

cases, before it is fully expanded. When the sterilized flower has arrived at the condition for impregnation, which is indicated by the moist state of the stigma, the muslin is removed and the pollen of the variety with which it is intended that the cross shall be made is gently deposited on the stigmatic surface. The muslin is replaced and kept on the flower until fertilization is accomplished, when it may be removed.

Of course the results will sometimes be disappointing, and the plants produced as a result of the cross may show no different characteristics from one or the other of the parents. But generally some of the offspring show the effect of the cross, by distinct variations in color, vigor, etc., and it is this that commends the experiment to us and makes it worthy of a trial by even the most humble of nature's admirers.

In conclusion, let me say that I know of no other place that offers such an illimitable field for the prosecution of this study as Manitoba. Even in our most favored districts Red Fyfe wheat is occasionally nipped by frost, clearly showing the necessity for procuring an earlier variety, and there is every probability that in the near future cross-fertilization will furnish the solution of the problem. Careful experiments have been made in this direction by the Experimental Farms, and the results so far are encouraging. Take apples, again, for an illustration. It has been conclusively proved that even the varieties that stand the rigorous winters of Russia will not succeed in our Province, yet what a vista is opened up in this line by the agency of cross-fertilization. I offer these two suggestions to show the great work that may be accomplished by the most humble of us, and to the man who succeeds will be accorded the deserved eulogy, "Well done good and faithful servant."

The Crow and Other Insectivorous Birds.

BY MARTIN BURRELL.

"From blossom clouded orchards, far away
The bobolink tinkled." —Lovell.

What sort of a country would it be without orchards and birds? Hard is the heart and dull the ear that is not responsive to the fine appeal from the bird world! Of all men farmers have the greatest opportunities for acquiring an intimate knowledge of birds and their manner of life, and too often the opportunities are completely ignored and a stolid indifference shown on the whole subject. Nevertheless, the clear call of the oriole, the morning song of the catbird, the cheery piping of the robin, the soft flute notes of the bluebird, and the music from a score of other songsters do give universal pleasure and doubtless exercise a formative, even if unconscious, influence on the child-life of the country home.

We are living in a utilitarian age, however, and the money test is applied all round. If a weak indulgence in the poetic side of life should lose one a dollar, he is straightway urged to push sentiment and poetry to the wall. One shudders to think what we might be tempted to do if the birds in the struggle for life affected our pockets unfavorably! Fortunately, the reverse is the case, but the fact is not sufficiently understood or appreciated. We have wise legislation on the subject as far as it goes. It might go a trifle farther. Hawks, crows, blackbirds, and English sparrows are unprotected. Possibly the day will come when the last alone will be on the "free" list. It is questionable even whether a bounty wouldn't be advisable in the case of this ubiquitous pest. In the State of Michigan the authorities pay three cents a head for English sparrows killed during the winter months. This is a wise provision, not only because it anticipates the breeding season, but because the bounty hunter who knows little of ornithology would undoubtedly kill many of the useful species of sparrows if he were encouraged to prosecute his work during the summer when the song birds are with us. Europe has long condemned the English sparrow, Australia "cusses" him, and on this continent opinion is practically undivided. He is detestable, especially for the relentless war he wages against the natives. His impudence and pugnacity are the means of banishing dozens of birds whose usefulness is unquestioned and whose voices are incomparably more musical than that of Mr. Passer Domesticus.

As to hawks, while Cooper's hawk—or the chicken hawk—plays occasional havoc in the poultry runs, nearly all other species are beneficial, feeding very largely on mice and insects. Blackbirds too are insectivorous to a degree hardly suspected by the average agriculturist.

When we come to our familiar friend, *Corvus americanus*—the common crow—the evidence is strongly in favor of the bird. He should be protected by law. Fortunately, he is fairly well able to protect himself.

Personally I have a strong liking for the "dusky embodiment of worldly wisdom and prudence." He is a cheerful, optimistic fowl, and were he wiped out of existence we should sadly miss his sable form and confident, if unmusical, voice. With respect to his economic status, the United States Government in 1895 issued a most exhaustive bulletin which deals most thoroughly with the whole subject, and its decisions are practically final as regards the relation of the crow to agriculture. That part of the report which deals with the diet of the bird is exceedingly interesting and is based upon an examination of nearly 1,000 stomachs collected from various parts of the States at different seasons of the year. Farmers have always had doubts as

to the crow's usefulness, and more than once bounties have been offered for his destruction. The most serious charges brought against him are that he pulls sprouting corn, injures it in the milk, and feeds largely on the eggs and young of poultry and beneficial birds. It appears, however, that while during the entire year about twenty-five per cent. of the crow's food is corn, most of this grain is in a sense wash grain picked up by the bird during the winter months, and that the sprouting corn and corn in the milk consumed only amounts to 3% of the total food of the crow. As for the sprouting corn, it is a well-established fact that all danger may be avoided by tarring the seed corn. This practice was adopted as far back as 1800, and with complete success. The objections are that the process retards germination of the corn and makes the seed too sticky to work in the planter. If the tar is made thin and a stick dipped in and then the seed corn stirred with the stick till it is all a brownish color, and enough air-slaked lime mixed with it to coat the grains, there will be little trouble. The germ of the corn will not be killed, as some people imagine; and after the crows have tried one or two hills they will start using "cuss" words, and seek "fresh fields and pastures new." With regard to the accusation of devouring eggs and young birds, while it is true that the crow does practice such villainies it should be understood that this species of food only constitutes 1% of his whole diet. Our black friend is an omnivorous feeder, for rabbits, mice, bats, moles, snakes, lizards, frogs, toads, fish, and insects are all embraced in his bill of fare. Insects constitute 26% of his animal food supply, and, speaking agriculturally, it is by the character of this insect food that the crow must stand or fall. The analysis of the stomach contents were very carefully conducted by entomological experts, and the different species of insects duly tabulated. Some very interesting facts were elicited, facts which told heavily in favor of the crow. Grasshoppers, cutworms, May beetles, and other injurious insects were the kinds most largely eaten. Beetles appear to be specially liked. While the total percentage of insect food in the year is only 26, we must especially bear in mind that in January the percentage is but 3, while during April nearly 53% of the food consists of insects, and in May and June the figures are nearly as high. Young crows while in the nests live still more largely on insects, and it is an important fact that the breeding period of the crows correspond closely with the May beetle season, and the "white grub," the larva of the May beetle, is often an extremely injurious insect. Amongst our most prominent beneficial insects are the "ladybirds" (*Coccinellidæ*), and various species of four-winged and two-winged flies: "Ichneumon" flies, Tachina flies, and so on. These insects were almost entirely absent in the hundreds of stomachs examined.

Altogether, the testimony is overwhelmingly in favor of the crow. We must admit that a bird which devours such enormous numbers of our worst pests, and whose corn-pulling proclivities are so easily checked, should no longer be outlawed and classed with a feathered scoundrel such as the English sparrow.

DAIRY.

Cheese Sales Inspection.

A bill has been introduced in the Dominion Parliament by Mr. McMullen, M. P., of which the following is the substance:

"If any dispute arises between the buyer and the seller of cheese sold subject to inspection as to the quality or condition thereof, either of the said parties may refer the dispute to the chief inspector of cheese appointed under this Act, or to such other person as is authorized by the Governor-in-Council to act as referee in such cases, and the decision of such chief inspector or referee as to the quality of the cheese shall be final, and the costs of the proceeding shall be borne by the party against whom the decision is given."

We fail to see the need for creating an office of this description to settle a few disagreements which the cheese boards throughout the country ought to be able to deal with themselves. These boards are composed of factory salesmen and cheese buyers and are surely competent to make rules governing their methods of doing business that will suit the local conditions, providing for a simple arbitration. As a matter of fact, this course has been adopted in the past where such a case has arisen. There is no legal Canadian standard for cheese, and exporters are governed by the requirements of the particular English trade for which they are buying, and the practicability of having an inspector or referee to pass judgment in case of dispute is very questionable. Government has its proper functions in connection with the development of the dairy industry, but we very much doubt that this is one of them. If the bill were passed it would simply afford the opportunity to impose another batch of officials upon the taxpayers of the country. We notice that the London (Ont.) Cheese Association at a recent meeting, after careful discussion, very properly declined to endorse the proposed Act.

How to Improve the Canadian Butter Trade.

BY F. C. HARRISON, BACTERIOLOGIST, O. A. COLLEGE.

A great deal has of late been written in the papers with regard to cold storage and the exportation of Canadian butter to England, and in order to see the extent of this market for our produce let us examine for a moment the capabilities which the United Kingdom possesses to satisfy its own requirements and also note what colonial and foreign importers send.

Competent English authorities (Profs. Long and Sheldon, and Messrs. Morton, Rev. Turnbull, etc.) estimate the yearly English production of butter at 92,000 tons, and of cheese, 120,000 tons, but the annual consumption of butter is about 215,000 tons, and cheese, 230,000 tons. Thus the English production is very far behind the total consumption, and the balance not made there necessarily has to be imported. Since 1890 the growth of the butter trade has averaged 8,000 tons yearly of this increase. Denmark has supplied 3,380 tons; Australia, 2,445 tons; Russia, 1,200 tons; and Canada but 239 tons; these figures being the yearly average of the last five years. This enormous increase of imported butter may be accounted for by the bad seasons in England, all the crops but one for this period being below the average; also on account of the low price realized by the English farmer for butter, causing him to pay more attention to the supplying of milk, and the uniformity of quality of the imported butter, the bulk of it being manufactured in large factories, which are provided with the most scientific appliances, combined with skillful manipulation in its manufacture.

Russia, Australia, and the Argentine Republic are among the more recent competitors for the British market, the last named State sending in nine months 637 tons, which realized good prices. Russia also is to the fore with 6,428 tons for 1895, whilst Australia sent 15,670 tons, and Canada only 1,947 tons. These figures are eloquent, and it behooves Canadians to do their utmost to attempt to capture a larger share of the English market, and now is the opportune time. Canada has many advantages. She is much nearer than Australia, and butter is always at its best when it is new, and the age of Australian butter reduces its value from \$1.50 to \$2.50 per 100 pounds. In Denmark the wage question is yearly increasing their difficulties, wages having risen 32% in the last ten years. The Danes look very carefully after winter feeding, as is seen by the fact that 117,400 tons of bran and 60,300 tons of oil cake were imported, and Canada need not expect any supremacy in the British market unless an all-the-year-round supply of butter be secured. This will of course necessitate winter feeding. Again, 75% of Danish butter is made from pasteurized cream and pure culture starters added to this, which of course gives them greater uniformity, and because of its uniformity Danish butter maintains its high-standing. It is all first-class, has the same color, same degree of saltiness, and varies but slightly in aroma. Not so with other countries; for although some is of fine quality, no two lots are the same.

This contest for supremacy is just commencing, and the victory will belong to the competitor who can make the best quality and place it on the market at the lowest cost. Some of the considerations entering into the contest are as follows:

1. *Properly Equipped Dairy Schools.*—These we have, and no person should be allowed to take control over factory of creamery unless duly certificated from such a school.
2. *Selected Herds to Produce Butter and Cheese Instead of Beef.*—The methods of feeding followed in countries like Denmark, where cows are fed on artificial food for six months in the year, must be studied, and to a modified extent followed.
3. *The Newest Methods of Buttermaking, such as the Pasteurization System, must be Developed.*—This must be done in order to produce the necessary uniformity in aroma and taste, and also to increase the keeping quality.
4. *The Special Requirements of the British Market must be Studied.*—Small but vital points, as the amount of salt best suited for English palates, most desirable color, neatness of package, etc.
5. *Low Freights and Cold Storage.*—These are of prime importance to the success of the trade, and there is no reason why both cannot be arranged to the mutual satisfaction of the railway and storage companies and the producers.
6. *Regular Supplies.*—An irregular supply is very detrimental to Canadian butter's best interests. Enough should be shipped week by week to meet requirements, for butter is best when it is freshest. Denmark follows this question very closely; for instance, the week preceding Xmas 1,158,100 pounds more were sent than in the week following.
7. *Provincial and Dominion Aid to the Dairy Industry.*—The Province in its annual grants to dairy societies already does much in this direction, but notice might also be taken to what Denmark does in encouraging the improvement of dairy breeds by the so-called "Bull Association"; that is, the State pays a cost of keeping pure-bred bulls, provided the Association keeps certain specified rules; also, the appointment of an official residing in England, whose duties are to aid the sale of Danish dairy products, to meet and correct through the press all false and injurious statements regarding Danish products, to counteract such frauds as adulteration of Danish butter with oleomargarine,