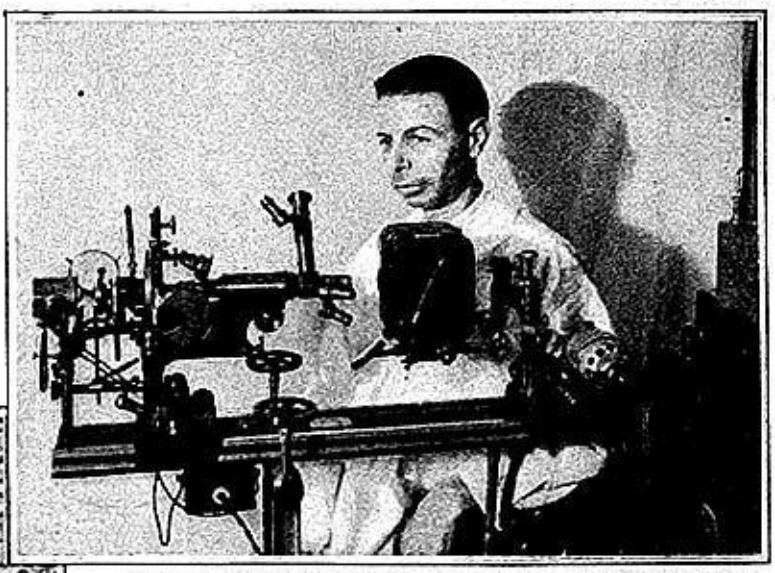
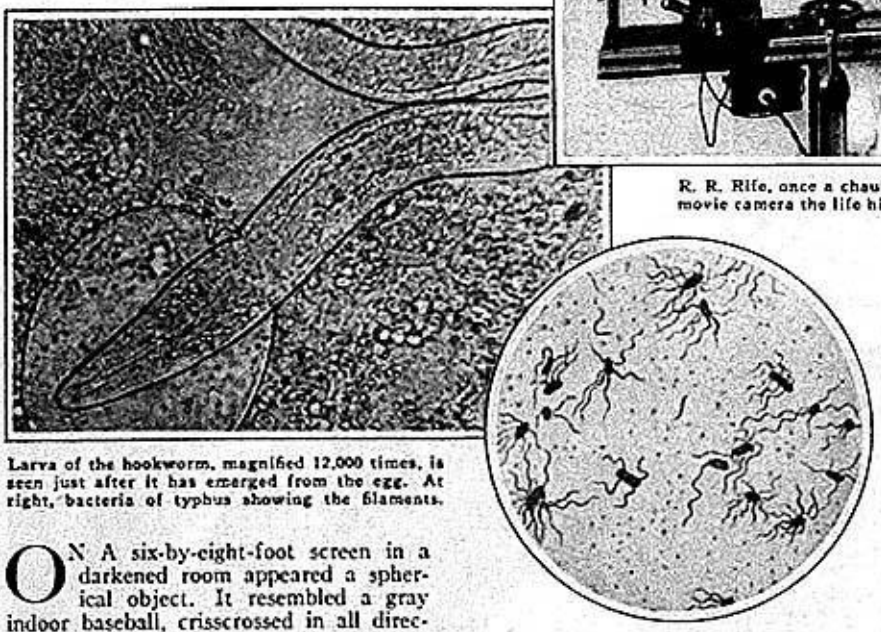
Movie New Eye of *Microscope* in War on *Germs*

By H. H. DUNN



R. R. Rife, once a chauffeur, has devised a means of preserving with a movie camera the life history of man's most deadly microscopic enemies.



Larva of the hookworm, magnified 12,000 times, is seen just after it has emerged from the egg. At right, bacteria of typhus showing the filaments.

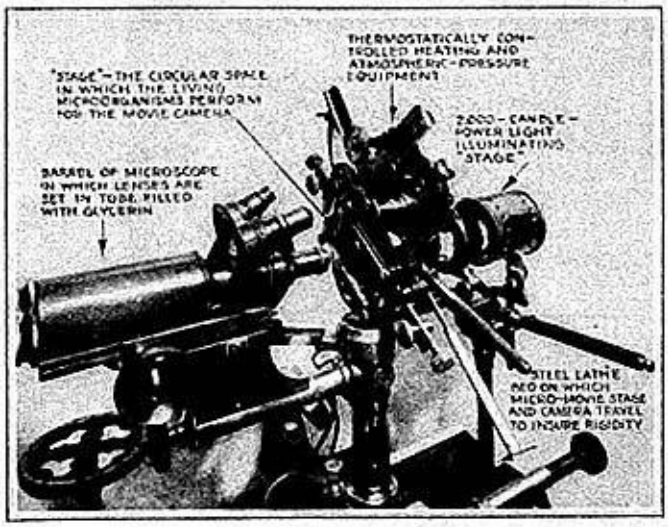
ON A six-by-eight-foot screen in a darkened room appeared a spherical object. It resembled a gray indoor baseball, crisscrossed in all directions by fine threads of silk. Slowly and aimlessly it rotated.

"The spore of the bacterium that causes lockjaw," came a voice from the loudspeaker of the motion picture apparatus. "Watch it!"

A dozen physicians and laboratory workers leaned forward. The sphere swelled. When it had become six inches or more in diameter on the screen, a dark line appeared across its middle. It parted. From it emerged a black bar, nearly as long as the diameter of the spore, spinning on its long axis—the cylinder-shaped germ of tetanus, or lockjaw. For what was probably the first time, a movie had shown the lockjaw spore hatching.

We were in the laboratory of R. R. Rife at San Diego, Calif. He is a pioneer in the art of making motion pictures of the microscopically small. Once he took care of half a dozen automobiles for their wealthy owner, a widely-known physician. Encouraged by the man of medicine, Rife began building his own microscopes in a laboratory fitted up in a room over the garage. In this little room, he has today more than $50,000 worth of microscopes and cameras. Most of them he has built himself.

For ten years he has worked to capture in motion pictures what the eye sees through the most powerful microscopes. He has succeeded and his work has won recognition from the medical profession. Now doctors may sit at ease in comfortable chairs and watch bacteria in their native surroundings on a motion picture screen. There they may compare their own observations of disease germs taken from patients with the life history of these microbes, preserved on motion picture film. It is estimated that the time required to diagnose certain diseases may be cut from days to hours by the use of the films.



It is with this mechanism, in a home built laboratory, that Rife magnifies minute organisms 12,000 times and makes pictures of their activity.

WHENCE come the actors in these strange movies? Rife propagates and rears all the microbes he studies, I learned, in an incubating plant of his own design. Deadly germs, housed in jars, are nursed as carefully as the frailest child. Delicate thermostats control the warmth of ovens in which the germs are kept active, or the coolness of refrigerators in which they lie dormant. "If the electric current holds out," Rife told me, "These microörganisms will be alive a million years from today, without the interference of a human hand."

When he is ready to make a movie, Rife places a small colony of disease germs on a quartz slide. Then he picks up one or more with a human hair, the finest obtainable, which is split lengthwise and mounted in a chuck beneath the lens of his microscope. Slowly he lowers this strange pair of tweezers onto the slide. Its halves part. Between them one or a few microbes lodge. Lifting out the hair, Rife transfers them to the stage of the micro-movie camera, and he is ready to film the life history of a germ.

An electric light of 2,000 candlepower falls upon the center of this microscopic movie studio—a tiny spot on the thin slab of transparent quartz that bears the germs. Above it, sixteen of the finest quartz lenses obtainable, immersed in glycerin, magnify the dimensions of each germ 12,000 times. Designed by Rife himself, this apparatus is one of the most powerful microscopes in the world; its magnification compares with the 2,000-diameter enlargement of microscopes commonly used in research laboratories and in medical examinations.

The small camera at the observation end of the microscope starts. Into this

(Continued on page 141)

MOVIE NEW EYE OF MICROSCOPE

(Continued from page 27)

camera Rife has built a twenty-one-jewel, high grade watch movement that automatically makes pictures at any desired interval—from the usual sixteen or eighteen a second to one every five hours.

THUS he has been able to record on one film the complete life story of the hookworm, from the hatching of the egg to the full development of the serpentlike parasite. "I set the camera controls," Rife explained, "and placed one egg of the hookworm in the center of the stage. When I returned, seventy-two hours later, I had a complete film record of the parasite." The film takes only a few minutes to run off, but a research worker bending over his microscope would spend three days and nights, an all but impossible task, to see the same things happen.

Either as he makes the film or afterward, Rife records a lecture to accompany it upon a sound strip synchronized with the pictures. He explains, too, the effect of special treatments administered to the germs under the camera's eye, such as doping them with drugs, or testing the effect of heat and cold.

Weighing germs and timing the speed of their movement are some of Rife's feats in microscope land. He showed me a quartz slide bearing several hundred typhus germs, invisible to the eye, and then slipped it beneath the microscope. I peered into the eyepiece and saw a score of small black objects which appeared about an eighth of an inch long. Waving wildly from each were from one to eight black filaments. Hither and yon they dashed so rapidly that the eye could hardly follow them.

"If a man could move proportionately fast, he could travel on his own feet more than 500 miles an hour," Rife said. He timed them by etching measured lines on the slide and noting how many lines they crossed in a fixed time.

"We have weighed them on extremely delicate balances," Rife added. "The weight of these disease germs averages one-184-trillionth part of an ounce."

HOW various rays affect the lives and activities of disease germs was another thing that Rife wanted to find out. One day he rigged up an electric discharge tube, an instrument of which the X-ray and cathode ray tubes of laboratories are special forms, and shot through it the comparatively high current of sixty-four milliamperes. He obtained a strange ray that casts a greenish glow on the surrounding atmosphere, and of a sort beyond the usual range of X-rays. It penetrates air so easily that it may be detected at great distances from the tube. Rife devised a liquid screen of salt solution and acid to protect his hands against injury from the ray.

While X-rays had no effect on lockjaw germs, and ultra-violet or invisible light rays merely halted their development, Rife discovered that the green ray would destroy the microbes. Now he is making a movie of that operation.

Rife has devised a magnetic compass so delicate that it can be used to study the electricity and magnetism in living germs. He suggests that if the electrical make-up of certain dangerous germs is learned, it may some day be possible to destroy them in the human body by applying small doses of electricity. In no way, however, Rife makes clear, does this idea uphold the claims of medical fakers that they can cure disease by applying electrical "vibrations" to the body of a patient.