good offices of the NAS, the traditional agent for international scientific trips and exchanges. The Chinese have indicated that they will not deal directly with the Academy until China-U.S. relations are "normalized," which apparently means not until formal diplomatic relations are established.

The concluding speaker of the meeting was John H. Knowles, general director of Massachusetts General Hospital, a member of the institute, and the next president of the Rockefeller Foundation. Knowles gave an iconoclastic analysis of medical education, physician manpower, and health insurance and challenged the institute to come to grips with such problems lest it become merely a "status organization."

The new institute has set out to influence major decisions in the health field. Hogness himself has reportedly made a start by contributing, along with representative of the Association of American Medical Colleges (AAMC) and others, to Representative Paul G. Rogers' (D–Fla.) development of the House alternative to the Senate's version of the big new cancer research program (*Science*, 22 October). The institute plans to cultivate cooperative links with other national organizations in the health field, such as the AAMC and the American Medical Association, but obviously expects that the spectrum of professions represented in its membership will give it important advantages over more narrowly based organizations. Only the next few years will tell, however, whether the institute will be just, as one member of the audience surmised, "another competitor for funds," or whether it will really carve itself a special niche in the burgeoning ecology of health policy and politics.

—JOHN WALSH

APPOINTMENTS

Robert G. Layer, chancellor, Southern Illinois University, Carbondale, to president of the university. . . . **Edward J. McCarthy**, former president, Biscayne College, to president, Villanova University. . . . **Stanley E. McCaffery**, president, San Francisco Bay Area Council, to president, University of the Pacific. . . . **John H. Ehrenreich**, chairman of watershed management, University of Arizona, to dean, College of Forestry, Wildlife, and Range Sciences, University of Idaho. . . . **Merle L. Borrowman**, dean, School of Education, University of California, Riverside, to dean, School of Education, University of California, Berkeley. . . . **Joseph M. Pettit**, dean, School of Engineering, Stanford University, to president, Georgia Institute of Technology.

RESEARCH TOPICS

Molecular Biology: Gene Insertion into Mammalian Cells

The problem of inserting specific genes into human cells has intrigued molecular geneticists, and the prospect of the successful solution of this problem has concerned everyone. Both the excitement and the concern have grown now that the armchair speculations—and exploratory results—of a few years ago have matured into hard experimental work. The current results of that work indicate that animal viruses, bacterial viruses, and cell fusion techniques are all capable of introducing new functional genes into mammalian cells, although many of the fundamental genetic and regulatory processes in mammalian cells remain unknown.

Much has been learned about the genetic code and the mechanisms of the replication of DNA, the transcription of DNA into RNA, and the translation of RNA into protein, especially in bacterial cells. A clever and sufficiently industrious molecular geneticist can often produce a specific mutation in any of a large number of genes in the bacterium *Escherichia coli*, can delete genes or add new ones from outside the cell, and can then regulate the expression of genetic traits inside the cell. But the extension of these techniques from bacteria and bacterial viruses (bacteriophages) to nucleated (eukaryotic) cells, especially human cells, awaited new tools and more knowledge.

Several biologists have studied the interaction of foreign DNA with nucleated cells. Among these, Pradman Qasba and Vasken Aposhian at the University of Maryland School of Medicine in Baltimore, have recently shown that one type of animal virus can be used to transport DNA from mouse cells into the nuclei of human cells. At the Roswell Park Memorial Institute in Buffalo, W. Munyon and his coworkers have shown that another type of animal virus may have inserted a specific gene into mouse cells without harming the cells. These workers found that the enzyme specified by this gene was made by the cell and that the new gene seemed to be replicated as the cells divided.

Munyon and his group infected mutant L cells (a line of mouse tissue culture cells) that lacked the enzyme thymidine kinase with the animal virus herpes simplex. The virus had been irradiated with ultraviolet light to decrease its ability to kill cells (*1*). Herpes simplex virus normally induces a thymidine kinase activity during infection before it kills the cells, but in this experiment about 0.1 percent of the infected L cells were transformed by the irradiated virus into stable cells that had thymidine kinase activity and were maintained in culture for 8 months. No measurable proportion ($< 10^{-8}$) of control L cells gained the ability to express thymidine kinase when uninfected cells or cells infected with a herpes simplex mutant that does not induce thymidine kinase activity were examined.

These results are consistent with the idea that the herpes simplex virus introduced a gene for thymidine kinase into the L cells and that this gene was then maintained and replicated by the cells. However, Munyon notes the possibility that a herpes gene product may have simply induced the stable expression of a gene that was already present in the L cells.

Aposhian has proposed that pseudo-