

Home Course In Modern Agriculture

XI.—Bacteria—How They Affect the Farmer

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WE hear a great deal about bacteria, or germs, as they are more popularly called, but few people know what they really are. Although they are so small that it would take several thousand together to make a spot large enough to be seen with the naked eye, yet their importance to the farmer is not measured by their size.

Bacteria are tiny plants, each composed of a single cell. These cells are of various shapes and sizes. Some are round, some long and some shaped like a corkscrew. Some are found singly and some in groups. Some cannot move at all, some move by twisting themselves about, and still others have long, tail-like flagella by which they move themselves along.

Bacteria are made up of a clear, jellylike material called protoplasm. This protoplasm is surrounded by a harder cell wall. There is a great difference in the thickness of these cell walls, and on this thickness depends to a large extent the ability of the germs to withstand unfavorable conditions. Those with thin cell walls can be killed easily, while the thicker walled kinds are very difficult to exterminate.

Bacteria propagate themselves by dividing. One cell divides into two. Each of these two grows to full size and divides again, and so on. Under favorable conditions this process may be repeated every half hour. At this rate the descendants of one germ would in ten hours number more than a million.

At times the part of the protoplasm of a germ will gather into a round, comparatively hard mass, called a spore. The rest of the cell then crumbles away. This spore is inactive, but possesses much greater powers of resistance than when in the active state. These spores often remain alive to start the infection afresh after the active bacteria have all been killed by disinfection.

Bacteria, like higher plants, have definite requirements for growth. One of the most important of these is moisture. Drying will not kill bacteria, but it will stop their multiplication. Another essential to bacterial growth is warmth. Cold, like dryness, will not kill them, but it will stop them from multiplying. This is the reason that the souring of milk or the spoiling of meat, which is caused by bacteria, goes on much more slowly or not at all when they are kept in a cold place.

One of the principal foods of bacteria is nitrogen. Without it they cannot live. Because of this fact sugar and lard, which contain no nitrogen, never spoil. Bacteria also require oxygen, though only certain species are dependent on the air for their supply. One of these is the kind that causes meat and vegetables to decay. This is why canned fruit and vegetables do not spoil. The bacteria have been killed and the oxygen driven off by heating. The few germs that do get in before the can is sealed up cannot develop for lack of air. If the can is not air tight, however, some oxygen will find its way in, the germs will multiply, and the contents will spoil.

Not all bacteria are injurious. Although some of man's most deadly enemies are found among these invisible micro-organisms, yet many of them are his best friends. We have already learned about the bacteria that live on the roots of legumes and change the nitrogen of the air into a form in

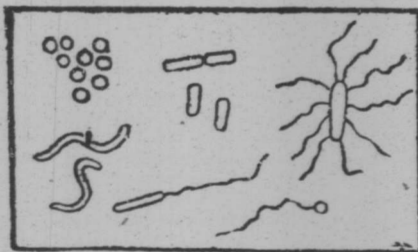


FIG. XXI—SOME TYPES OF BACTERIA, which it can be used by plants. The rotting of manure and trash to make humus and of humus to make the elements of plant food available is also due to the action of bacteria. In this way bacteria, by making animal wastes available for plant food, complete the circle of plant and animal life.

The putrefying bacteria, or those which cause rotting, are more beneficial than harmful. By their action dead animals and other refuse matter are quickly reduced to the elements from which they were made. Even the odor given off during the process is also beneficial as a reminder that the matter of burying or burning has been neglected.

Other micro-organisms in the form of yeast are a necessary help in bread-making. The yeast plants, growing in the dough, set free considerable amounts of carbon dioxide. This gas being lighter than air fills the dough with bubbles and makes it rise.

Bacteria which cause milk and cream to sour are also useful. Butter made from sweet cream is lacking in flavor and there is not so much of it as in the case of butter that does not sour as readily as in sour cream. But while the germs that cause milk to sour are harmless, there are others

often found in milk that are not. The first variety will always be plentiful enough anyway, and the others should be kept down to as small a number as possible.

One of the most important methods of doing this is by cleanliness. The milk pails and strainers and the separator should be thoroughly cleaned every time they are used. Mere rinsing with cold water is not enough. Following the ordinary washing by scalding with boiling water is the only sure way of killing all the germs. In cleaning dishes a brush is much better than a rag, since it can be more easily cleaned itself. A dish rag remains damp for a long time after it has been used and furnishes an excellent place for bacteria to grow. The "dish rag flavor" caused by these can often be detected in butter.

After the dishes have been scalded they should be placed in the sun for several hours. There should be as

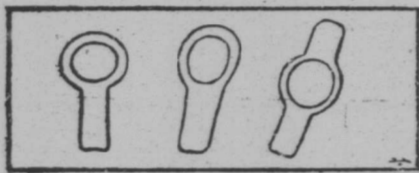


FIG. XXII—HOW SPORES ARE FORMED.

much sunshine as possible in the milk room and cow stable also. Sunlight, which is so necessary to the growth of the higher plants, is fatal to bacteria.

The stable where the milking is done should be cleaned and aired every day. A coat of whitewash should be applied occasionally, as in addition to being a good germ killer it also makes the stable much lighter. Hay should not be fed immediately before milking, as the dust from it is covered with bacteria. The udders and flanks of the cows should be kept perfectly clean. A little dirt falling from them into the milk will take with it thousands of germs. The milk should not be left in the barn after it is drawn, but taken immediately to the milk room.

Many creameries and city milk dealers practice pasteurization. This simply consists in heating the milk to as high a temperature as possible without scalding it. This kills most of the germs, and the few that are left will not develop rapidly enough to do much harm. In creameries a starter—that is, a portion of milk which contains a particular kind of bacteria—is added after pasteurization and the cream then "ripens" for twelve hours or so. By thus supplying germs which are known to produce desirable flavors and killing the others butter of very high quality may be made.

There are bacteria everywhere—in the soil, in the air and in the water. By far the greater number of these are harmless. Even disease germs are unable to obtain a foothold in a perfectly healthy animal or person. The secretions of the mouth and the digestive organs are fatal to many of them. Even if they succeed in getting into the blood they are not yet out of danger. The blood contains large numbers of white corpuscles, which seem to have no duty to perform but to seize and destroy these invaders. It is only when an animal becomes weakened from one cause or another that these corpuscles fail to do their duty and the germs begin their destructive work.

The first step in avoiding infection by disease producing bacteria, then, is to keep the animals healthy by proper food, exercise and shelter. The next point is to do everything possible to prevent the germs from getting into the animal's body.

In case a contagious disease of any sort appears the sick animals should be shut up by themselves as far as possible from the rest of the herd. Disinfectants, such as coal tar dips and bicarbonate of mercury (one part of the chemical, two parts salt and 1000 parts water), should be used freely. There should be taken not to carry the germs from the sick animals to the well ones while caring for them.

Wounds, such as wire cuts, need especial care to prevent infection. Ordinary disinfectants are too irritating, and something must be done to keep the bacteria from attacking the raw surfaces. Keeping the wound bound tightly and substituting daily with iodine solution is one of the best ways of insuring rapid healing.

Another problem, like the problem of wounds and insects, is easily solved if it is done at in the right way. The flies, sunlight and disinfection should do much to hold the injurious ones in check, and the others need encouragement to continue doing their invisible though none the less real work to help us. There is no other reason why the germ problem should be made a matter of constant business on the part of the farmer.

It requires a scientist to determine which bacteria that may infect a cow and those that are harmless, and the insurance it is safe to take is to destroy all of them. The ordinary method is to scald the udder and flanks with boiling water, and to scald the milk pails and strainers and the separator with boiling water. It is fortified by the fact that the scientist to make a special study of bacteria. Let the scientists do that.

ESTIMATES FOR YEAR BROUGHT DOWN

Show Big Increase Over Last Year Northumberland County Has Not Been Forgotten.

The estimates for the year were table in the Canadian House of Commons on the 18th inst. They show a large increase over last year. Of the special appropriations, the following relate to Northumberland County: Neguac extension of wharf \$2,000. Chatham, diversion of railway and branch to wharf \$300,000. Missing Link \$2,000; Improvements at Loggieville \$12,000. The sum of \$675,000 has been set apart for dredging in the Maritime Provinces, but what part applies to the Miramichi is not stated.

LETTER FROM A FORTY-NINE

Here is a simple, interesting and sincere letter from a rugged pioneer of '49, who braved the dangers and hardships of the overland trail to California. It should appeal to all catarrh victims.

Santa Rosa, Cal., May 5, 1908. Booth's Hyomei Co., Buffalo, N. Y. Dear Sirs—I was afflicted with catarrh and tried a number of remedies but received no relief. I purchased an outfit of Hyomei, and before I had used the bottle I noted a marked relief. I used it for a month or so, and thought I was cured, and stopped using it for a year or so. Thought I was getting catarrh again, and started using it again. I use it every morning, and keep myself clear of catarrh. I consider it the best catarrh medicine that is used. I have often recommended it to my friends. I am 81 years old. I came to California in 1849, and of course am not as vigorous as I was 58 years ago. My address is 841 4th Street. Yours truly, W. Mock.

Hyomei (pronounced High-o-ne) is guaranteed by T. J. Durst not only for catarrh, but for grip, coughs, colds, bronchitis and croup. A complete outfit, including inhaler, costs only \$1.00; extra bottles of Hyomei, if afterwards needed, cost but 50 cents.

READ MYSTERY AS DEEP AS EVER

Montreal, Nov. 25.—The clue which Detective Markey has been following in connection with the missing Herbert Reed was run to earth this morning and proved to be foundationless, as it was another party who resembled Reed that the police rounded up. The mystery is as deep as ever.

DR. AGNEW'S OINTMENT CURES PILES.—Itching, Bleeding and Blind Piles. Comfort in one application. It cures in three to six nights. It cures all skin diseases in young and old. A remedy beyond compare, and it never fails. 35 cents. Sold by A. E. SHAW'S Pharmacy, 63.

A FLAG OUTRAGE

Kingston, Ont., Nov. 25.—There is indignation here over picture postcards of Grant Hall, Queen's University, showing the Stars and Stripes flying over the building, being offered for sale. Citizens are being urged not to purchase the cards until they bear the proper flag.

FERROVIM is the pleasing name of the best preparation of Beef Iron and Wine ever placed on the market. If you or any of your friends are anemic, generally run-down, pallid, easily exhausted, try one bottle of Ferrrovim and you will be gratified by the result. \$1.00 at druggists.

Things have come to a pretty pass when Englishmen cannot have a dinner without being the victim of attack by suffragettes.

ONLY SUCCESSFUL REMEDIES are ever imitated. It is evident that "D. & L." Menthol Plasters successfully relieve rheumatic pains, backache, pleurisy, etc. "The D. & L." have been so widely imitated. Avoid disappointment. Get the genuine. Made only by the Davis & Lawrence Co.

A Winnipeg bank manager says the farmers are getting all the money. We have waited for a long time past where all the money was going to.

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CHRISTMAS STAMP CAMPAIGN

THE 1909 BATTLE AGAINST THE DREAD WHITE PLAGUE.

Available Beds in the Muskoka Free Hospital for Consumptives Increased Three-Fold as a Result of Last Year's Sale of Christmas Stamps. The Number Can Be Doubled This Year If Everyone Will Help.



STIMULATED by the success of a year ago the National Sanitarium Association have made large preparations for the sale of the Christmas Stamp of 1909-10, issued on behalf of the Muskoka Free Hospital for Consumptives.

Nearly \$8,000.00 was netted from last year's sale, making it possible for the trustees to increase the available beds for needy patients from an average of fifty-five a year ago to one hundred and forty, the accommodation to-day.

The trustees are hopeful that they may bring the accommodation up to 300 beds as the outcome of this year's sale of this little one cent messenger of hope and healing.

The Christmas Stamp, as a means of fighting the dread white plague, had its origin in Denmark in 1904, the sale from which has financed a hospital for consumptives in that country. The idea was taken up by the Red Cross Society of the United States in 1907, and interest has grown each year.

A year ago a Christmas stamp of special design was put in circulation by the Muskoka Free Hospital for Consumptives with the success already indicated in this article.

The price of the individual stamp is only one cent, but what wonderful things can be accomplished by so tiny an instrument. There is no reason why everyone who writes a letter, addresses a postcard, mails a newspaper or parcel from this day out should not use one of these stamps.

The educational value of the stamp appearing on every piece of mail matter would be enormous. One can hardly figure up the material results. It would mean a routing of the enemy

Tuberculosis that would bring hope and joy and gladness to thousands of homes and communities in all parts of Canada.

The stamp of 1909 is more beautiful than that of a year ago. The design is as shown in this article, but printed in red and green, and is of same size as the regular government postage stamp.

This Christmas stamp will not carry any kind of mail, but any kind of mail will carry it—and carry too the happy Season's Greetings from sender to receiver. The stamps will be done up in envelopes of ten, twenty-five, fifty and one hundred for ordinary selling, and large users will be supplied in quantities. The price for ten or for one thousand is a cent each.

The banks, departmental stores, drug stores, book and stationery stores and many other stores will sell them. Women's clubs, church organizations, bible classes and Sunday schools, public schools, and many other organizations and individuals will help this year as last year.

There would seem to be no reason why everybody everywhere may not help in forming an army of willing workers to sell these stamps all over the Dominion. The Muskoka Free Hospital for Consumptives is in the fullest sense a national institution caring for patients from every province in Canada.

The first issue of the stamp for this year is one million, and these will be put into circulation immediately, but there can hardly be any reason why the issue should not be increased many times over before Christmas.

The direction of the sale of Christmas Stamps is in the hands of Mr. J. S. Robertson, Sec.-Treasurer, National Sanitarium Association, 347 King Street, West, Toronto, who will give prompt reply to any enquiries regarding the stamp.

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S. Kerr, Principal, Odd Fellows' Hall

I. R. C. TIME TABLE.

The I.R.C. change of time table went into effect on Sunday, Oct. 17th, is as follows:

DEPARTURE—NORTH	
Night freight, No. 39,	4.20
Maritime, No. 33	24.10
Local express, No. 35,	14.15
Way freight, No. 37,	13:00
DEPARTURE—SOUTH	
Maritime, No. 34,	8.20
Way freight, No. 38,	14.10
Local express, No. 36,	11.05
Night freight, No. 40,	2.20
INDIANTOWN BRANCH	
Blackville dep.	9.05
Indiantown dep.	9.34
Newcastle an.	10.55
Newcastle dep.	
Indiantown dep.	16.00
Blackville an.	17.20
Blackville an.	17.50

Wanted Now

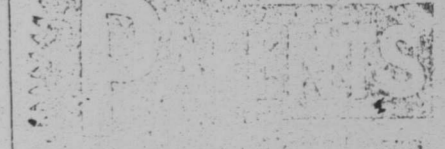
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It's time for Overcoats; Have Us Make Them, and you'll be satisfied.

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