

# Disease Theory Skips DNA

Sub-viral, protein-like particles are suspected in an infectious disease of animals and humans.

by Faye Marley

A whole new area of biomedical research is opening up as a result of a cautious report by an agricultural scientist in England that the "transmissible agent" of the long-researched sheep disease, scrapie, may be a basic protein, smaller than the smallest filter-

although "further work will be required" to establish accurately the structure of the tiny agent, it is possible that some of the mystery of scrapie and a wide range of similar diseases, both animal and human, may be unraveled.

**Human diseases** that might be caused by the same tiny agent include amyotrophic lateral sclerosis, which killed the famous baseball player Lou Gehrig; Parkinsonism dementia, a type of shaking palsy; kuru, a disease of the Fore tribe of New Guinea, resembling multiple sclerosis; MS itself and other diseases such as leukoencephalopathy, which involves the brain's white substance.

Pattison denies sole credit for the discovery, which also has been reported and partially substantiated by others, mainly in England and Scotland.

Early in 1966, a London magazine called *Biochemical, Biophysical Research Communications* published a collaborative report by two other Compton staff members, Dr. David Haig and Michael Clarke, with Tikvah Alpers, director of the radiopathology research unit, Hammersmith Hospital, London, suggesting a sub-viral agent.

They used ultraviolet light to irradiate scrapie material, and its infectivity was hardly affected after three-quarters of an hour of treatment. But a virus was obliterated in about a minute and a half under the same conditions. Repeat experiments have confirmed this work.

**Pattison himself** had previously reported resistance of the suspected sub-virus to formalin, which kills live viruses. He reported a dialysis method some time ago in the magazine *Veterinary Science*, and only in January 1967 the *Veterinary Record*, journal of the British Veterinary Association, published his latest work in which a suggestion that "the transmissible agent of scrapie may be, or may be associated with, a small basic protein."

American scientists hail the report as fascinating, but Pattison denies that there is any actual proof of the sub-virus's effect, and cautions against any sensational claims.

Dr. Robert W. Leader, head of Rockefeller University's laboratory of comparative pathology, who reported in the January *Scientific American* much of the outstanding work on scrapie in this country, says the possibilities of the subvirus are fascinating, but like all these researchers, he warns

against building up any premature hope among people who may expect quick results in finding the cause and cure of central nervous system disease.

**Sheep owners** in Australia and other countries have been worried for years about the disease that has been killing many animals in their herds. Scrapie

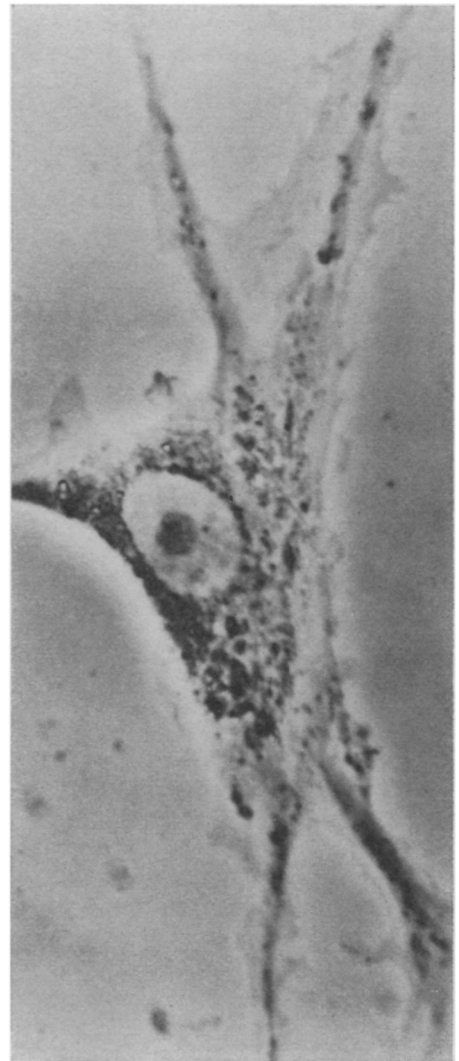


NINDB

Kuru: related to scrapie.

able virus. The nucleic acids DNA and RNA, long thought fundamental to life and the heart of viral particles, appear to be missing, and a new, sub-viral infectious agent is suspected.

Iain H. Pattison of the Agricultural Research Council, Institute for Research on Animal Diseases, Compton, Newbury, Berkshire, England, reports that



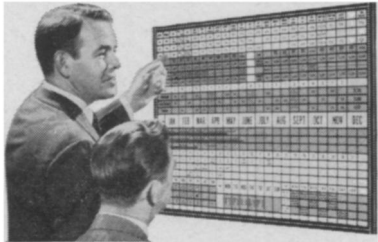
NINDB

Scrapie-infected sheep brain cell.

gets its name from the fact that intense itching drives the sheep to scrape off their wool by rubbing against fences, gates or any other firm object they can find. It is a brain disease, and some researchers believe it is caused by predisposition or genetics.

Heated arguments have taken place between English and Scottish scientists over whether a virus causes scrapie, or whether it is caused by a genetic ab-

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## ... Pre-virus

normality. The problem was discussed at a meeting in this country, which was called by the U.S. Department of Agriculture, and a fist fight was barely averted, a scientist who was present reports.

If the scrapie agent is neither viral nor genetic, but is a small protein, it is reproducing a different way from the nucleic acids, DNA and RNA. It could be, as does a virus, taking over part of the reproductive mechanism of the cell it infects.

Any discussion of scrapie should include comparisons with kuru, the fatal Fore tribe disease. Dr. D. Carleton Gadjusek, chief of collaborative and field research of the National Institute of Neurological Diseases and Blindness, who is presently on a return trip to New Guinea, has recently reported follow-up studies on the injection of tissue from the brains of kuru victims into the brains of chimpanzees. The earlier study showed that the agent was infectious and that the disease could be transmitted from man to animal.

Dr. Michael Alpers, an Australian scientist working for several years with Dr. Gadjusek, says chimp brains have now been injected with a preparation from the brain of a supposedly kuru-affected animal. (Kuru has always been described as a human disease, while scrapie has been considered purely an animal disease.)

Two of the chimps got symptoms of kuru, and a third showed characteristic degenerative changes of kuru, so-called, in its autopsied brain.

These researchers, with Dr. Clarence J. Gibbs, reported this study in the Jan. 13, 1967, issue of Science magazine. They used the term "virus" and said that "if a filterable agent can be identified for this disease, kuru will be the first chronic neurological degenerative disorder of man" to have demonstrated virus cause, and the first such disease to be transmitted to a laboratory animal." They say the importance of this to the study of such diseases and to clarifying the concept of a "slow virus" infection is apparent.

Dr. F. R. Abananti, who is chief of the virology and rickettsiology branch of extramural programs for the National Institute of Allergy and Infectious Diseases, says regardless of what the agent is, it is replicating and transmissible. He says it is intriguing to speculate that it may be a substance of an enzymatic nature.

The basic protein material extracted, he points out, might not itself be the infectious agent, but could be something attached to the real agent.

# Films of The Week

Listing for readers' information of new 16mm and 8mm films on science, engineering, medicine and agriculture for professional, student and general audiences. For further information on purchase, rental or free loan, write to distributor listed.

**BIRDS IN YOUR BACKYARD.** (Revised edition). 16mm, color sound, 11 min. Two boys share in a project to attract birds to their yard. Shows building feeder, types of food used, and birds using feeder. Audience: primary and elementary grades. Purchase \$120 from Arthur Barr Productions, 1029 N Allen Avenue, Pasadena, Cal.

**THE COMING CRISIS IN VETERINARY MEDICINE-ARE YOU PREPARED?** TFR-1292. 16mm, b&w, sound, 30 min (TV film recording). Speech at the American Veterinary Medical Association meeting in 1966 by Dr. Jacob Antelyes DVM, advocating increased efforts by veterinarians in mankind's battle against disease, ignorance, and poverty. Audience: veterinarians and allied biomedical personnel. Free loan from Public Health Audiovisual Facility, Atlanta, Ga. 30333.

**DEM DRY BONES.** 16mm, color, sound 24 min. Visit to the site of excavation of prehistoric bones by paleontologists to see how these scientists work to identify the bones and add to our knowledge of the distant past. Audience: schools, general. Purchase \$300 from Text-Film Division, McGraw-Hill Book Company, 32 West 41st St, New York, N.Y. 10036. (Part of "The Smithsonian" TV series produced by NBC).

**LSI: THE SPRING GROVE EXPERIMENT.** 16mm, b&w, sound, 24 min (Part I) and 30 min. (Part II). Documents the case histories of two psychiatric patients at Spring Grove Hospital in Maryland and focuses on experimental use of LSD in their treatment. Emphasizes that LSD is neither a form of instant psychotherapy nor a miracle cure, and points out importances of investigating the drug's possibilities under controlled conditions by serious researchers. Audience: high school and college. Purchase Part I (\$135), Part II (\$165) or complete film (\$275) from McGraw-Hill Text-Films, Dept WF, 330 West 42nd St., New York, N.Y. 10036. (Produced by CBS-TV).

**MODERN STEEL FOR TODAY'S HIGHWAYS.** 16mm, color, sound, 12 min. Demonstrates through tests and illustrations the role steel plays in building safer and better highways. Audience: available to highway engineers, traffic engineers, and related professional groups. Free loan from Sterling Movies Inc., 43 West 61st St., New York, N.Y. 10023.

**SCIENCE OF LIGHT.** 13 min, b&w, sound, 13 min. Shows the principles of refraction and reflection of light through a series of demonstrations with objects such as goldfish in a tank, prism, telescope, microscope, and microprojector. Audience: junior high school science, high school Physics. Purchase \$75 from Carousel Films Inc., 1501 Broadway, Suite 1503, New York 36, N.Y.

**SIMPLE CUP OF TEA.** 16 mm, b&w, sound, 28 min. Shows the work of an agricultural advisor for the Agency for International Development in Pakistan, and how he used his forty years of experience as a farmer, teacher, rancher, and businessman. Audience: general. Available for loan from state university film libraries or inquire of Motion Picture Service, Office of Information, Department of Agriculture, Washington, D.C. 20250 for loan or purchase information.

**SPOT PREVENTION.** 16mm, color, sound, 13½ min. Fast-moving animated film showing chase and capture of measles "germ" and his conversion to protective vaccine. Audience: pre-school, kindergarten, 1st and 2nd grades, parents. Purchase from DuArt Film Laboratories Inc., 245 W. 55th St., New York, N.Y. 10019. Free loan from Public Health Audiovisual Facility, Atlanta, Ga. 30333.

**THAT'S NOT MY JOB.** 16mm, color and b&w, sound, 26 min. Shows what happens when a worker does not understand the true dimension of his job, and how learning the limits as well as the potential of a job helps to reduce conflict and increase job satisfaction. Audience: employees, supervisors. Purchase \$285 color and \$160 b&w from Roundtable Film, 321 South Beverly Drive, Beverly Hills, Cal.