

BACTERIOLOGY-MICROSCOPY

Filterable Germ Forms Seen With New Super-Microscope

Device Using Quartz Optical Parts Makes Possible First View of Organisms Rendered Filterable by K Medium

USING the new "super-microscope" invented by Dr. Royal Raymond Rife of San Diego, Dr. Arthur Isaac Kendall of Northwestern University Medical School has seen for the first time the exceedingly minute moving bodies that apparently carry the life of bacteria when these are induced to "dissolve" into a form that will pass through the pores of the finest porcelain filter and still remain alive and able to resume their microscopically visible bodies upon suitable treatment.

The work was done at the Pasadena Hospital, and will be reported in the official publication of the California Medical Association, *California and Western Medicine*.

The material used by Dr. Kendall was a culture of the typhoid bacillus, ordinarily a fairly large germ, easily visible under the higher-powered lenses of a compound microscope. By feeding it on his recently-evolved "K medium," which apparently has the power of causing all visible bacteria to pass over into an invisible, filterable phase, Dr. Kendall induced the bacilli in his cultures to go through this change. Under the highest power of the ordinary microscope, he could see nothing moving in the fluid, except a swarm of rather active little granules that were visible only as tiny motile points.

Small, Motile, Turquoise-Blue

Examined with the Rife microscope, however, these points became plainly visible as small, oval, actively moving bodies, turquoise-blue in color. These appeared in all the cultures, and could be transferred from one culture to another through the fine-pored filters; so Dr. Kendall considers them to be the actual filterable forms of the typhoid bacillus.

He put them to another, more definitely crucial test. Reasoning that since they were all that were to be found in "K medium" cultures of more than eighteen hours' growth, he might find them in an intermediate state in younger cultures, he tried examining samples from cultures exactly eighteen hours old.

In these he found both full-sized bacilli still unchanged, and his small, turquoise-blue bodies, and in addition there were peculiarly altered bacilli within whose substances the turquoise-blue bodies could be seen. These he holds to be bacilli caught in the act of changing from the filterable to the non-filterable phase.

This visual demonstration of the hitherto invisible, living and moving particles of the filterable phase of a bacillus is hailed editorially by *California and Western Medicine*. Of Dr. Rife's microscope the editorial says:

"Whereas our present microscopes magnify from one to two thousand diameters, in this new microscope we have an instrument for which a magnification as high as seventeen thousand diameters is claimed. This is certainly a long stride from the initial efforts of Van Leuwenhoek, whose simple instrument may be said to have laid the foundation for the science of bacteriology which later came into being; and by means of which science much of the world's progress in man's conquest of

the infective and other diseases has been made possible."

In the forthcoming article only meager details of the new microscope itself are given. It is made known, however, that all the optical parts are of quartz instead of the usual glass, that attachments make possible spectroscopic examinations and motion pictures of the material under the lens, and that magnifications up to seventeen thousand diameters are possible. The work on Dr. Kendall's filterable typhoid germs was done at a magnification of five thousand diameters.

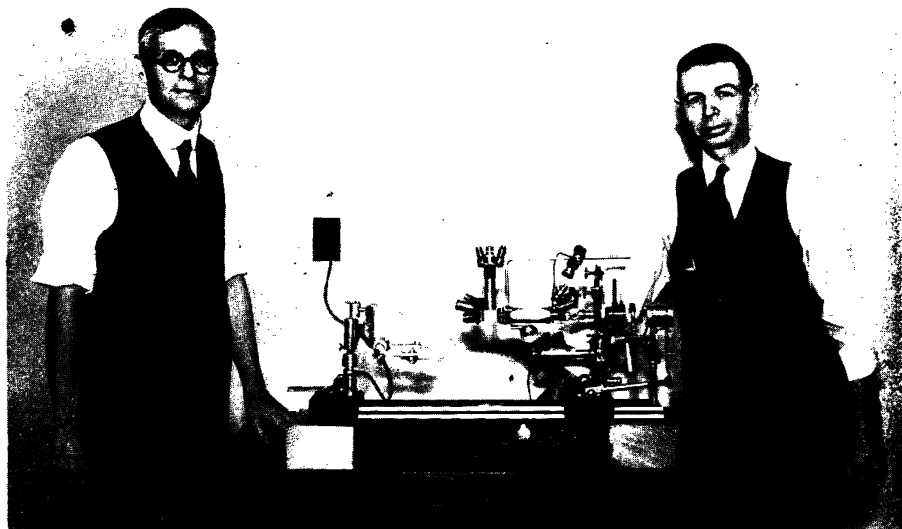
The light used with Dr. Rife's microscope is polarized, that is, it is passed through crystals that stop all rays except those vibrating in one particular plane. By means of a double reflecting prism built into the instrument, it is possible to turn this plane of vibration in any desired direction, controlling the illumination of the minute objects in the field very exactly. Further details regarding the mechanical construction and the optics of the sensational new instrument are promised soon.

Science News Letter, December 12, 1931

ARCHAEOLOGY

Grand Stairway Unearthed In Ruins of Monte Alban

DIGGING in the principal plaza of the old ruined city of Monte Alban, a Mexican archaeologist, Alfonso Caso of the Mexican National Museum, has unearthed a grand stairway 130 feet in width. Monte Alban was a city



TO 17,000 DIAMETERS

Magnifications as great as this are claimed for the new Rife microscope, which made visible the hitherto unseen living particles in the filterable stage of the typhoid bacillus. At left, Dr. Arthur I. Kendall, Northwestern University Medical School; right, Dr. Royal Raymond Rife of San Diego, who built the instrument.

built by Zapotec Indians and abandoned before the Spanish Conquest.

The stairway which has been cleared gave access to a platform in the city plaza. To reach the platform, the people of old Monte Alban climbed thirty-five steps.

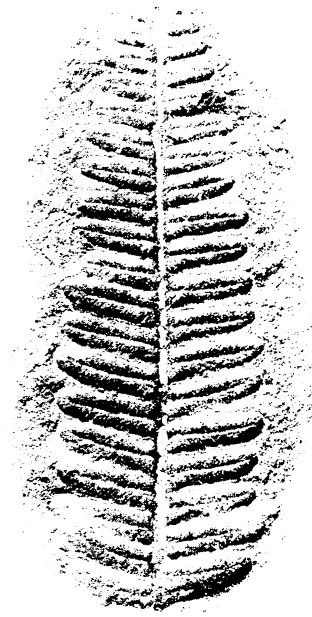
It was a common practice in Mexico to enlarge old structures when they became too small by covering them with an outer shell. This was done at the stairway of Monte Alban. Beneath the stairway first discovered, the archaeologists have found an older, inner stairway which appears to be intact and superior in construction to the newer,

outer stairway. The outer stairs were in their turn concealed by an even later set, but only traces of these can be seen.

At each end of the big platform are mounds, formed of a series of small superposed platforms. One of these mounds still has the stumps of a temple on top.

Monte Alban is a complicated system of such mounds on top of terraces and platforms, placed symmetrically about sunken courts or other structures. These were built at various levels along a high mountain ridge. From the valley below, the serrated effect of the prehistoric city's sky-line may still be seen.

Science News Letter, December 12, 1931



SIGNATURES IN CLAY

Some of the most important of early historic documents have been found inscribed on tablets of clay, in the buried ruins of cities that were the abodes of kings and gods when Sumer and Akkad were young. Not less important are the signatures in clay, since hardened into stone, that tell some of the tales of the unmanned world, ages before even the dinosaurs wallowed in the swamps and crashed through the underbrush. The waste-heaps of many soft coal mines will yield abundant flattened-oval lumps of shale which, struck carefully on their edges, will split apart and disclose leaf or stem or fruit. This one yielded, for the inspection of Cornelia Clarke's camera lens, a perfect fern leaf.

PHYSICS

Airplanes See Through Fog With New Photocell Device

THE PHOTOELECTRIC cell, magic eye of science, has penetrated blinding fog with an effectiveness thousands of times that of the human eye and so gives promise of enabling the aviation industry to overcome one of its greatest handicaps.

This and other important facts about aviation light signals have been learned from studies at the General Electric Research Laboratory by Dr. Irving Langmuir, who first filled the vacuum of electric lamps with rare gases to make them shine brighter and last longer, and his associate, W. F. Westendorp. They reported results of their work before the annual meeting of the American Society of Mechanical Engineers.

A device was described which, it was said, will enable a photoelectric cell on an airplane to "see" through dense fog, light beacons on the ground entirely invisible to the eye of the pilot and thus enable the pilot to hold to his course.

Far More Sensitive

Its operation depends chiefly on the fact that the photoelectric cell is thousands of times more sensitive to diffused light—and all light from the ground will be diffused by fog—than the human eye.

To make sure that this super-sensitive electric eye will report airplane beacons and not just any lights on the ground, Dr. Langmuir and Mr. Westendorp suggested feeding special beacons with a 1000-cycle current so that they will give a rapidly flickering light. Since other

lights use either a 60-cycle or direct current, it will be possible to isolate the 1000-cycle signals and use only these for direction purposes.

Indicative of the extreme sensitivity of the photocell, the scientists said that even in full moonlight the photocell can detect a diffused modulated light of an intensity only one-thirteenth-thousandth of that of a diffused flashing light just visible to the eye.

Science News Letter, December 12, 1931

MEDICINE

Reports Success With New Treatment for Pellagra

A REMARKABLY successful method of treating pellagra, based on a new theory of its cause, has been reported by Dr. Ibrahim Sabry, skin specialist of the Government Hospital at Alexandria, Egypt, to *Lancet*, medical journal published in London.

Dr. Sabry's method consists simply of daily injections into the veins of a small amount of a sterilized solution of a common chemical, sodium thiosulphate.

The skin lesions which are a distressing feature of pellagra are checked in early cases after only a few injections and disappear quickly in late and lingering cases, Dr. Sabry claims. Gangrenous limbs, sometimes seen late in the course of the disease, soon heal under this treatment. Other symptoms clear up as the disease yields to treatment. From 20 to 60 injections are needed. So far

no complications have been met with.

Dr. Sabry considers these facts sufficient grounds for contesting utterly the idea that pellagra is caused by vitamin deficiency, since no disease due to deficiency of a vitamin has ever been known to improve without supplying the lacking vitamin, and certainly not from the mere introduction into the body of a drug that cannot contain any vitamin.

Instead, Dr. Sabry believes that the symptoms of pellagra are due to the presence in the body of a poison belonging to a chemical group having the name dioxiphenylalanine. This is closely related to tyrosine, which occurs normally in the body.

Dr. Sabry claims that the pellagra toxin which he calls "dopa" has been obtained from the vegetating seeds of beans. He therefore attributes pellagra in Egypt mainly to the eating of beans.

Science News Letter, December 12, 1931