
SCIENCE & TECHNOLOGY

ery orthodoxies" after the 1830s. But the South actually improved its low standing in the scientific community during the decades just before the Civil War, even as support for slavery became more entrenched. And, as the record of the Border states attests, slaveholding itself was no impediment to scientific inquiry: Representing only 10 percent of the U.S. nonslave population, that region (Maryland, Kentucky, Delaware, Missouri, the District of Columbia) produced almost 20 percent of AAAS leaders. Slavery, say the authors, gave some Southerners—prominent scientists such as botanist Henry William Ravenel and physicist John LeConte—the leisure to pursue their researches.

The chief obstacle to scientific inquiry in the South was an agrarian economy. Rural libraries were poor; cities were few and small. Twentieth-century historian Thomas Cary Johnson, Jr., a Southern partisan, writes that "for the most part the scientists of the Old South led lonely lives, separated by many miles from fellow workers in their chosen fields." In the words of 19th-century geologist William Barton Rogers, "Solitude is, after all, no friend to Science."

RESOURCES & ENVIRONMENT

The Last Ark

"Zoos: Endangered Species' Last Hope?"
by Joseph Wallace, in *Museum* (May-June
1982), Museum Circulation Services, P.O.
Box 1300, Bergenfield, N.J. 07621.

Nowadays, zoos must be more than just showcases for exotic animals. As one zoo administrator puts it, "Zoos must be an ark, a place where animals can survive even when their natural habitat has disappeared."

The horrors of 19th-century menageries—cramped, smelly cages filled with bored and unhealthy animals—have rapidly disappeared now that many animals can no longer be replaced easily. Zoo directors today, observes Wallace, a freelance writer, must concentrate on encouraging reproduction in captivity. Spacious enclosures that resemble natural habitats and scientifically determined food regimens, along with ropes, swings, and branches for daily exercise, have made for healthier, happier, and better-looking potential mates. But, as the National Zoo's frustrated attempts to pair off its giant pandas attest, simply placing a male and a female in the same cage is not always enough.

Curators must determine, often through trial-and-error, the best environmental and social conditions for the mating of each species. The male zebra enjoys harems; the finicky rhinoceros requires a long "courtship." And the gila monster refuses to mate without an extensive, exact replication of the seasonal changes in its desert home.

There already have been notable successes. American buffalo, nearly extinct in 1907, now number 20,000; almost 800 Père David deer have

RESOURCES & ENVIRONMENT

been bred in captivity from an original 18 survivors. Lions reproduce so readily in captivity that some zoos now prescribe birth control pills. And new techniques such as embryo transfer and artificial insemination are proving effective. In August 1981, an ordinary Holstein cow gave birth to a rare Asian gaur at New York's Bronx Zoo after a fertilized egg was implanted in the cow's womb.

Nevertheless, by the end of this century an estimated one million species of plants and animals will face extinction. The expense of maintaining even one animal in captivity is high, and often an entire herd is needed to ensure successful breeding. Better communication among zoos has helped spread the responsibility. But zoo experts now face the weighty task of choosing which of the earth's dwindling species will be saved and which will disappear.

Europe's Oil

"On or Off? Oil and Gas Survey" by Roy Eales, in *The Economist* (June 12, 1982), P.O. Box 2700, Woburn, Mass. 01888.

Enough oil and gas lie offshore to make Western Europe self-sufficient for the next 20 years. Will it happen? Eales, a reporter for *The Economist*, sees two big obstacles: oil companies and governments.

In 1973, Western Europe depended on OPEC for almost all its oil. By 1981, one-quarter of its oil and all of its gas came from indigenous wells, mostly in the North Sea sectors apportioned to England and Norway. But development of known reserves has slowed lately, partly because of feuds between oil companies and European governments over taxes. Before 1980, host governments were so eager to increase production that few oil companies paid taxes at all. Today in England, the companies pay taxes at an average rate of 85 percent, according to Esso Petroleum's reckoning. In Norway, the rate is 81 to 84 percent. Combined with today's lower oil prices, these taxes have made the oil companies think twice before sinking up to \$1.5 billion into an oil field that may yield no profits for 15 years.

"Oilmen," says Eales, "are never knowingly happy." While they complain about high levies and threaten to pack for Africa, South America, or China, they are still pushing—especially in England and Norway—for more exploration licenses. For them, the advantages of operating in "a politically stable area" are strong. But Europe's governments are dragging their heels, keeping taxes discouragingly high and moving slowly to open new fields, partly to allow their economies to absorb the shock of oil prosperity.

Both England and Norway are better off because of their new-found resources (Britain enjoyed a \$6.7 billion surplus in its balance of payments for 1981 versus a 1974 deficit of \$1.25 billion). Yet both suffer from high unemployment and a weakened manufacturing base because of oil-induced high exchange rates and cheaper imports. These governments have another reason to stall: Today's low oil and gas prices