

available to the following crop, and as a general thing grass seeds make a better catch on land which has been cultivated shallow the previous summer.

LESLIE TENNANT.

Brant Co., Ont.

The Common Grain Rust.

Reports of rust in certain sections of country have brought forth considerable inquiry regarding this disease so common among cereal crops the world over. There are several species of the rust family, but the most important of these is the common black rust of grain (*Puccinia graminis*). This species attacks oats, wheat, rye, sometimes barley and several of the grasses. This rust has two host plants—a grain, and the common barberry tree (a host plant is one upon which an insect fungus or other plant lives to produce its own life cycle). A part of the life cycle of the disease is completed on the barberry, the remainder on the grain. Rust is a sporadic disease; that is, it is reproduced or spread by spores. On the barberry, the rust attacks the leaves, the upper portion first showing the disease, when a number of small, flask-shaped bodies break through the upper epidermis or leaf skin. As time goes on, a second stage of the disease is reached, and spores break through the under side of the leaf. It is these spores which germinate, and upon the different grain and grass hosts penetrate the stomata or small openings in the plant's outer skin, enter the grain plant and begin to grow. Two types of spores are produced on the grain or grass plants. The first type, called uredospores, are reddish, and thus the plants show a reddish tinge where affected. This is the stage at which the rust is generally first noticed. As time goes on, the careful observer notices that the affected areas are showing a darkened color. This is caused by the production of a different type of spore (teleutospores), which are dark in color, and which appear just previous to or at harvest time. The blackened appearance is familiar to all who have had experience with the rust. This last type of spore will not, as a rule, germinate until it has been exposed to outside weather for all or nearly all of the winter. These germinate and attack the barberry, thus completing the life cycle.

The injury is done by the mycelium or body of the fungus using up the sap of the oat plant as it travels upward, laden with food material for the development of the seed. It is the same thing as tapping a spring. With a large portion of the food supply cut off, the seed is shrunk, and the amount of damage done depends upon the severity of the attack. Sometimes the attack is largely confined to the leaves of the grain. In such cases the damage done is comparatively light. It is only when the stems are attacked that the rust assumes dangerous proportions.

Rust is always worst in seasons of much close, damp weather, when the atmosphere is laden with moisture. The spores must have moisture to germinate, and they are carried by the wind from place to place, travelling in a moist air. Plants in the low places in the field are more subject to attack than those on the higher land. Late grain, or grain weakened by wet soil, or held back by other causes, is more susceptible than early grain or grain on well-drained land. The only means of control, then, is to destroy all barberry bushes, sow resistant varieties, for there are some varieties much more readily attacked by the fungus than others; sow the grain early and under-drain all low, wet soil.

THE DAIRY.

The Gases of Emmental Cheese.

Why holes in cheese? What makes them, and what do they contain? Exhaustive research alone can solve this tangle, but it is believed that the investigation reported in U. S. Bureau of Animal Industry Bulletin No. 151, bearing the title at the head of this article, has provided both a clearer definition of the problem and a sound basis of fact.

The so-called "eyes" in Swiss cheese are, as is well known, its most prominent characteristic, and its commercial value is largely dependent upon the proper size and spacing of these eyes. While the hole is not the whole of it, much depreciation in value of this popular variety of cheese, in both domestic and foreign kinds, is known to exist because of defects in eye formation. Hence, to the biological chemist their formation is a fascinating subject, and to the cheese-maker a matter of great importance. In certain districts the dealers rely almost entirely upon these features, and, shortly after the eyes have reached their proper development, relieve the maker of further care. Therefore, the American makers of Swiss cheese are unable to attend to their cheeses in that mellowed old age upon which so much of the fine flavor of a true Emmental

cheese depends. Although this quick marketing may be deprecated, it nevertheless raises the relative importance and adds significance to whatever knowledge can be gained concerning the process of eye formation.

The experimental work described in this bulletin, which can be secured by those interested from the Secretary of Agriculture, concerns the chemical contents of these eyes, the gases of which are immediately concerned in the process of their formation, and offers the following conclusions:

The gases of normal "eyes" in Emmental cheese are exclusively carbon dioxide and nitrogen, and of these only the carbon dioxide is of significance.

The nitrogen accompanying the carbon dioxide in normal eyes is that of air originally occluded in the curd at the time of manufacture.

There sometimes occurs during the initial fermentation an evolution of gas, characterized by the presence of hydrogen. This is believed to be due to the gaseous fermentation of sugar.

The hydrogen from such an initial fermentation may sometimes linger to contaminate the gas of normal eyes.

The two fermentations are distinct, and are characterized by their gaseous products. The one is detrimental, the other that demanded of a good Emmental cheese.

High oxygen-absorbing power, combined with low permeability of the cheese to air render the interior thoroughly anaerobic, and consequently favorable to the growth of anaerobic bacteria.

A comparison between the amount of carbon dioxide evolved and the total volatile fatty acids shows that the activity of the propionic bacteria of Von Freudenreich and Jensen is not sufficient to account for all the carbon dioxide found.

It was found that cheese was capable of retaining a very large amount of carbon dioxide.

The possibility is suggested that there are two phases in the formation of normal eyes, a saturation of the body with carbon dioxide, and an inflation of eyes; and the bearing of this hypothesis on the production of gas by a specific cause, is discussed.

Autumn Feeding of Dairy Cows.

Editor "The Farmer's Advocate":

Silos are not in use in this district. The season is not long enough to have any degree of certainty about maturing corn suitable for silage, although occasionally we have a season such as that of 1911, that matures corn such as Compton's Early all right; so that, what little corn is grown for fall feeding is mostly fed as it is taken from the field, which usually lasts from two to four weeks. We find that we get best returns from feeding when the corn comes to the roasting stage, and we have not tried any of the millets.

Pastures are generally getting pretty well eaten down by the last of July. By that time, we plan to have some oats, peas and vetches (which do better sown rather more thickly than if grown for seed), ready for cutting, and which should be sown a portion every week or ten days, the size of the plot depending upon the size and capacity of the herd. This should last until the corn is ready, although we usually have some second-growth corn to help out through this season.

Corn and green fodder are always fed in the stable; and, if pastures are very short, the stock are kept in the stable the greater part of the day to increase the supply of manure for fall use. We prefer to have two fields for pasture, and change occasionally. Change of pasture is good for cattle, especially if the change is a good one.

We never feed off or even allow the stock on new-seeded meadow; it might be good for the stock, but ruinous to the next season's crop of hay or pasture. The feeding of after-growth clovers is mostly confined to that portion of last year's seeding that is intended for pasture the following spring, and which is better not cropped too bare.

Have not tried sowing such crops as rye, oats, turnips, or rape, on unseeded stubble. Would think the season too short, after the grain is harvested, to get good results. I might say that we are now seeding with rape a field of last year's seeding of clover and timothy, that is intended for roots next season. After getting a light top-dressing of manure last fall, we put on something like thirty cart loads to the acre and plowed in lightly, dragged it over with plank drag and a few turns with the smoothing harrow, running lengthwise with the plowing; got it ready for seeding, which was done with a disk drill, sown from grass-seed spouts turned to drop the seed in front of disks. After sowing, one scrape was given with harrow, and then rolled.

Colchester Co., N. B.

J. R. SEMPLE.

The Cow's Version of Her Position.

The keeping of a large number of boarder cows is not a subject which would rouse the owner's feeling to poetic parlance if he knew the loss he sustained, yet the following, which the writer, Berton Braley, in *Farm and Fireside*, titled "The Easy Mark," is quite a true exposition of the case:

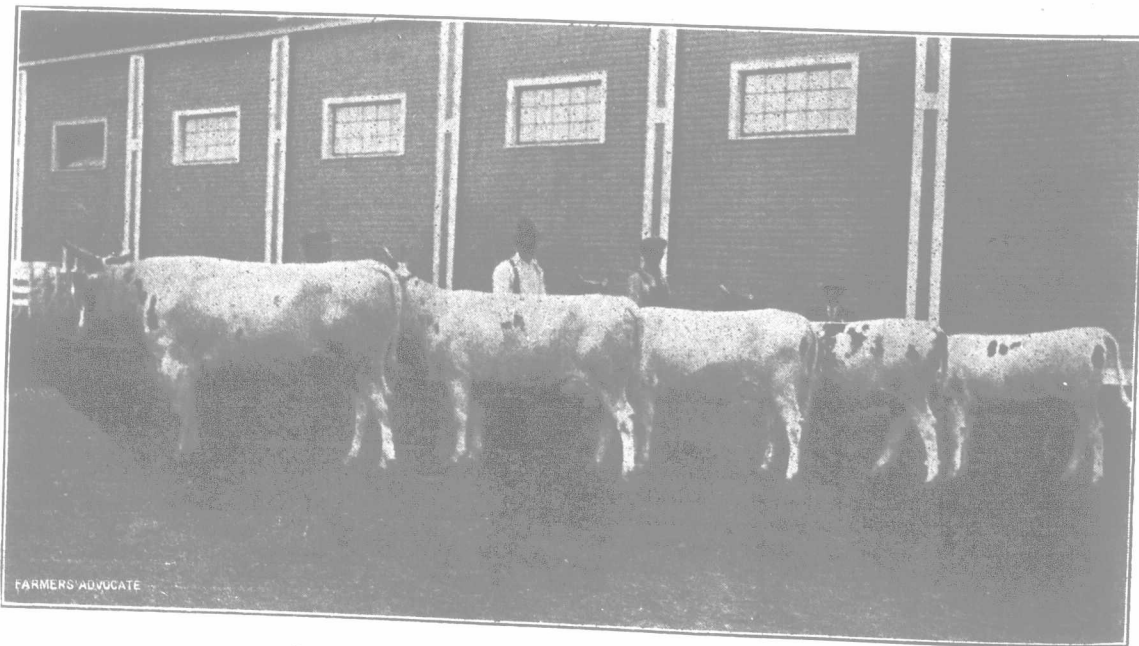
Said the scrub-bred cow to the high-bred cow,
"Say, you are an easy mark, I vow.
You eat no more than a scrub like me,
You're treated no better that I can see;
Yet you give that farmer three times as much
In payment for board and room and such;
Three times the milk, and it's better, too;
I'd hate to be such a fool as you!"

Said the high-bred cow to the scrub-bred cow,
"I'd like to shirk, but I don't know how;
I'm not intending to pay so well,
And why I do it I cannot tell;
I reckon it isn't for me to say,
I guess I was simply BORN that way!
No matter how hard to stop I try,
I keep on boosting the milk supply."

Said the scrub-bred cow to the high-bred cow,
"You're up against it, I'll allow;
You're padding the farmer's increment,
While I'm not making the dub a cent.
I know this much, if I were he,
I'd banish all scrawny cows like me,
Who eat as much as their betters can,
And bunco their board from the farmer-man."

"But I'm not the farmer, and so I'm here,
Eating my head off year by year,
And I'll do it as long as I can, I vow."
Said the scrub-bred cow to the high-bred cow!

The milk-dealers of London, Ont., have formed themselves into an organization called the Retail Dairymen's Association of London, in order to uniformly improve the sanitary conditions, as required by the local Board of Health. Owing to the high cost of labor and foods, rendering milk production barely profitable, it was found necessary to advance the price of milk from 6 cents to 7 cents per gallon, after Thursday, August 15th.



Ayrshire Herd at Calgary Exhibition, 1912.

Handled by the champion bull, Netherhall Douglas Swell. Exhibited by J. J. Richards & Sons, Red Deer, Alta.