

tively normal tissue of the transplant and the sick environment of the patient, says Dr. Kayhoe, is a "very sophisticated research problem." So far, he says, physicians have not had long enough experience with enough transplant patients to draw reliable conclusions.

An immediately practical consequence of what Dr. Barnard says is that surgeons may not need to be so rigorous in selecting young donors if other factors, such as tissue type, are favorable.

"It was thought at the beginning," Dr. Barnard says, "that we needed young donors. But there is no real need for this, as a transplanted heart will last only five years. So we can use donors of 50, as long as their hearts are functioning normally."

(Meanwhile, in both Houston, Texas, and Sao Paulo, Brazil, surgeons performed unprecedented quadruple transplants of organs from single donors. In Texas, a 60-member team under Dr. Michael E. DeBakey used the heart, kidneys and one lung from a woman suicide.

In Sao Paulo, another gunshot victim provided a heart, kidneys and a pancreas for four patients in Das Clinicas Hospital.)

## DISEASE DYING OUT

### Cannibalism may spread kuru

Kuru, the fatal nervous system disease found in the Fore tribe of New Guinea is now dying out—as cannibalism declines.

Dr. R. W. Hornabrook, director of the Institute of Human Biology of New Guinea, says he is convinced the disease arises from ritual cannibalism, which has been disappearing from the highlands of eastern New Guinea since missionaries came.

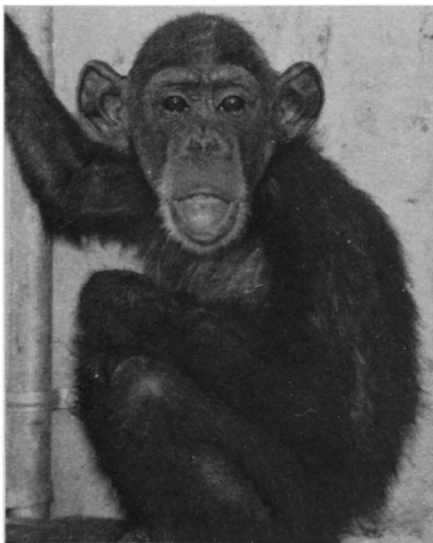
When kuru first was found among the Fore tribe it was thought to be a genetic disorder because of the limited area in which it spread. But later research showed that it occurred occasionally among neighboring tribes and also among women who married into the Fore tribe. Doctors also were puzzled by the fact that after about 1960 virtually no children appeared to contract the disease, although earlier it had been common among them.

Anthropologists traced the course of the epidemic and established that it spread at a constant rate through the tribe. Although there has been no airtight evidence to prove it, a number of doctors have concluded that kuru was transmitted through the process of ritual cannibalism that required a family to eat any member who died.

Dr. D. Carleton Gajdusek, chief of collaborative and field research of the

National Institute of Neurological Diseases and Blindness, Bethesda, Md., who has spent considerable time in New Guinea doing research on kuru, agrees with Dr. Hornabrook that ritual cannibalism could have played a role in the transmission of kuru.

Dr. Gajdusek, with Dr. Clarence J. Gibbs Jr., and Dr. Michael Alpers last



NIH

Human brain tissue gave chimp kuru.

year reported transmission of a syndrome closely resembling kuru in man, from chimpanzee to chimpanzee.

The affected chimpanzees belong to a large colony that had been inoculated with brain suspensions from human patients with multiple sclerosis, Parkinson's disease and other neurological ailments.

Dr. Hornabrook emphasized that kuru was the first neurological disease believed to be transmitted by an infec-

## METEOROLOGY

### Hail-fighting plan

There are few meteorological phenomena in which the interplay of the macroscopic and the microscopic is more perfectly coordinated than the storms that produce hailstones. The range is from the miniscule scale of nucleation and crystal growth up to the sweeping drafts within the cloud.

Hailstorms cause between \$200 million and \$300 million in crop losses every year in the United States alone. The costs world wide cannot be estimated, but the economics are sufficiently severe to have caused at least five other countries to engage in large-scale projects to decrease hail.

They are the Soviet Union, France, Kenya, Canada and Italy.

Until now, U.S. projects on hail suppression have been fragmented; in response to a recent request from the

tive agent. The linkage with ritualistic cannibalism opens the way to further research on more common brain disorders, he declares.

Sir Macfarlane Burnet, Australian immunologist who won the 1960 Nobel Prize, believes, after touring the New Guinea highlands, that kuru "holds in unprecedentedly concentrated form, a manifestation of some of the most important problems in general medicine." Understanding the disease would be a major medical advance.

Kuru appears to destroy the brain in stages. First, patients lose coordination. Their legs tremble and the victim cannot stand or sit correctly. Finally there is difficulty swallowing and the patient eventually chokes to death or succumbs to starvation or pneumonia. Death occurs within a year.

Kuru is a Fore word that means trembling associated with fear or cold. Its common name is laughing sickness or laughing death, so-called because of the slack facial muscles of its victims, who seem, at one stage of the illness, to be laughing.

Investigators in England, Scotland and the United States have noted striking similarities between kuru and the incurable brain disease of sheep called scrapie (SN: 2/18/67, p. 167). Intense itching drives the sheep to scrape off their wool by rubbing against any firm object they can find. Brains of normal sheep have been injected with materials from the brains of patients who have died of multiple sclerosis, and some of them have developed a disease similar to scrapie.

The transmissible agent of scrapie is believed by some scientists to be a subviral basic protein. Others insist that the cause is a genetic abnormality.

Federal Council for Science and Technology, the National Science Foundation has come up with a national plan for attacking the problem.

The program, developed by the National Center for Atmospheric Research, is now under review by the FCST. It calls for spending \$3 million to \$4 million a year during the next five to ten years, in an effort to modify hail formation.

In the pilot project next summer, Colorado State University scientists will rocket explosive nose cones into the center cell—the hail-producing core—of thunderstorm clouds. Detonation of the cones, containing lead iodide as a seeding agent, will be timed by command from ground radar.

The idea is to cause the formation of many more hailstones than would other-