

Mike Gravel (D-Alaska), who has become a vocal foe of nuclear power, seems to think so. In a speech to the Oregon State Legislature not long ago he urged that every state "stop all construction of nuclear power plants until the safety problems are resolved and until we achieve the safety-first policies to which we are entitled." Last May, voters in Eugene, Oregon, approved a 4-year moratorium on a nuclear power facility planned for their area. Similar movements are afoot in the Oregon legislature, in Minnesota, in New York City, and in California where a citizens' group has succeeded in placing on the June 1972 ballot a proposal to ban power reactor construction for 5 years.

AEC officials understandably find

such activities unjustified. And so, it seems, do the most influential conservation organizations, which say they prefer to weigh the merits of atomic power plants on a site-by-site basis rather than putting up blanket opposition to nuclear power.

For their part, AEC officials say that conservatism in plant design and operation should compensate for any uncertainties that remain in the behavior of reactors.

One AEC authority in reactor safety, and a man who is less reserved in his criticism of the agency than most, sums it up this way:

"I believe that nothing in the water reactor safety program is of low priority. It should all be done. And until these tasks are completed we are going

to have to use rather more conservative bases for design judgments on plants, and we are going to have to make decisions with a certain lesser degree of cheerfulness, or confidence, than if we had the results of this research.

"We think we can set boundary conditions, so no matter how a reactor goes we are quite sure it's safe. But I find having to work this way intellectually less satisfying. . . . I prefer to *know*, in a quantifiable way, what the limits of safety are.

"However, I think we're in good shape, and that in the long pull, when we look back, we may see we spent money unnecessarily. At least that's what I trust we'll see."

—ROBERT GILLETTE

Lead Poisoning: Zoo Animals May Be the First Victims

New York. Death and illness as a result of simply breathing polluted urban air is a specter of the future that only the more alarmist environmentalists conjure up from time to time. Nevertheless, researchers at New York Medical College (NYMC) have discovered that a large proportion of the animals at Staten Island Zoo suffer from lead poisoning. And while some of the lead in the animals' bodies may have come from paint in their cages, the major source appears to be atmospheric contamination. In the words of Ralph Strebel, the pathologist who directed the study, "The findings have ominous implications for the people who live in that area of the city."

The first indication of trouble at the zoo came last November, when an 11-month-old leopard became weak, started losing its hair, and refused to eat. The cat was taken to New York Medical College, where sick animals from the city's five zoos are treated under the comparative pathology program. Although Strebel and his colleagues could find no evidence of disease, the leopard died 24 hours later.

Three weeks later, zoo keepers found the leopard's fraternal twin, a black leopard (formerly known as a black panther) named Mr. Leo Pard, lying

paralyzed in his cage; he too was taken uptown to the medical school. Again there was no evidence of any known disease. But in response to symptomatic treatment, Mr. Leo Pard survived and regained his muscular coordination. At this point, Dennis Craston, a toxicologist from the city's Medical Examiner's Office and an instructor at the medical college, tested Mr. Leo Pard for heavy metal poisoning and found extremely high levels of both lead and zinc in the animal's hair, blood, and feces. A check of the first leopard's preserved organs also revealed high concentrations of the same two metals.

After 6 weeks of intensive treatment at the hospital's animal facility, Mr. Leo Pard was well enough to return home to the Staten Island Zoo. But once there, the level of lead in his body again began to rise. After he went into convulsions, he was taken back to the hospital, where he is still recuperating.

On the basis of their experience with the two leopards, the NYMC researchers decided to check other animals in the zoo for lead poisoning. They found not only that other animals had high concentrations of lead in their bodies, but that the victims ranged from reptiles to primates.

For some time, snakes at the zoo

had been dying after having lost sufficient muscular coordination to slither properly. Sure enough, chemical analysis of the preserved carcasses revealed high concentrations of lead. Hair clippings, along with blood and fecal samples, from a variety of cats and primates showed many of the animals to be contaminated with lead—often in amounts far exceeding the level considered toxic in man. Even a great horned owl, brought to NYMC because it had lost its feathers, was found to be a victim of lead poisoning.

Searching for the source of the contamination, the NYMC investigators first tested the zoo's water, food, and bedding and found them all to be free of heavy metals. An analysis of the paints used in some of the cages, however, revealed that 11 out of 16 paints contained lead in concentrations ranging from 0.01 to 3 percent. This finding is significant in itself, according to Craston, because all of the paints are marketed as lead-free interior paints.

But perhaps even more significant were the levels of lead found outside the cages. Grass, leaves, and soil collected on the zoo grounds contained lead in quantities as high as 3900 micrograms per milligram dry weight—an amount equal to or exceeding that found along the sides of major highways, where automobiles continually spew out lead-containing exhausts. "We can only conclude," said Strebel, "that most of the lead taken in by the animals resulted from atmospheric fallout."

Significantly, the animals kept in outdoor cages, including those in cages

without paint, showed the highest levels of lead in their bodies. Even the carcasses of dead mice found inside and outside the zoo buildings were loaded with lead.

Lead poisoning of animals apparently is not confined to the Staten Island Zoo. The same doctors made a preliminary investigation of animals in the Bronx Zoo and turned up the same problem, although fewer animals seem to be affected.

Originally an occupational hazard, lead poisoning in recent years has been identified in slum children who eat chips of paint in old, dilapidated buildings (*Science*, 5 September 1969). Several studies have found an increasing concentration of lead in the air over many cities. And, although the question has been raised, little is known about the effect of this lead on the cities' inhabitants.

It is known, however, that increasing exposure to lead in the air can increase the amount of lead in a person's blood. And a recent position paper drawn up by the Air Pollution Control Office of the Environmental Protection Agency concluded that atmospheric lead pollution does indeed pose a health hazard, particularly for children exposed to lead from other sources.

Since there is little data on the levels of lead in the bodies of adult residents of New York, the findings from the zoo animals cannot be compared with those from the human population. But the wide range of species that were affected in the zoo seems to indicate that man might well be in danger. One of the difficulties in detecting widespread lead poisoning is the lack of specific symptoms. For many years, the headaches and listlessness experienced by slum children who were suffering from sub-clinical cases of lead poisoning were overlooked by doctors—simply because they were unaware of the problem. And so it could be with some of the city's residents who simply breathe the city air.

Over the past few years, however, New York City has compiled a good deal of data on levels of lead in the blood of children. And according to Vincent Guinee, director of the New York lead poisoning prevention program, there is no apparent correlation between levels of lead in children's blood and those areas of the city in which airborne lead pollution is highest. "I would therefore doubt," said Guinee, "that the animals in the zoo

developed clinical symptoms just from breathing the air. But," he added, "I'm prepared for surprises."

The NYMC researchers intend to continue their investigation, in order to correlate their findings in the zoo ani-

mals with the surrounding human population. "The zoo animals," said Strebel, "could potentially serve as barometers of the medical effects of the variety of pollutants in the city's air."

—ROBERT J. BAZELL

Public Interest: New Group Seeks Redefinition of Scientists' Role

A small group of scientists has formed a new public interest group to explore the frontiers of social responsibility in science and push the members of their profession into a keener appreciation of the significance of their roles in society. The latest addition to what might be called the non-Establishment scientific establishment is the Center for Science in the Public Interest, set up last January by four alumni of Ralph Nader's Center for the Study of Responsive Law. The purpose of the group, according to James Sullivan, who has a doctorate in meteorology and oceanography from the Massachusetts Institute of Technology, is to stoke the social consciences of scientists and "establish the legitimacy of advocacy in the public interest." The group holds that scientists must make value judgments about their work at every level of scientific endeavor and that "the myth of objectivity is the worst myth we've got in the scientific profession."

The CSPI aspires to plant itself in territory that is at present only thinly inhabited—"the middle ground between science and law"—where it hopes to supply reliable and extensive technical input into decision-making processes, both in government and in the courts.

It has staked out three primary areas of activity: making available competent witnesses to testify at hearings on science-related legislation before Congress; conducting studies to supply consumers with information on matters about which data are either unavailable or obscured by conflicting sets of "facts"; and instigating its own lawsuits, as well as acting as co-plaintiff in public interest legal actions.

Of the four men comprising the organization, three are scientists and one is a lawyer. For at least two of them, experience working for Nader seems to have been the catalyst in turning them from scientists into scientist-advocates. Sullivan says that after he got his de-

gree last June he planned to spend a month working for Nader and then return to M.I.T., where he had been offered a job doing research on how to cope with oil spills. He ended up spending 6 months with Nader, upon which, "after much agonizing," he decided he couldn't go back to a job that was "just a cosmetic approach" to more fundamental problems.

Another man on the team is Albert J. Fritsch, a Jesuit priest with a Ph.D. in organic chemistry from M.I.T. One day, he says, he saw Nader make a mistake during a television appearance about the difference between two gases and decided that "he needed scientific input desperately." He joined the Nader group for a year and remains one of their scientific consultants. The other two CSPI men are Michael Jacobson, a microbiologist from M.I.T., and Kenneth Lasson, a Maryland lawyer.

The group feels that most scientists, in the effort to preserve the purity of their work, deliberately avoid making any but practical, technical judgments about what they are doing. They thus fall, inadvertently, into the role of advocate of the particular interests of their employers. The country's number one example of this phenomenon, says Sullivan, is presidential science adviser Edward E. David, who said in a recent speech that he believed the function of a science adviser should be to present options and not to pass judgments. "Advocacy and the traditional scientific approach are not comfortably compatible," he said. But David, says Sullivan, is clearly pushing his boss's policies—notably in his recent efforts to sell the SST.

The CSPI thinks a different kind of advocacy is called for from scientists, one based on thorough consideration of the implications of their work, with priority given to the interests of the public rather than the interests of their employers. Each individual has to assess