

plants are so constructed that when they become dry an oblique tension is produced which causes them to curl up quickly, throwing the seed several feet. Wild tares is a good example. (2) Other weeds, chiefly perennials, have creeping rootstocks. These grow along below the surface of the ground, and produce shoots at intervals which develop into new plants. Prof. A. N. Prentiss, of Cornell University, conducted experiments which showed that if the roots of the Canada thistle were cut in pieces $\frac{1}{4}$ inch in length, the majority of these would grow. The same was true with perennial sow thistle. Couch grass will spread 10 to 15 feet in a season by means of its running rootstocks. The cinquefoils send out runners after a fashion similar to the strawberry, and spread from 10 to 15 feet in a season.

Artificial Dissemination.—The most fruitful source is in commercial seeds. It is said that flower, vegetable and ordinary field seeds have been responsible for the incorporation of more weed seeds than all other means combined, and it is practically certain that they spread them most when once introduced. In the pioneer days, fanning mills were very scarce, and those that were in the Province were very primitive and poor appliances for the task they were intended to perform. Even yet it is difficult to clean seed very well. Chess has always been, and still is, a common impurity in wheat. Perennial sow thistle seed occasionally attaches itself to the brush of wheat grains in such a manner as to escape detection in the hands of the casual observer.

Oats often contain impurities. Farmers in Ontario hearing of the phenomenal yields of some Western variety, order a carload, and often the oats are mixed with wild radish, tumbling mustard, ball mustard and other Western weeds.

Toadflax and several allied species came to us in imported German flaxseed. Hare's ear mustard came from Europe in flaxseed about 1892.

Grass and clover seed is even worse than grains for spreading weed seeds. Some weed seeds are almost identical with valuable seeds; for example, yellow trefoil and alfalfa.

Some plants have been introduced as ornamental plants, but they have proven troublesome, as the Bouncing Bet and Creeping Charlie.

The railways are another agency which aids in weed dissemination. The bedding is scattered along the tracks, and this is frequently full of weeds. The cars that carry elevator screenings are left uncleaned until they reach their next loading place; consequently, instead of having the refuse at one central point, it is scattered all over the Province. The dumps where this refuse is put become veritable weed nurseries. The tumbling mustard very quickly spread from one end of the C. P. R. to the other.

In some years, immense quantities of impure frozen wheat are brought from the West and fed

to Ontario stock. That fed to poultry is seldom ground, and what is ground for cattle is seldom fine enough to destroy the germinating power of the small seeds.

Last year, 57,189 cars of grain were screened at Fort William and Port Arthur; 51 cars of screenings were obtained; 39 of this was sold for chicken feed, and the remainder ground for feed. What a chance for scattering weeds!

Prepared stock foods are composed largely of cheap, impure, insufficiently-ground grain. George Clark, B. S. A., estimated that 15 or 20 new weeds were imported last year in stock foods.



Group of Shire Mares and Foals, Royal Farms, Sandringham.

Hon. Sydney Fisher, M. P., promised, at the last meeting of the Experimental Union that the existing law would be so amended that selling feed containing germinable weed seeds would be illegal.

The packing in imported glass and crockery ware frequently contains weeds and their seeds. This reaches the fields in manure.

Hay is often a carrier of weed seeds. The weeds surrounding lumber and construction camps are proofs of this. This is a very difficult matter to control, owing to the trouble of detecting weeds, and also in remedying unsatisfactory conditions.

Roots, rootstocks and bulbs are dragged from field to field on cultivators and various farm implements. Bindweed, couch grass, live-for-ever and St. John's wort are particularly well adapted to this means of propagation.

Threshing machines and binders also carry the seeds.

Manure affords a medium for the dispersal of weed seeds over the fields. Farmers living near towns and cities bargain for the manure from livery stables, etc. This is drawn to the fields before the seeds are destroyed by the pile heating, but if a watch is kept, the increased benefits from the unleached manure will more than counterbalance the danger from new weeds.

ERADICATION.

It is improbable that weeds found in Ontario will ever be completely eradicated, but an increased expenditure of time, labor and money in fighting them would undoubtedly be handsomely rewarded by increased crops of a superior quality.

A very pressing need at present is to educate the farmer so he will be constantly on the alert against the introduction of new weeds and increasing the number of those already present by sowing impure seed, etc.

The ease with which sow thistles and other weeds can be spread by the wind brings up the question as to how much relief may be expected from weed laws. Our weed laws are impracticable of enforcement, and should be improved; but if each individual farmer does his duty at home, he can, with a good system of farming and a reasonable amount of care, hold the weeds in check to such an extent that they would do comparatively little damage.

The frost destroys thousands of seedlings every fall. To increase the percentage germinating it is necessary to prepare a seedbed immediately after harvest. This is easily accomplished by a gang plow or disk harrow and a set of drag harrows.

The aid from the birds is greatly underestimated. More than a dozen members of the sparrow family, the juncos, red polls, snowflakes, grosbeaks, quail, and all the

species of the finch family, eat the seeds of ragweed, pigeonweed, smartweed, lamb's quarters, pigweed and prickly lettuce. When we consider that a bird at a single meal eats from 250 to 1,000 seeds, their value becomes apparent.

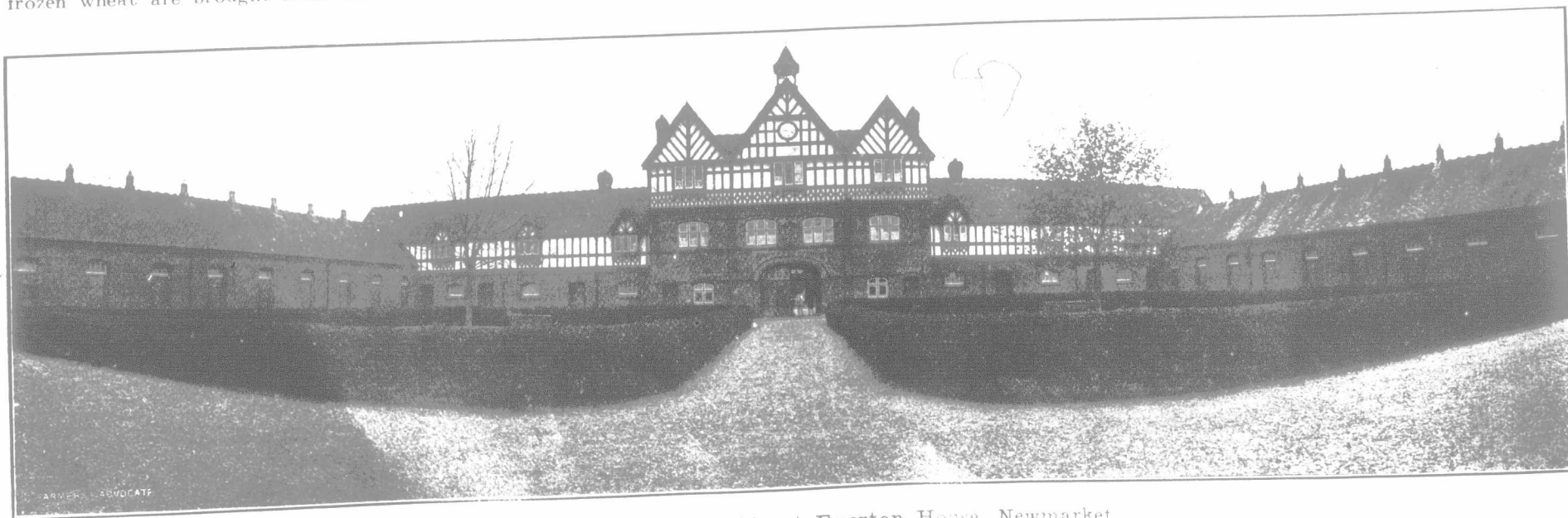
Sheep love variety of diet, and in a pasture where fresh grass is scarce, it is said they will eat 90 per cent. of the troublesome weeds. They are particularly fond of the young shoots and of the flower buds. Nipping them off at these stages retards the production of seed and seriously weakens the plant.

In combating weeds, a knowledge of their life-histories, characteristics of growth and soil preference is very beneficial.

Weeds are divided into three great classes, according to their length of life, viz., annuals, biennials, and perennials. The perennials, as couch grass, bindweed and perennial thistles, are undoubtedly the worst kind.

The first step in controlling weeds is preventing them from seeding wherever possible. This includes those on waste land, headlands, roadsides adjoining the farm, and the fence corners. It is also necessary to see that the proper people cut the weeds on the railways.

The next essential is to see that no weed seeds are sown. Samples of seed will be tested free of charge at the O. A. C. Guelph. Samples of red clover have been tested which contained as high



The King's Training Stable at Egerton House, Newmarket.