vestigators have been able to isolate it again.

Although the 6/94 virus is similar to the measles virus, it is most similar to another paramyxovirus known as the Sendai hemagglutinating virus of Japan. Koprowski and ter Meulen found that the two viruses cross-react immunologically, that they have similar numbers and types of proteins, and that there are extensive homologies between the RNA sequences of their genomes.

The 6/94 virus will infect and persist in cultured human brain and other mammalian cells. But like the Sendai virus—and unlike most other viruses—it cannot be passed to a second culture of such cells. Interestingly, the virus from the mammalian cells will infect macrophages (a type of leukocyte) and, after being grown in the macrophages, will once again infect mammalian cells. Koprowski attributes this phenomenon to the activity of proteases (enzymes that degrade protein) within the macrophage and, in fact, treatment of the cultured 6/94 virus with trypsin will accomplish the same thing. It is possible that this response in the presence of mammalian cells is a protective mechanism that, in effect, enables the virus to maintain a low profile and avoid an all-out immune response that would abolish the infection. Intriguingly, Fraser and other investigators have reported that a flare-up of MS after a period of remission is accompanied by an increase in the concentration of proteases in the blood and in tissues around the sclerotic plaques.

Inoculation of the 6/94 virus into the brains of adult mice produces a chronic neurological disease that is very little like MS. Its principal characteristics include an infiltration of immune leukocytes into certain areas of the brain and degeneration of the brain's white matter. Antigens specific for the 6/94 virus persist in certain areas of the brains of diseased mice for 14 days after infection, but Koprowski and his associates have never been able to isolate the virus from the mice.

Koprowski and his associates also injected the 6/94 virus into newborn chimpanzees. Inoculation of the virus into the noses of the chimpanzees produced a respiratory disease similar to influenza. Some of the animals inoculated this way died of pneumonia and autopsies showed brain damage, although the damage was not like that of MS. The virus was inoculated directly into the brains of three other animals. One died of pneumonia, but the other two developed recurrent seizures about 14 months after the inoculation.

Autopsy of the brain of one of these two chimpanzees showed substantial tissue damage, although this damage was also different from MS. But there are some striking similarities between the experimental disease and MS, Koprowski says. Most significant is the fact that the animals showed no symptoms for almost 14 months after inoculation, suggesting that the disease is an experimentally induced slow virus disease. Furthermore, the neurological symptoms appeared intermittently and the onset of symptoms was frequently preceded by respiratory infections. This pattern is observed in human MS, and suggests that the two diseases have a similar etiology.

Two aspects of the 6/94 infection in mice may also shed some light on human MS. The disintegration of brain white matter occurs even when the virus is

Speaking of Science

Social Anthropologists Learn to Be Scientific

Many social anthropologists traditionally have not considered themselves scientists so much as humanists. They often applied for research grants to sources other than the National Science Foundation (NSF), which usually did not favor their humanistic bent. In recent years, however, as more and more social anthropologists began to compete for funds, they have increasingly turned to the NSF.

Nancie Gonzalez, who is in the middle of a 2-year stint as Program Director for Anthropology at the NSF, thinks that social anthropologists have rarely fared well there because many of them are not trained to think like scientists. She is trying, with some success, to help these investigators present their ideas in such a way as to make their proposals competitive for NSF funds.

Gonzalez says she was shocked when she first saw some of the "mushy" grant proposals submitted by social anthropologists to the NSF. A number of these proposals were accepted but many more were not. Authors of some proposals would write that they wanted to study a particular group simply because it is disappearing or because no one had ever described it before. In contrast, Gonzalez says, grant proposals from archeologists, who tend to do better at the NSF, more often state a specific problem that the investigators wish to solve and tell why that problem is important and interesting.

According to Gonzalez, social anthropologists on NSF panels, who advise the foundation on which proposals should be funded, recognize bad proposals and recommend rejections. In fact, social anthropologists tend to be harder on their peers than other kinds of anthropologists are.

As a social anthropologist, Gonzalez was concerned about this situation and sought to remedy it. She wrote a description of what a good research proposal should be and sent it to applicants. She visited about 60 universities in the past year and lectured at meetings to try to explain, among other things, why proposals from social anthropologists are so often turned down. And when a promising research proposal is rejected because of the way it is written, Gonzalez writes the applicant a personal letter and suggests that the proposal be rewritten and submitted again to the NSF.

The results of this effort have been encouraging. In the past year, grant proposals from social anthropologists have been considerably more sophisticated, and the resubmitted proposals, which now constitute as many as one-third of all proposals being considered, often fare well.

It now appears that in order to get more money from the NSF, social anthropologists will have to think more like scientists. Although there will always be a humanistic contingent who should not look to the NSF, Gonzalez believes that there is now a large group of social anthropologists who should be able to compete for funds at the NSF. It's all a matter of learning the language and the ways of the scientific world.—G.B.K.