Creating the Nation's first BioPark

National Zoological Park · Smithsonian Institution · Washington, D.C. 20008

Letter from the Desk of David Challinor
May 1, 1990

A perpetual problem faced by zoos is inbreeding of their collections. Zoo scientists spend much of their time trying to understand just how risky inbreeding is to our animals.

With the advent of the computer, breeding records are now accurately kept in considerable detail. By carefully examining the National Zoo's long-term data on its herd of Dorcas gazelles (delicate, desert-dwelling animals of North Africa and the Near East), zoo scientist Kathy Ralls was able to find a direct correlation between degree of inbreeding and neonatal mortality. Now collection managers are careful to keep blood lines recorded in order to introduce unrelated breeders into our herd at regular intervals.

Moving large animals from zoo to zoo for outbreeding can be dangerous to the animals and expensive, as I described in my last letter. To help solve this problem, zoos are now developing cryogenic techniques to collect and store animals' spermatozoa and ova. A leading facility for this research is the New Opportunities in Animal Health Sciences (NOAHS) Center at the National Zoo. When low temperature conditions are properly maintained, laboratories can store sperm cells for 30 years with no loss of viability when the cells are thawed. Theoretically, such cells would remain viable for up to 2,000 years! Frozen cells are in the equivalent of a state of suspended animation and can thus be readily shipped around the world. Mailing frozen cells is certainly easier and more convenient than sending animals themselves. Of course, once the cells arrive at their destination and are thawed, a whole series of elaborate techniques must be employed to achieve a satisfactory artificial insemination.

We still have a lot to learn about deformities and whether they are genetically induced. Pere David's deer, for example, are descended from about 6 or 7 animals, and thus all the existing deer of this species have come through a genetic bottleneck. Nonetheless they continue to breed with reasonable success in

(over)

parks and zoos (there have been none living in the wild for hundreds, maybe thousands, of years). However, every three or four years during the spring birthing in our herd at Front Royal, a disproportionate number of does have breech deliveries, which can be fatal to the fawn. Is it possible that such abnormal deliveries are a result of the genetic bottleneck which occurred more than a century ago? If this phenomenon is indeed so linked, why does it appear at such widely spaced intervals? Despite our ever-increasing knowledge of genetics and how degrees of relatedness among parents affect offspring, the genetic pathways followed to result in each individual animal are so complicated that we may never truly be able to follow them.

The search at the National Zoo continues unabatedly to unravel the genetic mysteries of cheetah, golden lion tamarins, and several other rare animals we keep in our collections. For those of you who are interested in this kind of research, we hope to satisfy your curiosity at our Spring board meeting, which will be held in the recently renovated research building at the Zoo, where much of this work is being done.