BACTERIOLOGY

Bacteria Made to Change Forms by Change of Food

BACTERIA are made to live not merely a double life but a triple one, in the laboratory of Miss Agnes Quirk of the U. S. Department of Agriculture. By suitable modifications of their diet, she can at will make them visible or invisible, and she can make the visible forms develop two different kinds of colonies, on the solid nutrient media that constitute their food.

There is a certain parallelism between Miss Quirk's work and that of Dr. Arthur I. Kendall of Northwestern University Medical School in Chicago. Last summer Dr. Kendall announced his ability to make bacteria visible or invisible at will, using a special protein medium which he had developed. Miss Quirk controls the life forms of her bacteria without using an unusual type of food, but by controlling the acidity and alkalinity of the ordinary beef infusion broth and agar.

The bacteria which Miss Quirk was studying had a habit of forming spots or "colonies" of two different types, when cultivated in the laboratory. One colony type was smooth-surfaced, the other rough. Bacteriologists never knew why they did that. Miss Quirk found that she could produce either type at will from the same original stock, getting 100 per cent. "smooth" colonies on a poured agar plate when she left the culture medium chemically neutral, and 100 per cent. "rough" colonies when she made it acid.

She discovered further that the germs in "smooth" colonies are virulent and active, whereas those in "rough" colonies are less able to cause disease. She can convert either form into the other at will, merely by changing the acidity and physical state of its food.

The germs in both "smooth" and "rough" colonies are visible under the microscope; but Miss Quirk has found that at a certain stage of the growth of the smooth type organism, it can produce a filterable form, which can be induced to pass through the pores of a close-grained porcelain cylinder, and, after a period of time, be developed again into the microscopically visible form, retaining the characteristic virulence and behavior of the parent strain.

The bacteria used by Miss Quirk in her filtration experiments were those of two plant diseases; potato black rot and plant tumor.

The method for causing bacteria to produce at will, "smooth" and "rough" colony forms in pure plate culture, has been applied by Miss Quirk to thirteen plant pathogens and by Major James S. Simmons of Walter Reed Hospital to the Rawlin's strain of typhoid with success. The "smooth" and "rough" typhoid organisms were not tested for their pathogenic or antigenic properties.

It is believed that the technique for causing bacteria to assume a dual existence is applicable to many, if not all parasitic bacteria.

Miss Quirk believes that the invisible or filterable stage of the organism is reached during the transformation period of the smooth form to the rough form and that conditions can be imposed upon the organism to produce a filter-stage or invisible state and later be returned to the visible state.

Science News Letter, October 15, 1932

METEOROLOGY

Mt. Washington Station Begins Work for Winter

A WEATHER station on Mount Washington, N. H., which has the reputation of being the windiest spot outside of the "Home of the Blizzard" in the Antarctic, was opened to record the gales, blizzards and quieter moods of the weather on this highest point in New England. Already the snows have begun, and there is no prospect that the observers will lead an easy life.

The party that is attempting this arduous task is up there for the fun of it, but not simply to live there through the winter, though this in itself will be quite a trick. They will undertake to maintain a first order station and send out twice daily radio reports. They will also make many experiments in radio transmission.

In charge is Joseph B. Dodge, of the Appalachian Mountain Club, who has his home at Pinkham Notch at the base of Tuckerman Ravine. He will be a frequent visitor to the station on the summit, and will maintain a fully equipped weather station at the base. The base station should provide many interesting comparisons of wind and temperature with the top. Those who will live on the summit are seasoned mountaineers. R. S. Monahan spent several weeks on Alaska's icy mountains this summer with Bradford Washburn's Mt. Fayerweather party. Alexander A. Mackenzie, radio enthusiast, has been hutmastering at Pinkham Notch for the Appalachian Mountain Club. S. Pagliuca, electrical engineer, is thoroughly familiar with the White Mountains, and last summer was in charge of the Galehead Hut of the Appalachian Mountain Club system.

To obtain a weather record on a wind-swept summit is not easy, and for wind velocity and snowfall usually difficult. Anemometers will go round so long as they are not covered with ice. But how is an anemometer to be kept clear when the wind is building frostwork from cloud particles at a rate of one to six feet in a single night? The answer will probably be found in a heated anemometer, which the Blue Hill Observatory is constructing.

Snow falls so slowly that strong winds drive the flakes almost parallel to the surface of a mountain, up one side, across the top and down the other. Therefore, a cylindrical gauge with the usual horizontal receiver may catch only a little that may swirl into it. The rest is dumped into one of the ravines. Shielded gauges, with receivers parallel to the mountain slopes, will be constructed out of furnace piping and placed at various points on and around the summit.

To the summit of Mount Washington, altitude 6,288 feet, there have been transported in addition to instruments, coal, food and other material, ten cylinders of hydrogen weighing 1300 pounds that will be used during the winter to inflate 225 meteorological sounding balloons.

Science News Letter, October 15, 1932

If the prevailing winds of the eastern United States were to reverse themselves, the climate would become semi-tropical and rainfall would be very heavy.

Cucumbers were grown for the Roman Emperor Tiberius all the year round, by means of "frames" on wheels which were rolled into buildings for protection against cold and frost.