Ultramicroscope Finds Tiniest Germ Yet Seen

Microscopy—Medicine

MEN and women of science working patiently together in the small, obscure neurological laboratory of the Westminster Hospital in London, England, claim to have discovered the smallest disease germ ever seen by the human eye. In doing so they believe they have paved the way to the conquest of some of the most mysterious and terrible diseases afflicting mankind.

The organism they declare they have isolated, identified and photographed is thought to be that of multiple sclerosis—commonly called "creeping paralysis"—once a rare disease in this country, but now not at all uncommon.

The germ is one of a group known as the filterable viruses, which are so minute they will pass through a porcelain filter, which catches all hitherto discovered organisms. Hitherto, these have remained invisible even under the most powerful microscopes. They include the forms of parasitic life causing infantile paralysis, encephalitis (sleeping sickness), measles, small-pox, and some of the most deadly diseases of animals, such as distemper among dogs and pleuro-pneumonia among cattle.

This information is vouched for by Dr. Foster Kennedy, professor of neurology at the Cornell University Medical School and attending physician in charge of nervous diseases at Bellevue Hospital, New York City. He returned from abroad a few days ago after carefully reviewing the work done in the Westminster Hospital laboratory.

Some of the leading physicians in New York City, when told of Dr. Kennedy's report, said such an announcement from a physician less distinguished than Dr. Kennedy would be regarded sceptically, but that his guarded and qualified statement must be given the most serious consideration. Further research, according to Dr. Kennedy, will be required to confirm the discovery. He was reluctant at this time to allow any announcement to be made publicly.

In revealing what has been done, he said it was the first time to his knowledge that the ultra-microscope perfected by J. E. Barnard, a London hatter, had definitely revealed the organism of a filterable virus.

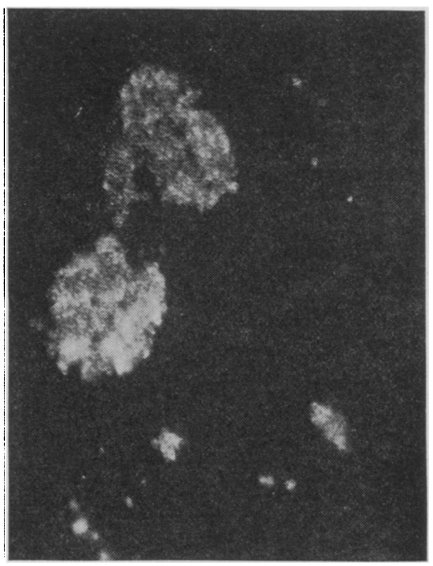
Dr. Kennedy reported that under the enormous magnification of 1,800 diameters glistening globules which seem to have life now can be seen and photographed. These are definitely claimed by Sir James Purves Stewart, neurologist of the Westminster Hospital, and Miss Kathleen Chevassut, the highly skilled technician who has actually conducted the experiments, to be the organism responsible for "creeping paralysis."

"While it is seldom wise to make positive predictions," Dr. Kennedy said, "it is quite possible that this work will lead to the discovery of the organisms causing measles, infantile paralysis, sleeping sickness, distemper among dogs and pleuropneumonia among cattle."

He recalled that in 1925 Mr. Barnard, who had cooperated with Dr. William E. Gye of London, announced that his ultra-microscope had revealed the organism of chicken cancer. At that time Dr. Max Cutler of the Memorial Hospital in New York associated with the Cornell Medical School and was sent to England to check up the work of Barnard and Gye. His report did not confirm their announcements.

But this time, so important does Dr. Kennedy consider the results attained, an ultra-microscope has been ordered from Mr. Barnard, and Dr. Lewis Stevenson, neuro-pathologist, has been sent over to work in the Westminster Hospital laboratory until he has mastered the technique of Miss Chevassut and can reproduce her experiments. He will then return and attempt to repeat them in the new neurological laboratory of Bellevue Hospital.

"If this can be done," declared Dr. Kennedy, "we shall feel reasonably sure that the organism causing multiple-sclerosis has been discovered, and that we may be on the way to developing a serum with which to treat the disease. At present, I can only say that the work thus far is very hopeful. The experiments have been conducted with the utmost care, but until the same results can be obtained under entirely different surroundings—not simply in other London laboratories—we must consider the work as tentative only."



Smallest germs ever seen by human eye as revealed by the ultramicroscope. These tiny germs, which are here magnified 1,800 times, cause creeping paralysis, known scientifically as multiple sclerosis.

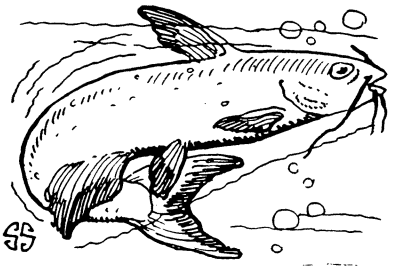
"Creeping paralysis" some years ago was considered a rarity in America, Dr. Kennedy explained. Today it is fairly common. At almost any time a half-dozen cases can be found in the wards of Bellevue Hospital. Its most marked symptom is a progressive inability to walk. It is characterized by episodes of weakness, from each of which a marked recovery is made, although the patient is left slightly weaker each time until paralyzed.

Yet a patient rarely dies of the disease. Dr. Kennedy says he has personally seen only two deaths that appeared to be directly due to it. A patient may be virtually helpless over a long course of years. Strangely, blond, blue-eyed people seem to be most susceptible. It also seems to be selective as to age. Dr. Kennedy says he has never seen a case in a person less than sixteen years old and very rarely after the age of forty.

Hitherto, the principal clinical evidence has been the hardening of disc-like patches upon the nerves. Sclerosis means (*Turn to page* 44)

NATURE RAMBLINGS

By Frank Thone



Mississippi Catfish

TWO or three successive fishermen in the Presidential chair have given so much advertising to game fish, especially trout, that we are in some danger of forgetting that after all a fish's chief function is not to be caught but to be eaten. There are a good many fish that sportsmen do not bother about, that still make capital objects for the prowess of trenchermen.

High rank among these should be accorded to the great catfish of the Mississippi river and its larger tributaries. He is not the abject groveller in the mud that many of his lesser cousins are (though even these humble fish are good food); he is a big, bold, free swimmer in the turbid, soupy waters that are his home. Though he may not understand the delicate arts of fencing like a trout or bass, he makes up with weight and sheer brawn what he lacks in skill, and can give a couple of men in a skiff a lively scrap if they are looking for one.

And after the cook has performed his offices upon the big catfish carcass, never expect a proper riverman, be he white or colored, to come away from the platter while anything but bones remain!

Three-foot catfish are nothing uncommon in the big rivers of our central valley, and once in a while a five-footer is brought in. Writers as diverse in time and gifts as Pére Marquette and Mark Twain have devoted their pens to the Mississippi catfish. The former saw one in the Mississippi during the first day of his immortal voyage on that river, and he devoted more space to it in his diary than he did to the great stream itself.

Science News-Letter, July 19, 1930

Hydraulic Study to Save Millions

Hydraulic Engineering

MILLIONS of dollars will be saved the United States government as the result of a $350,000 investment in an hydraulic research laboratory at the Bureau of Standards, H. N. Eaton, now in charge of this work at the Bureau, said in a radio talk presented by Science Service over the Columbia Broadcasting System.

The savings will be effected, he declared, in the work now planned on flood control on the Mississippi and other rivers, in dams, waterways and irrigation projects. Billions of dollars will be spent in carrying out these plans, so the saving of even a small fraction will be a great gain to the country.

Appropriation of the funds for the hydraulic laboratory has recently been made by Congress and the plans for establishing it are now being considered by an advisory committee of leading engineers.

Describing the immediate financial value of the laboratory, in addition to its academic interest, Mr. Eaton said:

"We have already embarked upon the extension of our inland and coastal waterways at a probable cost in excess of $500,000,000. Flood control of the Mississippi and other rivers will cost us many hundreds of millions of dollars during the next decade. The immense Boulder dam on the Colorado river is to be constructed at a cost of $165,000,000. Consideration is being given to the construction of the Nicaraguan Canal at a cost undoubtedly in excess of $500,000,000. In addition, immense sums are being expended every year in irrigation projects, on hydroelectric plants and on water supply projects.

"Obviously all means which will permit a saving of even a small percentage of the cost of these huge projects will mean the saving of millions of dollars. This can be done with the aid of the hydraulic laboratory.

"The investigations conducted in its experimental flumes furnish more exact information to the designers of hydraulic structures and enable them to effect economies through the more accurate knowledge of the processes of flow with which they have to deal. Tests on models of proposed structures point out the most effective design, give added assurance that the structures will function as planned and indicate how maintenance costs can be reduced."

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Smallest Germ Viewed by Eye—*Continued*

hardening — multiple-sclerosis, many hardenings. These patches increase in number as the disease progresses.

Aside from the development of Barnard's ultra-microscope, the detail of technique which seems chiefly to be responsible for the discovery is the making of cultures in a completely sterile atmosphere. A chamber a little smaller than an egg crate is exposed to short wave lengths—ultraviolet rays—until the air it contains has been sterilized. The technician's hands and arms also are sterilized and introduced into this chamber through a device which prevents contamination. Hitherto, research with the ultra-miscroscope has been inconclusive because it has seemed impossible to obtain uncontaminated cultures. Miss Chevassut's technique appears to be a great step forward in this direction, and to have made the isolation of "creeping paralysis" germs possible.

A blood serum known as Hartley's broth is used for the cultures. Virus from the cerebro-spinal fluid of persons suffering from the disease is introduced into the culture tubes in the sterile chamber and the tubes are closed and incubated.

When the cultures are examined under a magnification of 1,800 times, spherical globules in clusters appear. When separated they have two motions, one a Brownian movement or very rapid vibration associated sometimes with inert matter under very high magnification. The other appears to be a longer oscillation comparable to the movements of some living bacilli. The apparent organisms are too small to take a stain and can be seen only on a dark field with direct illumination. As yet no nuclear material is evident.

But the fact that these forms are discovered only in the virus taken from persons suffering from the disease and that they appear to multiply in cultures, suggests very strongly that they are the first organisms of a filterable virus the human eye has seen and identified.

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