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tion projects. The cost to taxpayers of subsidizing these low-interest loans: \$4 billion from 1973 to 1983, and over \$600 million in 1983 alone.

Because the authority is banned by law from building new plants, BPA bureaucrats persuaded the Washington Pacific Power Supply System (WPPSS, or "Whoops") in 1970 to build three nuclear plants and allow BPA to keep most of the power generated. BPA then forced its customers to pay for the WPPSS plants by "net-billing" contracts, which required participating utilities to pass costs on to the consumer. Cost overruns and incompetence caused WPPSS to default on \$2.25 billion worth of bonds in 1983. BPA customers are now paying the interest (\$751 million in 1986—over one-third of BPA's total revenues) on \$6 billion in bonds for net-billed facilities that supply only 3.4 percent of BPA's power.

The authors call for the sale of BPA to the private sector, in hopes that a nonbureaucratic management may be encouraged to build more cost-efficient power plants. Otherwise, they warn, "another Whoops-like debacle" is "just a matter of time."

Preserving Wildlife

"Foundations of Wildlife Protection Attitudes" by Eugene C. Hargrove, in *Inquiry* (March 1987), P.O. Box 2959 Tøyen, 0608 Oslo 6, Norway.

Where did the notion that wild animals should be left unharmed by humans originate? "Animal liberationists," such as Australian philosopher Peter Singer, argue that animals have an inherent right to live, and that hunting or harming animals is a fundamental violation of their rights.

Hargrove, a philosopher at the University of Georgia, disagrees with Singer. He believes that endangered species should be protected for aesthetic rather than moral reasons. Rather than thinking of wild animals as individuals endowed with rights, he says, people should consider the question of their protection as inseparable from the preservation of the landscape of which they are a part.

Nineteenth-century Western naturalists, reports Hargrove, while calling for the protection of animals as a class, did not object to killing them for food or experiments. Artist George Catlin (1796–1872), for example, called for creation of a "*Nation's Park*, containing man and beast," as a way to curb the "profligate waste of the lives of these noble and useful animals." Yet Catlin once wounded a buffalo and watched it slowly die, in order to see sublime expressions that he could use as material in sketches.

During the 20th century, naturalists discovered ecological reasons why wild animals could and even should be hunted. Although Aldo Leopold, a wildlife biologist, had deep reservations about hunting, they were not because it was wrong to see animals suffer or because he thought that hunting was immoral. Rather he believed that animal predators were both more efficient and better able to maintain the ecological balance than their human counterparts.

Hargrove argues that Leopold was right. A wilderness or national park is good because it provides an ecosystem that allows humans an "aesthetic experience." Like other art objects, landscapes deteriorate over time, and

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parts of the landscape (such as endangered species) may need to be preserved in zoos, just as fragile paintings are sometimes removed from public view. But to insist that individual wild animals have rights and that all share an equal need for protection is "improper sentimentalism," a falsification of the sometimes bloody and constantly evolving ecological web. Admiration of wild animals as "worthy opponents and/or trophies," Hargrove maintains, may also be a morally justified, aesthetic experience.

ARTS & LETTERS

Chicago's Architecture

"The Rise of the Skyscraper from the Ashes of Chicago" by Tom F. Peters, in *American Heritage of Invention and Technology* (Fall 1987), 60 Fifth Ave., New York, N.Y. 10011.

Why was the skyscraper developed in Chicago during the late 19th century? Peters, associate professor of architecture at Cornell, argues that the birth of the tall building in the Windy City just then resulted from several technological advances that "emerged at once and coalesced."

The Great Fire of 1871, while destroying most of the buildings in downtown Chicago, left the city's economic structure intact. Because most modern forms of communication and transportation (telephones, cars, fast commuter trains) did not exist, businesses had no choice but to rebuild Chicago's concentrated downtown core.

The builders who flocked to Chicago (most of them demobilized military engineers) replaced burned-out wood structures with those of fire-proof cast iron. Although iron had been used by architects since 1847, Chicago's were the first to routinely construct *entire* buildings (instead of just their facades) from the metal.

Builders found cast iron stiff and unwieldy. In 1881, Charles Louis Stobel, an engineer working for Andrew Carnegie, perfected *wrought* iron sections that could be mass-produced in quantities suitable for large buildings. Stobel later developed steel "Z-bar columns," which could withstand heavy loads. At the same time, the slow steam elevator was replaced with the more efficient hydraulic elevator, capable of reaching 36 stories.

These technological advances, together with improved designs for the "skeletons" of buildings, gave architects the freedom to experiment with different "skins" or facades. Chicago's builders used that freedom to produce bold structures. William Le Baron Jenney (1832-1907) not only built the first modern skyscraper (the Home Insurance Building of 1885) but also proved a formidable teacher. His pupils included Louis Sullivan (1856-1924), the foremost American architect of his time, and Daniel Burnham (1846-1912), whose works include Union Station in Washington, D.C. and Filene's department store in Boston.

No one man was responsible for the skyscraper, Peters observes. It was the collective achievements of Chicago's architects, engineers, and inventors that ensured that the city will "always be central to a history of the building type that defines our age."