# biomedical sciences

## Kangaroo hopping: one energy solution

When kangaroos hop, they look like bouncing balls or pogo sticks. Such movement suggests that the first hop takes a lot of energy, but subsequent hops rely mostly on elastic rebound. If so, kangaroo hopping should be an energetically cheap way to travel at high speeds.

Harvard biologists Terence J. Dawson and C. Richard Taylor set out to see whether this is so. They trained two kangaroos to hop on a treadmill while wearing ventilated face masks. While the animals hopped at various speeds, the biologists measured their oxygen consumption—a reflection of the amount of energy they were expending.

The biologists found that while the distance per hop increased with increasing speed, the amount of energy per hop was nearly constant. So the animals achieved greater acceleration on takeoff as they moved faster without expending more energy. They were probably able to do this beeause of the great stores of energy in their rear limbs and heavy tails, which they sometimes used as a fifth leg.

"It is difficult to understand," the researchers ponder in the Nov. 30 NATURE, "why largely hopping herbivores are found only in Australia, since hopping appears to be such an inexpensive way to travel at high speeds."

## Chromosomes and cancer

The search for a meaningful association between chromosomes and cancer has been, for the most part, frustrating. Until recently only one conclusive relationship has been observed, an abnormal chromosome in a kind of leukemia.

Now abnormal chromosomes have been found in six bladder-cancer tumors by William H. Falor and Rose Marie Ward of the Akron City Hospital in Ohio. They report their findings in the Dec. 10 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

They found five rather consistent chromosomal abnormalities in tumor cells taken from six patients. One abnormal chromosome was especially striking and strongly supports the concept that cancer arises from a single malignant cell. The abnormal chromosome was also rarely present in those cells that were not very advanced, suggesting that the sequence of events at the chromosomal level might well have a bearing on the transition of a cell from noncancer to cancer.

## Trace elements and appetite

Undersized, run-down children who hate to eat, or adults who say that everything they eat tastes like sawdust, have often been judged psychosomatic by physicians. That is, their poor eating habits have been attributed to psychological problems rather than to a physical disturbance.

Robert I. Henkin and his co-workers at the National Heart and Lung Institute questioned this assumption and set out to see whether poor eating might be a physical problem. They cut hair samples from 75 undersized, poor-eating children and examined the samples for levels of zinc. The levels were low compared to the traces of zinc found in the hair of healthy children. They then fed the children liver, kidney and other zinc-rich organ meats for one month. The children's appetites showed marked improvement; apparently the zinc supplements improved their taste and smell.

In reporting these results at a recent symposium at Drexel University, Henkin said that zinc deficiencies are probably not the only cause of poor eating. Copper and nickel deficiencies may be culprits as well.

# ocean sciences

## 1588 and all that

How cheerfully inquisitive the British are, even at the expense of their most cherished traditions! And as a seafaring nation, no traditions are more cherished than those involving naval military excellence. But now comes word that British scientists have found that perhaps the defeat of the Spanish Armada is as much a failure of Spanish technology as a triumph of Sir Francis Drake's naval genius.

Lodged in a temporary building on the campus of Scotland's oldest university, the St. Andrews Institute of Maritime Archaeology, a two-man organization, has been investigating the sunken remains of three Armada ships lost that fateful August in 1588. From the few fragments left and from the scatter pattern of ballast and cargo, they conclude that the Spanish ships were not the heavily ribbed leviathans historians have supposed. Relatively lightly constructed for service on the Mediterranean and armed with guns of crooked and nonuniform bore, the ships were simply "inadequate for rough business on the North Atlantic."

## Flipper joins the Navy

Porpoises, sea lions and even whales have been trained to retrieve dummy rockets and other objects from the bottom of the ocean, according to Jerry D. Stachiw of the Navy's Undersea Research Center at San Diego. Speaking to the Stanford chapter of Sigma Xi, the national honorary scientific society, Stachiw described how the animals, guided by a homing device, would carry grappling hooks to submerged objects. Recoveries have been made from depths of 1,654 feet by a pilot whale named Morgan. But whales became too expensive and kept running off to mate, so research now concentrates on smaller sea mammals such as porpoises.

## Radiometry at the old fishing hole

Along the salmon-rich Oregon coast, new charts began to appear last summer along the docks and taverns favored by commercial fishermen. Many an old salt had a hearty laugh when he found the charts purported to predict salmon movements based on data from an airborne infrared radiometer—a device similar to those used on spacecraft to remotely measure the temperatures of Venus and Mars.

Actually, the sophisticated equipment merely extends the range of a well-established observation of coastal fishermen: that the salmon catch will be best in local patches of relatively cold water where visibility is less than six feet into the sea. During early studies, conducted as part of the International Decade of Ocean Exploration under NSF funding, scientists accidentally noticed that wherever they found localized cold patches in the sea, they also found fishermen. After some investigation, they found that the cold patches resulted from "upwelling" of cold, deep ocean water to the surface, a surge that brought with it huge quantities of organic debris from the seafloor called "detritus," which gave the patches their murky appearance. This detritus forms the base of a food chain topped by the great, 20 pound coho salmon, which follow such upwellings in the course of feeding.

Only one tenth of one percent of the world's oceans experience upwelling, but these areas produce the food for more than half the fish caught. Radiometry studies could thus have a significant economic impact on commercial fishing and more old salts are beginning to cooperate with the project by feeding back information to the scientists.