsville Agricultural Research Center, he reported having developed "an extra increment of shortness" in a variety of rice—"Calrose 76"—that has already been bred for dwarfness by conventional plant crosses. Short rice is desirable because it can be fertilized for increased yield without the plants growing too large.

Schaeffer has been able to pass on the extra-short trait to succeeding generations by culturing the pollen-producing organs. Sex cells, like pollen, contain only half the normal number of chromosomes. This number can be doubled in the laboratory (by adding the chemical colchicine), so you can "get complete uniformity in succeeding generations," Schaeffer says.

More ferrets found—maybe

In Wyoming last fall, Fish and Wildlife Service biologists spotted their first wild black-footed ferret in nearly 10 years (SN: 11/28/81, p. 340). Because the species had been considered extinct by many, federal researchers radio-collared the ferret and followed it closely. What they learned helped them locate nine more within a few months.

Now Tim Clark, an Idaho State University researcher, claims he has "indirectly observed" (through snow tracks) as many as 10 additional ferrets in the same area, potentially raising the total known population to about 20. But Clark's sightings have not been confirmed, Max Schroeder of the FWS Denver Wildlife Research Center told SCIENCE NEWS. "There probably are more than nine ferrets, but we need to get back out in the field to document it." An advisory team is currently evaluating several research proposals. Meanwhile, the ferrets appear to be safe. They're all living on private land, says Schroeder, and "the landowners are very cooperative."

SPACE SCIENCES

The crater-makers: Five families

Until recent years, many scientists assumed that most of the impact craters on the moon probably represented the lunar share of a single great episode of meteorite bombardment, more than 4 billion years ago, which would have similarly affected most or all of the other rocky planets and satellites in the solar system. The Great Bombardment was not taken to be the whole story—craters in the moon's lava-filled mare basins suggested a subsequent episode or an extended tapering-off of the main big one—but spacecraft close-ups of other worlds have been indicating the picture to be considerably more complex even than that. In fact, according to Robert G. Strom and Alex Woronow of the University of Arizona, careful analysis of the sizes and numbers of craters found on various planetary surfaces now points to the possibility that "at least five different crater populations occur in the solar system." In other words, signs of five distinct batches of crater-making objects, instead of a single homogeneous one, their diverse signatures strewn around the system.

The ancient highlands of earth's moon, Mars and Mercury form one category, heavily scarred by craters large and small. A separate cratering episode took place later on, the researchers maintain, after the emergence of the lava that filled in the lunar maria and flowed over vast expanses of the Martian plains. The difference in the later episode, says Strom, is typified by the larger numbers of small craters visible in such regions, where the lava has erased evidence of the original size mixture.

Jupiter's big moons Ganymede and Callisto appear to carry signs of a third family of crater-making objects, this time with a marked shortage of the large objects whose scars remain in the inner solar system. Slumping or "relaxation" of the ice in a surface such as Callisto's might well have obliterated part of the original cratering record, but the researchers say that enough relaxation to erase so many large craters would also have left some virtually smooth areas in regions where only small craters had existed before. And on Callisto, craters are everywhere.

The other two episodes show up on the icy moons of Saturn, several of which show signs of having been partially resurfaced by some kind of tectonic activity, with different numbers and sizes of craters in the old and new terrain. The older parts of Tethys, Dione and Rhea, for example, report Strom and Woronow, show crater distributions reminiscent of the post-mare sections of the inner planets. But the lack of such a distribution on the intervening moons of Jupiter, the researchers note, seems to indicate that the inner-planet and Saturnian cratering patterns did not result from a single, solar-system-wide bombardment episode. Perhaps, suggests Strom, the post-mare-style cratering in the Saturn family of moons resulted instead from impacts by objects left over from the Saturn system's own accretion.

The resurfaced portions of the Saturnian moons preserve only a few large craters, with an excess of very small ones, less than about 20 kilometers across. Much more analysis remains to be done, but Strom observes that one source of this more recent cratering could have been the break-up of another satellite.

There is even a plausible candidate: Hyperion, so oddly shaped (about 290 by 230 by 380 km in its various axes) and unstably oriented (it appears to be "the only known satellite in our solar system that is not spinning about its shortest axis," says Thomas C. Duxbury of JPL) that it may be the major fragment remaining from the destruction of a once-larger moon. Perhaps, in fact, says P. Farinella of Italy's University of Pisa, Hyperion is merely the "naked core" of its disrupted predecessor. So odd is its shape, he told a recent Saturn conference in Tucson (where Strom and Woronow also presented their five-family idea), that if it was once spherical, Hyperion has lost about half its original mass. Many of its fragments might have been potential crater-makers on other Saturnian moons.