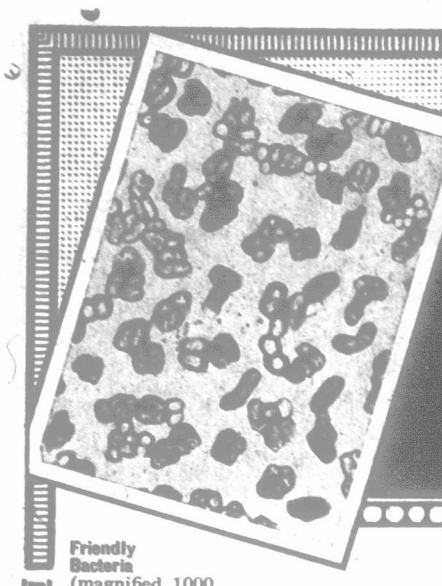
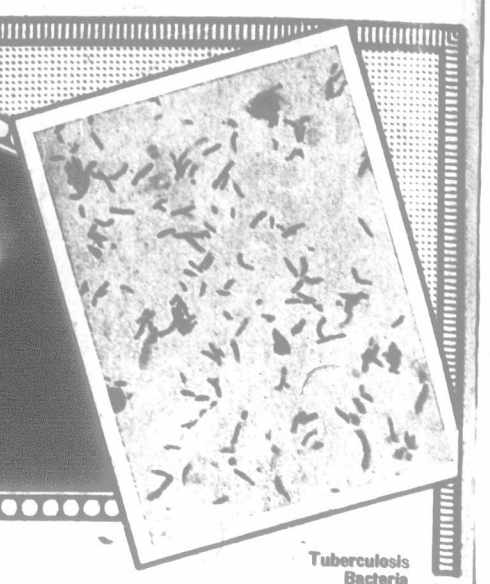
The Farmers' Friends and His Foes



Friendly Bacteria (magnified 1000 diameters) which fix nitrogen in the soil for the use of plants. They make millions of dollars for farmers.



Tuberculosis Bacteria (magnified 1000 diameters) which cause one of our worst diseases. They are responsible for huge losses to farmers.

Bacteria, though the smallest of these, are most important of all. Upon their activities depend the farmer's livelihood, his profits, in fact, life itself. Some bacteria are true friends, but others are bitter foes. It means dollars in every man's pockets to understand the action of these tiny organisms.

Bacteria are really plants—but so small as to be seen only with a microscope. There are many different kinds, but the great majority are beneficial. Among these are the soil bacteria. Some, however, are harmful, as those causing decay of foods and most of the infectious diseases of man, animals and plants. It is the part of wisdom to encourage the development of beneficial bacteria and to prevent the growth of the harmful kinds so far as is possible.

Bacteria and the Soil.

An ounce of cultivated soil contains millions of living bacteria. It is their function to prepare plant food that is in the soil for the use of growing plants. Without their action the plants growing in the soil could not develop into profitable crops.

Nitrogen in the form of nitrates is a necessary part of plant food, and the nitrates are among the most expensive of fertilizers. Certain species of bacteria provide this important plant food by fixing the nitrogen present in the air, which later is transformed to nitrates. Therefore, their activities should be encouraged. This is done, first, by keeping the soil well drained, so that it will be dry, porous and thoroughly aerated; second, by keeping the soil free from any acid by the addition of lime. The nitrogen-fixing bacteria will not grow where acidity is present, and they need a thoroughly aired soil.

Legume Bacteria.

One species of nitrogen-fixing bacteria works only in combination with leguminous plants, causing the production of nodules on the roots of clovers, peas, beans, vetches, etc., in which nitrogen is stored. Thus a good crop is raised and valuable fertilizer is thrown in free for good measure. If the necessary kinds of bacteria are not in the soil they should be put there by legume seed inoculation. **Bacterial cultures for treating legume seed may be obtained from the Bacteriological Laboratory of the Ontario Agricultural College, at 25 cents each.** Each culture is enough for 1 bushel of seed.

Bacteria and the Water Supply.

Some species of bacteria are normally present in natural waters, and their presence is not injurious to those drinking the water. Other species, however, are liable to be present as a result of the contamination of the water from surface drainage and seepage. These contaminating organisms are liable to lead to serious results, as typhoid fever, in those drinking the water. Care should thus be taken to prevent all surface or seepage contamination of the drinking water supply. **Farmers' well water will be tested on application to the Bacteriological Laboratory of the Ontario Agricultural College. If the water is proven to be impure, simple directions will be given for the cheap improvement of wells.**

Bacteria and Milk.

All the changes that normally take place in milk after it is drawn are due to the action of the bacteria that get into the milk during the milking operations and subsequent handling.

The bacteria get into the milk from poorly-washed and imperfectly scalded milk vessels, dirty hands, bits of dust, hay, straw, hair, manure, flies, and such like materials that drop into the milk pail. Some of these are removed by the strainer—but straining does not remove bacteria. These bacteria are responsible for the milk souring and putrefying.

The greatest care should be taken to thoroughly wash and scald the milk pails and other vessels, and to keep out of the milk all particles of contaminating material such as those above mentioned. **Full directions will be supplied free upon request.**

Bacteria Cause Infectious Diseases.

Tuberculosis, anthrax, symptomatic anthrax, infectious abortion and hog cholera are some of the worst diseases affecting animals. Each one is caused by a different species of bacteria. Many of the worst diseases of plants are also caused by bacteria. Together these diseases cause an enormous loss annually to the farmers of Ontario, which by foresight and proper methods might be quite largely prevented.

Consider two of these most serious bacterial diseases, for example:

The Dreaded "White Plague."

Tuberculosis is a slowly developing disease affecting man, animals and poultry. Estimates tend to show that it causes more loss than any other disease. It is present in many herds of cattle where it impoverishes the health, reduces the milk flow and longevity of the cattle, and amongst many flocks of poultry, where it diminishes the egg production and causes many deaths after reducing the birds frequently to skin and bone.

It is very desirable that every farmer who has a herd of cattle should have each member of the herd tested for tuberculosis with the **Tuberculin Test.** This will enable him to weed out from his herd those animals that are affected with the disease, and so prevent the disease from spreading to the healthy stock. So long as the disease is present in the herd it means a steady drain on the returns from the herd. It costs more to keep tuberculosis in the herd than to eliminate it. Tuberculin testing followed by the isolation or slaughter of reacting animals is the only satisfactory way to control the spread of the disease.

When the disease is found present in a number of birds in a poultry flock, the best thing to do is to kill off the flock, disinfect the premises and start anew with healthy stock. **Sick and dead birds are examined free at the Bacteriological Department, Ontario Agricultural College.**

Infectious Abortion of Cattle.

This is a wide-spread disease resulting in heavy losses to the cattle breeder. It is caused by **Bacillus abortus,** which gets established in the uterus of pregnant cows and there causes an inflammation which results in the expulsion of a dead foetus, or in premature birth. Frequently in such cases, the fœtal membranes or afterbirth fail to come away normally, thus necessitating their artificial removal or death from blood poisoning will ensue. There are usually no marked symptoms of the trouble until abortion takes place, the general health of the animal not being affected. The abortion bacillus is present in large numbers in the placental fluids, and in the discharges from the vulva after abortion. Consequently, the fœtus, fœtal membranes and fluids should be buried deeply in quick lime, and an immediate, thorough disinfection of everything with which they come in contact is necessary. The cow after abortion should be kept isolated from the rest of the herd until all discharges from the vulva have ceased. The external genitals, thighs and udder should be washed with a disinfectant daily, and care should be taken that the hands and clothes of the attendant should not get contaminated with the discharge without a thorough disinfection following. Attempts are being made to produce a serum or vaccine that shall prevent abortion following its use on pregnant animals.

Prevention Better Than Cure.

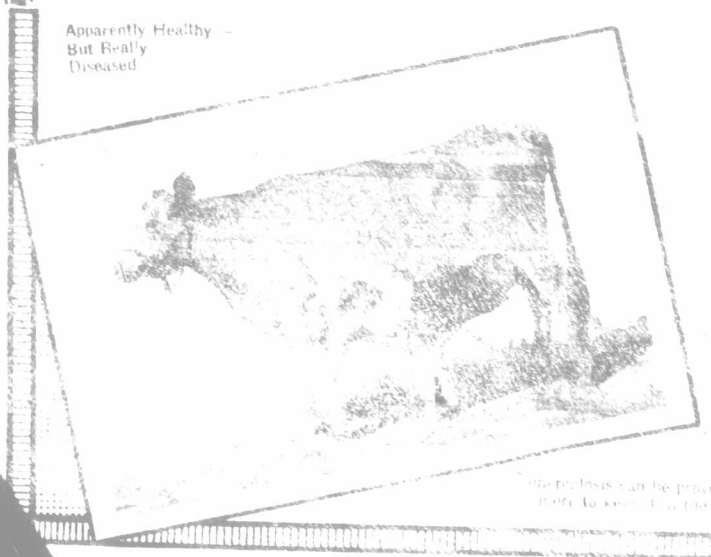
It pays to be forehanded in this regard. It is cheaper to prevent a disease than to cure it. The natural enemies of all these destructive bacteria are cleanliness, dry, fresh air and sunlight. Bright, dry, clean stables are the best medicine for preventing disease. Artificial disinfectants, as any of the coal-tar products, are very valuable also.

Similarly it pays to provide the best possible environment for those bacteria which are beneficial—which work without pay in the farmer's interest.

It Does Not Require a course in bacteriology to do this. By following a few simple directions, supplied by a competent bacteriologist to meet the special requirements of the case in point, any farmer can aid his bacterial friends and combat his bacterial foes. **Such information will be supplied in detail, free of charge to any Ontario farmer requesting it. A bulletin will soon be available for Ontario farmers, giving general information upon the subject.**

In seeking assistance regarding your special problems, kindly give full particulars. If your crop yields are not satisfactory, or if your stock is not thrifty, kindly send full details regarding your methods, stables, etc. Write the Office of the Commissioner, Ontario Department of Agriculture, Parliament Buildings, Toronto.

Apparently Healthy But Really Diseased



Ontario Department of Agriculture

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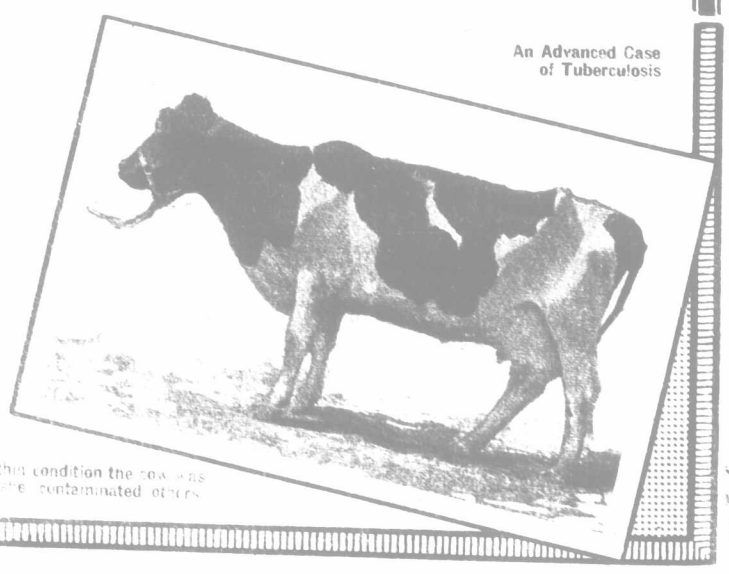

An Advanced Case of Tuberculosis

Even in this weak and thin condition the cow was a heavy milker but she contaminated others

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