

iron is bound to a protein called transferrin that regulates iron metabolism. It seemed likely, therefore, that transferrin might be the factor that denies the dermatophytes the iron that is necessary for growth and skin penetration. King removed the transferrin from blood serum with affinity chromatography and found that without this iron-regulating blood protein, the serum was unable to prevent penetration by the "skin plants."

This immunity to invasion through iron regulation represents the best example yet of "nutritional immunity." This little understood "first line of defense" is separate from the cell-mediated and immunoglobulin systems, King says. Besides providing insight into the nutritional immunity system, the identification of transferrin as the protective blood factor may help King and others design topical agents to treat and prevent the fungal infections. King's team is looking at iron-chelating agents, transferrin included, that could be used to collect the available iron from the skin surface and starve the unwanted "skin plants." □

## Endangered list: Ten new animals?

Ten more animals may be added to the endangered species list soon, if an Interior Department suggestion is not disputed by the public within 90 days. Among those animals considered in danger of extinction are the American crocodile, the Mexican wolf and three Hawaiian birds.

There are believed to be only 10 to 20 breeding female crocodiles still in southern Florida, where development has destroyed most of the species' habitat. Commercialization has also destroyed the homes of most of the eastern United States' gray bats, and two fish species, the bayou darter, found only in the Bayou Pierre watershed of western Mississippi, and the Scioto Madtom, a catfish found in Darby Creek in Pickaway County, Ohio. The fish are dying out from pollution and destruction of habitat.

The Mexican wolf, once common in Arizona, New Mexico and Texas, hasn't been seen there since 1960, and, although protected by Mexican law, its numbers may have dwindled to less than 200 in Mexico.

Hawaii's shearwater, a sea bird, is in trouble because of its fatal attraction to light at night, which causes the bird to smash into automobiles and lighted towers. Two other Hawaiian birds, the po'o uli, a creeper, and Newall's manx shearwater, are also endangered, as are the Cedros Island Mule deer and the peninsular pronghorn antelope in Baja California. □

## Where have all the primates gone?

There is no denying the importance of nonhuman primates to biomedical and behavioral research. Researchers, however, may soon be denied the primates upon which they depend so heavily. Monkeys and apes have been used extensively for the study of human diseases and for the development of pharmaceuticals ranging from vaccines for poliomyelitis, malaria and hepatitis to birth control drugs. But, according to a soon-to-be-released report of the National Research Council, the long-anticipated shortage of primates is now a reality.

The report, "Nonhuman Primates: Usage and Availability for Biomedical Programs," examines the problem of dwindling supply and concludes that a determined national program is needed to ensure that laboratories have an adequate supply of primates now and in the future. A number of features should be included in such a program, the NRC report says. One goal, for instance, should be an adequate, assured supply of animals derived primarily from the establishment of self-sustaining domestic breeding colonies. "Various political, economic and ecological forces," the report says, "are such that self-sufficiency for the United States within 15 to 20 years is essential." But wherever possible, the report goes on, domestic supplies should be augmented by breeding colonies and production centers in countries of origin and also supported by the application of management techniques to natural populations.

Another goal should be the reduction of waste in the international primate trade by the adoption of sound managerial procedures—closer supervision of trapping, holding and shipping operations and sponsorship of trapping expeditions in which all aspects of collection and transport are monitored. One currently used trapping practice that should be changed is the slaughter of adult female chimpanzees, gibbons and leaf monkeys in order to obtain dependent young.

The report also calls for the establishment of a computerized users' service that would encourage and facilitate multiple use of primates by rapidly matching available surplus animals to existing needs, and would permit accurate estimates of national needs based on usage data. Such an information network would not only provide rapid information on available animals, or conversely, the need for specific animals, but also facilitate the exchange of biological materials derived from primates.

The NRC recommends that the primate program be administered by the National Institutes of Health. NIH

would, among other things, administer contracts for domestic breeding colonies, establish and operate the computer service, develop and distribute guidelines for commercial trapping, shipping and holding of primates and develop contingency plans to deal with shortages and to allocate resources when shortages develop. "It is essential," the report concludes, "that the plan look to meeting the needs of all major biomedical programs and be fully operative within a decade." □

## Inventor wins NAE award



Kilby

One of the most significant fruits of the "solid state" electronics revolution, the monolithic integrated circuit, has won for its inventor the prestigious Vladimir K. Zworykin Award of the National Academy of Engineering.

It was in 1958 that Jack S. Kilby, then with Texas Instruments, conceived the idea of forming sequences of electronic components in a single block of semiconductor material, to provide a complete circuit within one monolithic block. Where transistors and other semiconductor components had already replaced vacuum and gas-filled tubes hundreds of times their size, integrated circuits took technology a full step further—whole amplifiers, for example, could be formed in a single "chip" often smaller even than a transistor. The electronic calculator and electronic watch would have been virtually impossible without them.

Kilby, who was granted patents on his basic integrated circuit concepts in 1964, is now a consultant in Dallas. He is the fourth recipient of the Zworykin Award, which honors the pioneer in electronics whose invention of the iconoscope helped lead the way to modern television. Kilby has received numerous other honors, including the 1969 National Medal of Science, the Sarnoff Award, the Ballantine Medal from the Franklin Institute in Philadelphia and the Hall Minuteman Trophy. □