as you would prescribe high blood pressure medication."

The use of animals as helpers also appears to have a burgeoning future. The American Humane Association recently started a program to training "hearing-ear dogs" for deaf people; the dogs alert them to telephones, fire alarms, and other meaningful noises. Dogs are being trained to perform chores for wheelchair-bound people and specialized tasks for people with particular disabilities. There is also talk of training dogs as "night nurses," to be alert to signs indicating a change in a patient's condition.

Although many people intuitively believe that close bonds with animals will prove to have measurable effects on people's health and happiness, long-term large-scale studies will be required. One such study is being conducted by epidemiologists Marcia G. Ory, at the National Institute on Aging, and Evelyn Goldberg of Johns Hopkins University. Theirs is a 5-year study on the health consequences of bereavement covering 1000 married women, aged 65 to 75. In assessing the well-being of the subjects, pet owning did not emerge as a significant factor. However, the researchers did find that women who felt close attachments to their pets were also more likely to have close relationships with their husbands. Ory suggests that as spouses die, valuable information about the role of pets may emerge. "This is a wonderful study, but morbid as hell," she notes.

By the end of the conference, Beck appeared excited about the prospect that the study of animal-human relationships (no official name for it has been agreed on) is becoming established as a legitimate field. He noted that the University of Minnesota has just followed Pennsylvania's lead in setting up a Center to Study Human-Animal Relationship and Environments, cosponsored by the schools of public health and veterinary medicine. Pennsylvania has also established a membership group, the Delta Society, which eventually hopes to publish its own journal.

—CONSTANCE HOLDEN

No Boost in Sight for Science Budgets

Keyworth says economic recovery is the President's first priority

Two Administration officials said recently that scientists supported by the government will continue to face tight budgets as part of President Reagan's economic recovery program. This fiscal austerity is spurring the government to reevaluate priorities in scientific research, according to the President's science adviser, George Keyworth, and Health and Human Services assistant secretary of health, Edward Brandt, Jr.

Although every government science agency is confronted with the 12 percent cut that Reagan announced recently, across-the-board reductions would be "irresponsible," Keyworth stated at a recent meeting of the NIH director's advisory committee.

Keyworth said, "The President recognizes the importance of science and technology, but economic recovery is his first priority." Neither he nor Brandt spelled out any new areas where future budget reductions might be made.

Keyworth presented a few examples of the Administration's concerns in science. He went out of his way to deplore the state of scientific instruments used for teaching in universities in the United States. "I will say it bluntly. The status of [such] instrumentation is disgraceful," he declared. It is in "crisis condition."

The Administration is trying to alleviate the problem through changes in tax law. One reform gives tax credit to businesses for donating instruments to universities. But an NIH committee member took the Administration to task for contradictions in the federal reforms. New York University medical school dean Ivan Bennett pointed out that the tax policy also permits companies to depreciate instruments more rapidly than before. Bennett said this reduces industry's incentive to contribute instruments to schools.

Marjorie Sun

Keyworth at NIH

Since Reagan announced his plan to cut the budget even more, Keyworth said he is devoting most of his attention to the broader issue of ironing out the total science budget for the next fiscal year. He emphasized that the federal government has "primary responsibility for basic research" and that industry's main role is to support applied research. In answer to a question about the elimination of the Department of Energy (DOE), Keyworth said he was unsure what would happen to research conducted by DOE scientists. In areas of research where federal support is inadequate, industry may pick up the slack, he said. Keyworth hailed recent collaborative agreements reached between several universities and corporations in biotechnology research as a "momentous step and a critical element to strengthen scientific research."

He also mentioned that the Administration is reexamining the controversial time and effort accounting rules set up under the Office of Management and Budget Circular A-21, that government-supported researchers have complained about (*Science*, 15 May, p. 760). Although he acknowledges the need for modification, Keyworth, a former research physicist, appears not to be as troubled over the requirements. "A-21 is not such a terrible ugly piece of legislation. It's more that it was the straw that broke the camel's back." Denis Prager, an associate director in Keyworth's office, said later that the Administration is considering the adoption of a different accounting philosophy that would assess scientists' "performance levels" rather than a log of their time spent in research. This approach would examine whether scientists have accomplished the goals of their research. An official of the Associa-

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tion of American Medical Colleges says some scientists support this idea, but "exactly how 'goals' would be defined is difficult."

Both Keyworth and Brandt lauded the achievements of NIH and underscored the importance of maintaining its eminence. But neither one gave any clue as to who would succeed Donald Fredrickson as NIH director. Thomas Malone, who was the deputy director under Fredrickson, is now acting director. Brandt said the Administration wants to select a director as quickly as possible but stated it has no specific timetable in mind.

Brandt, in his remarks to the committee, said that the federal government is rethinking its role in medicine and health and in some areas has concluded that its presence is inappropriate. For example, the Administration decided early on that Professional Standards Review Organizations (PSRO's) are primarily a professional responsibility, not a federal one, Brandt said.

One of Brandt's principal concerns is providing NIH with stability by supporting a fixed number of grant awards or research trainees. He said, however, that it is not clear what the number should be. Two years ago, after many negotiations the government announced it would support 5000 grants a year. For fiscal 1982, the number is 4800. "Should it be 6000, 4000, 1000? What number is appropriate and how should we arrive at it?" Brandt asked, apparently willing to start the discussion of stabilization levels over again.—MARJORIE SUN

Germplasm Resources Are Losing Ground

Despite international efforts to preserve genetic variety, massive land clearing threatens many species with extinction

Human population growth and economic development are rapidly encroaching on natural ecosystems throughout the world. The problem affects all life forms—animals, plants, and microorganisms. The threat to wild animals has received greater publicity, but the loss of potential food sources has prompted a more intense if less conspicuous international effort to conserve plant germplasm resources.

Food crop plants have come under particular pressure because radical changes in agriculture associated with the Green Revolution have caused replacement of indigenous, genetically varied plant varieties with a relatively few hybrid types that are genetically similar.

The resulting susceptibility of these crops to disease and insect damage was brought home in 1970 by the southern corn leaf blight epidemic in the United States (*Science*, 9 October, p. 161). The epidemic spurred both national and international efforts to increase genetic diversity in crop plants and also to preserve the germplasm pool from which future food crops and also pharmaceutical and other useful products might be developed.

Significant progress has been made in the past decade in creating better means for collecting, preserving, and using plant germplasm resources. Many experts warn, however, that this progress is being outpaced by the accelerated clearing of land for settlement, farming, grazing, and lumbering. Loss of genetic material in wild species and in primitive crop varieties developed from them is said by an official of the U.N. Food and Agricultural Organization to have created a "crisis situation."

At the same time, international cooperation is troubled by disagreement over what has come to be known by the shorthand term "plant breeders rights." Industrial countries have increasingly granted plant breeders the equivalent of patent rights for new plant varieties produced by selective breeding. Critics in less-developed countries (LDC's) argue that these proprietary rights and the royalties charged on seed protected by the laws are unwarranted exploitation of Third World countries.

The United States has a special incentive for cooperation. Despite its prodigiously productive agriculture, this country was originally a have-not in respect to indigenous food plants. Of the major cereals, for example, only maize was found here when the first European settlers arrived, and that had been introduced from Mexico by the Indians. Americans have excelled in breeding high-yielding "cultivars," but scientific breeding tends to narrow genetic variety. Interest has grown, therefore, in germplasm resources found in the so-called "land races," crop varieties domesticated from wild plant species over thousands of years in regions where they originated.

The chief international mechanism for conserving these germplasm resources is a network of gene banks and clonal repositories coordinated by the International Board for Plant Genetic Resources in Rome. A year ago at a meeting of the Internation Union for the Protection of New Varieties of Plants the executive secretary of the IBPGR, J. T. Williams, gave a forthright summary of the shortcomings of the international program in respect to preserving wild species and primitive cultivars.

Williams, also an official of the U.N. Food and Agricultural Organization, said that "for nearly all crops or species of economic interest these types of germplasm are barely represented in the germplasm collections. To give you an example, there is a very large collection of rice held now by the International Rice Research Institute, but this is relatively deficient in wild material. We have recently conducted a survey of the wheat collections of the world and even though this was a very difficult task, and in some cases some countries were unwilling to release their information, we were able to make relatively educated guesses and we found the taxonomic range to be completely inadequate. We find that the samples from geographical regions that are represented in these collections are also completely inadequate and this poses the question now whether we proceed from the base we have already got for an important crop like wheat or whether we really start again and go about it in a much more scientific manner. At the same time, the collections have been relatively deficient in primitive cultivars, largely because breeders in the past have not used them to any great extent." Williams concluded by noting, "It is this type of material which is being eroded in many parts of the world; in fact, for many crops we are facing a crisis situation."

Anchoring the international program is

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