

the Animal Medical Center in New York City, says the disease really is becoming more common: "It's not just that we're diagnosing it more because we know what to look for now."

Untreated, an affected animal would likely die from heart failure or malnutrition. Detecting the disease, however, is not very difficult, and there is effective treatment: controlling thyroid activity with a daily pill, removing the affected thyroids, or radiation therapy.

So far, Bullock says, vets have been unable to correlate the disease with diet, disease history, an urban environment or whether the animal spends time outdoors. However, she says, data from cats treated surgically for the disease suggest that some circulating factor — such as an antibody — might be responsible.

That possibility is especially provocative, Bullock says, because the human disease that feline hyperthyroidism most resembles — the relatively rare toxic multinodular goiter — is initiated by

the development of antibodies that mimic the activity of the hormone that controls thyroid activity. But because no such antibody has yet been found in cats with hyperthyroidism, Peterson says that "these cats have a different disease."

Though incidence data are still largely anecdotal, the disease seems to be most common in large East Coast cities and in California, and least common in the Midwest, according to Peterson.

At the New York State College of Veterinary Medicine, in Ithaca, N.Y., Janet Scarlett Kranz is just completing an epidemiologic survey in the hope of identifying predisposing factors, such as pesticide exposures, sharing a household with an already affected cat or differences in iodine consumption. What concerns all the vets is a suspicion that some environmental factor — such as exposure to a pollutant — might be responsible. If so, they say, these older cats may be a harbinger of what's in store for other species — including humans. — *J. Raloff*

## See how they run: Motion symmetry

Robots are starting to move. In recent years, a number of legged machines have taken their first hops, steps and jumps (SN: 7/6/85, p. 9). These efforts to design walking and running robots are also leading to a better understanding of how two- and four-legged animals move.

Researchers have discovered that human runners and animals such as cats sometimes adopt a simple, symmetric gait that is more often associated with legged robots than with animals. In this type of motion, reversing both the direction of forward travel and the direction of time (equivalent to running a movie backward) would not affect the pattern of footfalls and of body movement.

Running is a series of bouncing and ballistic motions that accelerate the body within each stride, says robot designer Marc H. Raibert of Carnegie-Mellon University in Pittsburgh. The bouncing motions result from the rebound of the body when the legs push on the ground.

For a legged system running at a constant speed with a stable upright posture, the net acceleration of the body over an entire stride must be zero. Many patterns of body movement satisfy this constraint. People and many animals generally move their legs in complex, asymmetric modes and still travel at constant speed. Symmetric leg motions provide especially simple solutions that have been applied in the design of one-legged hopping machines, four-legged trotting machines and other mobile robots.

"The importance of symmetry in the control of legged robots," says Raibert, "raises the question of what role symmetry may play in the behavior of running animals." Raibert's study of symmetry in running appears in the March 14 SCIENCE.

About 20 years ago, zoologist Milton Hildebrand of the University of California at Davis observed that the left half of a horse often uses the same pattern of footfalls as the right half, but 180° out of phase. Raibert's study of a human running on a cinder track and a cat trotting and galloping on a treadmill looked at a body's path through space and the trajectories of its feet with respect to the body. These data revealed another, robotlike symmetry in the way some animals run.

Why animals sometimes choose this symmetric type of motion isn't clear, says Raibert. As in robots, such patterns may simplify the controls necessary for steady movement. Instead of controlling the detailed motion of each leg joint, all an animal need do is provide the initial conditions that automatically lead to steady-state forward travel. That's the way robots run. — *I. Peterson*

## A moderate view of population excess

Ever since Malthus, economists have been unable to look at populations without multiplying in their heads. But the math keeps giving different answers. Recently, "market theorists" have challenged the pessimism of ecologically oriented projections of world population growth, arguing that the demands of growing populations can bring advances that counter the tendency toward depletion of resources (SN: 10/17/81, p. 245). Into the midst of the debate, the National Academy of Sciences (NAS) last week released a report that takes the middle ground.

The NAS committee looked at the effect of population growth on the economies of developing countries, focusing on such issues as resource degradation and exhaustion, distribution of capital, positive effects of technological innovation and economies of scale, and quality-of-life indicators such as levels of schooling and health. In most of these arenas in such countries, the report concludes, slower population growth would improve well-being. But the authors take a moderate view of the hazards of growth, giving much greater weight than earlier studies to the adaptability of institutions and individuals.

"The rate of population growth is an important variable, but there are many other variables that can have a greater effect on people's welfare," says D. Gale Johnson of the University of Chicago, a member of the NAS working group on population and economic development. For instance, urban bias in developing countries can leave rural areas without roads or access to goods;

or a decision to tax crops destined for export can dissuade farmers from planting — and "people can change that," Johnson told SCIENCE NEWS.

With population in developing countries growing at an average of 2 percent each year — doubling in numbers every 35 years — some would have preferred a stronger statement from NAS. "I have no doubt that the world can accommodate a 1 percent growth rate for the next 100 years, with no problem," says Hans Binswanger of the Washington, D.C.-based World Bank. "Countries that are growing . . . at a 4 or 5 percent growth rate would need agricultural miracles" to avoid extreme declines in income and living standards, he says. "All policies have to be right and governments have to be wise and all goals have to be achieved. And that's a lot to ask."

Lester Brown of the Washington, D.C.-based Worldwatch Institute puts it more strongly. "There will be adjustments [in population growth rates]; I don't think there's any question about that. The question is whether those adjustments will take the form of declining birth rates or rising death rates."

Because of its measured tone, though, the report may be taken more seriously by the market-oriented Reagan administration, and it may well increase support here for international family-planning programs, some observers believe. Ben Wattenberg of the American Enterprises Institute in Washington, D.C., says, "I would argue that from realism — and I regard this as a profoundly realistic document — flows credibility. And from credibility flows money." — *L. Davis*