

BIOLOGY

Of mice and kangaroos

Is it cheaper, in energy terms, for an animal to run or hop? A zoologist from Australia, the land of hopping animals, has been working on this question for a number of years. And now, with the aid of kangaroos in gas masks and mice on treadmills, he has an answer: It's cheaper to hop.

Terence J. Dawson of the University of New South Wales reports an experiment in the Jan. 29 *NATURE* using the fawn hopping mouse. He chose that animal because it can be trained to hop, full speed, on a treadmill inside an enclosed chamber. With this setup, Dawson can measure the mouse's oxygen consumption and deduce the energy cost of its locomotion. He and a colleague tried to study kangaroos this way, using a larger treadmill and an oxygen mask instead of a chamber. But a kangaroo hopping full speed can clear the longest treadmill in one or two leaps. So Dawson found the fawn hopping mouse on the stony desert of western Queensland and ran it full speed on a miniature treadmill.

He found that hopping on its specialized legs costs the mouse less energy than walking or running on four legs would. Kangaroos are a slightly different case, though. Because they are heavy, hopping at slow speeds actually requires four times more energy than four-footed walking or slow running. This probably explains why kangaroos use their tails as a sort of fifth foot to help them ambulate slowly. At high speeds, they are back in business on two feet, saving energy.

Knowing that hopping saves energy helps to explain, Dawson says, why hopping animals have survived Australian desert conditions and outlasted many quadrupeds over the eons.

A black story gets blacker

Blacklight kills human, hamster and mouse cells in culture. This uncomfortable fact set some University of Missouri scientists wondering about the safety of the millions exposed to blacklight through industry and recreation, and the millions more exposed to the low levels given off by fluorescent lights. They found that blacklight (also called near-ultraviolet) causes the ubiquitous amino acid, tryptophan, to break down and give off a toxic photoproduct that does the killing. Their latest study now reveals the structure of that photoproduct: It is the powerful oxidant hydrogen peroxide (H_2O_2).

Abraham Eisenstark, J.P. McCormick, J.R. Fischer and J.P. Pachlatko report their study in the Feb. 6 *SCIENCE*. Hydrogen peroxide can kill cells, inhibit growth and prevent fertilization. "I'm not an alarmist," Eisenstark told *SCIENCE NEWS*, "but H_2O_2 is often recommended for soaking contact lenses, and I would be very skeptical of using it that way." Since their paper was submitted, the team has discovered that the presence of H_2O_2 actually amplifies the harmful effects of near-ultraviolet. Soaking contacts, then wearing them near a source of blacklight (fluorescent lights or the sun, for example) could be harmful. One of Eisenstark's students is now studying the effects of H_2O_2 on vision processes.

Wave-watchers

Migrating birds, according to current evidence, have a built-in compass, the stars and sun, to give them a bearing. But the finer points of navigation are still up in the air. Two Swedish scientists, Thomas Alerstam and Sven-Göran Pettersson, report radar evidence in the Jan. 22 *NATURE* that birds over the ocean watch wave patterns to correct their courses against wild drift. That they are often blown farther off course over sea than land may be due to this reliance on shifting, irregular wave patterns.

BEHAVIOR

Smoking women: An increase

"You've come a long way baby," says a popular cigarette ad. And it may be true. In many ways women are achieving full equality with men. Take, for instance, the recently released statistics on cigarette smoking by women. A survey conducted for the American Cancer Society finds that 27 percent of girls between the ages of 13 and 17 smoke, and 40 percent of these smoke at least a pack a day. This represents a five percent increase since 1969. During the same period, smoking by teenage boys remained at about the same level. These "alarming" findings represent an "urgent public health crisis," says Benjamin F. Byrd of the ACS.

The report on smoking blames the increase on the "new values" of the 1960's. These values, it says, "represent the breakdown of previous moral norms and are characterized by the rejection of authority, emphasis on the emotional rather than rational, freer sexual morality, strong accent on self and self-fulfillment, the acceptability of illegal drugs and a more informal life style." It points out that young female smokers, more so than nonsmokers, are likely to use alcohol, marijuana and to have had sexual relations.

Do-it-yourself psychology: A warning

How to lose weight . . . toilet train children . . . cure sexual inadequacies . . . manage retarded children. Do-it-yourself psychology is being made increasingly available to the public through numerous self-help books that can be purchased in almost any book store. Many of these "nonprescription" behavior therapies have been responsibly prepared and adequately tested and have "tremendous implications for the health profession," says Gerald M. Rosen of the University of Oregon. "What is perhaps most important," he says, "is that these programs may enable therapists to more efficiently extend professional services to greater numbers of individuals."

But there's a catch. Rosen points out in the February *AMERICAN PSYCHOLOGIST* that behavioral programs for various clinical problems have already been marketed or are in press without having been subjected to controlled clinical trials. Consequently, he says, consumers run the risk of purchasing treatment programs that may be ineffective or harmful when used on a totally nonprescription basis. Furthermore, he says, ineffective programs are likely to affect consumer attitudes and discredit programs that have been properly developed.

In the face of this proliferation of do-it-yourself behavior therapies, Rosen calls for a set of professionally defined standards that would clarify those steps necessary to adequately evaluate a self-help program. The American Psychological Association, he suggests, could set forth such standards (as it does for test materials) and give a stamp of approval to safe and effective treatments. "The history of medical treatments," he concludes, "suggests that governments inevitably move in when professionals fail to responsibly protect consumers."

Lie detectors: An attack

"People have been deceived by a myth that a metal box in the hands of an investigator can detect truth or falsehood," said Rep. Bella S. Abzug (D-N.Y.) in conjunction with the release of a report by the House's Government Information and Individual Rights subcommittee, which she chairs. The report calls for a total ban on government use of the lie detector and the psychological stress evaluator which attempts to measure stress in voice recordings. The report further recommended that no federal funds be used for research on polygraphs or other lie-detecting devices.