

preparation of the land or sowing is necessary, the grass seed usually being sown with the preceding grain crop. All the charges to be made against the grass crop are rent, cost of seed, harvesting, and sometimes fencing; and the crop, in order to return equivalent net profits, does not need to yield a product with as large a gross value as corn or the small grains.

Where live stock is kept and the grass is marketed as beef, pork, mutton or milk, the value of the grass or other raw product is often so increased as to make a larger net return per acre than had grain crops been grown. In addition to whatever profits may be made by feeding the grass crops to live stock over selling it as hay, the grain or cultivated crop following the grass is usually stimulated to yield enough more than it would following a grain crop, to be equivalent to that which would have been secured from two years of grain giving low yields. As a rule, 75 acres of grain each year on land that grows a crop of clover every fourth year, will yield a larger net profit than will 100 acres sown to grain continuously.

Ventilation of Root Houses.

Forethought is ever demanded in farming. At this season, one's mind is liable to be far from the winter storage of root crops, but in a few months' time that problem will confront us, and with it some practical questions regarding the ventilation of root cellars, upon which subject there seems to be comparatively little Canadian experience on record. The Physics Department of the Ontario Agricultural College is anxious to secure home experience along this line, and has requested "The Farmer's Advocate" to co-operate by publishing the subjoined list of inquiries, with answers as received. All who are in a position to do so are invited to contribute brief letters for publication covering the points as enumerated:

1. Where roots, say turnips or mangels, are piled into a large bin or cellar, is it necessary to make provision for letting fresh air down into the pile of roots or not?
2. Some people claim that roots keep better when packed in soil; for example, just below the window or chute, where the roots are always mixed with some earth. Is that your experience?
3. Wouldn't it be a good practice to keep the roots off the floor a few inches by pieces of old rails or boards; also from the walls by strapping the walls up and down and nailing on rough boards six inches or so apart, in order to allow the air to circulate around all sides and the bottom of the pile of roots?
4. Which is the better floor for roots, earth or cement?
5. If fresh air is necessary among the roots, where should it be let into the root house, bottom or top? To what extent will air diffuse through a pile of roots?
6. What system of outlets for the foul air should be used. How could the inlets and outlets be controlled in the very cold weather in guarding against the freezing of the roots?
7. A large stone-basement stable has a root-storage room across the most of one end, the dimensions of it being 60 ft. (width of stable) by 17 ft., and 10 ft. high. It is separated from the stable proper by a brick wall, and has a cement floor. The basement is partly below the ground level.
 - (a) What system of ventilation would you recommend for this root cellar?
 - (b) Have you any criticisms to offer on its construction and size?

Longevity of Alfalfa.

It is the long life of the alfalfa plant that makes it of such especial value to the farmer. It is a perennial, and, under favorable conditions, continues to grow for many years. A report of some very interesting original inquiries by R. Schuyler, of Haldimand County, Ont., and a 1912 graduate of the Ontario Agricultural College, is contained in Mr. Schuyler's final-year thesis, part of which is quoted in the O. A. C. Review. The investigations appear to have been confined to Haldimand County, the prevailing soil of which is a very heavy clay, mostly level, though rolling in some sections. The following table gives a classification of 55 fields, according to ages:

14	fields	were	over	6	years	and	under	9	years.
24	"	"	"	8	"	"	"	12	"
8	"	"	"	11	"	"	"	15	"
7	"	"	"	14	"	"	"	17	"
2	"	"	"	17	"	"	"		"

The most prevalent age was from 8 to 12 years, the oldest field being 25 years established. This was on the farm of Jas. Douglas, Caledonia, whose contributions on alfalfa will be recalled by many of our readers.

SEEDING AND SOIL PREPARATION.

Nine seedings of alfalfa were made on stubble-ground fall-plowed and top-dressed during the winter. Their average age is 11.7 years.

Twenty-three seedings made on stubble ground fall plowed but not manured. Average age of these, 11.08 years.

Six seedings were made on sod which was fall-plowed and sown to alfalfa in the spring. In each case these were blue-grass sods. The average here is 9.7 years.

There was apparently little difference between the fields top-dressed and those not. The longest life was attained by the fields top-dressed. On the other hand, the results indicate that alfalfa, following directly after sod, does not produce the longest-lived plants.

NURSE CROPS.

Only three fields of alfalfa are reported as being seeded without nurse crops. Their average age is 13 years, which is somewhat more than where nurse crops were sown. The nurse crops stood in order of merit as follows:

Rank.	Nurse Crop.	Age of Alfalfa.
1st.	Spring Wheat	14 years.
2nd.	Oats	12 years.
3rd.	Barley	10.4 years.
4th.	Grass Peas	9.28 years.
5th.	Winter Wheat	9.1 years.

The average age where nurse crops have been used is 10.5 years. The poor showing of barley, as compared with oats, is rather surprising, but might not be confirmed by broader investigations.

It was found that the fields not pastured were in a somewhat better condition than those pastured carefully, and in much better condition than those pastured without any particular care. These facts, strengthened by the opinions of all the growers consulted, indicate that pasturing is one of the chief factors that determines the longevity of alfalfa.

We append the summary, which contains many reliable hints, though we think the author is a little too sweeping in his second conclusion to the effect that "all sandy and gravelly knolls appear to be unsuitable for alfalfa."

SUMMARY.

The alfalfa fields visited, and reports which are included in this thesis, represent fairly average conditions in this county. The farmers interviewed are located for the most part in each section of the county.

1. The maximum life of alfalfa varies considerably, depending on local conditions, but the average life was found to be 10.7 years.
2. All sandy and gravelly knolls appear to be unsuitable for alfalfa.
3. The alfalfa always kills out very quickly wherever the land is not properly drained.
4. The majority of seedings are made with the ordinary spring grains as nurse crops, and this is usually the second crop after sod has been plowed down; i. e., stubble ground, fall-plowed, and alfalfa sown the following spring.
5. Canadian blue grass is very prevalent in this county. When blue grass is plowed and followed directly by alfalfa, it does not attain so long a life as when the sod is plowed back before seeding.
6. When sown after the land was top-dressed, its life was increased a little.
7. Fifteen pounds of alfalfa seed is the average amount sown. Seed-growing is practiced very largely in this county, and heavier seedings are thought to produce excess of hay, rather than best yield of seed.
8. The sowing of nurse crops is largely practiced, and in only a few cases were no nurse crops sown. In these, however, the alfalfa was slightly longer-lived. The comparison is hardly fair, owing to unevenness of numbers, and can only be considered as an indication.
9. Many varieties of nurse crops are sown, including most of the common cereals. Grass peas are also used, with fair results. Seeding with spring wheat gave best results. Oats, at the rate of one to one and a half bushels per acre, came next, while winter wheat came last. With winter wheat, the seed was sown in the spring after ground would permit of harrowing.
10. Most farmers pasture their alfalfa. The results indicate that it is harmful, but only to a limited extent, when pastured carefully with cattle only.
11. Pasturing with horses and sheep, however, proved very injurious in every instance, completely destroying it where the practice was continued.
12. Alfalfa's extreme branching habit increases the life of the plants as a whole, by thickening up the meadows.
13. Young seedling plants arising from shelled seed in harvesting, may thicken up the crop.

Saving a Weak Seeding.

Every farmer of lengthened experience has been up against the problem of dealing with a poor catch of clover and grass seed. Sometimes it is a complete failure, and sometimes so near it as to warrant breaking. At the best, this involves considerable loss, and the original cost of the seed is the smallest part of it. The negative loss far outweighs the positive. We mean that, to deprive a field of the soil-improving virtue of clover, and at the same time to deprive the stock of the clover hay it might have produced, represents a far greater loss than the two or three dollars per acre expended for seed. Where a definite rotation is followed, the issue at stake is all the greater, for failure of the clover catch interferes with the system, just as the slipping of a cog interferes with the working of a machine. Secure a regular catch of clover, and you can practice any rotation you like. Nothing else can break the rotation, but that will throw the whole thing out, unless some extra-ingenious shift can be made. For this reason, in particular, we regard the securing and preservation of a good catch of clover as the fundamental problem in field agriculture. The old saying, "Grow clover, and you can grow anything," might well be modified to read, "Grow clover and you can pursue any rotation you choose."

Hence, we regard with very special satisfaction the degree of success attained last year at Weldwood in preserving what was left of the new seeding after the scorching midsummer drouth, which killed many of the plants outright and browned most of the rest to a tinder—so much so that even the wheat stubble gave no promise of being worth leaving, while large areas of the oat stubble presented hardly a living plant to casual view. Extremely reluctant though we were to lose a catch, we should have plowed most of the oat stubble and sown it to wheat, had other work permitted. Instead, we ran over all the stubble with the disk drill, August 21st to 23rd, sowing four or five pounds per acre of a mixture of timothy, alsike, red clover, alfalfa and mammoth clover, but principally timothy. One half-acre strip of oat stubble was disked up in August and re-seeded August 23rd with a more liberal mixture. Save for a few very light showers, the weather had remained distressingly dry until August 15th, when a prolonged "wet spell" set in and the clover thickened up rather encouragingly. A heavy volunteer crop of oats from hauled-out seed came on ahead of it, however, offering a large amount of tempting pasturage. The courage of our convictions was fortunately supplemented by lack of fences, so that not a bite was grazed off any of the new seeding, either wheat or oat stubble. Instead, we top-dressed most of the latter with about three spreader loads of manure per acre, and during the winter applied to the poorer knolls a second coating on the snow.

We cannot give results exactly, but estimate that the wheat stubble yielded about 2½ tons of cured clover and blue-grass hay per acre; while the oat stubble, which not one farmer out of ten would have thought worth leaving, ran well over a ton and a half, with chances of a second crop for seed.

Apart from the general result, some interesting points were noted. On both wheat and oats, the original seed mixture consisted of about the following: Red clover, 8 lbs.; alsike, 2 lbs; timothy, 3 to 4 lbs. The wheat field was seeded early in April on frozen ground. On the wheat-stubble field there was a little alsike in the hay; on the oat stubble, none. Was the alsike affected by the drouth more than the red?

There was a good deal of blue grass, but very little timothy in either field. In the oat stubble there was no timothy at all on a certain strip which missed the extra seeding in August. Evidently the timothy, too, was killed out by the drouth.

On the oat stubble field, rather the heavier crop of hay was cut from the portion that had been spring-plowed out of sod in 1911, the bottom here being much thickened by blue grass. However, the clover was better on the other part, where the oats had been sown on fall-plowed stubble. This may have been due to the fact that the oats on this portion were lighter, having been sown late. It was noticeable that on the best land, or wherever the oats made their rankest growth, the clover withstood the drouth least successfully.

The strip sown after deeply disking up the land, destroying all that was thereon, was the poorest part of the field, yielding a thin, short growth of timothy, with a sprinkling of alfalfa, but very little good clover. Evidently, on the rest of the field it was the spring-sown seed which came on and made the crop. Had our supplementary seeding been done before the mid-August rain, and had the volunteer crop of oats been lighter, results from the summer seeding would very likely have been more satisfactory than they were. As the autumn was extra favorable for