

ers in this country, and many in the eastern parts of the Province.

The great advantage urged for the short rotation is the killing of weeds. There may be something worthy in this, although I have never seen it practically wrought out, but I know there can be no very creditable excuse for a farmer to allow weeds to accumulate on his grass fields. Here he has ample opportunity to prevent them from going to seed. An experience of nearly three-quarters of a century, as boy and man on a farm, has convinced me that since bare fallowing has become almost obsolete, if the most vigilant means is not used to eradicate weeds in the green crop, no matter whether the shift be long or short, weeds will increase on the farm, and, like a monstrosity, be an eyesore to the passerby, and a dead loss to the farmer. It is in this respect that most farmers fail. The season is short for killing weeds, either in corn or turnips, and the scarcity of help when hoeing should be done. Hoeing is such a simple occupation to appearance that one would naturally think anyone could perform it to perfection. Not so, good hoers are as scarce as good plowmen nowadays. The time is lost, the wages are thrown away, if the hoeing is not done thoroughly. In my experience, the majority of hoers I have had simply tickled the weeds, and to pull a thistle or ragweed with the hand at the root of a cornstalk that could not be reached with the hoe would be almost sacrilege.

Whether there is any virtue in the seven years' shift, more than a closer rotation, I am unable to speak with the authority of a scientist. I have ample proof, however, that it has prevailed in Scotland in many districts for over two hundred years. Some sixty years ago it was allowed by land owners for farmers to change from the seven to five years' shift when leasing a farm. This enabled them to raise more turnips, but they had to be dependent on renting grass fields for the keep of their rising young stock until stall feeding commenced. It has been reported lately from farmers in the district of Buchan, Aberdeenshire, that the turnips on the seven years' shift had not suffered nearly so much from finger and toe as on the shorter rotation; and clover still grew luxuriantly on the seven, but clover sickness was quite prevalent on the five.

It has been my belief, ever since I knew of or heard of rotation of crops, that the longer any two crops of the same kind (except, perhaps, grass) were kept apart the better. This I believe to be the main principle of rotation. To grow any crop indefinitely on the same land we know is ruinous to land and farmer, even although manured regularly. I can give no reason for it, but I have known potatoes grown in the same plot in a garden for many years, manured heavily year after year, become sad and waxy, the land refusing to come to a fine tilth, the potatoes a very poor crop, and a very poor quality.

To use a common phrase, the farm that I was raised on was put under the seven years' shift as soon as eighty-four acres was in condition for adjusting into fields of equal size, or nearly so, going on to seventy years ago. For one or two rounds there was little difference between its production and the haphazard system of seventy years ago. For the past forty years it has produced almost the double of many of the surrounding farms. In all parts of the country where I have visited there are still many farmers whose fields have never been adjusted since the farm was cleared. No regularity in manuring or seeding to clover. They perhaps judge from the appearance of the land what it will produce best, no matter if it be the same crop over again.

In the County of Ontario (south), in the Township of Pickering, I knew a farm of a hundred and fifty acres, fifty years ago that never failed in producing 35 to 40 bushels of most excellent wheat to the acre. The farmer became rich. His plan was to grow all the wheat he could, and peas, a small quantity of oats, and turnips. The farm had a reputation, and was sold for fifteen thousand dollars. The purchaser could not get the crops of wheat nor grass the former owner had been blessed with. What mystic tantrim had come over the farm was the gossip and discussion of the neighborhood. Although many theories were suggested as the cause, or probable cause, yet to the cute observing farmers of the neighborhood, the wheat crop had been gradually waning for some years back. A not very philosophic reason, yet fraught with much truth, was that the farm had been wheated to death.

From 1850 to 1868 the fall wheat and spring wheat was totally destroyed by the midge in all the southern counties in this Province. Early varieties were introduced from the United States. An early red wheat, called the Midge-proof, and Kentucky Blue Stem, escaped for a season or two, but the midge to a great extent adapted itself to the seasons. Only an early frost in the fall, or give up the wheat crop altogether as a remedy. And it would have been millions of dollars to the benefit of this Province if it had been given up for one or two seasons. The same may be said of the potato beetle. If farmers and gardeners had abstained from planting potatoes one single year, it would have been many dollars, not only to farmers, but to the country at large. The insect cannot live on any other plant but the tomato and deadly nightshade. I have digressed from the trend of my story. In the County of Simcoe, in the Township of Nottawasaga, the wheat midge never reached. The soil was quite suitable for fall wheat; the mills in the southern townships had to be supplied with wheat at a big price; the Nottawasaga farmers could raise wheat almost spontaneously; one-half of their farm barley and the other half wheat continuously for many years they became wealthy; came

down to the southern townships as a rather superior member of the genus homo, and bought up the dandiest teams—carriage and draft—regardless of price. So enchanted were some of the Dutch farmers of Markham and Whitchurch, that they sold their splendid farms, equipped in buildings, fences and other paraphernalia, and purchased farms in this land of Ophir, paying more by one-third than they received for their good old farms.

Time changes all things, as well as youth to old age. The midge left the southern counties, and wheat fields reappeared again. The southern farmers had not suffered very much for the want of it, had turned their attention to stock-raising, and the coarser grains. And what of the Nottawasaga aristocrats? As the southern farmers became plethoric they became scrawny. They had killed the goose that laid the golden egg, and only learned the fact when too late to mend it. I have learned only two years ago that fall wheat has almost ceased to be raised profitably.

In writing this article, I have tried to present to the reader the danger of continuously growing the same crop year after year, even with a short rotation. For a course or two little difference may be observed, but, assuredly, persevered in for many years it will end disastrously to the man or men who practice it.

Middlesex Co., Ont.

OLD FARMER.

MORE WEEDS.

SOME OF THE WORST ANNUALS.

Weeds, as it is scarcely necessary to mention, are divided into three classes—annuals, biennials and perennials. Of these, the perennials are much the most difficult to eradicate, as cultivation, if not thorough, only encourages them, and even a tiny piece of root not destroyed is often sufficient to perpetuate the species. Biennial weeds, on the other hand, give little trouble in cultivated fields. Good plowing is death to most of them. They infest waste places, fence sides and around buildings, and often are very unsightly. Burdock, bull thistle and blue weed are samples of the tribe. If burdocks, during the month of June, are cut off below the crown with a spade, they will die, and so, we presume, will any of the others.

Annuals, though the easiest killed by being cut off, yet, because of the profusion of seed they produce, and also of their ability to spring up with the growing crop and ripen and shed their seed before it is harvested, furnish some of our most troublesome weeds. Some annuals are what are called winter annuals; that is, the seed will germinate in the fall, the tiny plants will survive the winter, and be ready to start off early in the spring.

WILD MUSTARD (*Brassica Sinapistrum*).

This weed has a brilliant flower; everybody knows it. The seed is much like rape or turnip seed, and of extraordinary vitality. It will grow if brought to the surface after being buried thirty years—some say fifty. On that account it is very difficult to get rid of. Prevention is much better and easier than cure. If the farm is clean, and by any chance some mustard seed is sown with grain, it will show itself when it blooms (which is a blessing), and should promptly be pulled. By this simple means many farms are kept entirely free of this weed, while others, where this process was neglected, are overrun by it.

Where it is very bad, spraying with a 2-per-cent. solution of bluestone (copper sulphate) is recommended. Dissolve 9 pounds of bluestone in 45 gallons of water, and, choosing a fine, bright day, spray just when the plants are coming into bloom. This quantity will cover an acre, and will cost 60 to 80 cents. The mustard will be killed, while the grain will not be seriously hurt.

General treatment is thorough fall cultivation, followed by hoed crop, and afterwards, without plowing the ground, sow spring grain and seed with clover. Pull weeds by hand out of grain crop, if there are not too many. Break up clover sod in August and cultivate repeatedly during the autumn, following with another hoed crop.

RAGWEED (*Ambrosia artemisiæfolia*).

Ragweed is an annual. The stem is much branched and slightly hairy, from one to three feet high. The leaves are very finely divided, the lower surface being of a lighter color than the upper. The flowers are yellow, one-sixth of an inch across, infertile in the terminal spikes, and fertile only at the base of the spikes. As it does not mature seed until late, it is not troublesome in cereal crops, but makes a rank growth in the stubble. Autumn cultivation is peculiarly helpful in destroying this weed. The mower should be run over infested grass lands in September or October if any plants are likely to mature seed. Another charge against this plant is that, besides being a weed, it causes hay fever.

WILD OAT (*Avena fatua*).

An annual, almost impossible to distinguish from the cultivated oat until it heads out. After that the loose chaff shows whiter than that of other oats, and can thus be readily noticed, even at a distance. The seeds are shed as they ripen, beginning while part of the head is still green.

The grain, usually of a dark color, and of ordinary size, has a small kernel, with a thick hull which is hairy, especially around the base, and a stiff, long awn or beard. This beard, when dry, is twisted and somewhat bent. Lay the grain in the palm of the hand, wet with the tongue, and the beard begins slowly to untwist, the grain moves as if alive, and in a few moments turns completely over. This power of movement under changing moisture conditions enables wild oats to bury themselves to a considerable depth in the earth, where they await their opportunity to further exasperate the farmer.

Practically nothing can be done by fall cultivation to exterminate wild oats. They decline to germinate at that season. On fields infested with them, spring grain crops should be dropped out of the rotation as far as possible, and hoed crops, soiling crops, hay and pasture should take their place. We give the rotation of one farmer who succeeded in ridding a field of them so completely that his neighbors afterwards bought seed oats grown there: First, oats seeded with clover and cut green for hay; second, clover hay; third, peas sown late, preceded by spring cultivation—wild oats that appeared in crop pulled by hand; fourth, corn.

As precautionary measures, examine closely all seed grain purchased; better still, procure seed only from farms known to be clean, clean out in some way the threshing machine before it begins work on the place and burn the refuse, and hand-pull any specimens observed. By such methods, whole sections of our country are still kept free of these pests, whereas some would have us believe it is impossible to keep them at bay.

FALSE FLAX OR WILD FLAX (*Camelina sativa*).

An annual, or usually a winter annual, which is in some sections a weed much dreaded. The plant resembles flax in general appearance, in leaves, seed boll and seed, though these are all much smaller than in true flax. Its flowers are numerous, yellow, and rather inconspicuous. An average plant produces 40,000 seeds. The seed is distributed as an impurity in flax, timothy and clover seed, and occasionally in seed grain.

This weed peculiarly infests fall wheat, rye, meadows and pastures. It does not usually grow to any considerable extent in spring crops. To overcome it, drop fall wheat out of the rotation for a time. Give very thorough fall cultivation, followed by hoed crop. Sow grass seed with spring grain.

WILD OR PRICKLY LETTUCE (*Lactuca Canadensis*).

A weed which a few years ago was believed to be one of the worst, but which does not seem to have proved as bad as feared. It is an annual or biennial, growing to a height of four to seven feet. The plant, when ripe, quite resembles garden lettuce that has gone to seed—many-branched, yellow-flowered, with downy seed. The leaves are peculiar, in that many of them are turned on edge. The railways are blamed for introducing and furnishing a breeding-ground for the seed.

Wild lettuce does not flourish in grain or hoed crops, but grows freely in meadows and pastures and alongside fences and other byplaces. It is well to be watchful with this newcomer and cut out or spud any specimens noticed.

CRAB GRASS OR FINGER GRASS (*Panicum sanguinale*).

An annual which is a great nuisance in the cornfields of the Prairie States. This weed has obtained a foothold in Ontario, and while it may not prove formidable on farms, it is certainly a very troublesome weed in gardens. It is much more difficult to keep in check than the common foxtail. Where there is room, its habit is spreading, and it will take fresh root at the joints. The leaves are of a pale or sickly-green color, giving the misleading idea that the plant is delicate. On attempting to pull it, one finds out that appearances are deceptive. It has a very firm hold of the ground, and takes root again readily after being hoed out or pulled. The upright seed-stems are slender, and frequently of purplish color. The head is formed by the stem dividing into three to six branches, these spreading out like the toes of a hen's foot or the ribs of a fan. These branches do not subdivide. Each is, as it were, a straight, slender finger, bearing minute seeds the whole length, which look as if glued on.

Thorough cultivation of hoed crops, and keeping plants from going to seed, are recommended. This course pursued, is death to any of the annuals.

Mention might have been made of lamb's-quarter, pigweed, foxtail, shepherd's purse, and the like, but these are old companions, whose habits we know and whose absence we would miss. So little troublesome are they in comparison with others we have to contend with, that they may almost be counted old friends.

To make lime water, agitate an ounce of pure caustic lime in a pint bottle nearly filled with water, and after the lime has subsided decant the clear liquid. Keep in a well-stoppered bottle.