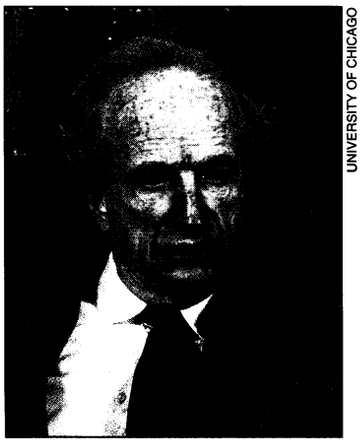
affect how much time members of the household devote to their work in this factory, and how much "capital"—labor-saving goods, child care, and prepared foods—they substitute for labor.

That kind of analysis has led to insights that predicted many social trends. In the 1950s, for example, well before the civil rights movement emerged, Becker probed discrimination in the workplace and concluded that it was costly to both the perpetrator and the victim. In his economic analysis of families, he recognized that the "no fault" divorce laws being passed in the 1970s would boost the number of poor, single-parent families headed by women. And his early studies of "human capital" led him to conclude that as families' income rose, they would tend to have fewer children and invest more in their education.



UNIVERSITY OF CHICAGO

Home economist. Gary Becker makes three in a row for Chicago.

But just in case his status as iconoclast starts to pale, Becker has recently been studying the incentives and disincentives that lead to criminal behavior. Simply asking, When does crime pay? has led him to some unsettling conclusions. He has noted that the probability of getting caught is a much greater deterrent to crime than the severity of punishment; when laws are not well-enforced, he finds that criminal behavior is indeed the rational choice. His analysis has also convinced him that the social and legal costs of enforcing some drug laws impede efforts to curb more serious crimes.

Becker believes that the conclusions uncovered by such work should play a stronger role in public policy; indeed, he has argued for the legalization of some milder drugs, such as marijuana. But according to his students and colleagues, he is not flamboyant. Instead he commands respect with a gentle, probing manner. During lectures, says Heckman, Becker often uses the Socratic method to draw students into discussions. "His is a very penetrating curiosity," Heckman adds, "and everyone who enters his class, including fellow faculty members, is engaged."

One key to Becker's success may be his unwillingness to accept limits to that probing. Speaking fancifully, a colleague notes, "He has the intellectual rigor to make a formal model of the economics of Jewish guilt... [and] that is to his credit." Indeed, his colleagues say the only surprise in Becker's award is that, having awarded the 1990 and 1991 prizes to two Chicago economists, Merton Miller and Ronald Coase, the Swedish Academy would choose this particular year to honor him.

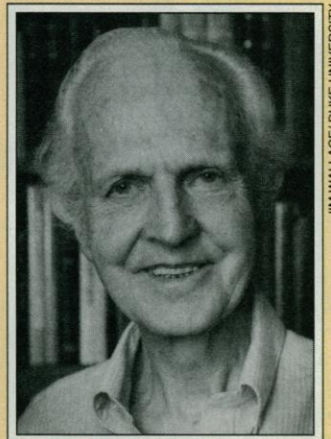
–Anne Simon Moffat

Biology: There's Honor Outside Stockholm

The Swedish Academy of Sciences doesn't hold a monopoly on prestigious science awards. Almost a decade ago, in honor of the late Emperor Hirohito (Showa), Japan established the International Prize for Biology, meant to recognize areas of research the Nobel Prize in Medicine or Physiology might not cover. This year's prize, carrying a $80,000 check and a trip to Japan for a formal ceremony before the country's highest officials, goes to Knut Schmidt-Nielsen, a Duke University physiologist, for his lifetime of pioneering work on how animals adapt to their often extreme environments.

While the molecular biologists and high-energy physicists who populate the ranks of Nobelists seek unifying principles, Schmidt-Nielsen's work has focused on diversity. His experimental subjects have ranged from kangaroo rats to camels to seagulls. "He has this remarkable ability to look at animals and intuitively figure out how they work," says physiologist Henry Prange of Indiana University, a former student of Schmidt-Nielsen's.

Schmidt-Nielsen sums up his method succinctly: "I only ask simple questions." One of the first was a question familiar to schoolchildren: How do some animals go without drinking? As Schmidt-Nielsen quickly adds, such questions may not have simple answers; this one took him to the Arizona desert for several years in the late 1940s to examine the water metabolism of rodents like the kangaroo rat. "It was unthinkable that mammals could live without free water when we began the kangaroo rat work," he recalls. But a close look at the animal's diet, lifestyle, and physiology showed the rat does just that by becoming a miser with its own internal water supply. To avoid the drying desert heat, the rodent emerges from its burrows only on cool nights. More important, Schmidt-Nielsen found that the animal conserves water by excreting highly concentrated urine and cooling the air it exhales to capture water vapor.



JIM WALLACE/ DUKE UNIVERSITY

A focus on diversity. Physiologist Knut Schmidt-Nielsen.

Later, in the 1950s, Schmidt-Nielsen studied how sea birds cope with the converse challenge: lots of water, but none of it fit to drink. He devised an experiment in which he would give a bird a dose of seawater and monitor the salt content of its excreta. But almost immediately after the bird drank up, Schmidt-Nielsen noticed a few drops of water around the bird's beak. A quick test showed the liquid had a high concentration of salt. In a flash, he deduced the existence of salt-secreting glands near the bird's eye. The glands turned out to be standard equipment in marine birds and reptiles, allowing them to get rid of unwanted salt.

In the decades that followed, Schmidt-Nielsen hopped from animal to animal and topic to topic, making findings that solved physiological mysteries and launched new areas of study. "He makes the important discoveries and moves on," says physiologist Don Jackson of Brown University. For example, Schmidt-Nielsen has been a pioneer in the area of "scaling," the study of how body size affects an animal's life. He was also among the first to document the features of the avian respiratory system that allow birds to extract oxygen efficiently at low atmospheric pressures, an obvious benefit for flying creatures.

Besides admiring his scientific legacy, Schmidt-Nielsen's colleagues also applaud his ability to popularize his field and engage students. His textbooks on animal and comparative physiology are considered classics, remarkable in their readability and enthusiasm. "I envy his ability to make this arcane stuff intelligible," says anatomist William Jungers of the State University of New York at Stony Brook. Two decades ago, for instance, Schmidt-Nielsen wrote a short book ambitiously titled *How Animals Work*. The book became an instant hit. The Japanese scientists and officials on the prize committee evidently agreed that there could have been no better author.

–John Travis