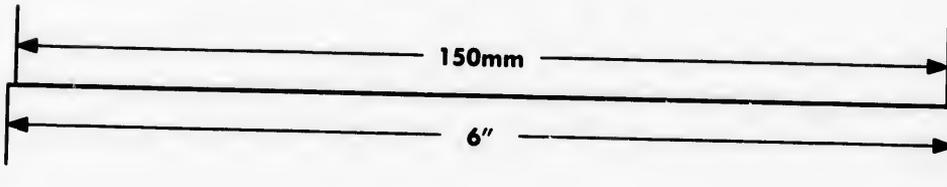
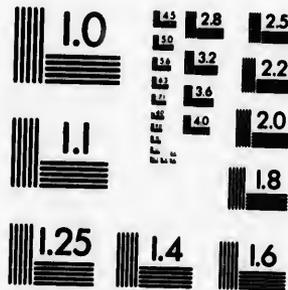
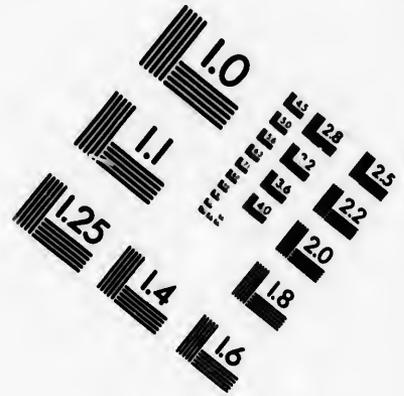
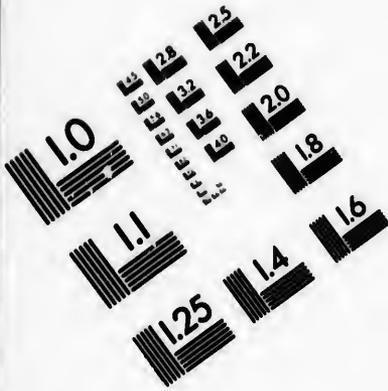


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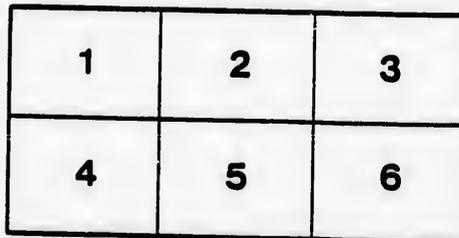
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1899

THE FARM PESTS OF INSECT LIFE

EVIDENCE

OF

DR. JAMES FLETCHER

ENTOMOLOGIST AND BOTANIST

BEFORE THE

SELECT STANDING COMMITTEE

ON

AGRICULTURE AND COLONIZATION

1899

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

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THE FARM PESTS OF INSECT LIFE

COMMITTEE ROOM No. 48,
HOUSE OF COMMONS,
Tuesday, 6th June, 1899.

The Select Standing Committee on Agriculture and Colonization met this day at 10.45 a.m., Mr. Bain, Chairman, presiding.

Dr. JAMES FLETCHER, Entomologist and Botanist, being present at the request of the committee, made the following statement :—

Mr. CHAIRMAN AND GENTLEMEN,—In the department of insects and plants, which is under my care, during the past year it has been of course necessary to attend to the regularly recurring pests of every year, and I am happy to say there is no new pest of importance which has to be reported upon; but, every year, there are certain of the well known pests which occur in increased numbers or which require special attention.

At the present time there is probably no insect more in the public mind than the Tent Caterpillar, which is destroying the foliage of large numbers of forest and ornamental trees and also of fruit trees in orchards. This is a well-known insect, and everything that can be known about its life-history is already well-known, as well as the remedies to be used against it. Though it is difficult to get at all, from the insect being found over large areas and particularly when they attack forest trees, still the place where most of the harm is done is in our orchards and I have no hesitation in saying that the damage done by these insects is much more than it should be and would be, if people would only treat the study of injurious insects as they do other lines of business which affect their prosperity.

THE TENT CATERPILLAR.

One great trouble about this and other injurious insects is the prevailing ignorance of the great mass of the people of the country. This is a state of affairs for which there is no excuse, because there is no branch of science which means more to them than the study of insects, and it is a marvel to me that more attention is not paid to it. The subject is taught in schools and colleges to some extent, but on the whole there is great ignorance of this branch of science. The ignorance is appalling in regard to this very common insect, the Tent Caterpillar, which I have just mentioned. Now I have had three letters this morning in reference to the Tent Caterpillar in all of which it is inaccurately named although it is an insect which has been known for over a hundred years; and I think, that as we lose at least one-tenth of our crops every year from injurious insects, it is about time the people should know something about how to distinguish between a caterpillar, a worm, a bug or a moth, but they do not and they have to pay for it. Now I do not mind ignorance in any man if he has nothing to lose by it, but, when he does suffer loss from not knowing the commonest crop pests so as to inquire about them intelligently and others suffer also, this ignorance is deplorable. In all business matters that affect my pocket, I take good care to know everything about them as soon as possible; but it is not so with many in regard to insect pests which annually cause so much loss.

In one of the letters I received this morning I find the Tent Caterpillar described as a moth. Luckily a specimen came with the letter and I knew what the man

meant, but if the specimen had not come I could not have conceived what was meant, especially as he said that it "cut the trees down." Now it does not cut the trees down, but it eats the foliage off them, and that is probably what he means. In another letter the Tent Caterpillar is spoken of as a worm, in another as a slug, both very inaccurate descriptions, but quite similar to others given not only of these but of many other insects. I embrace with pleasure every year this opportunity to come up before the committee on agriculture to speak a few timely words about these insect-pests to men who are going out among their constituents in all parts of Canada and who can remind them; when their crops are attacked by insects, to whom they can apply for help, and also because it is a committee whose proceedings appear in the newspapers and are read by many, so that it seems to me a proper time to speak a word of warning about the pests which cause loss at this season. If I spoke of nothing new at all, I think it would be well worth the time of the committee to hear something about the latest remedies for many of our common crop enemies.

SAN JOSE SCALE—TREATMENT.

There are one or two problems which demand discussion at the present time, and one of these is the most important subject with regard to injurious insects which has ever yet been discussed by the public in Canada, that is the treatment of the San José Scale. Now this is a matter of importance, because, in the United States, enormous losses occur every year from the attacks of this insect, notwithstanding all that has been done to control it. It has also occurred in a few places in Canada, in the extreme south-west of Ontario and in the Niagara district, where it has done most harm and where the largest amount of money has been spent in controlling it. It has become a matter of importance because the Ontario government has spent a large amount of money and put forth special efforts to stop the spread of this pest. But these efforts have been misunderstood by the fruit growers, for whom they were put forth, and even to-day, after much money has been wisely spent in exterminating this pest, letters appear in the papers from fruit growers stating that these efforts are misguided and that more harm is being done than good. Now in the *Toronto Globe*, one of our leading newspapers, a letter has appeared, anonymous of course; people who write these letters never sign their names. This one calls himself "Pro Bono Publico," for the public good; I hope the gentleman who wrote this will some day feel so clear as to what may be for the public good that he will only write such letters as he is not ashamed to sign. The letter is reasonable enough in some particulars, but it has so many inaccuracies in it that it will do much harm. Now as this letter has been widely circulated and has not yet been contradicted or criticised, and because as I say much of it is reasonable, though it has so many unfortunate mistakes, I take this opportunity to answer it publicly. The writer condemns the action of the Ontario government in the way they treated orchards infested by the San José Scale, and I might here state what that action was. The government sent out inspectors to all such portions of the province as they thought were liable to be affected by this most injurious insect, and I lay stress on its pernicious nature: no other insect which has ever been studied has done so much harm as this small scale insect which, as I treated of it fully last year I shall not say much about now, except that it is very inconspicuous and thus easily overlooked, is very fatal to the trees it occurs upon, spreads with great rapidity, and is more difficult to control than any other insect pest we have yet had to deal with. The Ontario government recognized early the injury which this insect had done in the United States and might do in Canada, and the Minister of Agriculture sent a specialist to the States to study it. He then, after due consultation, put in force an act with the idea of controlling it. But this, after a year's experience, was thought not to be sufficient, and this year the act was amended so that the inspectors have more power to carry out its provisions. Now the letter referred to states that the scale insect is prevalent over such a large area in Canada that we cannot possibly succeed in eradicating it. But such I believe is not the case. This plague is confined in Canada to certain restricted sections of the province of

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Ontario, and every reasonable and wise effort has been put forth to control the insect by not allowing it to spread from that area. Where it is very abundant, trees are condemned and destroyed, and compensation is given to the owner of the trees so that he may not have to meet too serious a loss. I had the honour last year of speaking to you on this matter, and I think the fruit growers should thank and not condemn the Ontario government for what it has done. The compensation should be looked upon as a bonus because this is so dangerous a pest that if the government had destroyed every one of the trees and given nothing, the world would say it was hard luck but only what should be done. The Ontario government have fortunately secured excellent inspectors, who have done their work thoroughly. They have visited all parts of the province to which it was known trees from infested nurseries in the United States had been sent.

I believe that nearly every orchard in Ontario where the scale occurs has been located and that its spread has been prevented. The statement that it has spread all through the country is inaccurate. But though a small area only is now affected, we do not know that the insect would not thrive elsewhere. We have made mistakes in the past as to the places where it could exist as an injurious pest; therefore it is wise to be on the safe side, and take no risks in the way of relaxing our efforts to control it in the most effective manner.

All of the best authorities who have had opportunities of studying this pest agree that digging up and burning trees found to be infested is the only certain way of eradicating this enemy; but some fruit growers, and among them the writer of our letter claim that they should be allowed to treat their trees instead of destroying them, as has been done by the government inspectors.

Now, then, with regard to this treatment. Should fruit growers, the ordinary fruit growers of the country, be allowed to treat their trees instead of having them destroyed? I say most emphatically "No." This is an exceedingly difficult insect to fight against. The very best men we have have been experimenting for eight or ten years to find out the best remedy. And although one or two of the leading entomologists in the United States to-day claim that they are able to thoroughly destroy this insect, there are frequent instances where we find that they have failed; therefore we must take what they say with caution. This certainly is not an insect which should be given any benefit of a doubt; or rather the prosperity of the whole country should not hang on the chance of whether the ordinary fruit growers and farmers in the country have skill and willingness to take the trouble to treat their trees properly and thoroughly. If it was an ordinary pest, as is claimed in this letter, then the government would not make these strenuous efforts to control it. But it is not an ordinary pest. It does a great deal of harm, and I consider that the Minister of Agriculture of Ontario has adopted a wise measure, and what he has done up to the present has been the best thing that could be done under the circumstances. Now it is claimed that trees should be treated and that this treatment would be sufficient to destroy the insects, because some success has attended the efforts of the specialists in the United States; but I say that it would be time to discuss that when more thorough investigation has been made. I say the time has not yet come when we can with safety adopt this principle. The Minister of Agriculture of Ontario is not only destroying the trees, but has specialists examining into every treatment yet devised, is watching the whole matter carefully, and is taking every precaution. He has specialists, I say, examining into all the remedies proposed. He has a full plant for fumigating the trees, and, although he does not allow men who are growing fruit in Ontario, the fruit growers, to risk the prosperity of the whole country by undertaking these experiments themselves, he is having that work carried on by specialists and is ready at the very first moment he can find a sure remedy to relax his act so that the less drastic remedy may be used instead of destruction. This is a matter that I think we should speak very definitely and very distinctly upon, because here is a definite statement in which it is demanded that the act shall be repealed and the country left to take its chances.

PERNICIOUS TEACHING.

The letter referred to says:—"So that the alternative is this—shall we have orchards with the scale, a comparatively harmless pest, or shall we have no orchards in the country? The scale is a comparatively harmless affair, nor nearly so pernicious as the yellow or the rose leaf. I was in an orchard the other day which had just been cut down by order of the inspector. The owner told me it had been infested with the scale since it was planted out, eight years ago, and yet you could not find healthier and more vigorous trees anywhere. They were the finest looking trees I ever saw, and yet that magnificent orchard was cut down because the scale was found on about one in every eight of the trees. If the orchard had been allowed to stand, it would probably have lived almost to its natural age without the fruit being injured in the least, if proper sprays had been judiciously used. In no other part of the continent do they resort to these drastic measures for destroying the scale, so far as I have learned. In California they have had it for nearly thirty years and they regard it with comparative indifference.

"And here, again, if the scale could be got rid of by the measures adopted by the government, we would soon have it again, as long as the scale is not being destroyed in New York State, which is just across the river from us. The orchards of that state are not much more than half a mile from our orchards on this side of the river. The scale is as bad there as it is here, and they are not such fools as to cut down their orchards on account of the scale. So that, as long as we have any orchards on this side of the river, the scale will be carried from the other side by the birds which are continually crossing.

"Now, this attempt to do the impossible is costing the province a good deal of money, besides almost ruining this part of the country. In many a case the accumulations of a lifetime have been put into a fruit farm, perhaps by men who are incapable of any other kind of farming, and then just as their orchards are beginning to yield a full crop they are ruthlessly destroyed in the fruitless attempt to get rid of a pest which would be incapable of much mischief if properly sprayed. As a consequence, our fruit growers will have no source of income, for the farms are, many of them, too small for general farming, even if their owners could adjust themselves to the new role.

"Now, there is only one rational and fair thing to do. Let the operation of this act, which is making such havoc in this part of the province, be at once suspended, and let a fair compensation be given to those fruit-growers whose property has been destroyed, and when the House meets again let it at once repeal the Act. The condemnation of the Act is well nigh unanimous throughout this section of the country, and just as fast as the scale travels this denunciation of cutting down the orchards will travel with it. Just as soon as any fruit-raiser learns that his own orchards are condemned he at once joins in the chorus of denunciation, no matter how ardently he has supported the Act up to that time. As long as the Act only affects other people it is all right, but as soon as it strikes home it is all wrong. Whatever is done should be done quickly, as all our best orchards are fast being destroyed. It is only a question of time and the government will have to arrest this wholesale destruction of the fruit industry. Why not do so at once before the mischief becomes irreparable?"

It is not an attempt to do the impossible. A sufficient amount of success, a very large amount of success, has attended the efforts of the Ontario government, and I think that in the meantime these efforts should be continued on exactly the same lines that have been adopted. The Minister is watching the matter carefully himself and through his specialists, and directly a successful remedy can be found this will be adopted instead of the total destruction of the trees.

CATERPILLARS.

I will now speak of the caterpillars which are destroying so many trees. The reason they have done so much damage to cultivated trees is because generally people hitherto have not understood that this insect can be destroyed if attended to

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at the right time. The life history of the Tent Caterpillar is well-known. The eggs are laid in July; the young caterpillars form in a few weeks and remain in the egg until the following year. The next spring after a few warm days they hatch and appear on the trees destroying the young leaves as they expand. The warm weather in the spring hatches the young caterpillars and at the same time the young of two others of our most destructive insect pests, the Eye-spotted Bud-moth, and the Canker worm. These are hatched during the first warm days of spring, but the leaves and foliage of the trees do not respond as quickly to this warm weather in April and May, and consequently the caterpillars are hatched before the leaves have formed. That means that the caterpillars are not always retarded to the same degree that foliage and plant life are and consequently a few warm days in spring followed by colder weather have the effect of allowing the injurious enemies of fruit trees to be hatched out while the foliage is held back. This is sometimes deceptive, and it was said this year that there would be no caterpillars, consequently; when they wakened up to the fact that there were a great many, some people didn't understand, and wasted time writing to learn the meaning of it. It does not help our fruit growers and orchardists to be looking for a solution of a problem like this, when they should be attending to the application of the remedies for the pest. It does not matter much to the fruit grower how this occurred. The point for him is how to apply the remedies that are known to be effective, for fruit farming requires constant care and prompt timely action. The fruit grower must watch with unremitting attention all through the spring for injurious insects. The old days when no one had to take any steps at all to prevent fruit trees being destroyed have passed by, and during the ten or fifteen years that have lately passed it has been found necessary as a rule to do something every year to destroy the hordes of insects which attack almost every crop we grow. In the old days, before the forests were destroyed, the injurious insects had in the wild plants sufficient food to prevent them coming into the orchards and gardens. But since the forests disappeared the insects have increased enormously from finding suitable food in large areas, and consequently there has been increased difficulty in growing uninjured crops. A great deal of special study has been devoted to this branch of agriculture and we now have practical remedies for most injurious insects which attack crops. It has been considered expedient in all the experimental stations and agricultural institutions, to issue at short intervals what are called spraying calendars, a means of ready reference for fruit growers and farmers to learn the chief injurious insects each year and the best and most practical remedies for each, with a note as to the time of year to apply them. This is a copy of our last spraying calendar, which we issued this spring for our correspondents; there is of course every year a very large demand for it. This year we were fortunate enough to make an arrangement with the *Canadian Horticulturist* by which we sent copies to all their five thousand subscribers, and in that way we have got copies into the hands of most of the fruit growers in the country quite early in the season, thus providing them with means of fighting the chief injurious insects liable to give them trouble and cause loss. Of course there are others which do not occur on this condensed list, but fruit growers are now learning that there is a source of reference for reliable information in regard to the various injurious insects, at the Central Experimental Farm. All we ask is that they will write promptly on the first appearance of the injury and send specimens so that we can tell what it is caused by. Owing to the ignorance of insect life to which I have referred, the descriptions are sometimes very inaccurate and hard to understand. We therefore ask to have specimens sent and have been fortunate enough to make arrangements with the Post Office Department by which there is no trouble in sending them. All that is necessary is to wrap them up and send them to the department. There is little trouble and no expense to the sender as they are forwarded post free. On these calendars are given the different chief crops and insects and fungi which attack them, then short accounts of the different substances used to destroy the insects, and to control the various diseases.

These are drawn up in the simplest language that can be found, and I think they are intelligible to any one that likes to know about these matters. In the

the annual reports and bulletins sent out from the farm we try to make known promptly the best remedies that have been discovered for these pests. There are, of course, with regard to every insect a great many remedies which have been tried and which have been exploited in the agricultural and daily press of the country, but unfortunately many of these remedies which are frequently recommended are not of very much use. It is wise, therefore, for those who follow the business of farming or fruit growing to follow very closely these reports and bulletins which teach them the best remedy to use under certain circumstances. I have put together a few notes so as to refer briefly to some of the worst enemies which are likely to occur at this time of the year, because many people are looking for information regarding them.

THE ROCKY MOUNTAIN LOCUST--REMEDIES.

Last year there was considerable interest in the reappearance of what was supposed to be the Rocky Mountain Locust in southern Manitoba. Any one who can remember the damage these insects did in 1868, 1870, 1872 and 1874 will know what a curse to that whole country the invasion of these locusts was, how everything that was green was stripped and the great suffering among the settlers which followed from the visitation. Therefore it was not surprising that last year when in southern Manitoba there was an outbreak of what was supposed to be, and no doubt was, the Rocky Mountain Locust, there was a great deal of anxiety on the part of the farmers and of the Manitoba government. I was passing through Manitoba during the summer, and was requested by Mr. Fisher, Minister of Agriculture, and Mr. Greenway, Premier of Manitoba, to visit the district and see if this was, as stated in the newspaper press, the real Rocky Mountain Locust or whether it was only one of the less dangerous native species, and if so what could be done to remedy the evil. It was thought that because this insect was small and very similar to the ordinary grasshopper it was not the real Rocky Mountain Locust. Sufficient of its life history and habits were known by the settlers there to know that it was a matter of a great deal of importance to be able to ascertain the exact identity of this insect, because it is well known that the Rocky Mountain Locust has a far greater power for evil than any other of the native insects. Of course it was only a matter of a moment after once securing a specimen to find out that it was the real Rocky Mountain Locust and to warn the farmers that, unless active steps were promptly taken, they would this year have a great deal of trouble from the large number that would be present in the wheat and oat fields.

The season last year was exceedingly dry, so that much of the grain which was sown quite early did not germinate until late in June, therefore on every field there was a double crop; a few grains that had been placed to a sufficient depth in the soil germinated early, but the large proportion, probably 50 or 75 per cent of the grain was not sufficiently covered with soil to obtain moisture enough to germinate and was only just coming up at the end of June when the others were far advanced. There had been no rain from the autumn before until June of last year, consequently there was a great deal of anxiety as to how the crop would turn out, because it was thought that the first crop would be so small and that the later crop would be late and probably injured by frost or destroyed by the grasshoppers. A large area of this, however, on account of the recuperative properties of the climate and soil being so great, did come forward, and on account of the absence of early frosts in autumn a good crop was reaped in localities where it was feared in the spring there would be no crop at all. I do not fear such bad results from the visit of the Rocky Mountain Locust now that so many farmers have learned what to do under the circumstances. It is known that where the eggs are laid in large quantities injury must be expected in the following year, and as the farmers were warned to be on the lookout they were able to ascertain the localities where the eggs were laid. We know that the eggs are laid chiefly in the stubble fields and not on the open prairie, consequently even in such a large extent of country as we have in southern Manitoba the remedy is practicable. The eggs, as I have said, are laid in the stubble, consequently if the

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farmers would plough the stubble either in the autumn or early in the spring, the eggs which are laid within an inch or two of the surface are buried down very deep, so deep that when the delicate young locust is hatched from the egg, it is unable to emerge from the depth of soil beneath which they are buried, or, if they do, there is nothing on the surface of the ground for them to feed upon. Therefore they starve before they can travel by hopping to where there may be food for them. They are of course very small when they first emerge, and the sun during the latter part of May and early June is extremely hot; so no insect that has to hop and is very small can go very far before being destroyed by the very hot sun and by the want of food. The ploughing under of the eggs has been found the most effective of all the remedies tried.

By Mr. Wilson:

Q. And that is the best remedy they have found?

A. Yes.

Q. How would burning the stubble do?

A. It would not do equally well for this reason. The eggs are too far down in the ground to be destroyed by the burning of the stubble. The burning of the stubble is however adopted there for some other insects, and because up there they do not use all the straw they grow, they frequently burn over the stubble to destroy weed seeds. It is not absolutely necessary to plough in the fall, as ploughing in the spring will answer the same purpose if it is done early enough, so that the soil becomes consolidated by the rains and winds and the young locusts are unable to emerge when they hatch. If the ploughing is not done, hopper dozers are used very extensively in Minnesota, Dakota and other parts. They have not been used on this side of the line, but it is possible that some of our farmers in Manitoba may find it advantageous to use them this season if the land has not been ploughed; I think the farmers of southern Manitoba are sufficiently awakened up to attend to the matter. I do not want to make any prophecies at all, but I am in no fear of a general outbreak as some of the farmers feared last year on account of the number of grasshoppers in the fields during the month of July last. It was noticed that not many eggs were laid during the egg-laying season, as the weather turned cold about the time of egg-laying and the eggs were not laid in as large numbers as might have been expected, consequently the outbreak may not be so great this year. Several of my correspondents have been taking a great deal of trouble to find out where the insects had laid their eggs and to warn the farmers there that, if they appear in numbers, the matter should be attended to at once. One danger is that stubble fields intended for summer-fallowing may be left until after the young locusts hatch. If this is noticed these fields will require ploughing as soon as possible, and, if done while the insects are small, a great many will be destroyed. The ploughing should begin at the outside of the field and gradually work towards the centre. In that way farmers can destroy large numbers of them. That is, the land should be ploughed early in June so as to plough down the young locusts as soon as possible after they hatch from the egg.

Another remedy which was used by Mr. Scott, near Deloraine, was spreading long rows of straw across the fields where the young locusts were abundant. It was found that they gathered in these for shelter; so at night by firing the rows of straw after dark he managed to kill bushels of these insects. Mr. Scott's farm was specially infested and full particulars of this case are contained in the last report of the Experimental Farms. I have nothing more to say on this subject unless anyone wishes to ask a question.

WHEAT STEM MAGGOT.

During my investigations of insect pests in Manitoba last year a subject on which a great deal of curiosity existed was cleared up to some extent, that is the injury to wheat known as "Dead Heads" or "White Heads" in wheat. Various theories have been advanced as to the cause of this, one that it is fungus. The

word "fungus" seems to be a sort of an explanation for everything, and when nothing is known about some growth the first thing you hear said about it is that it is a fungus or fungous disease. There is no word more commonly used among badly informed people as an explanation of something they know nothing about; it is something they know nothing about; it is something like the word evolution. When a dabbler in science does not understand something he generally says it is to be explained by evolution; and it is so with the word fungus. Farmers say "It is a fungous disease, and we must trust to Providence to remove it." The "Dead Heads" or "White Heads" in Manitoba wheat are due however to a large extent to the Wheat Stem Maggot, one of the well known pests of Eastern Canada, and one concerning which I will only say that, though its injuries may sometimes be rather severe, it disappears periodically and is not likely to be injurious to any great extent in the future. The perfect fly is abundant on the prairies in Manitoba where the maggots doubtless feed on the stems of various kinds of wild grass. It is only recently that it has taken to the habit of eating the wheat stems. This is undoubtedly due to the climatic conditions which develop the wheat plant to a suitable condition at the time the flies lay their eggs; though the injury in places the year before last was five per cent, the pest disappeared in most sections last season, and I do not think it is going to be a serious cause of injury in the future.

By Mr. Rogers :

Q. Is that the same maggot that attacks timothy ?

A. No, sir, it is a different thing, but has occasionally the same appearance. The insect which attacks timothy is a true plant bug which sucks the sap from the stem by a puncture, and the puncture is made where the soft fleshy part of the stem is, where there is most sap. The sap is sucked out and the top of the stem dies. In Ontario it is particularly noticeable also in June grass; we find it mostly in pastures which have been left down too long. It is the same in timothy, because when left too long in grass the insects increase and more injury is done. The weather has nothing to do with this injury; we have had wet weather and the injury has gone on just the same. It is the juicy soft part of the stem which is attractive to the plant bug.

By Mr. Semple :

Q. Did you find White Heads as common in strong, well cultivated fields as in poorer ones ?

A. In Manitoba you mean, yes. It was just the same; there was no difference. It was local, but the vigour of the crop did not affect it. One particular crop I saw near Rounthwaite was a very beautiful and vigorous crop of wheat, which had many of these White Heads, and across the road in another crop there were none. I could not learn that there had been any difference in treatment except that the land was not broken for a year after the other, but that was not enough to account for this. Probably the condition of the wheat, that is when the head came out of the sheath, was a little different in the two crops when the females were laying their eggs.

CUTWORMS.

Among the constantly recurring field pests are the Cutworms, now doing such harm. I have a little contrivance here that I would like to exhibit, because it is one that any one can make, which protects the plants after they are planted out, especially tomatoes or cabbages. You can buy them in Ottawa of an enterprising firm for \$1 a thousand.

By Mr. Wilson :

Q. What are they made of ?

A. Ordinary stiff paper. Of course the maker would advertise that it is a special paper, perhaps a waterproof paper, but ordinary stiff paper would answer

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just as well. This has a slit at one end with a tongue at the other which fits into it from the outside. The paper is bent round and the tongue in one end is put through the slit in the other, forming a ring. As you know, cut worms cannot climb up smooth surfaces, and this is certainly a smooth surface. They use to a large extent practically the same remedy in Prince Edward county, where they use tin, but it is more expensive and more difficult to store, while these are so cheap that one need never be without them.

Q. How far are they above the ground?

A. Half an inch below the ground and $2\frac{1}{2}$ inches above. In his advertisement the maker states that they are excellent for protecting young tobacco plants against frost.

Q. They are about three inches wide?

A. Two inches and a half perhaps, but it is a very good and simple affair and is the same remedy exactly as is used by many growers, of pieces of paper wrapped loosely round the stems of transplanted plants so as to leave an inch or two above the ground. We have used these for years on the farm and they have given satisfaction. One year an experiment was tried of planting 2,000 cabbages on one field. Three-fourths of these were papered and saved almost without a single failure, while the whole of the others which were unprotected were lost, and the only protection was an ordinary piece of paper. We have tried many forms of improved tarred and oiled paper but ordinary paper answers sufficiently to prevent enormous loss from cutworms.

By Mr. Featherston :

Q. Did you ever try salt?

A. Yes; it is practically no use at all. Salt as a remedy is very much recommended and very much used. It is a slight stimulant to cabbage, because cabbage is a sea plant, but it is practically useless against cutworms. Lime is another thing very largely recommended but of little value.

ROOT MAGGOTS.—HOW TO CHECK.

Among the very worst pests which injure the crops of the field and garden are the Root Maggots, which every year destroy large quantities of turnips, radishes, onions, early cabbages and cauliflowers. It is not at all an unusual thing for a gardener to have to plant the whole of his cauliflowers or radishes over again. I am now trying some experiments with radishes; I left a whole row untreated and I do not think there is one that is not destroyed by the root maggots. Experiments are being carried on which vary in the use of remedies, but I am not prepared to state what the results of these are as yet. Many remedies have been tried which are spoken highly of and much written up in newspapers and other publications and have been found wanting. If a remedy is recommended and puffed before it is known sufficiently and fully tested, great harm may be done. Where market gardeners grow large areas under certain crops, and where they rely on a remedy, particularly if, as is sometimes the case, it costs a good deal of money for materials and labour, much harm is done by giving the wrong remedy. First of all, the man loses his crop and the use of his land; besides this, he loses his confidence in all remedies for injurious insects, and every one who sees the failure knows it is a failure; thus the whole cause is discredited and great injury may be done. Therefore, I am not very anxious to give out remedies before they are well tested and it is quite time to do so, because far too much of this bad work is being done to-day simply for a little cheap credit.

With regard to the protection of cauliflowers and cabbages against maggots, I have here another little contrivance which I wish to show to the committee. It is called the "Goff Tarred-paper Card." In the course of his experiments at one of the United States agricultural college stations, Mr. Goff devised this apparatus. It was known that carbolic acid had a very repellent effect on many insects, particularly on the root maggots. Mr. Goff conceived the idea of putting tarred paper,

which has a strong odour, around the young plants at the time of planting. As you see, these are hexagonal pieces of ordinary tarred building paper, three inches in diameter, with a slit from one angle to the centre, where there is a star-shaped perforation to allow the placing of the card around the stem of the young cabbage. The reason it is star-shaped is to allow the little points to stick up and fit back closely against the stem. If this appliance is placed around the cabbages when planted, no eggs are laid by the fly from which the maggots come, and consequently the young plant is protected until it is strong, or it is too late for the flies to lay their eggs. I do not think these are made in Canada now, but it is such a simple matter, and a punch for cutting them out is so easily made, that I suppose any man of ingenuity could make them. We had very good results last year in the use of these cards, and we are using them in large number this season. I received a large box of them as a present to the department from Prof. Slingerland of Cornell University.

REMEDY FOR CUTWORMS.

Before I leave this subject I wish to speak again of a remedy for cutworms, which do so much harm every year by cutting off young cabbages as soon as they are set out. In the last report of this committee or the report of the year before, I mentioned a mixture of bran and Paris green for the destruction of cutworms. I have tried it again this year and can only describe its effects as remarkable. It seems strange that a caterpillar which feeds on green vegetable matter will pass by the green leaves and eat poisoned bran, but such proves to be the case. By sprinkling between the rows to be protected a mixture of wheat bran dampened sufficiently with water or sugar and water to make the Paris green adhere to it, and enough Paris green dusted into the mixture to give it a green tinge, we find that the cutworms will eat the poisoned mixture and that from the time the poison is set out the plants are left uninjured. During the last month I have tested this remedy thoroughly and with the greatest possible success on all kinds of vegetables, and I do not think that half a dozen have been eaten since the bait was put out. Before that fifty and sixty plants a night were eaten in rows of pease, beets, carrots, onions, &c. The bran has been eaten and the caterpillars are dead.

By Mr. Rogers :

Q. Is it any better than the paper band ?

A. It is for plants grown in a different way, that is in rows as carrots, onions, beets, beans, &c. It may also be used in corn fields by putting a very small quantity on the hills.

Q. Is it any good for caterpillars ?

A. Yes, cutworms are caterpillars—the caterpillars of a class of night-flying moths.

By Mr. Wilson :

Q. You take the wheat bran and put on enough Paris green to give a green colour ?

A. Yes, after dampening the bran a little, if this heavy poison is put into perfectly dry bran, it sifts through it to the bottom, when it is stirred for mixing.

Q. You do not give the specific quantities ?

A. No, it is a remedy that does not require particular directions as to quantities, if there were an excess of Paris green the caterpillars would eat it just the same, and it would be difficult to injure the plants, because it is only put on the ground near them.

By Mr. McMillan :

Q. Would that have any effect on the insect that cuts off corn, sometimes right at the ground ?

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A. It is the very thing. In Prince Edward County, as I learn from Mr. Pettet, this remedy is now being used extensively by the large growers of tomatoes, who used formerly to use tin bands which were rather expensive and were hard to store safely owing to the space they required.

By Mr. Wilson :

Q. How long have you been using this remedy ?

A. Four years.

THE PEA MOTH—HOW TO PREVENT.

With regard to another insect, which is not abundant in Ontario as a rule, but is very injurious through New Brunswick, Nova Scotia and Quebec, as far up as here, I have a few words to say. I refer to the pea moth. The pea moth or pea maggot, which attacks the green pease in the pod, is a little caterpillar somewhat like that of the Codling moth or apple worm and does a great deal of harm. It is not very pleasant when you find a few of these in a dish of cooked pease; and sometimes and in some places they are so abundant that people get used to them and don't take much trouble to pick them out of the pease before cooking them. In almost every dish you will find a few boiled, swelled out maggots, as they are generally called, now such discoveries have a tendency to destroy the appetite of a good many people, when they see them they do not want any more pease; others profess not to mind them and eat their delicacies contentedly. This is no new insect. It is not mentioned, however, in any reports on injurious insects as far as I know, except our own, although it does considerable harm in New York, and the states to the south of us. The life history of the insect has been studied out, and we have found that the moth which lays the eggs from which the caterpillars hatch does not appear till the end of June or beginning of July. To avoid injury by this insect we can, in the case of garden pease for table use at any rate, sow the seed of the earliest varieties with good results, because the moth that lays the eggs does not appear until these pease are ready for use, therefore some of the very early varieties, and there are several good ones which can be grown successfully for a garden crop, can be grown and matured long before any injury is done. I have picked out several varieties of this class, such as the following: Alaska, American, Wonder, Gregory's Surprise, Gradus, Nott's Excelsior, McLean's Little Gem. Many people do not like the Alaska, because they say it is a very little pea and not worth growing for that reason, however, it is well worth growing. These were ripe on the 17th of June last year, and this year they will probably be ripe as early. These varieties are all of good quality, and were ready and ripe for the table before the 1st of July last year, and add to that another fortnight this year, and we still have an early pea.

By Mr. Wilson :

Q. What do you mean by being ripe ?

A. I mean that they were ready for use, for boiling as green pease. Last year it was a very early season but give it an extra fortnight this year and you have all these pease ready before the "sea maggot" can do them any harm, that is, of course, if they are put in early in this part of Canada at any rate. When we get farther down towards the sea we find the season a little later as we go east and the best way there to avoid loss from the insect is the same as here, to choose the very best varieties of early pease and get them in as early as possible. Pease, as all know, can be put in as soon as you can get on the land, as soon as the ground is thawed out sufficiently deep to put the seed in. The only remedy then for the present for this insect, until something else is discovered, is to sow early varieties of pease and get them in as early as possible.

By Mr. McMillan :

Q. We got the best results from field pease recently by sowing late. We had the maggot two or three years ago very plentifully but last season it was not so plentiful ?

A. That, Mr. McMillan, I believe arose from the reason that the moth appears at a certain time and there is only one period in the year when the insects are ready to lay their eggs. The females lay their eggs on the pods that are young and in a suitable condition for the young caterpillars to eat their way in and get at the forming seeds; so by sowing either early or late the pods are not ready at the time the moths are laying the eggs and consequently the crop does not suffer from the ravages of the insect. Much useful information on this subject has been collected by Mr. Wetmore, of Clifton, N.B., and again this year at my request he is going to try spraying his pease in the same way we do apple trees for the Codling moth. It is possible that this may be a good remedy for garden use but might be found rather difficult for the pea crop growing in the field because the vines cover the ground so thickly. But the result of his experiments will be valuable, because if we can get a good remedy for a garden crop it is worth having and ultimately we may be able to apply it to field crops.

THE CARROT RUST FLY—TO PREVENT.

Another insect somewhat new as a crop pest is the Carrot Rust Fly. This insect, which I am sorry to say is increasing in Canada and giving a great deal of trouble, is a small black fly. It lays its egg near the surface of the ground by the side of the young carrots, particularly after the carrots have been thinned out, that is when by handling the plants a certain amount of the odour of the plant is given out. The eggs are laid at that time and the young maggots burrow down, they puncture the root and serious injury is done by their boring into the roots in every direction, thoroughly ruining them for table use, and certainly not improving them for stock, but probably not injuring them to the same extent as those intended for table use. The only remedy that has given satisfaction with us for getting rid of that insect is late sowing. The carrot is a plant from which good roots may be obtained if sown very much later than is the usual practice. I found when in London, some years ago, that quite late in the year a very nice lot of tender young carrots were being sold in Covent Garden market, and learnt from one of the growers that they sowed them right up to the month of July and those which were sown late were better for the market than those of the earlier sowings. With field crops we sow them as early as possible in order to get the largest amount of crop for feed, but when sown for the table they can be sown late and if they get a little rain they make good growth and for table use are much better than those sown earlier in the season.

Experiments have been tried with some success in sowing along the rows different substances odourized with carbolic acid and other materials that have a strong odour, so as to hide the natural odour of the carrot.

THE TURNIP APHIS—HOW TO DESTROY IT.

Another insect that did a good deal of harm last season throughout all Canada was the Turnip Aphis. This is one of the plant-lice or green flies which attacks the turnip, and unfortunately they were very widespread, and the statement went forth, and was generally accepted by farmers, that nothing could be done to prevent loss from its attacks. Now that is not true; a great deal can be done. When we had a visitation some years ago we found that it was best to let our men who were thinning out the turnips know that they had to look out for the Turnip Aphis. When the men are thinning out the turnips they can easily distinguish the first colonies of the insects, and, whenever a colony is found, if the plant is hoed out and buried by hoeing a little earth over it with the hoe which he has in his hand, the colonies may be prevented from spreading. After hoeing earth over the uprooted plants it should be firmly pressed down with the foot. When the lice are too numerous for this treatment they should be sprayed with a solution of whale oil soap in the proportion of one pound in eight gallons of water. We have found that whale oil soap is one of the best remedies for all plant-lice, and in that proportion it is useful for nearly all

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kinds of plant-lice. In the Spraying Calendar, which I have submitted, is a soap and tobacco wash, in which tobacco is added, and where this is available the mixture is much more effective. We mix it in an ordinary forty-gallon coal oil barrel in the proportion that I have spoken of, one pound of whale-oil soap to eight gallons of water and two pounds of tobacco. Good's Caustic Potash Soap, No. 3, if obtainable. The native grown tobacco leaf is what we use. If this solution is sprayed on the attacked plants with a knapsack sprayer, the plant-lice are killed. The knapsack sprayer is a most convenient implement for spraying mixtures on all low crops. The worst example attack by the Turnip Plant-louse I have seen was at Morden, Manitoba, where whole acres of turnips were destroyed. It was an unusual attack, but steps have been taken to warn the farmers in southern Manitoba to look out for the appearance of this pest should it occur again.

By Mr. Featherston:

Q. Had they dry weather during the time the attack was on?

A. Yes, it was very dry weather.

By Mr. Moore:

Q. I think you have not mentioned the insects that prey on the onion.

A. The worst is the Root Maggot. You mean the one that destroys the bulb, do you not?

Q. When the onion plant has grown up to three or four inches high you find them cut off.

A. And the bulb all rotten or cut off?

Q. Cut off?

A. That is the cut worm. The Paris green and bran mixture is the best for that. The Root Maggot is a far more serious pest. One of the greatest desiderata is a good remedy for the Root Maggots of onions and other plants. As I have already said, carbolic is very objectionable to them, and I am trying various mixtures in which there is carbolic acid to determine which is best. A mixture of soap and crude carbolic acid mixed with water has given the best results against the Radish Maggot. The well known material, White Hellebore, used for the Currant-worm-insects on white and red currants and gooseberries, has also given good results. This is a remedy I expected nothing from, but after two or three trials of it I had such good results that I now feel I can recommend its use. It is dusted dry along the drills as soon as the young plants appear.

THE GRAY FRUIT WORM--SPRAYING MIXTURE FOR.

Throughout the province of Ontario last year a good deal of harm was done in apple and pear orchards by certain caterpillars known as the Green Fruit Worms. These are the caterpillars called "Gray Pinions," and they have the bad habit of not only eating the foliage but of attacking the young and forming fruit. This is the time of year that they do most harm. We have not suffered from them this year, and I hope they will not occur again. During the last twenty years we have had two or three visitations of these insects, but they soon disappeared. Last year the Green Fruit Worms were very troublesome in the Niagara Peninsula, and also in this locality. In addition to attacking fruit trees, one species attacks maples and other forest trees, and in some places it is so abundant that it strips the trees in the same way as the Tent Caterpillar.

In British Columbia I found that fruit growers suffered much from the caterpillar of a small moth, which has done a good deal of harm in apple orchards. It is called the "Lesser Apple-worm" or "Plum Moth." Last year it did great injury in British Columbia, together with the Apple Fruit Miner, and no remedy was of any avail. Experiments are being tried in spraying the trees with Paris green, as for the Codling Moth.

By Mr. Wilson.

Q. Is it the caterpillar of the Codling Moth?

A. No, but it answers to it in everything but size. The spray which we recommend is one pound of Paris green and one pound of fresh lime to 100 gallons of water. This should be applied early in the season after the blossoms have fallen and the young fruit has formed. The eggs are laid on the side of the fruit, and when the young caterpillars hatch they crawl over the forming apple till they reach the eye and remain inside the calyx or cup at the end of the fruit. Spraying should be done early, before the calyx closes and the weight of the young apple turns down the calyx end. The young caterpillar remains for some time in the calyx before it penetrates the fruit. This is the time the poison takes effect before it penetrates the fruit, when it cannot be reached.

Q. This miner you speak of is in the spring?

A. Yes, but the caterpillars are found all through the summer and autumn in the fruit which they destroy by burrowing in every direction.

Q. What do you use for the Tent Caterpillars you spoke of?

A. A spray of Paris green in the proportion of one pound to 160 or 200 gallons of water is the best remedy.

Q. It should be applied early?

A. Yes, very early, because the caterpillar is then small and much easier killed. When they are large they require much more poison and it might be necessary to increase the strength of the mixture to one pound of Paris green to 100 gallons of water, with lime in the same quantity as the Paris green. If lime is mixed with arsenical mixtures no injury is done to the foliage and it is just as poisonous to the caterpillars.

By Mr. McMillan:

Q. Could nothing be done to keep the caterpillars from getting up the trees?

A. Yes; when they have eaten the foliage off the trees where the eggs were laid and the food supply becomes reduced, they wander; they drop from the trees and crawl long distances. I measured a fortnight ago, where I found one on a fence; it was 300 yards from the nearest tree and it had crawled over grass to get to the fence. They crawl in search of food and they frequently crawl long distances along fences and railway tracks. That is how trains are stopped by them sometimes. I once saw a train stopped by weeds in the North-west. The tracks were not excessively weedy, but there had been a thunderstorm and the weeds were knocked over the track, so that the wheels had nothing to grip on. So if half a dozen caterpillars get on the railway track every few inches or so, I can understand how the wheels might spin round without being able to bite. Most people think when they read about trains being stopped by caterpillars that they are piled up on the track so that the train can't get through them.

By Mr. Wilson:

Q. It was reported in this case that they were six inches deep?

A. I believe that that was an exaggeration. I do not think that you could get them six inches deep, and if you did pile them up they would not stay. It reads better to say they were six inches deep than one inch, but I doubt if they were even one inch deep. My weeds when the train was stopped were more than two feet high, according to the report; but it was not so; they had simply blown down across the tracks.

By Mr. McMillan:

Q. What would you do on the trunk of a tree to prevent them getting up?

A. There are many mechanical contrivances which are good or the banding of the tree either with a band of some easily yielding material, such as cotton batting or some adhesive substance to catch them. The bands of cotton should be tied on

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with string about the middle—which gives a yielding surface over which the caterpillars cannot crawl. Many people use protectors of tin or wire netting or bands of castor oil and resin or even molasses spread on paper and tacked around the trees. When the caterpillars come to those they don't walk any further. The mixture of castor oil and resin has been much used and has proved very successful, being thick and sticky, and at the same time it keeps its viscosity a long time. This mixture has been used by Dr. Springer of Burlington with great success against the female moths of the cankerworm, which ascend trees in autumn to lay eggs. I think the simplest remedy which every one can use is a band of cotton batting tied around the trees that are not infested to prevent the caterpillars crawling up.

There is now, Mr. Chairman, just one point about grasses I would like to mention if no one has any further questions to ask about insects.

APPLE WORM,—WHEN TO SPRAY FOR.

By Mr. Cargill:

Q. You do not say what time of year you would spray to prevent the apple worm?

A. As soon as possible after the blossoms fall. This should be repeated three or four times in Western Ontario. In this part of the country we only spray once, as we have only brood of the Codling Moth. West of Toronto they have two and in the Niagara peninsula apparently three sometimes. Here, I think we may say, we have only one brood and hardly ever two, and west of Toronto two broods and occasionally three.

Q. Would you spray in the spring when the trees first bloom?

A. There would be no advantage in this, and, besides a law has been passed to protect the bees of the apiarist while the trees are in blossom. Most fruit growers find it to their advantage to keep a few bees in their orchards as they help to pollinize the fruit. In spraying it is necessary to have the proper materials and to put them on at the proper times with proper apparatus. This can only be done by finding out the life history of insects and applying these materials in accordance with that knowledge. Most of the most troublesome insects have now their life-histories well known and the best materials for destroying them are also known. Farmers of Canada have our annual reports and spraying calendars, and besides this many persons are writing regularly for information, which we willingly give to the fullest extent possible and on all occasions.

PASTURE GRASSES,—SEEDING MIXTURES.

Let me now draw your attention to another subject,—pasture grasses, which are of such interest to farmers. Most seedsmen sell special mixtures, some of which are good and some of which are not. We have tried a great many experiments with different mixtures to find out which would give big crops of hay and then good pasture afterwards.

One mixture which has given us splendid results is the Central Experimental Farm mixture, and the fact that we have christened it after our own institution shows at least that we have confidence in it. It was first used by us on a large area last year when it gave the best result out of twenty different mixtures, but it has been used by my correspondents for several years and all have reported most favourably upon it. It is a mixture for an average farm soil suitable for ordinary crops. It consists of, Timothy, six pounds; Meadow Fescue, four pounds; Orchard Grass, two pounds; Kentucky Blue Grass, one pound; Red Top, one pound; clovers, eight pounds. With the grasses mentioned above are sown two pounds each of the three clovers Alfalfa, Alsike and White Dutch, and one pound each of the two red clovers, Common Red and Mammoth Red. Thus we get eight pounds of clover and fourteen pounds of grass, twenty-two pounds in all. This is about the proper proportion of grass seed to produce a heavy crop of hay. It gives the heaviest crop of

a green fodder or hay of any mixture we have tried. It can be cut for two years as hay and after that gives excellent pasture, as good as any we have tried.

By Mr. Featherston:

Q. Is that twenty-two pounds to the acre?

A. Yes.

Q. What was the number of pounds of each?

A. Six pounds of Timothy, four pounds of Meadow Fescue, two pounds Orchard Grass, one pound Kentucky Blue Grass, one pound Red Top. Red Top is perhaps not necessary unless the land is low. In that case I generally put it in. If the land is high you may put in two pounds of Kentucky Blue Grass instead of one pound of each, but if the land is low in spots I always put in the red top grass. It is a very valuable soft and rich grass in such places.

Q. How many pounds of clover?

A. Eight pounds of clover, two pounds of Alfalfa, two pounds of White Dutch, or ordinary White, as it is familiarly called, an done pound each of the common Red and Mammoth Red.

TO RECLAIM SAND DRIFTS.

Some rather interesting experiments with regard to grasses have been carried on lately that I would also like to mention. Along the Ottawa River and also along the St. Lawrence are various areas of sand land where the pine timber has been cut down and the wind has had an opportunity of drifting the sand soil, and at one place in particular, near Lachute, there is an area five miles long by one-half to a mile wide that is simply a desert. There is not a blade of grass growing on this sand, and with every wind it shifts from place to place. Not only is this tract useless, but it is spreading over the neighbouring good land, and it is a very serious matter for the farmers living near this tract. Efforts are now being made to see if something cannot be done to hold it down. It is only about forty years since this tract began to appear. As the pine was cut down and the land cultivated, the land got poorer and poorer and the wind got in and now these shifting sands have taken the place of arable lands. I believe it is not a hopeless experiment to recover that land again, because the farmers are all actively interested and some results of a hopeful nature are being obtained from the experiments which are now being tried by the Minister's order as well as by the Department of Agriculture of Quebec, in planting spruce trees. Many farmers there have planted as many as four or five hundred trees in the last spring. Some of the trees were not in the best condition or in the best position, but the farmers are learning every day and are doing a good deal. It is intended to plant the Awnless Bromo grass, a free growing vigorous variety of fodder grass of excellent quality, among these trees, which will, I hope, in time recover this desert. We are working from the outside to the centre so as to gradually encroach on the sandy area and prevent it from spreading. Within the memory of people living in the district, as for instance, Dr. T. Christie, M.P., who has shown great interest in having the experiments instituted, this now useless tract of sand was covered with crops, and only the fact that the sand has accumulated in some places and moves so quickly when the wind blows prevents it being done now. Trees are being planted, grass is being grown, the farmers are working in unison, and I hope before long at any rate that some appreciable effects may be seen.

FLOODED LANDS.

Experiments are also being made with the object of making use of some alluvial flats on the Ottawa River that are flooded in spring. Vigorous grasses have been planted and better results than formerly have been obtained in getting back into useful grass some flats where the native grasses had been broken up, the whole of the surface soil was washed away and nothing was left but the sub-soil. By planting

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these valuable grasses I hope that some of these flats will be brought back into their old good condition, and in addition that the grasses used will be more valuable than the varieties which were originally there.

By Mr. Wilson :

Q. Has any effort been made at Prince Edward at the sand banks there to stop that sand from moving?

A. I do not think there has, the elevation there was considered so high that it was thought almost hopeless, and I have never heard of anything being done.

Q. Could there not be some trees planted there?

A. I think there might. There is a peculiarity of these sand banks but it is not a peculiarity after all if you come to consider it. There is always moisture very near the the surface, the same as we find where there has been proper summer fallowing or cultivation practised; by scraping away the dry sand from the top you can find moisture underneath. At Lachute we found moisture right underneath the surface only three or four inches down and the trees which grew on that sand are spruces and firs which we all know require a good deal of moisture. The reason why they grow was probably because of this moisture; from the shifting of the surface of the sand it was kept dry and this kept the moisture in and had the same effect as the cultivation of the soil in dry seasons. The trees got all the moisture which they required.

Q. I think it might be very well to plant some trees there?

A. I think so too. I have never been there myself; that is, I have never been very close to the sand hills and never examined them closely, but I think they are of very much the same nature as these sand banks on the St. Lawrence and Ottawa, and those trees that have been planted and protected against the wind storms that drive the sand which actually cuts them have succeeded well. It is this sand which destroys them, it is not the heat of the sun, nor the lack of fertility in the soil, so much as that they are actually cut down by the sand which is carried by the wind and cuts like a knife.

By Mr. Featherston :

Q. Was the exhibition of weeds at Winnipeg a success; I did not hear of any report upon that?

A. It was a tremendous success; although the exhibition was held in simply a shed which was put up, it was of very great service; all the worst weeds of the province were shown there. It was in charge of Mr. McKellar and Mr. C. Braithwaite, particularly energetic, active men, who kept things running all the time and had fresh weeds brought in day by day. More than that, they introduced the idea of having the faded weeds kept side by side with the fresh ones, and the idea was original and a very wise one, for this reason: when a farmer picks a weed he does not generally stop to examine it there and then, but he takes it home and examines it afterwards. I have found that to be the case in my own experience. The farmer carries the weed home and does not stop to examine it, as a rule, when he picks it, but sees it afterwards in its faded condition; and the wisdom of this idea was shown in the fact that there were more weeds actually recognized by farmers in the faded condition than there were of those weeds which were green and which were examined by the farmers in a green state. The success of this exhibition of weeds was shown by the large number of visitors to the exhibit who brought in weeds for report. During the three days this exhibition was on, there was a constant stream of farmers asking questions and bringing plants, asking information as to what they were. Many others said that if they had known this exhibit was to have been there they would have brought samples of weeds from their own farms in order to find out what they were.

It was instructive also to the officers of the department because they were able to find out from the questions asked and the specimens which were brought in just where and to what extent many of these weeds were distributed of which they had

no knowledge before. The worst weeds were hung in a conspicuous place across the front of the building, and every weed that is known as a pest and injurious to the crops was represented.

Mr. Braithwaite spent three or four days before the exhibition in collecting specimens for inspection. Rev. W. A. Burman also did special work of value for the department, and the information which was given was very largely sought after and taken advantage of, and the Minister of Agriculture for Manitoba, I believe, has made arrangements for a repetition of the exhibition this year. A full report of this effort will be published by the Hon. Mr. Greenway.

By Mr. Featherston :

Q. What about the French weed, some people object to that name?

A. I do not wonder. As I told them in Manitoba a few years ago I do not see why this weed should not be called the English, Irish, Scotch or German weed as well as French. The first year I lectured on weeds for the Manitoba Government was just after the present government came into power; it was said, now, there is a French Canadian Premier here, we have the government botanist going up there to Manitoba and telling them that the Stink Weed is not to be called French weed any more, but he has orders to call it by a new name. Of course, this was nonsense, but if there is anything in a name Stink Weed is just the name for this plant as any one can prove for himself by rubbing some in his hands and smelling it. Why it should be called "French weed" I do not know, and I do not wonder that any people object to have their national name applied to a plant which is simply a curse to the province, besides it is just as likely to have originally come from England or Germany as from France.

Q. Some of these people are very sensitive?

A. They are. It takes a very little thing sometimes to make people think something might be done another way and this is one of them. But this time these objections have reason on their side. French weed does not describe the plant accurately and stink weed does.

Having read the preceding transcript of my evidence, I find it correct.

JAMES FLETCHER,
*Entomologist and Botanist to the
Dominion Experimental Farms.*

