environmental sciences

ENERGY

Rate structure reversal urged

The rate-making philosophy of the electric utility industry in recent years has been to give large discounts to high-volume purchasers. The theory was that the increased usage achieved would allow the building of larger facilities and a reduction in unit price, which would benefit both large and small consumers.

But this policy has backfired. Usage has grown so much that there are serious shortages of fuels and rapidly escalating costs (SN: 11/14, p. 379). There is also increasing damage to the environment from the thermal pollution, sulfur oxides and particulates that are by-products of generating plants. One of the unhappy side effects is that low-income urban dwellers, who use electricity only for the most necessary purposes, are facing a 50 percent increase in the cost of energy over the next five years.

S. David Freeman, director of the Energy Policy Staff of the White House Office of Science and Technology, has proposed to utility commissioners that they exactly reverse the old rate policies—establish rate schedules giving the lowest rates to the smallest consumers and the highest rates to the largest.

This, he says, would cause the large consumers—mostly industries—to find ways to conserve energy, while relieving the burden on the small consumers.

NUTRITION

Chromium and glucose metabolism

Numerous middle-aged and elderly people in the United States suffer from a sub-diabetic condition marked by an impaired ability to metabolize glucose. Scientists at the Agricultural Research Service of the U.S. Department of Agriculture say studies they have done indicate the condition may be due to deficiencies of chromium.

Dr. Walter Mertz of ARS reports that animal studies show that chromium in trace amounts is a cofactor for insulin and that when chromium is deficient the effectiveness of the hormone is decreased. This leads to a lower tolerance for glucose, a breakdown product of carbohydrates.

The ARS scientists are now working to learn which foods chromium occurs in, and in what form. They also suggest a survey of selected groups in the United States to determine how widespread the chromium deficiency may be.

The scientists suggest that infants may be born with adequate chromium levels in their tissues but that these levels may gradually decline with age unless chromium-containing foods or supplements are taken.

NATURAL SCIENCES

Pigmentation related to balance

Certain mutations of various mammal species have altered pigmentation. But in addition to the altered skin color, these animals sometimes have other peculiar characteristics. Pastel mink and pallid mice, for example, cannot swim, although nonmutated members of the same species can.

Dr. Lawrence C. Erway of the University of Cincinnati reports that his work shows a relationship between altered pigmentation and a faulty sense of balance. The faulty balance results in an inability to swim, as well as such characteristics as "screw neck," a tendency to cock the head.

Autopsies by Dr. Erway show that the mutant animals have faulty otoliths, the inner-ear organ essential for balance. The reason: The animals lack pigment in their inner ears, and apparently this causes faulty functioning of the otoliths.

Dr. Erway says that a manganese supplement in the diets of pregnant pallid mice results in offspring able to swim. He speculates that the pigment in the inner ear of normal animals may act as a reservoir of manganese essential to proper otolith functioning.

RECYCLING

Proposed Los Angeles master plan

The Los Angeles area suffers from a number of severe environmental problems. One is the severe fires in dry vegetation during the dry season. The fires are often followed by floods caused by the rapid runoff from the denuded slopes. Combined with the floods are notorious mud slides. And, with a growing population, sewage and solid waste disposal problems are immense.

Dr. Albert F. Bush of the University of California at Los Angeles proposes a plan that would combine solutions to all of these problems through the establishment of greenbelts and artificial lakes fed with reclaimed sewage water.

Dr. Bush points out that fires will not spread when vegetation has a 20 percent or more moisture content. He suggests upstream sewage plants to reclaim waste water, which would then be fed into lakes created by small dams. The lakes would be used for recreation, but would also supply water to irrigate greenbelt fire breaks.

The greenbelts would also be available for recreation use. And, he suggests, many of the greenbelt areas could rest on sanitary landfill dumps in the numerous steep-sided canyons in the mountains in and near Los Angeles.

NOISE POLLUTION

Trees act as buffer

Noise levels near busy highways and heavily used airports are sometimes high enough to damage the health of people living nearby.

Research by the Florida State Extension Service shows that trees and shrubs can be an effective buffer, says FSES Forester Tony Jensen.

Jensen says many factors affect the noise-reducing efficacy of the trees. These include size, position and density of the trees; wind, moisture and temperature, and relative vertical position of the noise source and the trees. If the noise source is lower than the buffer zone of trees, for example, the trees are more effective as noise reducers.

Jensen says a 100-foot width of trees along a highway will reduce noise levels 8 to 11 percent and that greater widths will provide proportionately greater reduction.