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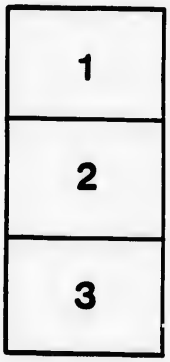

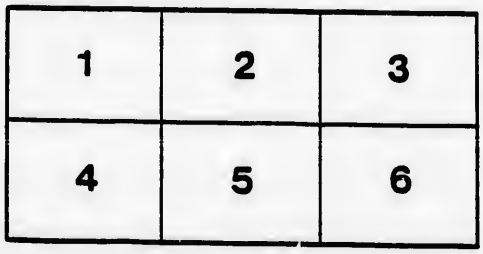

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GOVERNMENT OF THE NORTH-WEST TERRITORIES.

DEPARTMENT OF AGRICULTURE.

BULLETIN No. 2

NOXIOUS WEEDS

—AND—

HOW TO DESTROY THEM

SWEET GRASS. *(See Page 20.)*

1900

PRINTED BY DIRECTION OF GEO. H. V. BULYEA, COMMISSIONER OF AGRICULTURE.

[Information prepared by T. N. Willing, Territorial Inspector of Noxious Weeds, partly extracted from Bulletin No. 23 of the Dominion Experimental Farms by Dr. J. Fletcher.]

Addresses on Noxious Weeds at Agricultural Society Meetings in 1899

MINUTE of seventeen meetings held in Assiniboia between the 19th day of June, 1899, and the 7th day of July, 1899, both inclusive, and addressed by Mr. C. H. V. Bulyea, Commissioner of Agriculture for the North-west Territories, and Dr. James Fletcher, Botanist to the Dominion Government, the subject being "Noxious Weeds." Reported by William Trant.

A series of meetings, organized by the Department of Agriculture, was begun at Moosomin on the 19th day of June, 1899, and completed at Gainsborough on the 17th day of July, 1899.

Object of Meetings.

The object of the meetings was to hear a practical lecture on "Noxious Weeds," from Dr. Fletcher, Botanist to the Dominion Government. The meetings had been convened through the different Agricultural Societies, and in every instance an officer of the local society presided.

The Commissioner of Agriculture (Mr. C. H. V. Bulyea) attended and addressed all the meetings except those at Moose Jaw and Fort Qu'Appelle, at which places the Deputy Commissioner (Mr. C. W. Peterson) was present and delivered addresses, dealing with the subject on the same lines as did the Commissioner at the other meetings. Weed Inspector Willing was present at Whitewood and Carnduff, and on each occasion gave an address. His Honor the Lieutenant Governor was present at the Regina meeting and took part in the proceedings.

Commissioner's Address.

The Commissioner of Agriculture, in the course of his speeches, impressed upon the farmers that the question of noxious weeds was one of the most important they would have to handle. The Department had realized this, and that was why the meetings had been organized. The policy of the Department was to prevent the weeds getting a foothold in the Territories. The Government had taken warning from what had taken place in the neighboring Province of Manitoba. There the matter had become serious. There were lands in that Province that had become practically valueless on account of the hold noxious weeds had got upon them. He knew of a case where a person had offered a loan company 240 acres of land for $50 and the company had replied that they would not have the land as a gift, in consequence of the reputation the locality had for noxious weeds. The North-west Government had determined to do its utmost to prevent that sort of thing happening in the Territories. This was not a new policy. Some years ago the municipalities of Indian Head and Qu'Appelle passed by-laws to cope with the evil. Of course, these did not apply to portions of the country outside of those municipalities, and one of the first things he did when he became a member of the Assembly was, as one of a committee for the purpose, to prepare an Ordinance to do throughout the Territories what the two municipalities he had mentioned were doing within their own limits. That Ordinance was passed, and it gave very arbitrary powers to a Weed Inspector. Persons who did not appreciate or understand the object in view, might consider the Ordinance too stringent in some of its provisions. The Government,

Importance of Subject.

Depreciation of Land by Weeds.

Legislation on the Question.

however, considered the question not only important, but serious; and he believed that when the farmers understood the nature of these weeds and the danger that accrued from them, they would come to see that such legislation was not too arbitrary. It was true the Inspector had power to order a man's crop to be destroyed, but the instructions from the Department to the Inspector were, that he was not to exert those stringent powers when the farmer was doing his best to get rid of the weeds. There were persons, however, who were not alive to their responsibilities in the matter, who thought they could do what they liked with their own, who imagined they could sow weeds or wheat, just as it suited them. Such men had to be dealt with in a stringent way, and the Government was determined to protect the careful and prudent farmer against the farmer who was careless and foolish. The great fault of the legislation was that it dealt only with the weeds on occupied lands, and the Legislature felt that it was not fair to compel farmers to eradicate the weeds on their own lands while allowing adjacent or neighboring lands that had once been occupied, to be really seed-beds for these weeds. These vacant and unoccupied lands had proved a sort of stumbling block to the eradication of these weeds. In some cases, the owners of the lands had left, and it was not known where they had gone; in others, the land was owned by companies that declined to recognize their responsibility so far as the weeds were concerned. Last session, therefore, an Ordinance was passed to compel such persons and corporations to fulfil the duties of citizenship in this respect, Legislation had already been effected, compelling districts outside of municipalities to form themselves into Local Improvement Districts, wherever there were twelve residents within a prescribed area. These Districts were not municipalities and had neither the power nor privileges of municipalities, but they were compelled to do public works and to contribute either in money or labor $2.50 a year for the cost of them. The Government had undertaken the collection of the tax, and the arrangement had been found to work well. The Government, therefore, determined to utilize the machinery of the local improvement districts in the matter of noxious weeds, and by the Ordinance of last session the Authorities would clear away the weeds from deserted lands; the cost of doing the work would be charged up against the individual lands and collected in the same way as the Local Improvement Tax. It was only right that the owners of vacant lands should bear the cost of destroying noxious weeds on their lands, without burdening the public or a newcomer with that expense, especially when the occupiers of land had to bear the cost of keeping their own lands clean which the unoccupied land was making dirty for them. The C.P.R. lands they had not the power to tax, but so far as that powerful corporation was concerned, he was glad to say that it had agreed to do all that could be done to clear its lands of weeds and its officials were to assist the Inspectors in the work of eradicating the weeds that were so prolific on the track. The Government had found the C. P. R. amenable to reason in the matter and willing to assist in every possible way. The great corporation evidently saw that its lands should not be allowed to deteriorate in price in consequence of the presence of noxious weeds.

Careless Farmers.

Unoccupied Lands.

Weed Ordinance

The C. P. R.

The Commissioner also pointed out that, in addition to the above course of proceeding, the Government had appointed more Weed Inspectors. Some time ago eleven local inspectors were appointed, but these had been found insufficient and the number had been doubled. It was obvious that all these could not be botanists. There were not sufficient botanists in the whole country to fill these positions; but the best practical men that could be found had been selected. In addition to this, the Government had been fortunate enough to secure the services of Mr. T. N. Willing, an expert botanist, the best in the West, who was not only a graduate of Toronto University but a North-west farmer. Mr. Willing was then going round the country instructing the local inspectors, so that there would be uniformity in dealing with the whole question, instead of each inspector following his own peculiar ideas and his own pet methods. The new Chief Inspector would go over every district and in the fall would make a full report on the weeds in the different districts and indicate the best way to destroy them. In addition to this, specimens of the most prevalent weeds would be mounted for use in the schools, so that the children attending the schools would learn to recognize weeds and would be taught something about them and how to destroy them.

Weed Inspectors.

Another point on which there had been legislation, was in regard to

the elevators. Formerly farmers could take away the cleanings. Now, in the first place, there was no guarantee that in taking away this refuse a farmer was taking away the cleanings from his own grain. His own grain might have been free from the seeds of weeds, but the refuse given him might be from a dirty crop. Thus a farmer might carry home to his own clean farm a stock of weed seeds from a dirty farm. Anyhow the refuse or cleanings from elevators had been found a prolific source whence spread the seeds of noxious weeds. It had been determined to stop this. When the power at an elevator was steam power, there was no difficulty in the matter, as the refuse made good fuel, but, when the power was horse-power or a gasoline engine, the refuse could not be disposed of. It was now, however, prohibited to take it away or to sell it, and the man who bought was as liable to punishment as the man who sold. The refuse had to be burnt or otherwise destroyed. There was similar legislation in regard to threshing machines. A threshing outfit was another prolific source of spreading the seeds of weeds from one farm to another, either in the sacks used, or by not thoroughly cleaning out the separator. Here too the law called for the burning of the refuse before proceeding from one farm to another. Elevators and Threshing Machines

Such were the means adopted by the Government to fight the noxious weeds and to keep them down, and he felt sure that, if the farmers would do their part and do all they could to assist the Inspectors to carry out the law, great good would be the result.

Dr. Fletcher's lectures were eminently practical, vivid in the presentation of the subject and the illustrations apt, simple and effective. He said that the two most important points in connection with noxious weeds were how to know them and how to destroy them. As a rule, farmers did nothing because they did not know what to do. In regard to the first point every farmer ought to know something, not of Botany which was a Greek word the farmer needed to know nothing about, but of plant life. A knowledge of plant life was a valuable thing. It had enabled Prof. John Macoun to prophesy years ago that good wheat could be grown on the prairie. That eminent man was laughed at at the time and called a dreamer and an enthusiast, but his knowledge of plant life had enabled him to prophesy correctly, for it was now known that the prairie could grow as fine a class of wheat as was grown anywhere in the world, perhaps indeed finer than in any country except perhaps in Siberia where the conditions were almost identical—a country that had not yet entered into competition with Canada. Ere long, however, it would certainly compete with the North-west and therefore it behooved the farmers of this country to do all they could to keep to the front: one way of doing this was to keep down weeds. A farmer's Botany was a very simple science; the principal things a farmer should know about plant-life were very few in number. First he should remember that all plants, from the smallest flower to the largest tree, could be divided into three great classes: first those that lived and completed all their development in one year; secondly, those that lived two years, and thirdly those that lived many years. Every plant that grew came under one of these heads. The last class, the many-year plants, were again divided into two sub-classes, viz., those that root deeply and those that do not. To these important facts he would add just one more the full appreciation of which was of the utmost importance to all who wished to fight deep-rooted weeds which live for many years, viz., All plants like animals feed. He claimed that plants fed through their leaves. It had been customary to call the leaves of plants the lungs of plants. This definition he considered was a mistake. Plants did not breathe through their leaves, but they fed. They took in through minute openings or mouths in their leaves a most important part of their food in a gaseous condition, and then having mixed it there with the gases taken in by the roots in the shape of water, they elaborated from these all the materials necessary to build up their frames and develop to maturity. The leaves then were not the lungs of a plant, but they were its stomach. Deprive a plant of its leaves and it could not feed and, like an animal which could not feed, it must soon die of starvation. These the speaker claimed were the cardinal points of all the Botany any farmer needed to know, but he must constanaly bear them in mind, for upon them were founded all his rules of action when dealing with noxious weeds to destroy them. Dr. Fletcher here gave a detailed statement of what a weed is, how great the danger of neglecting them and what was the best treatment for some of the worst weeds, this part of the address was Dr. Fletcher. Knowledge of Plant-life. The Farmer's Botany.

practically the same information as that given on pp. 9-15 of this bulletin, so it is not repeated here. He continued his address by stating that the excellent North-west Weed Ordinance, gave a list of noxious weeds. The best definition of a weed, however, was contained in one word: it was an "enemy," an enemy that must be got rid of or it would get rid of the farmer, and got rid of, too, at once, for one year's seeding meant seven years' weeding. Farms were not yet so badly infested in the Territories as they were further east where land had been longer settled. In Ontario it cost the farmer ten per cent. of his crop to fight against insects, and another ten per cent. to cope with fungi, such as smuts, mildews and rusts, to say nothing of weeds, and it would be the same in the North-west Territories if the farmers did not put forth every effort to prevent it. In the rich lands of the Red River valley he had known wheat even reduced 50% in value in consequence of the prevalence of a very bad weed called Ragweed, the seed of which was of the same size and weight as the wheat itself, and could not therefore be either sifted or blown out easily from grain. It was, therefore, very difficult to get rid of, and buyers do not even care to handle at all such wheat as had seed of this weed in it. Now the soil of the North-west was exceptionally fertile, and would grow a good crop of weeds just the same as a good crop of wheat. All that was wanted was favorable conditions, and those conditions did, as a rule, exist in the North-west. Those conditions were a fertile soil, the proper amount of moisture and a short season, which caused the plant to exert itself, so to speak, to the utmost, to do its work of producing ripe seed before winter. Now they could not successfully grow two crops—weeds and grain—at the same time on the same land, any more than two horses could drink sufficient water from a trough that had only water enough for one. In the contest between a farmer's crop and the weeds which grew in that crop, everything depended on which got the start, the weeds or the wheat. Generally speaking, the weeds had the advantage because they were hardy, were native to the country or had become acclimatised and their seeds were in the ground ready to start as soon as the weather was suitable, whereas wheat was not, but was really an exotic plant and could only begin growth when the farmer found it convenient to sow the seed. The question was: how to get rid of weeds. The first thing was for farmers to be able to recognize a weed when they saw it, to know its true name, not necessarily its botanical name but the name by which it was generally known, not its local name, which was often a wrong name. Then in addition to the name of the plant they should know its habits. It could not be too widely known that any person could send plants post-free to the Experimental Farm at Ottawa, or they could send them, though not post-free, to the Department at Regina, and all information about the plant would be forwarded to the sender in the course of a post or two. It was better to send a specimen than merely to give the name, because farmers often called weeds by the wrong name. Farmers thought they knew the names of weeds, but they were often mistaken; and if they asked for information about a certain weed and sent the wrong name, why, of course, they would get the wrong information. He had often heard farmers speak of the Ragweed when they meant the Tansy Mustard. The true Ragweed or "Crown-weed" of millers was very rarely met with in the North-west. Again, the Hare's-ear Mustard was often called the Black Mustard, a plant that is seldom seen in Canada and is not anywhere troublesome. The importance, indeed the necessity, of calling a plant by its proper name had been forcibly illustrated in the case of the Tumbling Mustard, now so prevalent in many parts of the Territories, which was frequently called Tumble Weed, a comparatively harmless weeds and consequently left alone. It would be a good thing if a distinctive and appropriate name could be given to each weed instead of the endless confusion that at present existed in consequence of the many local and meaningless names that were given to weeds. The Stink Weed was often called the "French Weed," whereas there was nothing French about it, but there was a good deal of "stink" about it, as they all knew, which affected the milk, and even the flesh of the animals that ate it. The speaker considered Stink Weed a most appropriate name. Again, let any one look at the shape of the leaf of the Hare's-ear Mustard, and he would see how appropriate a name it was for that weed. Some person thought it difficult for a farmer to learn to name and recognize the different weeds. That was all nonsense. Although there were many hundreds of different kinds of plants growing on the

The Farmers' Enemy.

Cannot grow Weeds and Wheat.

Names of Weeds.

Tumbling Mustard.

Stink Weed.

prairie, there were very few which a farmer needed to trouble his head about. There were not many more weeds they needed to be afraid of than there were different sorts of crops, and every farmer knew the difference between wheat, barley, oats, rye, and so on. It was no more difficult to learn the names and appearance of Stink Weed, Tumbling Mustard, Hare's-ear Mustard, and so on. Let farmers know that it was important for them to learn to recognize the different weeds, and they would soon do so. In this respect he was glad to hear the Commissioner of Agriculture say that specimens were to be exhibited and explained in the schools. This had been found of immense advantage in Manitoba, and it would be the same in the North-west Territories. The children, not only became familiar with the weeds, but they took the information home and imparted it to those on the farm, and thus the knowledge soon spread all over a district. Learn to recognize Weeds.

Farmers should not only learn to recognize weeds, but to recognize them in all their stages. Some weeds, the Russian Thistle and Stink Weed, for instances, had a very different appearance when young and when mature.

It was important to destroy weeds as soon as they appeared and were still small and easily killed. When full grown it was far more labor to kill them and they would ripen many seeds. The Ordinance very wisely made provision to prevent the spread of seeds from elevators and by threshing outfits and from vacant lands. All that the farmers could do to help in those directions should be done, and done quickly. Destroy them Early.

Summer-fallow was a question on which Dr. Fletcher spoke at length. It was, he said, the salvation of the North-west and for teaching this more than anything else Mr. Angus Mackay deserved the thanks of the farmers and the country. Many farmers thought the object of summer-fallowing was to keep down weeds. Incidentally, summer fallowing did keep down weeds but its main object was to preserve moisture. They all knew that in the early days farmers came to the North-west, farmed, or thought they did, failed and went away declaring the country was too dry to grow wheat. Those who had summer-fallowed knew better than this. They knew that, if done properly, summer-fallowing preserved in the soil the moisture which is of so much importance in many places. In localities where the land was light and liable to have the surface blown away by the wind, seeding down at stated intervals with Brome Grass or Timothy, the roots of which would add fibre to the soil, was highly recommended. The erroneous idea that summer-fallowing was practised mainly to keep down weeds had led some to put off the operation until too late in the season. These men had got the idea that if they had but a good swathe of weeds to plough in, it would enrich their soil. that they were putting back into the soil what the weeds had taken out. Green plants, they said, were good for the soil. Let it be remembered, however, that they could never put back into the soil in that way all that the weeds had taken out; so then it would have been better to have prevented the plants from growing at all and taking out of the soil what they had, to say nothing of the risk of ploughing in seeds that would ripen under the soil and ultimately germinate. Summer-fallowing should be done as soon after the June rains as possible, so as to preserve all the moisture they could. All summer-fallowing ought to be finished by the first week in July. Summer Fallowing.

Seeding down was a process that deserved notice. When a piece of land was infested with weeds and the farmer had not the time to treat it in the ways above indicated, let it be seeded down with something strong, say, Brome Grass. In the same way that weeds would crowd out a crop of grain and reduce the yield of seed, so weeds might themselves be be choked by a more vigorous plant which would prevent their getting light and air, and thus weaklings would be produced instead of strong and vigorous plants. But seeding down would not kill the weeds. That must always be remembered. It would only weaken them. When the time came to break the land again to kill the Brome Grass, or whatever was the crop, seeds of weeds would still be there in less quantity and the destruction of the sickly plants would be an easier matter than if the land had been continuously cropped with wheat. Seeding down.

To summarize: Weeds were the farmers' enemies because they robbed the soil of the plant food and moisture intended for the crop; they crowd out and take the place of the crop plant, because they are hardier and as a rule more prolific; they cause loss because they require time and labour to eradicate and they injure the quality of the grain by the seeds Summary.

becoming mixed with it. The farmer should therefore be able to recognise the weeds when he sees them at any stage of their growth, to learn their names and their habits, whether they are one-year plants, two-year plants, or many-year plants, whether they root deeply or not; and, remembering that all plants feed, destroy the leaves of those plants that are not annuals or are such as can be destroyed by cultivation, mowing or ploughing. All weeds bearing mature seeds should be burnt. In no circumstances should they be ploughed under.

Weeds at the Lectures.

An interesting feature at every meeting was that the farmers brought in large collections of specimens of weeds growing in their respective localities and requested Dr. Fletcher to name them and indicate the best means of eradication. It was seen how few of the weeds were known to the farmers, even the notorious and widely-spread Stink Weed was not known to some persons on whose farms it was growing in profusion and great luxuriance. Even when recognized in some stages of its growth, it was not known in others. As an instance of how little is known about the weeds in the district it may be mentioned that at one of the places visited Commissioner Bulyea was assured that the district was tolerably free from weeds and especially were there no spilled seeds at the elevator. As a matter of fact, weeds were found in abundance all over the locality, and round the elevator specimens were found growing of all the worst weeds, including the Ragweed, so seldom seen in the Territories. A hopeful sign of the value of these meetings was that so many questions were asked after each lecture and a great amount of definite information of special local interest to those addressed was thereby elicited. In answer to a question whether weeds could not be destroyed by some acid, Dr. Fletcher said that Sulphate of Copper and Sulphate of Iron would destroy some plants, but the trouble and cost of spraying made it a less desirable process than the use of harrows and weeders. In reply to a despairing remark that it seemed impossible to get rid of weeds where once they had got a strong foot-hold, Dr. Fletcher asserted that the dirtiest land could be got clean by perseverance. He instanced the rich lands in parts of the Red River valley which were at one time over-run with weeds, but there were now many farms there that had been successfully dealt with and were practically clean. A great deal depended upon information on the subject being widely spread. Every means should be taken to spread information by lectures, by bulletins, through the schools and through agricultural societies which last have done an immense amount of good throughout Manitoba.

Sowing on Stubble.

In regard to sowing on stubble Dr. Fletcher said it should never be done twice in succession. There was a temptation to do so because the crop would perhaps come a little earlier; but the danger of weeds was too great for the risk. A farmer should make a point of summer-fallowing one-third of his land every year.

The above indicates but a few of the many questions asked and both the utility and appreciation of the meetings were fully discovered at these after-proceedings.

Weed Inspect or Willing.

Mr. T. N. Willing, chief weed inspector spoke at Whitewood and Carnduff. He spoke as a farmer speaking to farmers. Many farmers he said, did not know the different modes of treatment. The local inspectors would enlighten them on this point and also tell them how to discern between good seed and bad seed. This was important. He did not wish the farmers to sow the seeds of weeds along with their crops, and thus spread weeds all over the country. He had seen many weeds growing on farms that the farmers thought of no account, but which were harmful and noxious weeds. If the farmers knew how to recognise these, they would pull them up or otherwise destroy them in the spring and there would soon be few noxious weeds. He had heard it said there were too few inspectors; if every man became the inspector of his own farm there would be inspectors enough, and the weeds would soon disappear. They should remember, the better the land the better for the weeds, so those with good farms should look out. He had found in his travels about the district that summer-fallowing was not done early enough. When it was done so late as it was, it was not fallowing at all, it was seeding—seeding with the seeds of weeds. On the stubble there were many weeds which, although not exactly noxious, would yet give trouble if not got rid of. He found, too, that farmers were feeding cleanings without boiling them. This would spread weeds through the animals' droppings, and he had noticed on manure heaps many seedlings from last year's seeds.

It remains to add that at every meeting the greatest satisfaction and delight were expressed at what had been said, and the good achieved was frequently and cheerfully acknowledged.

What is a Weed?

There are many definitions of the word Weed, but perhaps from a farmer's standpoint the best one is: "any troublesome or unsightly plant that is at the same time useless or comparatively so." As a general statement, it may be said that our most troublesome and aggressive weeds of the farm have been introduced into Canada from other countries; but, at the same time, it is also true that under special circumstances some of our native wild plants may increase and become "noxious weeds." It must be acknowledged that in all parts of Canada weeds are a source of constant and very considerable loss to farmers. Indeed, so much is this the case that the great prevalence of some varieties in certain districts of the Dominion must be viewed with the gravest alarm, for they have taken such possession of the land as to seriously affect profitable farming. As examples of such aggressive enemies, mention may be made of the Wild Mustard, Quack or Couch Grass and Canada Thistle in parts of almost every province, Ox-eye Daisy in the Maritime Provinces, and Penny-Cress or Stink Weed and Tumbling Mustard in the West.

The increase of weeds has been frequently due to the fact that farmers have neglected them from not being aware of their noxious nature and power to spread.

"Many of our farmers have only a limited knowledge of weeds, and in many cases do not recognize those that are dangerous on their first appearance. Hence we have 'One year's seeding, seven years weeding.' There are some weeds so noxious that if farmers knew their real character and recognized the plants on their first appearance, they would postpone all other business until they were destroyed * * * Self-interest should be a sufficient incentive to farmers to destroy weeds if it is clearly shown that it will pay them to do so."—H. MacKellar.

Another point of considerable importance with regard to noxious weeds is the adoption, as much as possible, of some one English or common name. The names used in this pamphlet have been selected with much care as those which are most applicable and most widely known. When more names than one are given, the first is preferable. The scientific names, of which only one for each plant is recognized as

authoritative by botanists all over the world, are here given, so that the certain identity of each plant mentioned may be known. Few farmers, of course, are acquainted with these scientific terms, even in the case of our commonest weeds, but it would be well if they were; for certainly much confusion exists in different localities in the application of the English popular names, the same plant being frequently called by one name in one place and by quite a different one somewhere else, or quite as frequently a single name is applied to a number of distinct plants in different places or by different people in the same place.

The present bulletin is issued in response to numerous inquiries as to the nature of the many weeds found on farm lands in the Territories, and the best way of getting rid of them. While it is true that the character of each kind has to be considered, there are certain principles which must be constantly borne in mind by those who wish to clear their land of noxious weeds. In the present age of extensive and easy communication with all parts of the country, and indeed with the whole world, there are frequent opportunities for seeds of weeds being introduced into previously uninfested districts. As an offset against the great benefits we derive from railways, it has been found that many bad weeds have been introduced into new localities through their agency, the seeds being either shaken from cars or cleaned out of them at stopping places. It is important, therefore, to keep watch on all railway banks and station yards.

How Weeds Spread.

There are many ways by which weeds are spread:—

1. By natural agencies. The wind carries seeds long distances, not only in summer, but with dust and over the surface of the snow in winter. Streams distribute them far and wide along their courses, They are also distributed by seed-eating birds and herbivorous animals, through the stomachs of which the seeds have passed undigested, or by being attached to some part of their bodies by special contrivances, with which nature has provided some seeds for this very purpose, such as hooked and barbed hairs, spines and gummy excretions, &c.

2. By human agency. The seeds of weeds are frequently introduced as "foul seed" mixed with other seeds; they are also imported in hay used for packing or as fodder. In addition to this, weeds are frequeutly distributed over farms by waggons, harrows, seeders, threshing machines or other agricultural implements. But, notwithstanding all efforts to the contrary, weeds will certainly be introduced from time to time on the farms of the most careful; farmers should become acquainted with the different kinds which are likely to cause them loss, and the best way to treat them.

In the following pages will be found short accounts of some of the worst weeds of the country, arranged according to their natural orders, so as to bring together those which are most nearly related.

Classification of Weeds.

Weeds, like all other plants, may be simply classified under the three following heads:—Annuals, or one-year plants; Biennials, or two-year plants; and Perennials, or many-year plants. In eradicating weeds, it is of the greatest importance to consider under which of these heads they come, because in most instances the treatment is simple and will be upon the general principles of preventing annuals and biennials

from seeding, and perennials from forming new leaves, roots and underground stems.

ANNUALS—Are those plants which complete their whole growth in a year. As a rule they have small fibrous roots and produce a large quantity of seed. Examples of this class are found in Wild Mustard, Stink Weed (called also "Penny Cress" and "French Weed,") Lamb's quarters, Wild Buckwheat, Purslane, Ragweed, Wild Oats. There are also some annuals called "Winter Annuals," which are biennial in habit, that is, of which seeds ripened in the summer produce a certain growth before winter sets in and then complete their development the next spring. Of these may be mentioned Shepherd's Purse, Peppergrass, Stink Weed, mentioned above, Canada Flea-bane and the Blue Bur.

BIENNIALS—Are those plants which require two seasons to complete their growth, the first being spent in collecting and storing up a supply of nourishment, which is used the second season in producing flowers and seeds. Examples of these are Burdock, False Tansy, Common Evening Primrose and Viper's Bugloss or Blue-weed.

PERENNIALS—Are those plants which continue growing for many years. Perennial weeds are propagated in several ways, but all produce seeds as well. They have two distinct modes of growth, those which root deeply, and those of which the root system is near the surface. The most troublesome are those which extend long under-ground stems deep beneath the surface of the ground, as Canada Thistle, White-stemmed Evening Primrose, Showy Lettuce, and wild Sunflowers. Representatives of the second class or shallow-rooted perennials are: Pasture Sage, Yarrow and Couch Grass. Some perennials extend but slowly from the root by means of short stems or offsets, but produce a large quantity of seed. Of these, Ox-eye Daisy, Dandelion, Goldenrod and Yarrow are examples.

EXTERMINATION OF WEEDS.

In adopting a method of extermination, the nature of the plant to be eradicated must, first of all, be taken into consideration.

Annuals.—Any method by which the germination of the seed in the soil is hastened and then the young plants are destroyed before they produce fresh seed, must in time clean land however badly infested it may be with annual weeds. The seeds of some annuals have great vitality, and will continue appearing for several years as fresh seeds are brought up to the surface by cultivation. Wild Mustard and Wild Oats have been known to germinate after lying deep in the ground for twenty years.

Biennials must be either ploughed up or cut down before they flower. Mowing at short intervals will kill them; but a single mowing will only induce them to send out later branches, which, if not cut, will mature many seeds. Where ploughing is impracticable, this class of plants should be cut off below the crown of the root. For this purpose, a spud or a large chisel in the end of a long handle (to obviate the necessity of stooping) is as convenient a tool as can be used.

Perennials are by far the most troublesome of all weeds and require very thorough treatment, in some instances the cultivation of special crops, to ensure their eradictaion. Imperfect treatment such as a single ploughing, frequently does more harm than good, by breaking up the underground stems and stimulating growth.

There is no weed known which cannot be eradicated by constant attention, if only the nature of its growth be understood. Farmers should be constantly on the alert to prevent new weeds from becoming established

on their farms. There are some general rules which all should remember :—

1. Weeds do great harm by robbing the soil of the plant food intended for the crop and also of its moisture.

2. Weeds crowd out and take the place of more useful plants, being hardier and, as a rule, more prolific.

3. Weeds are a source of great loss to farmers as they require much labor and time to eradicate, and frequently compel them to change the best rotation of their crops, or even perhaps to grow crops which are not the most advantageous.

4. All weeds bearing mature seeds should be burnt, and under no circumstances should they be ploughed under.

5. *Weeds of all kinds can be eradicated* by constant attention and by adopting methods in accordance with their nature and habits of growth. Therefore,

(*a.*)—Never allow them to seed ;

(*b.*)—Cultivate frequently, particularly early in the season, so as to destroy seedlings while of weak growth ;

(*c.*)—For shallow-rooted perennials, either trench the land deeply or plough so lightly that the roots are exposed to the sun and dry up ; for deep-rooted perennials, the only means of destroying them is to prevent them from forming leaves and thus storing up nourishment in their rootstocks, to sustain future growth. This can be done by constant cultivation.

All weeds can be destroyed by the use of the ordinary implements of the farm, the plough, the cultivator, the spud and the hoe ; but some experience is necessary to know what is the best time to work certain soils or to deal with special weeds. No general rules can be given, as the necessary treatment will vary in different districts on different soils and under different climatic conditions. What may be the proper treatment in one place, may fail in another. Perennial plants, if allowed to develop flower stems and then ploughed down (or first mowed and then ploughed under), will by the production of the flower stems, have so far reduced the nourishment stored up in the rootstocks that they are much weakened and can afterwards be easily dealt with. On the other hand, it is found in the West that all the weeds and other plants decay readily if prairie land or meadows are broken in May or early in June. Land so treated can therefore be cleaned far more easily than if the operation of breaking is delayed until July. This is due to the climate and to the succulent nature of all parts of the plant at that season.

Summer-Fallowing.

As an agricultural practice, although not adopted to any large extent in the older provinces, summer-fallowing is essentially necessary in Manitoba and the North-west Territories, where the conservation of moisture in the soil is of the utmost importance, the farms are large, labour is scarce and the time for preparing the land in autumn and spring is very short. The question is so often asked whether the practice is a wise one, that I submit herewith extracts from four replies from men of much experience and who, in my judgment, were the best qualified to give useful and authoritative advice upon this subject.

Mr. Angus Mackay, Superintendent of the Experimental Farm for the North-west Territories, at Indian Head, says :—

" Summer-fallowing is absolutely necessary in the West to ensure a crop and get the work done, owing to the shortness of the time available

in the fall and spring. All land intended to be cropped should be summer-fallowed the year before. This will get the land into good condition, keep down weeds and produce the best results in every way. Summer-fallowing is generally started too late in the summer. It should be begun as soon as possible after seeding in the spring, so as to get the full advantage of the spring rains. As a rule, one ploughing only is advisable, because in wet years two deep ploughings will produce too much growth and retard the ripening of the grain. If the land should be weedy, the proper way to keep it clean is to harrow two or three times after ploughing. If farmers are willing to risk getting a smaller crop by sowing on stubble so as to get the grain to ripen earlier and in windy sections to avoid the danger of blowing, the proportion so treated should never exceed one third of their land."

Mr. Hugh McKellar, says: "Some farmers say they cannot afford to summer-fallow. I may say farmers cannot afford *not* to summer-fallow, for it is done by horse-power, of which they generally have a supply on hand at that time of the year, with sulky or gang ploughs, by which they will plough from five to seven acres a day with four or six horses.

Mr. Richard Waugh, Editor of the *Nor'-West Farmer*, says:—

"The general experience of the best class of farmers in Manitoba and the Territories goes to show that for wheat-growing especially, summer-fallowing, if properly done, is a great benefit. One strong point in its favour is that it can best be done at the season when no other work is pushing. Many mistakes have been made in doing this kind of work. But within the last two years careful observations and free discussion in farming papers and at farmer's institutes have led to practical unanimity as to the way in which it can be done with the least possible amount of labour, the best time and way to do it, and the results that may be reasonably expected from timely and well done work.

"Men with ripe Ontario experience began, as a rule, by ploughing twice, and occasionally even thrice. But they soon found out that this plan of action led to an overgrowth of straw, later ripening and an inferior quality of grain. I have for the last ten years been advocating one ploughing, going, if necessary, an inch deeper than any former ploughing on the same land, for nearly all the land now likely to be benefited by it. I urge that the harrow shall follow the plough, so as to preserve all the moisture and at the same time start into free germination all the foul annual seeds then in the soil, repeating the harrowing as often as the weeds show up in the seed-leaf. This consolidates the lower stratum of the soil while killing out all the foul seeds and at the same time putting all the land in better condition for preserving all the sap. If there has been a wet spell in summer (a rare thing here) and the weeds get a start, a skimming with the spade cultivator or a similar appliance on a warm dry day will be needed, for after the weeds have got a good start harrowing will help them rather than hinder them.

"Land thus treated will start the grain next spring earlier and more evenly, and the crop will ripen faster with a full yield of the best grade of wheat that Canada is fit to produce. If the land is infested with Thistles or Stink Weed, there must be some modification of this plan. For Stink Weed and other noxious annuals, I would follow the same course, but keep stirring the surface more, so as to work out all the foul seeds I could in the topmost two or three inches, and, while ordinary annual weeds might be let grow after August, I would keep stirring for Stink Weed until snow came. If any plant of Stink Weed is

left alive in the fall, it will live on all winter under the snow and start early in the spring, often over-topping the grain crop in May. I will not now go over the whole case for or against summer-fallowing. Green cropping may help in the rotation of crops that would enable us to dispense to that extent with fallow work, and there must be a difference in the treatment for such perennials as Couch Grass and Thistles; but, when farming is to be done on hundreds of acres with a very limited working force, I hold that wheat cannot be profitably grown without summer-fallowing, and the live question for to-day is, not whether we shall summer-fallow, but how it can be best and most cheaply done to suit the purpose."

Through the kindness of the Honorable Commissioner of Agriculture for the North-west Territories and the Minister of Agriculture for the Province of Manitoba I have had exceptional opportunities, during the past four or five summers, of travelling through all the important wheat growing districts of the West. It was very apparent to me during these visits that in many instances summer-fallowing was begun much too late in the season to get the best results as to weed eradication. By the middle of July several kinds of the most noxious annual weeds have developed their seeds sufficiently for these in the dry climate of Manitoba and the North-west Territories to ripen beneath the soil, even when ploughed well under out of sight, which, however, is by no means always done. There is always, of course, a temptation to put off the ploughing of land which is to be summer-fallowed as long as possible so as to reduce the subsequent labour of cultivating and harrowing. From a careful study of the development of weeds on summer-fallows in the West for five summers I believe that to obtain the best results in the eradication of such early-ripening plants and annual weeds as Stink Weed, False-flax, Ball Mustard, Peppergrass, Shepherd's Purse, Blue Bur, Golden Fumitory, etc., all summer-fallowing should be completed if possible not later than 12th of July, and earlier if possible, so that no risk may be run of ploughing down mature seeds.

Seeding Down.

The prevention of seed-production is of great importance when clearing land of weeds. Many weeds may be held in check to a large extent, particularly upon land which is required for cropping, by seeding down to grass or clover, but, of course, any ripe seeds of weeds which are in the soil, will germinate as soon as the land is broken up again. But in the same way that weeds crowd out crops and reduce the yield of seed, so may weeds themselves be choked out by more vigorous plants, which will prevent them from getting light and air, such as the free-growing grasses, millet, buckwheat, clovers, or even a thickly sown grain crop. This treatment will destroy the seedlings, which appear at the same time as the crop sown and thus prevent them producing other seeds. When the land is ploughed again, those weed seeds turned up near enough to the surface to germinate, must be killed by the frequent use of the cultivator, harrow or weeder.

An excellent plan of smothering out a restricted patch of any troublesome weed, frequently practised in the West, is to build a straw stack over the spot; a manure pile is used in the same way in the East.

Weeders and Harrows.

The introduction of weeders into the dry regions of the West, I consider an event of enormous importance to all grain growers. During the past five summers I have had exceptional opportunities, in driving through Manitoba and the North-west Territories, of meeting, and seeing

the farms of some of the best farmers in the West. In many places I have met men who make a practice of harrowing their growing grain crops with a light harrow, and invariably with great advantage. Upon the introduction of the various weeders these were used by a few of the most enterprising settlers, and almost always with decided satisfaction. So much was this the case that last spring several carloads of them were shipped into Manitoba by implement makers. The season of 1899, however, was so wet and late that the weeders were not used so much as would ordinarily have been the case. From what I have seen of these implements, particularly at the Indian Head and Brandon Experimental Farms, and from what I know to be the condition of the wheat fields in Manitoba and the North-west Territories with regard to annual weeds, I am convinced that there is more to be hoped for in the regular use of these implements after the grain is up, than from any other measure so far suggested for cleaning lands infested by such aggressive and persistent agricultural pests as Stink Weed and the different kinds of Mustard, as well as all other seedlings growing among grain crops. Weeders can be used not only safely, but with the greatest advantage to a grain crop, from the time the blade is an inch high until the plants have shot up 6 or 8 inches.

One of the frequent complaints made against weeders by western farmers is that they cover too narrow a strip of the crop at a time, but in the *Farmer's Advocate* of Winnipeg for December 5, at page 612, is given a cut, showing a successful way of uniting two of these implements and covering 24 feet at once. In this way the writer, W. F. Baker, of Portage la Prairie, states that he can go over nearly 50 acres in a day. The two weeders are fastened together with a rope, and the horses are kept apart by a stick between the halters. The wheat in the fields reported upon, had been cultivated twice after it was 4 inches high, and he says, as has been found by many others to be the case and as I have myself frequently seen: "If properly used when weeds are very small, nearly all weeds can be destroyed. On July 18, the wheat thus cultivated was 4 feet high and nicely out in head. The field was 70 acres of the first crop after summer-fallowing. It yielded 1,800 bushels (nearly 26 bushels to the acre), and so far as shipped, graded No. 1 hard. Another 70-acre field, cultivated with the weeder, yielded 29 bushels, while a large field, that we thought did not require a weeder, yielded only 17 bushels." Mr. Angus Mackay, at Indian Head, has the greatest confidence possible in these implements, and last year used them on every acre he had under grain.—J. FLETCHER.

SOME WEEDS OF SPECIAL INTEREST

Stink Weed.

Stink Weed, Penny Cress, French weed.

(Classed as a Noxious Weed.)

No weed gives more trouble in the West than this with its rank smell, dark green, smooth leaves, clusters of small white flowers and early ripening, yellowish, flattened pods, each one about the size and shape of a five cent piece and containing 16 seeds.

The rapidity with which this plant spreads, and the almost incredible difficulty of eradicating it when once established, make it important that its appearance should be known to everybody, so that no effort may be spared to destroy it as soon as noticed. Seeds germinate in autumn, and plants actually in flower when winter sets in, will mature their pods the following spring. There are frequently two crops of seed in a season.

Hand-pulling and burning is the best method to adopt when the area infested is small, otherwise it is well to adopt some treatment by which the seeds are made to germinate and the young plants are destroyed before they can ripen fresh seeds. Plants with fully formed pods should never be ploughed in, and when a field is found to be badly infested with this weed, before ploughing it should be mowed closely and the weeds at once carefully collected into one spot. They should then be burnt as soon as they are dry enough. It is not a very easy weed to burn and many of the seeds will remain on the ground uninjured after the fire. Particular attention must, therefore, be paid to the spot for some time, mowing frequently the young plants from time to time as they reach the flowering stage and never allowing a seed to ripen. The seeds are very dark brown, flattened, beautifully marked with concentric grooves on the surface. When wet they are covered with a jelly-like coating by means of which they adhere to any object with which they come in contact and are thus distributed widely and easily by sticking to the feet of animals and to farm implements.

Shepherd's Purse.

[Classed as a Noxious Weed.]

This weed is spreading to an alarming extent, especially in the rich soil of Saskatchewan and Northern Alberta. It is similar in its nature to Stink Weed and should be treated in the same manner. The plant consists of a tuft of leaves at the ground, from which a more or less branching stem arises. The leaves at the surface of the ground are deeply notched. The flowers are white and very small, the pods are flat and elongated-triangular.

Hare's-ear Mustard.

Hare's-ear Mustard, "Klink Weed."

[Classed as a Noxious Weed.]

This is an introduced European plant which has only appeared as a noxious weed in the grain fields of the West during the last seven years, but has already spread widely through the Territories. It is an extremely injurious plant with creamy-white flowers and large grayish green succulent leaves like those of a young cabbage, and grows so vigorously that it chokes out grain and absorbs a great deal of moisture from the soil. The seed pods are about 4 inches long and the ripe stems are wiry and stiff, growing sometimes 4 feet high and giving much trouble when grain is harvested, not only in cutting, but also in binding and handling. It is a slender branching annual and takes its name from the oblong.oval leaves of the stem, which are shaped like a hare's ear.

This should be treated in a similar manner to stink weed.

Tumbling Mustard. [Classed as a Noxious Weed.]

This is one of the very worst weeds we have in the Territories. It is only about 10 years since it was first noticed as a troublesome pest of

the farm and although great efforts have been made to control it, it has gradually spread over hundreds of thousands of acres in the West. It has all the bad characteristics of the other mustards and besides is a large, free-growing, exceptionally prolific plant, of which, when the seeds are ripe, the head breaks off and then becomes a "tumbling weed"; being blown for miles across the prairies in autumn and during the winter, and in that way scattering the seeds quickly over wide areas. The leaves of the young plants are quite different from those borne on the stems which are cut up into threadlike divisions Normally, this plant in its home, the south of Europe, is a winter annual, the seeds germinating one season and the plants not flowering until the next year. This is also the case occasionally in the North-west; but for the most part in North America it is a true annual, the seeds germin-

Tumbling Mustard: seedling.

Tumbling Mustard: a tumbler with ripe seeds.

ating in spring, and the plants developing quickly and producing their tall flowering stems covered with pods about 3 inches long, each one of which contains about 120 seeds. A single plant sent from Indian Head bore more than one million and a half of seeds. The seeds are very small, about half the size of timothy seeds, and consequently are easily cleaned from grain ; they are of a reddish or greenish-brown color.

The distribution of this plant is almost entirely by the wind blowing the stems across the prairie and over summer-fallow during the winter. This may, to a large extent, be offset by using a weeder or drag-harrow after sowing, and thus destroying the young weeds or keeping them in check until the grain makes a start. During the summer all plants should be pulled from the edges of fields. Like other annuals this may be destroyed by summer-fallowing.

WILD MUSTARD OR CHARLOCK. [Classed as a Noxious Weed.]

This well known pest of Eastern Canada is spreading fast in the Territories. It is found wherever cultivation is carried on, and is quite plentiful in the older settled districts. Wherever settlers' effects have been unloaded at railway stations, plants may be found. This is a good illustration of the way in which weeds are introduced. Farmers will do well to use every effort to destroy every plant of it before it becomes more thoroughly established. This can be done by hand-pulling and the frequent use of the harrow and weeder on grain fields after the grain is above the ground. Closely resembling the Wild Mustard, with its bristly hairy stems and dark green leaves is the Bird Rape, which has smooth glaucous stems and pods. Both of these plants are troublesome pests and equally to be dreaded.

Ball Mustard.

BALL MUSTARD, "YELLOW WEED."

[Classed as a Noxious Weed.]

No weed of recent introduction has made such headway in Alberta or Saskatchewan as this, and there is no doubt that it must be fought vigorously by farmers. Ball Mustard is a rather slender erect annual (or winter annual) two or three feet high. The leaves on the stem are arrow-shaped and are covered with star-shaped hairs. The flowers are orange yellow, so that the plant is easily recognized at a distance when growing in a crop ; they are about one-eight of an inch in diameter and are borne in clusters at the end of the branches. The small roundish, single-seeded pods on slender footstalks are borne thickly all along the gradually lengthening branches. From these pods the plant derives it name, and they are of such a size as to readily pass into the bags when threshing and necessitate extra care in cleaning the grain for seed.

Where the area under cultivation is too small to permit of summer-fallowing, good work might be done by harrowing after harvesting or early in spring, and then ploughing and seeding with barley or oats about the end of May. Hand-pulling should also be practised.

FALSE FLAX. [Classed as a Noxious Weed.]

A member of the mustard family often mistaken for Ball Mustard. It is, however, readily distinguished by the larger pale-yellow flowers and the pear-shaped smooth pods which contain numerous yellow seeds. Besides ripening its seeds as other annuals do, it sometimes begins its growth in the fall and produced seed the following summer. This plant is much too prevalent in the grain fields of Alberta and Saskatchewan.

THE TANSY MUSTARDS. [Classed as Noxious Weeds.]

There are two kinds of Tansy Mustards which are called from the color of their foliage the Gray Tansy Mustard and the Green Tansy Mustard; the former is the more prevalent of the two. They are mostly seen in crops that have been sown on stubble, as they then have opportunity to full develop and produce seed, being annual and biennial plants. They grow to a height of 3 to 4 feet and have pale yellow flowers which produce slender pods less than three-fourths of an inch in length. The leaves are finely divided and are gray green in one form and bright green in the other. Where summer-fallowing is practised frequently, these weeds give little trouble. They should be pulled from crops, as the stout stems are liable to break binders.

Both of these plants are frequently inaccurately spoken of as "Ragweed."

WORMSEED MUSTARD. [Classed as a Noxious Weed.]

This weed is similar in its nature and manner of growth to the preceding, but has narrow dark green leaves which are not divided. The flowers are bright yellow and the slender pods are about an inch in length.

PEPPERGRASS.

This plant is a native annual or winter annual. As a rule, it is not very troublesome in crops; but under certain climatic conditions it becomes an enemy of no small importance. During 1896 no weed was more frequently complained of in Manitoba, as a pest in wheat lands,

while in 1897 it was practically entirely absent in that province.

Peppergrass is a slender herb 12 to 18 inches high, which develops in the shape of a minature tree with a central stem and a large spreading head. It produces an enormous quantity of very small reddish seeds, two in each of the small, flat pods which are borne thickly all along the branches. This plant is generally most troublesome after wet springs, particularly in wheat sown on stubble. Although generally described as an annual, Peppergrass is much more of a biennial in habit. Fall and spring ploughing or cultivating will destroy those autumn-germinated plants, which are the ones most likely to do harm in wheat crop.

Yellow Whitlow-grass.

This is a very slender plant of the mustard family which was frequently brought to the attention of the Department last year. It only grows to a height of about 6 or 8 inches and has small yellow flowers which produce flat pods about one-third of an inch in length. This weed is not likely to give much trouble during dry seasons. Its abundance in various portions of the country during recent years may be attributed to the abnormally wet seasons.

Cow Cockle.

Cow Cockle.

The Cow Cockle, also called Cow-herb, Soapwort and China Cockle, is an annual plant belonging to the Pink family, which was introduced into Southern Manitoba from Europe. This weed has spread with somewhat alarming rapidity throughout the whole of the Territories. The Cow Cockle grows from seed every year and forms a rather elegant plant from one to two and a-half feet high, much branched and bearing in July a great many pretty pink flowers about half an inch across; these are followed by roundish capsules contained in five-angled enlarged calyces. The seeds are round, hard and black, twice or three times as large as those of wild mustard, and slightly roughened on the surface, a character by which they can be easily distinguished from the seeds of the wild vetches, which are of about the same size. Care should be taken to ensure that seed grain is clear of it. Summer-fallow will readily clean the land and plants should be pulled from the crop while in bloom, when they are easily distiuguishable.

Cockle, Corn Cockle.

This purple-flowered cockle is very abundant in some portions of the Territories. The seeds ripen early and are rather difficult to remove from wheat when plentiful. They are black, triangular-kidney-shaped and rough, and possess poisonous properties. The flowers of this plant being large and showy, good work is possible by hand pulling.

Great Ragweed, "Crown Weed." [Classed as a Noxious Weed.]

This is a coarse, annual weed which sometimes attains a height of 5 feet. Its leaves resemble in shape those of the maple, being three-pointed and are set opposite each other on the rough, hairy stem. The upper leaves are sometimes single-pointed. The male flowers are on tapering spikes about 4 inches in length and are green above and dull yellow beneath. The female flowers (which produce the seeds) grow close to the stem in clusters of from one to three together at the bases of the spikes and leaves. The seed is one-fourth to three-eighths of an inch in length, with horn-like projections at the broad end. It ripens in September and October and is very objectionable in wheat as it cannot readily be cleaned out and often renders it unsaleable. Ragweed will not make much headway where clean seed is sown and a good system of summer-fallow adopted. Any stray plants should be pulled when noticed.

Perennial Ragweed. [Classed as a Noxious Weed.]

Much less coarse and does not grow to more than a few feet in height. The leaves are grayish green in color and delicately divided. The flowers are yellowish and the seed is similar in shape to that of the Great Ragweed, but much smaller. It has running roots. Early summer-fallowing and late cultivation are the best methods of eradicating this weed.

Canada Thistle. [Classed as a Noxious Weed.]

This well-known weed is now found wherever there is settlement and is particularly noticeable along the railways. In view of the trouble which has been caused by it, the ease with which it spreads and the difficultry of eradicating it when once firmly rooted, farmers should make every effort to keep it in check. This thistle is easily distinguished from

our common prairie thistleby its darker appearance and its smaller and more numerous heads. The Canada Thistle has a deep running root, while that of the native thistle is shallow.

Dig out every plant if they are few in number, or if plentiful, mow when in bloom and plough a fortnight later, keeping the surface well cultivated to prevent leaves forming. A small patch may be smothered by putting a manure pile or straw stack over it.

Blue Lettuce.

This native perennial is pushing itself into prominence, especially upon headlands where cultivation has been shallow. Its method of spreading is similar to that of the Canada Thistle, namely, by seed and by deep root-stocks. The plant, which attains a height of 2 or 3 feet, contain a milky juice and has blue flowers about ¾ of an inch across.

Deep ploughing and frequent cultivation is the treatment needed to eradicate Blue Lettuce.

Canada Fleabane, Horse-weed.

This is a tall slender plant with long narrow leaves up the stem, producing an abundance of small whitish flowers at the top. It is very plentiful in some portions of the country, but, being an annual, it is easily eradicated by a good clean summer-fallow.

False Tansy, Biennial Wormwood, Carrot Top.

A strong smelling, dark green plant with finely divided leaves. It gives little trouble except in low lands that have been sown on stubble, or in hay meadows. Spring or fall ploughing or summer-fallow will subdue it.

Evening Primrose.

Is a tall coarse plant with narrow leaves from 2 to 6 inches long and a succession of large yellow flowers up the stem. Being a biennial, it is only troublesome in crops sown on stubble or after a poorly worked summer-fallow.

Blue Bur, Stickweed.

A slender branching annual, seldom over 18 inches in height, with small, blue flowers; these produce seeds which adhere readily to animals or clothing and are thus spread about. Many complaints have been made regarding the extent to which this weed has already spread in crops, firebreaks, roads, etc.

Frequent cultivation will destroy it; no plants should be allowed to ripen seed.

Russian Tumbleweed, Russian Thistle, Russian Cactus.

[Classed as a Noxious Weed.]

The plant is an annual, at first quite soft and tender with round green stem-like leaves. It appears about the end of May, and by the end of June the points of the leaves have developed into sharp, hard spines. As the plants mature, sharp spines are also noticed at the base of the leaves, where its flowers are almost hidden, and the whole plant becomes a mass of spines. The outer parts of the flower are rose-colored and when matured envelope the seed, which with its dry and paper-like

covering is easily scattered by the wind. The first frost kills the plant and when dry it is broken off by the wind and sent rolling over the land.

It is easily destroyed by summer-fallow and makes excellent pasture for sheep when in its early stages. As this weed has only appeared in a few isolated spots along the Pasqua Branch Railway, the safest way of eradicating it is by hand-pulling.

Although occasional specimens of the Russian Thistle have been

Fig. 1.

Fig. 2.

Fig. 3.

Russian Thistle.

Fig. 1.—A branch of a mature plant.
Fig. 2.—A young stem before flowering, and a single seed enlarged.
Fig. 3.—Enlarged prickles, flower and seed from which the seed coat has been removed.

found in Ontario, there is little probability of its ever becoming a menace to agriculturists, except in a country where the plants can blow long distances in winter. In the North-west Territories the farmers as a rule are wide awake as to the danger of neglecting noxious weeds, and it is very unlikely that this weed will be allowed to propagate and spread, now that its dangerous capabilities have been made known.

Wild Buckwheat, Black Bindweed.

An annual, climbing plant with arrow-shaped leaves and small pinkish white flowers which produce black seeds resembling buckwheat. These seeds possess some nutritive value as a feed for stock, but are a very undesirable addition to a crop. This weed does much damage, particularly in Alberta and Saskatchewan, by robbing the soil of moisture and food, which would otherwiee be increasing the yield of good marketable grain.

The great mistake made in summer-fallowing for the destruction of Wild Buckwheat is, that the work is not as a rule commenced until the plants have attained considerable size and seeds are forming. Plants are left protruding between the furrows and readily ripen seed. In a dry season partly filled seeds would ripen under ground sufficiently to sprout. Surface cultivation immediately after harvesting would in some seasons induce the seeds covered to grow and the young plants would be killed by frost. In any case, they will make an early start in spring and be killed by cultivation either for crop or summer-fallow. If a crop is sown on infested land, a drill should be used and the ground harrowed frequently until the grain is several inches high.

Lamb's Quarters, Pigweed, Fat-Hen.

Although this native plant is not included in the list of noxious weeds, there is no doubt that it is responsible for much loss to the farmers, as it is present to a greater or less extent in almost every grain field in the country. This is clearly indicated by an examination of the screenings at the elevators. Often underestimated as an enemy, on account of its common occurrence, it is given the freedom of the farm. It is hardly necessary to describe this tall weed, with its mealy green leaves, often used as a pot-herb.

Being an annual it readily succumbs to summer-fallow. When a fallow is not desirable, harrowing immediately after harvesting or in early spring, so as to sprout the seeds before ploughing, will have good results. In any case, the use of light drag-harrows or a weeder after sowing, will have a very baneful effect upon this weed.

Red Root, Pig-Weed. [Classed as a Noxious Weed.]

Is a tall coarse weed with oval leaves and a pinkish tapering root. The flowers are small and greenish, set on a crowded spike. This weed is well-known in Ontario and the States and is quite plentiful in many portions of the Territories, especially in gardens and waste places.

By pulling or cutting the plant before the seed ripens, its spread will be checked, as it is only an annual.

Tumble Weed.

This is a low growing white-stemmed annual closely allied to the above, and is somewhat prevalent in the prairie districts, but is not giving much trouble where intelligent cultivation is practised.

Wild Oats. [Classed as a Noxious Weed.]

Of this there are several varieties all possessing somewhat the same characteristics and now found far too plentifully in many portions of the Territories. It is an early maturing annual from which the seeds shell out as they ripen and retain their vitality for a number of years even under ground. Its appearance closely resembles that of the cultivated

oat, but the shells of the seeds are hairy toward the lower end and yellowish to black in color. They have a bristle-like twisted and bent awn and are considerably lighter in weight than good oats.

After taking a crop from a field badly infested with this weed, the land should be immediately ploughed very shallow or be well disked so as to cover any seeds that may have been dropped. Follow this by ploughing about the end of May, sowing barley or some other grain for a green crop. If barley is sown, it will be advisable to hand-pull and destroy any wild oats making their appearance; they will be readily distinguished. The following season, a grain crop may be grown after preparing the land by shallow cultivation. Repeat the treatment outlined, ploughing a little deeper so as to bring more of the wild oat seeds near to the surface where they may sprout and be destroyed.

Sweet Grass or Indian Hay.

One of the most troublesome weeds in the North-west Territories is Sweet Grass. It is frequently or incorrectly spoken of as Quack or Couch Grass, which is quite a different plant that roots near the surface of the soil, with bluish green leaves, with no special odour and with a narrow spike of seed, like a very slender starved spike of bald wheat. This can be destroyed by ploughing shallow and then cultivating frequently. The Sweet Grass, on the other hand, has a loose panicle of tawny seeds, a strong pleasant odour, like new-mown hay; its roots deeply and shallow ploughing merely encourages it to grow.

The treatment which seems to have given the best results in Manitoba, is to plough in spring when the grass is in flower and then seed down heavily at once. Mr. Angus Mackay's experience in the Territories, however, is different from this. He says, "We find that to plough early or when in flower only helps this weed. I would advise ploughing deeply in the latter part of July or in the beginning of August, then harrow well and repeat in September and October. With us when ploughed early, every root left in the ground grows, while, if ploughed after dry weather, when the growing season is over, it is easily killed.

Squirrel-tail, Wild Barley, Fox-tail.

This well-known grass is a source of much injury to horses, cattle and sheep. The bearded heads when taken into the mouth break up, adhere to and penetrate the mucous membrane. They also work in between the teeth and under the tongue causing inflammation and ulcers which eventually affect the jaw bones. It grows most abundantly on alkaline soils where the conditions are not so favorable for the growth of better grasses. There is no difficulty in eradicating it from any land which can be ploughed, as the usual method of breaking in June will destroy it. Where it gives most trouble, however, is on waste places where it ripens its seed, which is spread abroad by wind and water. It grows freely about the edges of hay meadows and is generally ripe before any hay is cut. The remedy in this case would be cutting before the seeds are formed. In a wet season, probably a second cutting would be necessary to prevent any seed ripening. If this course were continued for a few seasons the pest would die a natural death. It is the usual practice not to cut the borders of sloughs in dry seasons when the grass is thin; needless to state, such methods favor the further spread of the objectionable grass.

POISONOUS PLANTS

Larkspur.

In June, 1897, Prof. John Macoun investigated the subject of poisonous weeds in the district west of Calgary, and found ample evidence of Larkspur (*Delphinium scopulorum*), having caused the death of many cattle. Chemical analysis proves that Larkspur contains poisonous principles known as alkaloids. Prof. Macoun recommended herding cattle away from the poplar woods until after the middle of June, when the danger would be past because of the advanced growth of herbage.

During the season of 1899 a number of flock-masters in the Cypress Hills range reported serious losses amongst sheep from this cause. The symptoms are very similar to those of aconite poisoning. A Montana Experiment Station bulletin says: "The first signs of the poisoning are a slight stiffness and a straddling gait; soon there are twitchings of the muscles of the legs and sides of the body. No increase of saliva, no champing of the jaws or attempts at swallowing, no impairment of the senses, no disturbance of the digestive functions. The appetite remains good, and the sheep eat to the very last. At the first, the frequency of the pulse and of the respiratory movements is lessened and the temperature is lowered. The pulse remains very weak, but in the later stages becomes very rapid, in some cases 130 per minute. During the final convulsions the respirations are so shallow that the air is simply pumped up and down the wind-pipe. The air in the lungs is not renewed and the animal dies by suffocation.

"The most effective remedy was a hypodermic injection of atropine sulphate. It is only in small doses that atropine has the desired stimulating effect; in large doses it has the opposite effect. We would recommend giving one-sixth to one-fourth of a grain in the later convulsive stages and in the earlier stages or in mild cases one-twentieth to one-fifteenth of a grain. These doses are for sheep; for cattle we would use four to five times as much.

"In the later convulsive stages ammonia fumes in the nostrils act promptly and powerfully. Breathing is stimulated and deepened.

"If given soon after the sheep has eaten the Larkspur, ammonia and alcohol are useful stimulants. They may be given together in water, in moderate doses only."

Two species of Larkspur are found in the Territories, one growing to a height of about 6 or 8 inches and the other to 3 or 4 feet. The leaves are five-parted in a palmate manner and are again cleft two or three times. The flowers are of a rich purple color, about an inch across when expanded. Each flower has a backward projecting spur about an inch in length.

Cicuta, Cowbane, Water-Hemlock.

There are one or two species of this plant growing in the Territories. The commonest is a tall smooth plant with round hollow stems growing to a height of several feet. The leaves are several times divided. The small white flowers are borne in an umbrella-like cluster at the end of a long stock.

Animals eat the underground portion of Cicuta in getting the tops which are green early in spring. The poison works quickly, causing spasms with froth and foam from the mouth. A sure remedy is not yet known, but in mild cases lard, bacon grease, flour, and milk may be of

value. Prevention must be depended upon. Efforts should be made to eradicate these plants from the pastures. They are generally found along streams or in other low damp places.

BUTTERCUP.

Several species of Buttercups are known to possess poisonous properties of an irritant nature. The active principle is volatile, so that when the buttercups are dried with hay they become inert. A case occurred during the past season in which plants of one species were brought in under suspicion of being the cause of the death of some cattle in the Long Lake district. As the contents of the stomach were not examined, it is impossible to say whether they were or not.

There are many plants growing on the prairie and in the woods which are of a more or less poisonous nature, and children should be warned against placing strange flowers, berries, etc., in their mouths.

In all cases of suspected poisoning of animals, a prompt report to this Department, giving details of symptoms, and in cases of death, the forwarding of a portion of the contents of the stomach, would greatly help to throw light on this subject.

An Ordinance respecting Noxious Weeds

The Lieutenant Governor by and with the advice and consent of the Legislative Assembly of the Territories enacts as follows:

SHORT TITLE

1. This Ordinance may be cited as *"The Noxious Weeds Ordinance."*

INTERPRETATION

2. In this Ordinance unless the context otherwise requires—

Interpretation.

"1. The expression "Noxious Weeds" shall include tumbling mustard, hare's-ear mustard, common wild mustard, ball mustard, tansy mustard, wormseed mustard, false flax, shepherd's purse, stink weed, red-root, Canada thistle, Russian thistle, ragweed and wild oats.

2. The expression "department" means the department of agriculture;

3. The expression "commissioner" means the commissioner of agriculture;

4. The expression "overseer" means the overseer of a local improvement district;

5. The expression "inspector" means an inspector appointed under

this Ordinance;

6. The expression "occupant" means a person using or enjoying any land;

7. The expression "owner" includes every person, other than the occupant, who has any estate or interest in land, or who has any right to be vested with such an estate or interest.

INSPECTORS AND OTHER OFFICERS

Appointment of inspectors and officers.

3. The Commissioner may from time to time appoint such inspectors and other officers as may be required to carry out the provisions of this Ordinance, fix their remuneration and define their duties.

DUTY OF OWNER OR OCCUPANT OF LAND

Noxious weeds to be destroyed.

4. Every owner or occupant of land shall destroy all noxious weeds thereon, and if he make default in so doing he shall be guilty of an offence, and on prosecution thereof by an inspector, overseer or other officer under this Ordinance, shall on summary conviction thereof be liable to a penalty not exceeding $100.

PROCEEDINGS TO COMPEL DESTRUCTION OF WEEDS

Notice to destroy weeds.

5. It shall be the duty of the inspector to give or cause to be given notice in writing to the owner or occupant of any land whereon any noxious weeds are growing, requiring him to cause the same to be destroyed within not more than five days from the service of the notice.

Railway lands

(2.) In case of land belonging to or forming part of the land grant of a railway company whether actually vested in the company or not the notice may be given to a railway section foreman of such company residing near such lands.

Penalty for neglecting to destroy weeds

6. In case any person to whom such notice has been duly given neglects to destroy noxious weeds pursuant to such notice he shall be guilty of an offence and on summary conviction thereof shall be liable to a penalty not exceeding $100.

Procedure where notice cannot be given.

7. In case, by reason of the owner of any land not being known the notice cannot be given, or in case noxious weeds are not cut down pursuant to such a notice, the inspector may by himself or with workmen and servants, with teams and implements, enter upon the lands and cause such weeds to be destroyed, and the expense thereof may be recovered from the owner or the occupant of the land by action in the name of the attorney-general or the inspector or by distress and sale of any chattels on the land.

Weeds on unoccupied lands in local improvement districts.

8. In case noxious weeds are found upon unoccupied lands situate within local improvement districts, the inspector may notify the owner thereof, if his address be known to him, to destroy such weeds within five days from the mailing (by registered letter) or delivery of the notice, and if such weeds are not destroyed within such time the inspector may, in addition to any other power he may exercise hereunder, direct the overseer of the local improvement district to enter upon such lands and destroy such weeds in such a manner as the inspector may direct and the overseer shall thereupon, with such assistance as he may require, proceed to destroy the weeds, as required by the inspector.

(2). The amounts to be expended in the work to be performed as required hereby, including remuneration to the overseer, shall from time to time be fixed bo the Lieutenant Governor in Council, and any such

amounts shall be added to and form part of the local improvement assessment of such lands in all respects as if it were an original tax and it shall have the same effect on the land and may be recovered in any of the modes available for the recovery of such taxes or for the recovery of moneys expended hereunder in the destruction of weeds, and the amount so recovered shall be transmitted to the Territorial Treasurer and form a part of the General Revenue Fund of the Territories.

Weeds on cropped lands

9. In case noxious weeds are found on any land on which a crop has been sown, the owner or occupant of the land or the owner of the crop, shall on receiving notice from the inspector requiring him so to do, according to the terms of the notice either—

(*a*) destroy the crop, or

(*b*) within ten days after the crop is threshed, burn the straw and screenings therefrom.

SALE OR DISPOSAL OF GRAIN, ETC., CONTAINING WEED SEED.

Sale, etc., of seed containing weed seed.

10. No person shall sell or dispose of, or offer for sale or disposal—

(*a*) any grass, clover or other seed;

(*b*) any grain intended for the purposes of seed;

in which there is seed of any noxious weed.

Sale, purchase etc., of cleanings, containing weed seed

11. No person shall purchase or sell, barter or otherwise dispose of or remove from any premises any bran, shorts, chopped or crushed grain or cleanings containing seeds of noxious weeds without first destroying the germinating qualities of such seeds.

Mills, elevators, etc.

12. No person shall place outside any mill, elevator or grain warehouse, except in a securely constructed building, shed or covered bin, any matter containing the seeds of noxious weeds, without having first destroyed the germinating qualities of such seeds.

THRESHING MACHINES TO BE CLEANED BEFORE REMOVAL.

Threshing machines.

13. Every person in possession or charge of any threshing machine shall thoroughly clean out such machine immediately after threshing at each place and before removing such machine or any part thereof to another place.

PENALTIES.

Neglect of duty by inspector.

14. Every inspector, overseer or other officer who neglects to perform any duty placed upon him by this Ordinance shall in respect of each instance of neglect be guilty of an offence and liable on summary conviction thereof to a penalty not exceeding $100.

Violation of ordinance.

15. Violation of any provision of this Ordinance in respect of which no penalty is provided shall be an offence and the offender shall on summary conviction be liable to a penalty not exceeding $100.

REMINDERS.

No. 1 hard wheat cannot be grown from weed seeds.

Like produces like.

Over 500,000 bushels of weed seeds were grown in the Territories last season.

Those weeds were grown where there should have been good grain.

There is no weed that cannot be eradicated by proper treatment.

The effects of years of carelessness cannot be overcome in a season.

One weed allowed to ripen means perhaps thousands next year.

Never put off till to-morrow what can be done to-day.

Pull those weeds.

Weeds, like the poor, we have always with us, and again like the poor, they are most numerous in the most shiftless communities.

Weeds are a great tax on machinery and on the temper of the operator.

Never sow dirty seed or neglect to clean machinery before passing from one field to another.

Know what is growing in your fields.

Send a specimen of any plant you do not know and information will be gladly given regarding it. Address it to the Department of Agriculture, Regina, N.W.T.

T. N. W.

A LIST OF THE MORE PROMINENT WEEDS OF THE NORTH-WEST TERRITORIES.

The plants mentioned in the following list are those which have been most frequently inquired about by correspondents in the North-west Territories. Those preceded by an asterisk are "bad weeds" and care should always be taken to destroy them whenever they are noticed. There are many others which might have been included in a full list of the weeds of the North-west Territories, but in nearly every case these are so similar to allied species treated of here that to prevent confusion it was thought best to omit them, unless they had been actually inquired about. The Territorial Weed Inspector will at all times be pleased to hear from correspondents concerning weeds, and will give all information in his power on their habits, and the best way of eradicating them It is particularly requested that, when inquiries are made about weeds or their seeds, samples may be sent for examination. All that is necessary is to tie up the sample in a paper parcel, with a short statement of what information is required, and the name and address of the sender, then direct them to the Department of Agriculture at Regina, or to The Botanist, Central Experimental Farm, Ottawa, Ont. Such samples and all correspondence referring to them may be sent to the latter FREE by post, and will be promptly attended to.

Botanical Names of Arrangement of Flowers.

Names given to some of the different arrangements of the flowers in plants, which for the sake of brevity it is necessary to use in the following list, are as follows :—

A *Spike*, when the flower stalks are very short or wanting altogether ; examples, Plantain, Wheat.

A *Raceme* differs from a spike in the flowers being borne upon footstalks of an equal and of a noticeable length ; example, Lily of the Valley.

A *Panicle* is a compound raceme or a raceme with branched footstalks ; example, Oats.

A *Corymb* is a raceme in which the footstalks are gradually lengthened from the apex downwards, so that all the flowers are brought to the same level, or nearly so ; example, Groundsel.

Cyme is a panicle with the foot-stalks so developed or contracted as to form a flat-topped head, the central flowers generally blooming first ; examples, Elder, Dogwood.

A *Head* is when numerous flowers are arranged upon a disk or receptable ; example, Ox-eye Daisy.*

An *Umbel* is when all the flowers are supported upon foot-stalks of equal length ; example, Geranium. If each of the foot-stalks of an umbel bears a secondary umbel as in the carrot, it is a *compound umbel*, and indeed, most of the forms above mentioned by repetition upon themselves become *compound.*

*In the following table of weeds, the heads of flowers of plants of the Sunflower Family are treated of as if they were single flowers.

A LIST OF

THE WORST WEEDS

OF THE

NORTH-WEST TERRITORIES.

A List of the more prominent Weeds of the North-

Common Name.	Botanical Name, Origin.	Duration. — Height.	Time of Flowering	Time of Seeding.
BUTTERCUP FAMILY.				
1. White Anemone, Pennsylvanian Anemone.	*Anemone dichotoma*, L., native.	Perennial, 12 in.	June-Aug.	July-Sept.
FUMITORY FAMILY.				
2. Golden Fumitory.	*Corydalis aurea*, Willd., native.	Biennial, 6-12 in.	June	June-July.
MUSTARD FAMILY.				
3. Marsh Cress..... .. .	*Nasturtium palustre*, D C., native.	Perennial, 1 3 ft.	June-Sept.	July-Sept.
4. Tower Mustard.....	*Arabis perfoliata*, Lam., Europe.	Biennial, 2-4 ft.	June-July.	July-Aug.
5. Western Wallflower, Prairie Rocket.	*Erysimum asperum*, D C., native.	Biennial, 6-12 in.	"	"
6. Small-flowered Wallflower.	*Erysimum parviflorum*, Nutt., native.	Biennial or perennial, 12-18 in.	"	"
7. Wormseed Mustard.	*Erysimum cheiranthoides*, L , native.	Annual and biennial, 12 in.	"	"
8. *Hare's-ear Mustard.	*Conringia orientalis*, Andrz., Europe.	Annual, 1-2½ ft.	"	"
9. Green Tansy Mustard	*Sisymbrium incisum*, Engl., v. *ftipes*, Gray, native.	Annual and biennial, 1-4 ft.	June	July .....
10. Gray Tansy Mustard	*Sisymbrium incisum*, Engl., v. *Hartwegianum*, Watson.	"	"	July-Aug.
11. *Tumbling Mustard	*Sisymbrium altissimum*, L., (=*S. sinapistrum*, Crantz), Europe.	Annual and winter annual. 1-4 ft.	June-July.	"
12. *Wild Mustard, Charlock, Cadlock, Herrick.	*Brassica Sinapistrum*, Boiss., Europe.	Annual, 1-3 ft.	June-Sept.	July-Sept.
13. *Bird Rape.....	*Brassica campestris*, L., Europe.	Annual, 1-3 ft.	"	"
14. Yellow Whitlow-grass.	*Draba nemorosa*, L., v. *leiocarpa*, Lindl.	Annual, 4-6 in.	June-July.	"
15. *False Flax, Gold of Pleasure.	*Camelina sativa*, Cranz, Europe.	Annual and winter annual, 1-2 ft.	"	"
16. *Ball Mustard.....	*Neslia paniculata*, Desv., Europe.	" "	"	"
17. *Shepherd's Purse...	*Capsella Bursa-pastoris*, Medic., Europe.	" "	May-Oct.	June-Oct.
18. *Stink-weed, Penny Cress, "French Weed."	*Thlaspi arvense*, L., Europe.	" "	"	"
19. *Peppergrass	*Lepidium apetalum*, Willd., (=*L. intermedium*, Gray), native.	" "	"	"
CAPER FAMILY.				
20. Spider Flower.....	*Cleome integrifolia*, L., native.	Annual, 1-3 ft.	July-Aug.	August.
PINK FAMILY.				
21. *Cow Cockle.....	*Saponaria Vaccaria*, L., Europe.	Annual, 2 ft.	"	Aug.-Sept.
22. *Cockle, Corn Cockle	*Lychnis Githago*, Lam., Europe.	Annual, 1-2 ft.	July-Sept.	September

West Territories, with their chief characters:

Colour, Size, Arrangement of Flowers, and other Characters of the Plant.	Time of Seeding.	Method of Propagation and Distribution.	Place of Growth, and Products Injured.	Methods of Eradication.
White, 1-1½ in., solitary; head of fruit round.	July-Sept.	Seeds and root-stocks.	Low meadows, hay.	Plough up sod and follow with hoed crop.
Yellow, ½ in., raceme	June-July.	Seeds	Wheat fields.....	Summer-fallow; cultivate fall & spring.
Yellow; raceme, 1-3 in.....	July-Sept.	Seeds, in hay.	Lowlands; grain fields and hay.	Plough fall and spring.
Yellowish-white; racemes slender, elongated; pods erect, narrow, smooth, close to stem, only root leaves rough.	July-Aug.	Seeds	Grain and clover fields.	Plough fall and spring, hand-pull before seeds ripen.
Yellow, nearly 1 inch; racemes elongating in fruit; pods angled, 5 in. long, spreading.	"	"	Summer-fallows..	" "
Yellow, ½ in.; racemes elongated; differing from above in the small flowers, short pods, 1-2½ in. long, ascending and close to stem, covered with short gray hairs.	"	"	" "	" "
Yellow, ½ in.; racemes elongated; pods small, less than 1 in., on slender spreading stalks.	"	"	Grain fields, summer-fallows, waste places.	" "
Creamy white, ½ in.; racemes elongated; pods 4 in., square, ascending; leaves quite smooth, entire, succulent, glaucous.	July	"	Grain fields	Hand-pull, summer-fallow, hoed crops.
Yellow, ½ in; racemes elongated; pods smooth, spreading, curved, ¾ in.; seeds, 1-ranked; leaf thin, finely divided, green, very few hairs.	July-Aug.	"	Grain fields and summer fallows	" "
Yellow, ½ in.; racemes elongated, compressed and erect, pods ½ in., straight; leaves gray and downy, divisions not so fine as in No. 9.	"	"	" "	" "
Yellow, pale, ½ in.; racemes elongated; pods, 2-4 in., very slender, spreading, seeds greenish brown.	July-Sept.	Seeds, wind ..	Grain fields	" "
Yellow, ½ in.; racemes; pods erect, 1-1½ in., ¾ empty or 1-seeded, with two-edged beak; stems bristly-hairy, purple at joints.	"	Seeds, in grain	" "	" "
Yellow, bright, ½ in.; racemes; pods 1½-2½ in., spreading; stems perfectly smooth, glaucous.	"	" "	" "	" "
	"	" "	" "	" "
Yellow, ½ in.; racemes; pods pear-shaped, many-seeded.	"	Seeds, in grain flax & clover seed.	Grain, fall wheat, flax and clover fields.	" "
Orange yellow, ½ in., racemes, much elongated in fruit; pods nearly spherical, 1-seeded.	June-Oct.	Seeds, in grain	Grain fields	Pull, summer-fallow, hoed crops.
White, ¼ in., racemes, much elongated in fruit; pods triangular.	"	Seeds	Everywhere	Constant hoeing and cultivation.
White, ⅓ in., racemes, much elongated in fruit; pods flat and round, over ½ in.	"	"	Grain fields, waste places.	Mow and burn mature plants, thorough cultivation
Whitish, minute, 1/16 in.; racemes, much elongated in fruit; pods flat roundish, ¼ in., 2-seeded.	"	"	Grain fields, after a wet spring.	Plough or cultivate fall & spring
Reddish purple, 1 in.; petals 4, stamens 6, long and conspicuous; racemes; pod flattened, hanging, 1½ in.; leaves 3-parted, strong smelling.	August.	Seeds, carried by floods.	Grain fields and low spots.	Pull, cultivate.
Pink, ¾ in.; cymes; calyx 5-angled, covering ripe pods; leaves succulent and glaucous; seeds 1/10 in., black, minutely roughened.	Aug.-Sept.	Seeds, in grain	Grain fields	" "
Purple, 1 in., solitary; seeds, ⅛ in., black, rough.	September	" "	Grain fields, summer-fallows.	Pull, sow clean grain.

A List of the more prominent Weeds of the North-West

Common Name.	Botanical Name, Origin.	Duration. — Height.	Time of Flowering.	Time of Seeding.
Pea Family.				
23. Wild Liquorice.....	*Glycyrrhiza lepidota*, Nutt., native.	Perennial, 2-3 ft.	July.....	Aug.-Sept.
Rose Family.				
24. Erect Cinquefoil....	*Potentilla Norvegica*, L., native.	Annual, winter annual, 6-24 in.	June-July.	July-Aug.
25. Silverweed, Cinquefoil.	*Potentilla anserina*, L., native.	Perennial, 6 in.	June-Sept.	July-Sept.
26. Prairie Rose...	*Rosa Arkansana*, Porter, native.	Shrub, 3 in.-3 ft.	June-July.	Aug.-Sept.
Evening Primrose Family.				
27. Common Evening Primrose.	*Œnothera biennis*, L., native.	Biennial, 1-4 feet.	July.....	July-Sept.
28. White-stemmed Evening Primrose.	*Œnothera albicaulis*, Nutt., native.	Perennial, 6 in.-4 ft,	"	Aug.-Sept.
Parsley Family.				
29. Spotted Cowbane, Musquash Root, Beaver Poison.	*Cicuta maculata*, L., native.	Perennial, 2-6 ft.	July-Aug.	Sept.....
Honeysuckle Family.				
30. Wolfberry, Western Snow-berry.	*Symphoricarpus occidentalis*, Hook., native.	Shrub, 2-3 ft.	July	" .....
Bedstraw Family.				
31. Northern Bedstraw..	*Galium boreale*, L., native	Perennial, 1-2 ft.	"	Aug.....
Sunflower Family.				
32. Gumweed.....	*Grindelia squarrosa*, Dunal, native.	Biennial, 12-18 in.	July-Aug.	Aug.-Sept.
33. Goldenrod	*Solidago Canadensis*, L., native.	Perennial, 2-3 ft.	July	" "
34. Many-flowered Starwort.	*Aster multiflorus*, Ait., native.	Perennial, 12-18 in.	"	Aug.....
35. Canada Fleabane, Horse-weed, "Fireweed."	*Erigeron Canadensis*, L., native.	Annual, and winter annual, 6 in.-5 ft.	July-Oct...	Aug.-Oct..
36. Poverty Weed, Smother Weed.	*Iva axillaris*, Pursh, native.	Perennial, 6-12 in.	July-Aug.	Aug.-Sept.
37. False Ragweed, Turkey Foot.	*Iva xanthiifolia*, Nutt., native.	Annual, 1-4 ft.	Aug.-Sept.	Sept.-Oct..
38. Great Ragweed, Crownweed, Riverweed.	*Ambrosia trifida*, L., native.	"	July-Sept.	Aug.-Nov.
39. Perennial Ragweed..	*Ambrosia psilostachya*, DC., native.	Perennial, 1-2 ft.	" "	" "

Territories with their chief characters.—*Continued.*

Colour, size, Arrangement of Flowers and other Characters of the Plant.	Methods of Propagation and Distribution.	Place of Growth, and Products Injured.	Methods of Eradication.
Whitish, ¼-in.; spikes pedunculed; pods oblong, ½ in., covered with hooked prickles.	Seeds, pods attached to stock, in hay.	Summer-fallows, pastures; wool.	Summer-fallow early.
Yellow, ½-in.; leafy cymes; leaves 3-parted; whole plant dark green, hairy.	" "	Summer-fallows, grain fields.	Summer-fallow, cultivate.
Bright yellow, ¾-in., solitary on long stalks.	Seeds, runners	Lowlands, particularly if alkaline.	" "
Pink to deep rose, 2½ in.; corymb....	" root-stocks	Summer-fallows, grain fields.	Summer-fallow early, harrow, cultivate.
Yellow, 1½ in., open at night; leafy spike.	Seeds, wind...	Summer-fallows.	Pull, plough fall and spring.
White, turning pink, 2-in.; malodorous leafy spikes; buds nodding; stems glistening white, simple, branching at the top.	Seeds and root-stocks.	Grain fields on knolls.	Summer-fallow, cultivate thoroughly.
White; umbol 4-in. across; stem stout, spotted with purple, strong smelling, very poisonous.	Seeds, carried by floods.	Wet meadows, troublesome in hay, poisonous to stock.	Spud, mow in flower.
Red, much bearded inside, ½-in.; dense terminal and axillary spikes; berry reddish, ¼-in.	Seeds and running root-stocks.	Newly broken land and summer-fallows and pastures.	Break early, summer-fallow.
White, small, in large terminal panicles.	" "	Grain fields, pastures.	Summer-fallow, cultivate.
Bright yellow; ¾-in.; whole plant glutinous; but bearing large drops of white resin.	Seeds, wind, in hay.	Fields, pastures, road sides.	Mow, cultivate.
Yellow, head large, 1-sided.....	Seeds, running root-stocks, wind.	Grain fields, summer-fallows.	Plough and cultivate.
White; ½-in., crowded on spreading branches.	" "	Grain fields, sandy land.	" "
White; heads very numerous, small, crowded in a slender erect wand-like panicle.	Seeds, wind...	Summer-fallows, grain fields.	Summer-fallow early, cultivate fall and spring.
Inconspicuous; ¼ in., hanging, short-stalked in axils of the upper leaves; leaves less than 1-in., rough, oblong linear, entire, opposite below, alternate above.	Copious underground creeping stems.	Grain fields.....	Summer-fallow, cultivate constantly.
Green, ½ in., crowded in large terminal panicles; stem smooth.	Seeds, wind, floods.	Grain crops, road-sides.	Pull, mow.
Yellow, ½ in., sterile flowers, in terminal racemes or spikes, fertile flowers axillary at base of spikes; stems rough; seed ½ in., bearing a crown of 5-6 tubercles above the middle; leaves 3-lobed.	Seeds, in grain, wind, floods.	Low rich land, grain fields, wheat.	Pull, mow, burn old plants.
Yellow, ¼ in., sterile in racemes, fertile green, axillary; seed ¼ in., long, hairy without spines. Plant grayish-green.	Seeds, running root-stocks.	Rich cultivated land, all crops.	Summer-fallow early, cultivate late.

A List of the more prominent Weeds of the North-West Territorie

	Common Name.	Botanical Name, Origin.	Duration. Height	Time of Flowering	Time of Seeding.	Co Arrange Charact
40.	Cocklebur	*Xanthium strumarium*, L., Europe.	Annual, 1-2 ft.	June-Sept.	Aug.-Sept.	Green, ¼ i triangul seed in bur, ½ in. spines a
4.	Wild Sunflower	*Helianthus rigidus*, Desf., native.	Perennial, 1-3 ft.	July-Aug .	" "	Dark yell 2 in.; he purplish
42.	" "	*H. Maximiliani*, Schrad., native.	Perennial, 1-4 ft.	" "	" "	Pale yello heads n short le stem; le
43.	Yarrow, Milfoil.....	*Achillea Millefolium*, L., Europe.	Perennial, 6-18 in.	" "	" "	White, ¼ i inches ac feathery
44.	Pasture Sage, Western Mugwort.	*Artemisia Ludoviciana*, Nutt., native.	Perennial, 1-2 ft.	" "	" "	Silvery wh plant; he ous in sh an elonga strongly
45.	Sweet Sage.....	*Artemisia frigida*, Willd, native.	Perennial, 12-18 in.	" "	" "	As above, cemes.
46.	False Tansy, Biennial Wormwood, Carrot-top.	*Artemisia biennis*, Willd, native.	Biennial and annual. 1-5 ft.	" "	" "	Whole pla numerou ers in leafy pa
47.	*Canada Thistle	*Cnicus arvensis*, Hoffm., Europe.	Perennial, 3 ft.	June-Aug.	July-Sept.	Lilac; ¾ i stocks.
48.	Western Bullthistle, Prairie Thistle.	*Cnicus undulatus*, Gray, native.	Perennial, 2 ft.	July-Aug .	July-Aug .	Lilac purp plant gr
49.	Skeleton Weed	*Lygodesmia juncea*, Don., native.	Perennial, 12 in.	" "	July-Aug .	Pink, ½ in., milky j stems m most lea
50.	*Blue Lettuce, Showy Lettuce.	*Lactuca pulchella*, DC., native.	Perennial, 1-2½ ft.	" "	July-Sept .	Blue; ¾ in cle; glau
51.	Sowthistle, Milk Thistle.	*Sonchus oleraceus*, L., Europe.	Annual, 1-2 ft.	Summer ..	Summer ..	Pale yello leaves he with ma two shar
52.	Spiny Sowthistle....	*Sonchus asper*, Vill., Europe.	"	"	"	Pale yello leaves le prickly, base rou
	PRIMROSE FAMILY.					
53.	Sea Milkwort.... ...	*Glaux maritima*, L., native.	Perennial, 6 in.	June	July.....	Pink, ⅛ in
	DOGBANE FAMILY.					
54.	Spreading Dogbane.	*Apocynum androsæmifolium*, L., native.	Perennial, 1-2½ ft.	July.....	Sept.....	Pink, ¼ hanging 3 in. long red, juic
55.	Common Milkweed, Silkweed, Wild Cotton.	*Asclepias speciosa*, Tor., native.	Perennial, 2-3 ft.	June-Aug.	July-Oct ..	Pinkish, ½
	BORAGE FAMILY.					
56.	Blue Rur, Stickseed.	*Echinospermum Lappula*, Lehm., Europe.	Annual and winter ann., 1 ft.	June-Aug.	July-Sept .	Blue, ⅛ in. racemes.
	CONVOLVULUS FAMILY.					
57.	Morning Glory, Bracted Bindweed.	*Convolvulus sepium*, R. Br., native.	Perennial, climber.	June-Sept.	Aug.-Sept.	Pink or wh
	NIGHTSHADE FAMILY.					
58.	Three-flowered Nightshade, Wild Tomato.	*Solanum triflorum*, L., Europe.	Annual, 6 in.	"	July-Oct ...	White or l like clust

Territories with their chief characters.—*Continued.*

Colour, Size, Arrangement of Flowers, and other Characters of the Plant.	Methods of Propagation and Distribution.	Place of Growth and Products Injured.	Methods of Eradication.	Time of Seeding.
Green, ¼ in., in heads; leaves triangular, toothed, rough: seed in a 2-celled prickly bur, ½ in. long with 2 hooked spines at tip.	Seeds. Burs carried by animals.	Low fields, wool..	Mow, burn old plants cultivate.	Aug.-Sept.
Dark yellow rays, disk black 2 in.; heads few, on long purplish stalks.	Seeds, running root-stocks.	New breaking, grain fields.	Summer-fallow early, cultivate.	" "
Pale yellow rays, disk yellow; heads numerous, 3 in., on short leafy stalks up the stem; leaves grayish.	" "	" "	" "	" "
White, ½ in., in flat heads, 2 inches across; leaves very feathery.	Seeds, offsets.....	Meadows, pasture	Break up sod, cultivate.	" "
Silvery white, like the whole plant; heads small, numerous in short spikes forming an elongated panicle; bitter, strongly scented.	Seeds, running root-stocks.	Pastures, summer fallows, hay.	Break up sod, summer-fallow.	" "
As above, but flowers in racemes.	" "	" "	" "	" "
Whole plant dark green, the numerous very small flowers in a tall wand-like, leafy panicle.	Seeds, floods	Grain fields, particularly on stubble, hay, market value of land.	Plough fall and spring, summer-fallow.	" "
Lilac; ¾ in.; running root-stocks.	Seeds, wind	Fields, grain, pastures, all crops.	Mow in July & Sept. & cultivate frequently.	July-Sept.
Lilac purple, 2 in; whole plant grayish.	" "	Roadsides, summer fallows.	Summer-fallow.	July-Aug.
Pink, ½ in., solitary; exuding milky juice when cut, stems much branched, almost leafless.	Seeds, running rootstocks.	Grain fields	Summer-fallow, cultivate.	July-Aug.
Blue; ¾ in., few; loose panicle; glaucous.	Seeds, deep running root-stocks.	Grain fields, especially on slightly alkaline lands.	Plough deep, cultivate.	July-Sept.
Pale yellow; ½ in.; corymb; leaves heart-shaped at base with many soft spines and two sharp auricles.	Seeds, wind	Gardens, all crops in rich land.	Hoe, pull.	Summer..
Pale yellow; ½ in.; corymb; leaves less divided, more prickly, the auricles at the base rounded.	" "	" "	"	"
Pink, ½ in.....	Seeds, root-stocks	Meadows, wet fields on alkaline lands.	Summer-fallow, cultivate.	July.....
Pink, ¼ in., bell-shaped, hanging; cyme; seed pods 3 in. long, in pairs; stems red, juice milky.	Seeds, running root-stocks, wind	Fields, summer-fallows.	" "	Sept.....
Pinkish, ½ in., umbels.....	" "	Rich soil, all crops	Mow while in bloom, plough, hoed crops.	July-Oct ..
Blue, ½ in., axillary, on leafy racemes.	Seeds, carried by animals.	Grain fields, roadsides, wool.	Summer-fallow, cultivate.	July-Sept.
Pink or white, 2 in., solitary.	Seeds, running root-stocks.	Fields	Cultivate frequently.	Aug.-Sept.
White or lilac, ¼ in., umbel-like clusters.	Seeds	Fields, gardens, all crops.	Cultivate, hoe.	July-Oct ...

A List of the more prominent Weeds of the North-

Common Name.	Botanical Name, Origin.	Duration. — Height.	Time of Flowering	Time of Seeding.
Mint Family.				
59. Wild Bergamot.....	*Monarda fistulosa*, L., and v. *mollis*, Benth., native.	Perennial, 2 ft.	July-Aug.	August....
60. Dragon-head.....	*Dracocephalum parviflorum*, Nutt., native.	Annual, 12-18 in.	June-Aug.	July-Aug.
61. Hemp Nettle.....	*Galeopsis Tetrahit*, L. Europe.	Annual, 1-3 ft.	July-Sept.	July-Sept.
Plantain Family.				
62. Common Plantain...	*Plantago major*, L., native and Europe.	Perennial, 6-18 in.	June-Sept.	" .....
Goosefoot Family.				
63. Lamb's-quarters, Pigweed, Goosefoot, Fat-hen.	*Chenopodium album*, L., Europe and native.	Annual, 1-3 ft.	June-Nov.	Aug.-Nov.
64. Spear-leaved Goosefont.	*Monolepis chenopodioides*, Moq., native.	Annual, 1 ft.	July-Nov.	"
65. *Russian Tumbleweed, Russian Thistle.	*Salsola kali*, L., var. *Tragus*, Moq., Russia.	Annual, 1-3 ft.	July-Sept.	"
66. *Russian Pigweed...	*Axyris amarantoides*, L., Russia.	Annual, 1-4 ft.	"	"
Amaranth Family.				
67. Pigweed, Redroot, Chinaman's Greens	*Amarantus retroflexus*, L., Tropical America.	Annual, 1-3 ft.	"	"
68. Tumbleweed, White-Pigweed.	*Amarantus albus*, L., Tropical America.	Annual, prostrate or ascending.	"	Aug.-Sept.
69. Spreading Amaranth Fleshy Amaranth, Low Amaranth.	*Amarantus blitoides*, Watson, native.	"	"	"
Buckwheat Family.				
70. Erect Goosegrass, Whiteman's Footstep.	*Polygonum erectum*, L., native.	Annual, 6-10 in.	"	July-Sept.
71. Wild Buckwheat, Black Bindweed.	*Polygonum convolvulus*, L., Europe.	Annual, climber.	"	"
72. White Dock.....	*Rumex salicifolius*, Weinm., native.	Perennial, 1-3 ft.	July-Aug.	Aug.-Sept.
Oleaster Family				
73. Wolf Willow, Silverberry.	*Elæagnus argentea*, Nutt., native.	Shrub, 2-6 ft.	June	August....
Grass Family.				
74. Fool's hay, Hair-grass.	*Agrostis scabra*, Willd., native.	Annual, 1-2 ft.	July.....	July-Aug.
75. *Spear Grass. Porcupine Grass.	*Stipa spartea*, Trin., native.	Perennial, 12-18 inches.	July 1-15.	July 16-20.
76. Couch, Quack, Skutch, Twitch.	*Agropyrum repens*, L., Europe and native.	Perennial, 1½-3 ft.	June-July.	Aug.-Sept.
77. *Skunk Grass, Skunk-tail Grass, Squirrel-tail Grass, Wild Barley.	*Hordeum jubatum*, L., native.	Annual, and perennial, 6-12 in.	July-Oct.	July-Oct.
78. *Wild Oats.....	*Avena fatua*, L. (and *A. strigosa*), Europe.	Annual, 2-3 ft.	July.....	July-Aug.
79. *Sweet Grass, Indian Hay, Holy Grass.	*Hierochloa borealis*, R. & S., native.	Perennial, 12-15 in.	May.....	June ... .

West Territories, with their chief characters.

Colour, Size, Arrangement of Flowers, and other Characters of the Plant.	Methods of Propagation and Distribution.	Place of Growth and Products Injured.	Methods of Eradication.	Time of Seeding.
Purplish, 1 in.; whorled heads, strongly scented.	Seeds, running root stocks.	Summer-fallows, newly cleared land.	Summer-fallow early, cultivate.	August....
Lilac, ¼ in.; terminal spikes.	Seeds.....	Summer-fallows, grain crops.	Summer-fallow early.	July-Aug.
Purplish, ½ in.; axillary whorls; stems swollen below joints; bristly.	"	Rich land, all crops.	Hoe, pull, cultivate.	July-Sept.
Spikes dense; pods 7-16 seeded; leaves inclined to lie down.	"	Meadows, pastures, lawns.	Break up sod, spud	" .....
Green, 1/12 in.; panicle; whole plant mealy white.	Seeds, in grain, clover and grass seed.	Rich soil, all crops	Cultivate, harrow grain fields.	Aug.-Nov.
Deep green, 1/12 in.; slender terminal panicle; whole plant smooth.	Wind.....	Alkaline soils, all crops.	"	"
Purplish, ¼ in., axillary; a prickly tumble weed.	Seeds, wind, floods.	Fields, railway banks, all crops.	Hoe, cultivate, burn.	"
Green, 1/16 in.; male flowers in terminal spikes, female axillary.	"	" "	"	"
Green, 1/12 in.; panicle of crowded spikes; root pink.	Seeds, in grain and grass seed, wind,	Rich land, everywhere.	Cultivate late, burn.	Aug.-Sept.
Green, 1/12 in.; spikes along the whitish stems; a tumble weed.	" "	" "	"	"
Green, 1/12 in.; spikes along the reddish fleshy stems; seeds twice the size of the preceding.	" "	Rich land, where there is some alkali.	"	July-Sept.
Pink and green, 1/12 in., axillary along the stems.	Seeds, floods...	Rich low land, grain and other crops.	Hoe, cultivate.	"
White, 1/12 in.; racemes.....	Seeds, in grain	Grain fields, summer-fallows.	Summer-fallow early, cultivate.	Aug.-Sept.
Green, ½ in.; panicle; seed valves with conspicuous white grains; leaves not waved, pale green.	Seeds in hay, in clover and grass seeds, wind.	Summer-fallows, low fields, pastures.	Summer-fallow, spud, cultivate.	August....
Yellow, ⅛ in., very fragrant.	Seeds, running roots.	Pastures	Break early, cultivate.	July-Aug.
Panicle very loose, purplish; leaves very short.	Seeds, winds..	Summer-fallows..	Summer-fallow early	July 16-20.
Panicle contracted; awns 4-6 inches long, blackish.	Seeds, carried by animals.	Prairie, seeding freely in wet seasons.	Break up prairie.	Aug.-Sept.
Spikes	Seeds, root-stocks, carried by cultivating implements.	Fields, all crops..	Plough shallow in summer, hoed crops.	July-Oct.
Pale green, sometimes purpled by cold weather; spikes; flowers long-awned (2 in.)	Seeds, wind, animals.	Meadows, pastures, the barbed seeds injuring stock when eaten	Mow, burn, break land.	July-Aug.
Seed hairy and bearing a long twisted awn.	Seeds in seed grain.	Fields, grain crops	Seed down with early barley or oats, cut for hay, follow with rape or millet.	June ... .
Spikelets brown; whole plant sweetly scented.	Seeds, running rootstocks.	Fields, all crops.	Plough deep, cultivate often.	

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Wormwood, Biennial	46	23, 38
Xanthium		38
Yarrow	43	38
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