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**RESOURCES & ENVIRONMENT**


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movement through a young forester named Aldo Leopold (1913–1948), founder of the American profession of wildlife management. In *A Sand County Almanac* (1949), Leopold expounded the notion that man's sense of right and wrong has evolved historically to include larger and larger communities: from self to family, to tribe, nation, race, and all mankind; then on to mammals, all animals and plants, all life. Environmental ethics, which recognizes the rights of nonhuman life and of the nonliving environment, represents the highest level of ethics.

Nash speculates that primitive man may have possessed such an extended ethic but lost it under the pressures of technological development. Today, he adds, thanks to the decline of some natural resources and a growing understanding of ecological reality, we may be groping our way back.

### *The Future of Oil Shale*

"Oil Shale: Prospects on the Upswing . . . Again" by Thomas H. Maugh II, in *Science* (Dec. 9, 1977), 1515 Massachusetts Ave., N.W., Washington, D.C. 20005.

The United States in the 1970s has become reliant on high-priced foreign sources of petroleum. According to Maugh, a *Science* staff writer, this combination of inelastic demand and rising prices has made the development of domestic oil shale economically feasible.

Oil shale—oil locked tightly in solid shale formations—has been touted before as a solution to America's energy crisis, but Maugh believes large-scale domestic production may soon begin in earnest. Techniques for underground conversion of oil shale into crude oil have been improved; federal tax incentives have increased; and as the price of imported oil rises, the relative cost of oil shale conversion becomes less prohibitive.

Deterrents and uncertainties remain, Maugh notes. Shale oil contains high concentrations of nitrogen, sulfur and paraffin; refining is expensive. A slowdown in federal subsidies, a rise in inflation, or a drop in the price of imported oil could doom the prospects for oil shale. But the oil industry is clearly interested. Within a 200-kilometer radius of the juncture of Utah, Colorado, and Wyoming, is the equivalent of 2 trillion barrels of shale oil—50 times the total U.S. petroleum reserves.

### *Water, Water, Everywhere*

"Drinkable, But . . ." by Frances S. Sterrett, in *Environment* (Dec. 1977), P.O. Box 3066, St. Louis, Mo. 63130.

Despite general progress on environmental quality in the United States, researchers have yet to determine the long-term physical effects of the 300-odd organic and inorganic chemicals found in America's local water supplies.

According to Sterrett, a Hofstra University chemist, scientists face two major obstacles: the sheer scope of the necessary research and the

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"human testing problem." The federal government has set maximum contaminant levels for a number of inorganic chemicals, including arsenic, lead, mercury, and nitrate. But concentrations of these chemicals in the water supply vary not only from place to place but also from season to season. It is difficult to determine the precise source of any one contaminant present in the human body. (The poisons may come from food or air as well as water.)

Our ignorance is compounded by the problems of conducting human tests. The primary threat posed by water pollutants lies in their long-term, low-dose cumulative effects. Because humans live about 35 times longer than mice and have a far more variable genetic composition, high-dose animal exposure tests are no good for determining maximum exposure concentrations in humans.

Despite the lack of adequate testing techniques, says Sterrett, scientists must keep plodding along, taking care to continuously "review, re-evaluate, and update" all standards—a process that will have to continue far into the future.

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**ARTS & LETTERS**


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### *Philadelphia's Third Dimension*

"The Origins of Sculpture in America: Philadelphia, 1785-1830" by Wayne Craven, in *American Art Journal* (Nov. 1977), Kennedy Galleries, 40 W. 57th St., New York, N.Y. 10019.

In 1782, Benjamin Franklin, then ambassador to France, advised Italian sculptor Giuseppe Ceracchi not to pin his commercial hopes on the American market. Private persons, he wrote, were not rich enough to afford sculpture, while the public, "being burden'd by its War Debts, will certainly think of paying them before it goes to the Expence of Marble Monuments."

Yet three years later, Franklin returned to Philadelphia with French sculptor Jean Antoine Houdon in tow. According to Craven, an art historian at the University of Delaware, the Virginia legislature surprised Franklin by commissioning Houdon to execute a marble statue of George Washington. As time went on, however, Philadelphia, not Virginia, led the way in making sculpture an equal partner to painting in the American arts.

Before the Revolution, New York, Williamsburg, and Philadelphia boasted classical ornamental statuary. But only after Independence was sculpture perceived as an integral part of the cultural scene. The arrival of Houdon and, later, of Ceracchi in Philadelphia sparked great excitement—and numerous commissions. As these artists' work appeared throughout the city, Philadelphians demanded more and more—busts, figures, monuments, garden statuary. Then, local wood-