

timothy and clover, ashes were spread at the rate of seventy bushels to the acre, one-eighth of an acre at one corner of the field receiving none. The oat crop showed no difference where the ashes were and where they were not, showing pretty conclusively that the potash and phosphoric acid were not reduced to the "available" state in time for the grain to benefit by them, but the grass, and particularly the clover, the following year made a remarkable growth except, where the ashes had been withheld. After two years' cutting of hay, in which the clover held its own better than usual, I applied in August a dressing of ashes to the piece that so far had received none. The next year the appearance of the field had entirely changed. On the main part the hay crop was principally timothy, while on the small piece the clover was far ahead, and the year after the clover crop was so strong on this piece that it had to be cut, cured and treated as clover while the rest of the field was practically pure timothy. Subsequent experiments with ashes and clover have all gone to show the wonderful effects that can be produced by the use of ashes; and where land is really run down this method of restoring its lost fertility by the use of ashes, in feeding clover on potash and phosphoric acid and letting it gather its own nitrogen from the atmosphere, is often far more economically done than by the use of barnyard manure, while it gives us the manure to use on other crops. Again, ashes, containing no seed weeds, make the best preparation for clean seeding, and one quick method of renewing a worn-out meadow or pasture is to plough as soon after haying as possible; mellow down the furrows by thorough harrowing (a disc or an acme harrow doing this part well and without tearing up the sod), then spread ashes at the rate of sixty to eighty bushels to the acre before the last harrowing, and sow clover seed at the rate of fifteen pounds to the acre, covering with a roller. In this latitude clover sown as late as August 25th will succeed well, and give a heavy crop the following year, somewhat later than the ordinary run; that sown as late as September 15th is liable to be winter-killed. In this way we insure a clean clover catch without grain, and lose no time by the operation. In the last issue of the Country Gentleman there are, I am sorry to see, no less than five advertisements of Canada ashes for sale by firms offering to supply them in car-load lots to parties in the United States. There they are evidently appreciated, while we, who already have them, are allowing our neighbors south of us to take from our very doors what ought to be, in conjunction with clover, the means of bringing thousands of our unproductive acres into a high state of fertility.

C. P. R. Extension.

The year 1892 has been no exception to the recognized policy of the C. P. R., in extending its lines throughout the Canadian Northwest as rapidly as the development of the country or the growth of business would seem to warrant. Truthfully in most instances it may be said that the railway is the pioneer of the country's development. The extensions built this year have been as follows:—On the Souris branch, from a short distance west of Oxbow to Estevan (the new coal town at the point where the Souris Line taps the Soo Line), a distance of 38½ miles; from Deloraine to Napinka, a distance of 18 miles; from Nesbitt (on what is sometimes called the Glenboro line) to Souris, a distance of 18 6-10 miles; the Pipestone extension from Menteith Junction (Souris Line) to Reston, a distance of 13½ miles; and from Mosquito Creek, now called Nanton Station, on the Macleod Branch, to Macleod, a distance of 48 miles. The railway from Paqua (the first station east of Moosejaw) to the International boundary, a distance of 170 miles, was energetically pushed, and a large extent of it graded, ready for track laying in the spring. This road will connect with the Minneapolis, St. Paul and Sault Ste. Marie Railway, commonly called the "Soo" Line, at the boundary, thus forming a very direct route from the Pacific coast, south of Lake Superior, to the Canadian Sault, where it strikes again the main line of the C. P. R.

Entomology.

Injurious Insects—No. 9.

BY JAMES FLETCHER, DOMINION ENTOMOLOGIST,
OTTAWA, ONT.



THE PEA-WEEVIL (*Bruchus pisi*, L.)

This old and well-known enemy of the farmer in western Canada is still far more abundant than it ought to be, and would be, if pea-growers were more careful to treat their seed before sowing. The pea-weevil (Fig. 1. a, natural size; b, enlarged so as to show the markings;) is a small, brownish gray, very active beetle, one-fifth of an inch long, with two conspicuous black spots on the end of the upper surface of its body. This beetle emerges from seed pease late in the autumn or in the springtime, leaving a small round hole, through which it may be seen that the greater part of the inside has been eaten away. There is only one beetle in each pea. The life-history of the pea-weevil has been carefully worked out and is now well-known. The eggs, which are white, elongated objects three times as long as wide, are laid on the outside of the young growing pods, to which they are fastened by a sticky fluid. As soon as the young grub hatches, it eats its way through the pod into the nearest pea. The hole in the pod soon fills up, but that in the pea can always be seen as a minute black spot on the skin. The larva, which is a yellow, legless grub, attains full growth and turns to the perfect beetle in autumn inside the pea. Most frequently the germ of the seed is injured, for the young grub requires some resisting object when it eats its way into the young pea and this it finds in the wall of the pod where it comes nearest to the forming pea; and this is where the latter is joined to the pod, and where also the young germ is situated. There are, however, a sufficient number of the attacked seeds of which the germ is uninjured, therefore, some farmers have occasionally used them for seed. These will produce, it is true, a weak plant if sown, but the plants are never strong enough to give a crop which will warrant weevilly peas being used for seed. Many of the beetles leave the pease in autumn, and seek a suitable place for passing the winter, in barns or out-houses and under rubbish, but by far the larger number in most seasons remain inside the pease until the following spring.

Mr. T. G. Raynor, of Rose Hall, Prince Edward County, writes with regard to this point as follows:—"During a warm winter or early in spring the weevils eat their way out of the seed, and from 50 to 75 per cent. of the peas would be emptied in this way. Where they are very numerous they cause the peas to heat."

Mr. J. H. Allan, of Picton, who has had large experience in dealing in pease, says: "A considerable proportion of the beetles emerge from the pease in autumn, if the crop is left out until the bug is fully developed. In threshing them in this state the caps are removed, and the bugs get out and conceal themselves in some dry place until the spring, when the heat revives them, and they will fly from field to field

until they find the young crop of peas. They feed on the young leaves and flowers until the pods take form. The eggs are laid when the pease are quite small, about the size of a mustard seed. As soon as the beetles have laid their eggs they die. I advise early cutting and threshing, so that the seed can be treated while the insect is in the larval stage."

REMEDIES.

The best remedies for application at this time of the year are the following:—

1. *Holding over Seed.*—Undoubtedly the safest plan for the eradication of this injurious pest is to avoid sowing any seed less than two years old. The insects mature and must die the first year, but I have found from extensive experiments that two-year-old seed gave a crop in every way as good as seed of the previous year.

As there are no wild plants known upon which the pea-weevil feeds, if all pea growers would systematically adopt this practice, the pea-weevil, at any rate one of the worst enemies of the Canadian farmer, could be kept within reasonable bounds.

2. *Warm Storage.*—A good plan for farmers who save their own seed is to store the seed in strong bags of paper or close canvas, which the beetles cannot get through, and keep them stored in a warm room. In this way most of the insects are developed early and perish inside the bags, as they do not feed on the dry pease. This is not a perfect remedy, because a few of the beetles will always be delayed in their development, but by far the largest number will die.

It is claimed that excessive cold kills this insect inside the infested grain, and its known distribution in Canada would seem to favour this contention. Weevilly peas, therefore, which have been stored in a warm room might be exposed out of doors upon one or two occasions during the winter when intense cold occurs. The insects would be more susceptible to injury from the cold after having been kept in a warm temperature.

Bi-sulphide of Carbon.—A remedy which is not practical for application by farmers, but yet which demands notice here, because it is the best remedy for destroying weevils on a large scale, is the bi-sulphide of carbon treatment. This must be used with great care, as the material mentioned is very inflammable and dangerous, and therefore requires special apparatus.

It may be mentioned that the statement which is frequently made that infested pease will float if thrown into water is inaccurate, as any one can prove for himself by trying.

Trimming Evergreen Hedges.

The question is often asked regarding the time most suitable for clipping or trimming a cedar hedge, so as to make it to grow thick and spread out in the foliage.

In all pruning operations two of the main principles to be borne in mind are (1) that pruning during the period of vigorous growth has the effect of checking development; and (2) that pruning while the plant is dormant tends to encourage growth the following year. With these points in mind, in the case of a young hedge where rapid growth is desired, the present time is favorable for this purpose. In the case of an old and well established hedge, two clippings at least are necessary each season, and these may take place near the beginning and towards the close of the growing season.

We want at once an active agent in every township to secure us a large list of new subscribers.