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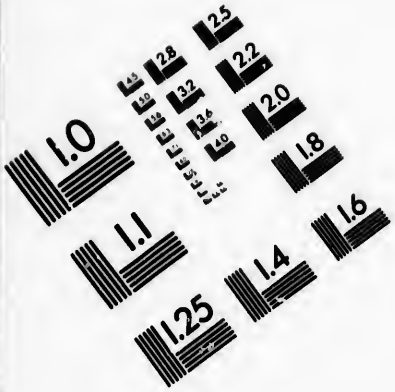

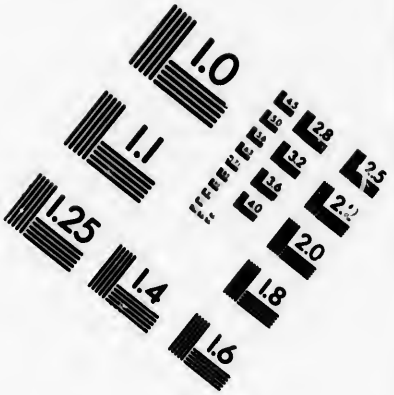

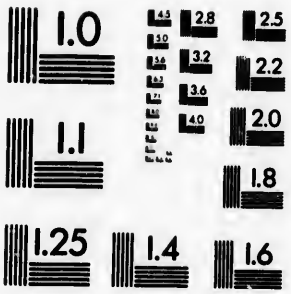

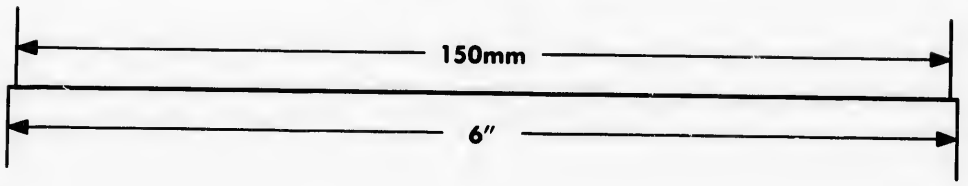

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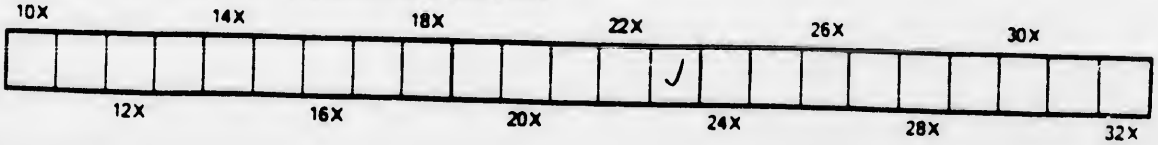

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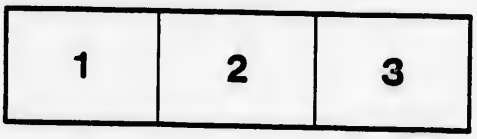

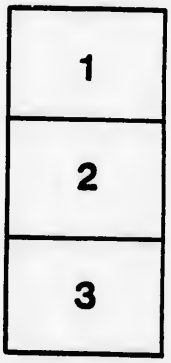

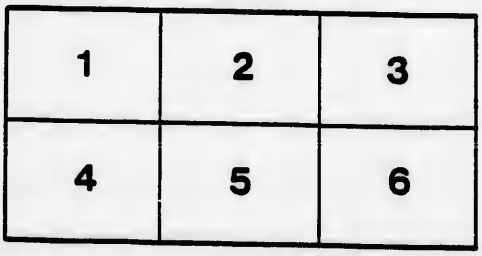

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BULLETIN No. 1.

GOVERNMENT OF THE NORTH-WEST TERRITORIES

DEPARTMENT OF AGRICULTURE.

NOXIOUS WEEDS

AND

HOW TO DESTROY THEM.

Tumbling Mustard, flowering plant.

BULLETIN NO 1,

1898.

PRINTED BY DIRECTION OF JAS. H. ROSS, M. L. A., COMMISSIONER OF AGRICULTURE.

[Information prepared for the Department by Dr. Jas. Fletcher, Entomologist and Botanist to the Dominion Experimental Farms, by permission of the Hon. S. A. Fisher, Minister of Agriculture, chiefly extracted from Bulletin No. 23 of the Dominion Experimental Farms.]

THE WORST WEEDS

OF THE

North-west Territories

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, Penny Cress or Stink-weed in Manitoba, and Tumbling Mustard in Manitoba and the North-west Territories.

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.

The following true statement occurs in an excellent pamphlet "Noxious Weeds in Manitoba and How to Destroy Them," issued by the Provincial Department of Agriculture and Immigration of Manitoba:—

"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."

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 recognised 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 advantage, or even necessity, of calling a plant by its proper name has been forcibly illustrated in the case of the Tumbling Mustard, now so prevalent in many parts of Manitoba and at Indian Head, &c., in the North-west Territories. This most injurious weed was for some time after its introduction, spoken of generally as "Tumble Weed," a name properly belonging to a much less aggressive plant, the *Amarantus albus*, one of the Pigweeds. Owing to the use of this wrong name, little effort was put forth by the settlers to destroy the new enemy, because it was well known all through the West that the true Tumble Weed was a native plant which had never given much trouble. Similarly, the Hare's-ear Mustard, a very noxious weed, was left undisturbed by some from having been wrongly spoken of by many as "Black Mustard." The Black Mustard, as a matter of fact, is of very rare occurrence in Canada, and as far as I am aware is not anywhere in the Dominion a troublesome weed in crops.

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 new 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 distance, 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 frequently distributed over farms by waggons, harrows, seeders, threshing

machines or other agricultural implements. Perhaps the most fertile source of weeds upon a previously clean farm, is manure brought from elsewhere. But, notwithstanding all efforts to the contrary, weeds will certainly be introduced from time to time on the farms of the most careful, and the wisdom is therefore apparent of farmers becoming 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, Penny Cress (called in the West "Stink-weed" or "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, Pepper Grass, 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 several 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 down 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 with annual weeds. The seeds of some annuals have very 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 eradication. 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 root-stocks, 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 be broken in May or early 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 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 would 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. S. A. Bedford, Superintendent of the Experimental Farm for Manitoba, at Brandon, Man., says :—"In regard to summer-fallowing : I consider it is absolutely essential on farms outside of the Red River valley. There, however, the advantages are not so clearly apparent, but even there I contend the farmers would be benefited from a proper fallow every three or four years ; too frequent fallowing in the Red River valley causes very rank vegetation and lodged grain. On our lighter and better drained soils this seldom occurs. Unfortunately, in this country much of the so-called summer-fallowing is badly done."

Mr. Hugh McKellar, Chief Clerk, Department of Agriculture for Manitoba, commenting upon a statement made by a Manitoba farmer that he could not afford to allow his land to lie idle as a summer-fallow for a year, 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. In some of the wooded parts of the province, however, the land under cultivation by farmers is restricted in area. If a farmer has only forty or fifty acres under cultivation, he might well crop all of it every year, each year having a few acres of roots or corn, but on those large farms, such as you passed through with me at Wawanesa, Souris or Hartney, where farmers crop 300 or 400 acres or more each year, it would be useless to crop a field of 150 or 200 acres

with roots or ensilage corn. Such a field would feed 150 head of cattle for a year, and as you know the cattle are not yet in the country. Summer-fallowing, properly done, that is, ploughed early and kept clean afterwards, is in my opinion the only way in the West to keep down the many noxious weeds which would otherwise become our masters, and I may say this is the method followed by some of our most practical farmers."

"Our farmers are now learning the importance of knowing the different weeds and fighting them according to their different natures, but in this country some weeds are extremely persistent and hard to control. The natural conditions are all in favour of the weeds, but their eradication is only a matter of diligent, careful work, and all the weeds, even the worst, can certainly be kept in check."

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 a 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 farmers' 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 it was 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 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 similar appliance on a warm dry day will be needed, as after the weeds have got a good start harrowing will help rather than hinder them.

"Land thus treated will start the grain next spring earlier and more evenly than any other, 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 a 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 Honourable Minister of Agriculture for the Province of Manitoba I have had exceptional opportunities, during the past three summers, of travelling through all the important wheat growing districts of that province. 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 developement of weeds on summer-fallows in Manitoba for three 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, Pepper-grass, Shepherd's Purse, Blue Bur, Golden Fumitory, etc., all summer-fallowing should be completed if possible not later than 12th of July, 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 by a more vigorous plant, which will prevent them 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.

SOME WEEDS OF SPECIAL INTEREST.

Large numbers of specimens of plants found growing in crops or on summer fallows in the North-west Territories, are every year sent to the Botanist of the Experimental Farms, for identification or for advice as to the best means of eradicating them. Figures have been prepared of some of the kinds most frequently inquired about and they are submitted herewith. These plants are not all among the most aggressive enemies of the farmer, but the numerous demands for information concerning them seem to make it advisable that recognizable figures should be published.

Tower Mustard.

Tower Mustard.

This is a tall slender plant 2 to 4 feet in height, with small yellowish white flowers which are followed by a great many slender pods 3 inches long, borne erect and closely pressed to the stem. The root leaves are hairy, but all the rest of the plant is very smooth and glaucous, that is, covered with a whitish bloom as seen on cabbage leaves. This is not a very troublesome weed. It has been sent in as occuring in summer fallows in Manitoba and in clover fields in the older provinces.

Wild Mustard or Charlock.

This well known pest of Eastern Canada is reported to be spreading fast in the Territories. 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 in the Prairie Provinces and equally to be dreaded.

Hare's-ear Mustard.

Hare's-Ear Mustard.

This is an introduced European plant which has only appeared as a noxious weed in the grain fields of the West during the last five years, but has already spread widely through Manitoba and the North-west Territories. It is an extremely injurious plant with large grayish-green succulent leaves like those of a young cabbage, and grows so vigorously that it chokes out grain and absorbes a great deal of moisture from the soil. 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.

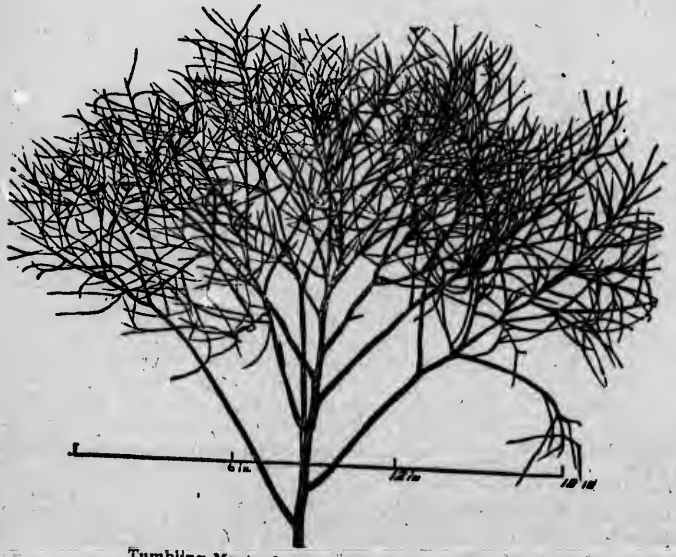
The cut given herewith is from a photograph taken from a living plant by Mr. R. J. Mackay at Indian Head.

Tumbling Mustard.

I have no hesitation in calling this one of the very worst weeds we have in the North-west 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 North-west Territories and Manitoba. 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

Tumbling Mustard : seedling.

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 thread-like divisions as shown in the figure of a flowering plant on the frontispiece. 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 Ontario and the Northwest; but for the most part in North America it is a true annual, the seeds germinating 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, N.W.T., bore more than one million and a-half 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.



Tumbling Mustard : a tumbler with ripe seeds.

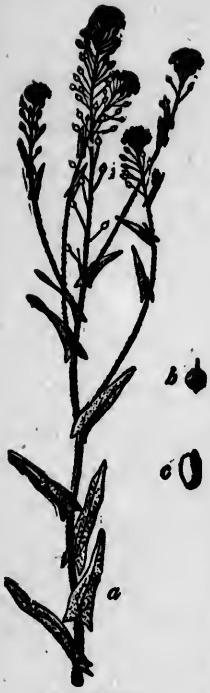
The distribution of this plant is almost entirely by the wind blowing the stems across the prairie during winter.

Stink Weed.

THE FIGURE IS ONE-THIRD NATURAL SIZE.

Stink Weed, Penny Cress, "French Weed."

No weed is better known in Manitoba 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 rank, nauseous odour of this plant, the rapidity with which it spreads, and the almost incredible difficulty of eradicating it when once established, make it important that its appearance should be known to everyone, so that no effort may be spared to destroy every plant as soon as noticed. I learn from Mr. Angus Mackay that this terrible pest is spreading rapidly in the Territories. He says:—"I find Stink Weed is a more difficult weed to kill and is spreading more even than the Tumbling Mustard." 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. The only way to clean land of this pest is 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.



Ball Mustard.

Ball Mustard.

This is one of the new weeds in grain fields. From the rapidity with which it spread all through the west, there is no doubt that it is a weed which must be fought vigorously by farmers. It is alarmingly abundant in Manitoba and the North-West Territories wherever wheat is grown. Specimens have also been received from British Columbia, Ontario and Prince Edward Island. 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 $\frac{1}{8}$ 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.

The cut shown herewith has been kindly loaned by the United States Department of Agriculture, and was first used in Circular No. 10 by Mr. Lyster H. Dewey, "Three New Weeds of the Mustard Family" to whom our thanks are tendered.

The cut shows at *a* the tip of a plant a quarter of the natural size, at *b* a pod natural size and at *c* a seed enlarged.

Pepper Grass.

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 sent in as a pest in wheat lands, and at meetings of farmers held during the same summer in Manitoba, this weed above all others was the one inquired about. At similar meetings in 1897 it was only mentioned once, viz., at Glenboro, Man. Pepper Grass is a slender herb 12 to 18 inches high, which developes in the shape of a miniature 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 on dry or light land, occasionally a serious pest in Manitoba and the Territories. It is much complained of by farmers in wet springs, particularly in wheat sown on stubble. Although generally described as an annual, Pepper Grass 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 crops.

Pepper Grass.

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. It has spread with rather alarming rapidity throughout the southern portions of the province and has been detected in many other parts of Manitoba and the North-west Territories. The Cow Cockle grows from seed every year and forms a rather elegant plant from one to two and a-half

Cow Cockle.

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 wild vetches, which are of about the same size.

Russian Thistle.

So much attention has been drawn to this plant by the Manitoba Department of Agriculture, since its discovery in Manitoba, that the farmers of that province should be well informed as to its appearance and characteristics. Although occasional specimens of the Russian Thistle have been 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 Manitoba and the North-west Territories the farmers as a rule are now exceedingly 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.

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.

Sweet Grass or Indian Hay.

Sweet Grass or Indian Hay.

One of the most troublesome weeds in Manitoba and the North-west Territories is Sweet Grass. It is frequently and 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; it 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. Mackay's experience in the North-west Territories, however, is different from this. He says: "We find to plough early or when in flower only helps this weed. I would advise ploughing deeply in the latter part of July or 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."

REPORT ON THE "POISON-WEED" OF THE ROCKY MOUNTAIN FOOT-HILLS.

By Prof. John Macoun, Naturalist to the Geological Survey Department.

Early in June, 1897, reports reached Calgary that a number of cattle had died in the neighbourhood of Jumping Pound, a point in the foothills about twenty-five miles west of Calgary. These deaths were supposed to have been caused by the cattle eating some poisonous plant growing where they had been feeding. While I was in Calgary a jar filled with the partly digested contents of the stomach of one of the dead animals was forwarded and submitted to me. At the same time a telegram

was sent to the Deputy Minister of Agriculture at Ottawa, asking that I might be sent up into the district in which the cattle were dying in order to investigate and report upon the cause of the mortality. In the meantime I carefully examined the material submitted to me, but as it had been chewed as cud I could find nothing by which the food could be identified. The fibrous bark of some undeterminable plant was all that could be separated from the partly digested mass.

On June 10th, however, a request came from the Deputy Minister of Agriculture asking me to go to Jumping Pound, and I at once started for that place. Arriving there on the 11th, I found that no less than eighteen fine steers and cows had already died. The living cattle had already been taken from the poplar woods and were then herded on the open prairie, and after this had been done there was no further mortality.

Being well acquainted with the flora of that region, I had decided before going there that there were but three plants that could have caused the deaths already noted. These were *Cicuta virosa* (Water Hemlock), *Sium lineare* (Water Parsnip), and *Delphinium scopulorum* (Mountain Larkspur). On making an examination of the plants growing in that region I found no specimens of the two first named species. Of the third, however, I found an abundance, and taking one of the ranchers with me, we found that in the adjoining woods it had been freely eaten by cattle. Owing to the fibrous outer bark of this plant it had not been cropped, but the young stems from six inches to a foot in height had been pulled up and nearly the whole plant eaten. I had no doubt that the deaths of all the dead cattle had been caused by eating this plant, as the symptoms the cattle exhibited before death were those which usually follow Aconite poisoning, and *Delphinium scopulorum*, is very nearly related to *Aconitum*.

The stringy bark found in the stomachs of the dead cattle agreed in all particulars with the bark of *Delphinium*, and as I could find no other poisonous plants I have no hesitancy in attributing the whole mortality to this one species. The remedy was obvious. At the season when cattle were apt to eat the Larkspur they should be herded and kept from it. I pointed out to the resident ranchers that early in the season when food was scarce the cattle ate all sorts of succulent plants in order to form cuds and fill their stomachs. Early in June if the cattle are herded on the prairie and kept out of the thickets and woods no danger need be apprehended. Later in the season they may run where they choose, with safety.

The truth of the theories was proved later in the season when I was on Bragg's Creek, a branch of the Elbow River. There I found that Mr. Turnbull, who has a large ranch, had lost cattle every spring until he built a series of fences to keep them out of the woods. I explained to him that after the middle of June there was no further danger, and his cattle were then allowed to run where they pleased with no ill effect. The Larkspur was then four feet high.

JOHN MACOUN,
Naturalist.

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 writer 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 Botanist, Central Experimental Farm, Ottawa, Ont. Such samples and all correspondence referring to them may be sent 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 foot-stalks of an equal and of a noticeable length; example, Lily of the Valley.

A *Panicle* is a compound raceme or a raceme with branched foot-stalks; 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.

A *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 receptacle; 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 becomes *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 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 inch.	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 Wall flower.	*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* (L.), Andrz., Europe.	Annual, 1-2½ ft.	"	"
9. Cut-leaved Tansy Mustard.	*Sisymbrium incisum*, Engelm., native.	Annual and biennial, 1-4 ft.	June.....	July.....
10. *Tumbling Mustard.	*Sisymbrium altissimum*, L., (=*S. sinapistrum*, Crantz), Europe.	Annual and winter annual, 1-4 ft.	June, July	July-Aug.
11. *Wild Mustard, Charlock, Cadluck, Herrick.	*Brassica Sinapistrum*, Boiss., Europe.	Annual, 1-3 ft.	June-Sept.	July-Sept.
12. *Bird Rape.....	*Brassica campestris*, L., Europe.	Annual, 1-3 ft.	"	"
13. *False Flax, Gold of Pleasure.	*Camelina sativa*, Crantz, Europe.	Annual and winter annual, 1-2 ft.	June, July	"
14. *Ball Mustard.....	*Neslia paniculata* (L.,) Desv., Europe.	Annual and winter annual, 1-2 ft.	"	"
15. *Shepherd's Purse....	*Capsella Bursa-pastoris*, Medic., Europe.	" "	May-Oct.	June-Oct.
16. *Stink-weed, Penny Cress, "French Weed."	*Thlaspi arvense*, L., Europe.	" "	"	"
17. *Peppergrass.....	*Lepidium apetalum*, Willd., (=*L. intermedium*, Gray,) native.	" "	"	"
Caper Family.				
18. Spider Flower.....	*Cleome integrifolia*, L., native.	Annual, 1-3 ft.	July-Aug.	August
Pink Family.				
19. *Cow Cockle.....	*Saponaria Vaccaria*, L., Europe.	Annual, 2 ft.	"	Aug.-Sept.
20. *Cockle, Corn Cockle.	*Lychnis Githago*, Lam., Europe.	Annual, 1-2 ft.	July-Sept.	Sept.

West Territories, with their chief characters.

Colour, Size, Arrangement of Flowers and other Characters of the Plant.	Method of Propagation and Distribution.	Place of Growth and Products Injured.	Methods of Eradication.
White, 1-1½ in., solitary; head of fr[illegible] round.	Seeds and root-stocks.	Low meadows, hay	Plough up sod and follow with hoed crop.
Yellow, ½ in., raceme.....	Seeds.	Wheat fields.....	Summer fallow; cultivate fall & spring.
Yellow; raceme, 1-3 in.....	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.	Seeds.....	Grain and clover fields.	Plough fall and spring, hand-pull before seeds ripen.
Yellow, nearly 1-in.; 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, ¼-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 ¼-in., square, ascending; leaves quite smooth, entire, succulent, glaucous.	"	Grain fields.....	Hand-pull, summer fallow, hoed crops.
Yellow, ½-in.; racemes elongated; pods smooth, spreading, curved, ½-in.; seeds, 1-ranked; leaves thin, green, almost without hairs.	"	Grain fields and summer fallows	" "
Yellow, pale, ½-in., racemes elongated; pods, 2-4 in., very slender, spreading, seeds greenish brown.	Seeds, wind...	Grain fields.....	" "
Yellow, ½-in., racemes; pods erect, 1-1½-in., one-third being 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.	Sow spring grain.
Orange yellow, ½-in., racemes, much elongated in fruit; pods nearly spherical, 1-seeded.	Seeds, in grain	Grain fields	Pull, summer fallow, hoed crops.
White, ½-in., racemes, much elongated in fruit; pods, triangular.	Seeds.....	Everywhere	Constant hoeing and cultivation.
White, ½-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.	Seeds, carried by floods.	Grain fields and low spots.	Pull, cultivate.
Pink, ½-in., cymes; calyx 5-angled, covering ripe pods; leaves succulent and glaucous; seeds 1/10 in., black, minutely roughened.	Seeds, in grain	Grain fields	" "
Purple, 1-in., solitary; seeds, ½ in., black, rough.	" "	Grain fields, summer fallows.	Pull, sow clean grain.

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

Common Name.	Botanical Name, Origin.	Duration. Height.	Time of Flowering.	Time of Seeding.
Pea Family.				
21. Wild Liquorice.....	*Glycyrrhiza lepidota*, Nutt, native.	Perennial, 2-3 ft.	July.....	Aug.-Sept.
Rose Family.				
22. Erect Cinquefoil.....	*Potentilla Norvegica*, L., native.	Annual, winter annual, 6-24 in.	June-July.	July-Aug..
23. Silverweed, Cinquefoil.	*Potentilla anserina*, L., native.	Perennial, 6 in.	June-Sept.	July-Sept..
24. Prairie Rose.....	*Rosa Arkansana*, Porter, native.	Shrub, 3 in.-3 ft.	June-July.	Aug.-Sept.
Evening Primrose Family.				
25. Common Evening Primrose.	*Œnothera biennis*, L., native.	Biennial, 1-4 feet.	July.....	July-Sept..
26. *White-stemmed Evening Primrose.	*Œnothera albicaulis*, Nutt, native.	Perennial, 6 in.-4 ft.	"	Aug.-Sept.
Parsley Family.				
27. Spotted Cowbane, Musquash Root, Beaver Poison.	*Cicuta maculata*, L., native.	Perennial, 2-6 ft.	July-Aug..	Sept.....
Honeysuckle Family.				
28. Wolfberry, Western Snow-berry.	*Symphoricarpus occidentalis*, Hook, native.	Shrub, 2-3 ft.	July.....	" .....
Bedstraw Family.				
29. Northern Bedstraw..	*Galium boreale*, L., native	Perennial, 1-2 ft.	"	Aug.....,
Sunflower Family				
30. Gumweed.....	*Grindelia squarrosa*, Dunal, native.	Biennial, 12-18 in.	July-Aug..	Aug.-Sept.
31. Goldenrod...	*Solidago Canadensis*, L., native.	Perennial, 2-3 ft.	July.....	" "
32. Many-flowered Starwort.	*Aster multiflorus*, Ait., native.	Perennial, 12-18 in.	"	Aug.....
33. Canada Fleabane, Horse-weed, "Fireweed."	*Erigeron Canadensis*, L., native.	Annual, and winter annual, 6 in.-5 ft.	July-Oct...	Aug.-Oct..
34. Poverty Weed..	*...a axillaris*, Pursh., native.	Perennial, 6-12 in.	July-Aug..	Aug.-Sept..
35. False Ragweed, Turkey Foot, Marsh Elder.	*...a xanthifolia* Nutt., native.	Annual, 1-4 ft.	Aug.-Sept.	Sept.-Oct..
36. *Great Ragweed, Crownweed, Riverweed.	*Ambrosia trifida*, L., native.	"	July-Sept..	Aug.-Nov..
37. 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.	Method of Propagation and Distribution.	Place of Growth, and Products Injured.	Methods of Eradication.
Whitish, ½-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, ½-in., solitary on long stalks.	Seeds, runners	Lowlands, particularly if alkaline.	" "
Pink to deep rose, 2½ in., corymb....	" rootstocks	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 rootstocks.	Grain fields on knolls.	Summer fallow, cultivate thoroughly.
White; umbel 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, ½-in.	Seeds and running rootstocks.	Newly broken land summer fallows and pastures.	Break early, summer fallow.
White, small, in large terminal panicles.	" "	Grain fields, pastures.	Summer fallow, cultivate.
Bright yellow; ½-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 rootstocks, 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; ½ 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, roadsides.	Pull, mow.
Yellow, ½ in., sterile flowers in terminal racemes or spikes, fertile flowers axilliary 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, ½ in., sterile in racemes, fertile green, axillary; seed ½ in., long, hairy without spines. Plant grayish-green.	Seeds, running rootstocks.	Rich cultivated land, all crops.	Summer fallow early, cultivate late.

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

Common Name.	Botanical Name, Origin.	Duration. — Height.	Time of Flowering.	Time of Seeding.
38. Cocklebur.....	*Xanthium strumarium*, L., Europe.	Annual, 1-2 ft.	June-Sept.	Aug.-Sept.
39. Wild Sunflower.....	*Helianthus rigidus*, Desf., native.	Perennial, 1-3 ft.	July-Aug..	" "
40. " " ..	*H. Maximiliani*, Schrad., native.	Perennial, 1-4 ft.	" "	" "
41. Yarrow, Milfoil.....	*Achillea Millefolium*, L., Europe.	Perennial, 6-18 in.	" "	" "
42. Pasture Sage, Western Mugwort.	*Artemisia Ludoviciana*, Nutt., native.	Perennial, 1-2 ft.	" "	" "
43. Sweet Sage.....	*Artemisia frigida*, Willd, native.	Perennial, 12-18 in.	" "	" "
44. False Tansy, Biennial Wormwood, Carrot-top.	*Artemisia biennis*, Willd, native.	Biennial and annual, 1-5 ft.	" "	" "
45. *Canada Thistle.....	*Cnicus arvensis*, Hoffm., Europe.	Perennial, 3 ft.	June-Aug.	July-Sept.
46. Western Bullthistle, Prairie Thistle.	*Cnicus undulatus*, Gray, native.	Perennial, 2 ft.	July-Aug.	July-Aug.
47. Skeleton Weed.....	*Lygodesmia juncea*, Don., native.	Perennial, 12 in.	" "	July-Aug.
48. *Blue Lettuce, Showy Lettuce.	*Lactuca pulchella*, DC., native.	Perennial, 1-2½ ft.	" "	July-Sept.
49. Sowthistle, Milk Thistle.	*Sonchus oleraceus*, L., Europe.	Annual, 1-2 ft.	Summer...	Summer ..
50. Spiny Sowthistle.....	*Sonchus asper*, Vill., Europe.	" "	" ...	" ..
PRIMROSE FAMILY.				
51. Sea Milkwort..... ..	*Glaux maritima*, L., native.	Perennial, 6 in.	June	July .....
DOGBANE FAMILY.				
52. Spreading Dogbane.	*Apocynum androsæmifolium*, L., native.	Perennial, 1-2 ft.	July.....	Sept. .....
53. Common Milkweed, Silkweed, Wild Cotton.	*Asclepias speciosa*, Tor., native.	Perennial, 2-3 ft.	June-Aug..	July-Oct...
BORAGE FAMILY.				
54. Blue Bur, Stickseed.	*Echinospermum Lappula*, Lehm., Europe.	Annual and winter ann., 1 ft.	June-Aug.	July-Sept.
CONVOLVULUS FAMILY.				
55. Morning-glory, Bracted Bindweed.	*Convolvulus sepium*, R. Br., native.	Perennial, climber.	June-Sept.	Aug.-Sept.
NIGHTSHADE FAMILY.				
56. Three-flowered Nightshade, Wild Tomato.	*Solanum triflorum*, L., Europe.	Annual, 6 in.	"	July-Oct.

Territories with their chief characters.—*Continued.*

Colour, Size, Arrangement of Flowers and other Characters of the Plant.	Method of Propagation and Distribution.	Place of Growth and Products Injured.	Methods of Eradication.
Green, ½ 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.
Dark yellow rays, disk black 2 in.; heads few, on long purplish stalks	Seeds, running rootstocks,	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 rootstocks.	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 rootstocks,	Seeds, wind.....	Fields, grain, pastures, all crops.	Mow in July & Sept. & cultivate frequently.
Lilac purple, 2 in.; whole plant grayish.	" "	Roadsides, summer fallows.	Summer fallow.
Pink ⅛ in., solitary; exuding milky juice when cut, stems much branched, almost leafless.	Seeds, running rootstocks.	Grain fields.....	Summer fallow, cultivate.
Blue; ¾ in., few; loose panicle; glaucous.	Seeds, deep running rootstocks.	Grain fields, especially on slightly alkaline lands.	Plough deep, cultivate.
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.
Pale yellow; ½ in corymb; leaves less divided, more prickly, the auricles at the base rounded.	"	" "	"
Pink, ½ in.....	Seeds, rootstocks.	Meadows, wet fields on alkaline lands.	Summer fallow, cultivate.
Pink, ¼ in., bell-shaped, hanging, cyme; seed pods 3 in. long, in pairs; stems red, juice milky.	Seeds, running rootstocks, wind	Fields, summer fallows.	" "
Pinkish, ½ in., umbels..	" "	Rich soil, all crops	Mow while in bloom, plough, hoed crops.
Blue, ½ in., axillary, on leafy racemes.	Seeds carried by animals.	Grain fields, roadsides, wool.	Summer fallow, cultivate.
Pink or white, 2 in. solitary.	Seeds, running root stocks.	Fields.....	Cultivate frequently.
White or lilac, ¼ in., umbel-like clusters.	Seeds.....	Fields, gardens, all crops.	Cultivate, hoe.

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

Common Name.	Botanical Name, Origin.	Duration. — Height.	Time of Flowering	Time of Seeding.
MINT FAMILY.				
57. Wild Bergamot.....	*Monarda fistulosa*, L., and var. *mollis*, Benth. native.	Perennial, 2 ft.	July-Aug.	August....
58. Dragon-head.....	*Dracocephalum parviflorum*, Nutt, native.	Annual, 12-18 in.	June-Aug.	July-Aug.
59. Hemp-Nettle.....	*Galeopsis Tetrahit*, L. Europe.	Annual 1-3 ft.	July-Sept.	July-Sept.
PLANTAIN FAMILY.				
60. Common Plantain...	*Plantago major*, L., native and Europe.	Perennial, 6-18 in.	June-Sept.	"
GOOSEFOOT FAMILY.				
61. Lamb's-quarters, Pigweed, Goosefoot, Fat-hen.	*Chenopodium album*, L., Europe and native.	Annual, 1-3 ft.	June-Nov.	Aug.-Nov.
62. Fleshy Goosefoot.	*Chenopodium rubrum*, L., Europe.	Annual, 1-5 ft.	July-Nov.	"
63. *Russian Tumbleweed, Russian Thistle.	*Salsola kali*, L., var. *Tragus*, (DC.) Russia.	Annual, 1-3 ft.	July-Sept.	"
64. *Russian Pigweed...	*Axyris amarantoides*, L., Russia.	Annual, 1-4 ft.	"	"
AMARANTH FAMILY.				
65. Pigweed, Redroot, Chinaman's Greens	*Amarantus retroflexus*, L., Tropical America.	Annual, 1-3 ft.	"	"
66. Tumbleweed, White Pigweed.	*Amarantus albus*, L., Tropical America.	Annual, prostrate or ascending.	"	Aug.-Sept.
67. Spreading Amaranth Fleshy Amaranth, Low Amaranth,	*Amarantus blitoides*, Watson, native.	"	"	"
BUCKWHEAT FAMILY.				
68. Erect Goosegrass, Whiteman's Footstep.	*Polygonum erectum*, L., native.	Annual, 6-10 in.	"	July-Sept.
69. Wild Buckwheat, Black Bind-weed.	*Polygonum convolvulus*, L., Europe.	Annual, climber.	"	"
70. White Dock.....	*Rumex salicifolius*, Weinm., native.	Perennial, 1-3 ft.	July-Aug.	Aug.-Sept.
OLEASTER FAMILY.				
71. Wolf Willow, Silverberry.	*Elæagnus argentea*, Nutt., native.	Shrub, 2-6 ft.	June.....	August....
GRASS FAMILY.				
72. Fool's hay, Hair-grass.	*Agrostis scabra*, Willd., native.	Annual, 1-2 ft.	July.....	July-Aug.
73. *Spear Grass, Porcupine Grass.	*Stipa spartea*, Trin., native.	Perennial, 12-18 in.	July 1-15.	July 10-20
74. Couch, Quack, Skutch, Twitch, Devil's Grass.	*Agropyrum repens*. L. Europe and native.	Perennial, 1½-3 ft.	June-July	Aug.-Sept.
75. *Skunk Grass, Skunk-tail Grass, Squirrel-tail Grass, Wild Barley, Alkali Grass.	*Hordeum jubatum*, L., native.	Annual, and perrenial, 6-12 in.	July-Oct.	July-Oct.
76. *Wild Oats.....	*Avena fatua*, L. (and *A. strigosa*), Europe.	Annual, 2-3 ft.	July.....	July-Aug
77. *Sweet Grass, Indian Hay, Holy Grass.	*Hierochloa borealis*, R. & S., native.	Perennial, 12-15 in.	May.....	June .....

Territories, with their chief characters.—*Continued.*

Colour, Size, Arrangement of Flowers and other Characters of the Plant	Method of Propagation and Distribution.	Place of Growth and Products injured.	Methods of Eradication.
Purplish, 1 in., whorled heads strongly scented	Seeds, running root stocks.	Summer fallows, newly cleared land	Summer fallow early, cultivate.
Lilac, ¼ in., terminal spikes.	Seeds.....	Summer fallows, grain crops.	Summer fallow early.
Purplish, ⅛ in., axillary whorls; steme swollen below joints; bristly.	"	Rich land, all crops.	Hoe, pull, cultivate.
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.
Deep green, 1/12 in., slender terminal panicle; whole plant smooth, stems reddish	" "	"	"
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, every where.	Cultivate late, burn.
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.	"
Pink and green, 1/12 in., axillary along the stems.	Seeds, floods.....	Rich low land, grain and other crops.	Hoe, cultivate.
White, 1/12., racemes.....	Seeds, in grain...	Grain fields, summer-fallows.	Summer fallow early, cultivate.
Green, ¼ 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,
Yellow, ⅛ in, very fragrant.	Seeds, running roots.	Pastures.....	Break early, cultivate
Panicle very loose, purplish; leaves very short.	Seeds, winds.....	Summer-fallows..	Summer fallow early.
Panicle contracted, awns 4-6 inches long, blackish.	Seeds, carried by animals.	Prairie, seeding freely in wet seasons.	Break up prairie.
Spikes.....	Seeds, rootstocks carried by cultivating implements	Fields, all crops..	Plough shallow in summer, hoed crops
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.
Seed hairy and bearing a long twisted awn.	Seeds, in seed grain.	Fields, grain crops	Seed down with early barley or oats and cut for hay, follow with rape or millet.
Spikelets brown; whole plant sweetly scented	Seeds, running rootstocks.	Fields, all crops.	Plough deep, cultivate often.

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