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The Field.

RESTORING LOST FERTILITY.

Under a proper system of culture, not only will the original fertility of the soil be retained, but it will be constantly increasing. A farmer should carry on his business just as a wise merchant does, who is not satisfied with profits merely, but aims to add continually to his stock-in-trade. The elements of productiveness in the soil, are the farmer's stock-in-trade. He should not only maintain the stock, but increase it. A merchant can sometimes realize considerable cash-in-hand by running his stock low, but he must replenish without delay, or the business will stop. Customers will not long continue to come to a shop, where they fail to find what they ask for. In the case of the merchant, it is comparatively easy to replenish an exhausted stock. He has but to go to the wholesale dealer, and order in a new supply. At most, he only needs to wait long enough to import fresh goods. He can quickly fill up his empty shelves. It is not so with the farmer. Time and patience are demanded in order to replace the stock he has used up in an exhaustive system of farming. If barn-yard manure were sufficiently plentiful and not too costly, and if it could be had as easily and quickly as dry goods can be got from the wholesale houses, the case would be different. But manure is always scarce and dear. There is never enough of it on hand to meet fully the regular demand; and it is costly. So a lost fertility can only be got back by slow and gradual processes. Let us glance at some of them.

1. *Fallowing.* A piece of land is said to be fallow, when there is no valuable crop on it during the growing season. This condition of things is sometimes spoken of as "letting the land rest," and the effect of it is, to some extent, the same as rest or sleep to a tired man. It recuperates the soil. The ancient Greeks and Romans were familiar with this mode of getting back lost fertility, and had much recourse to it. It is common at the present day in many parts of the world; but only in exceptional cases, can it be regarded as the best thing to do. It benefits the soil by weathering it, as it is called. The air, sunshine, rain, cold and wind act upon it. Oxygen, carbonic acid, and ammonia blend with it, dissolving and rendering available the mineral salts which lie in the soil, and which when rendered soluble, help to furnish plant-food. But this weathering process can be better carried on without keeping the land idle. A change of crop and thorough tillage, will accomplish the same results, and bring a greater or less remunerative return. If a field is badly infested with weeds, and it is desired to clean it as well as improve the quality of the soil, it is well to let it lie fallow. When the weeds are well grown, or are in blossom, such land should be ploughed,—the weeds ploughed under with a dressing of manure. Two, three or more crops

of weeds may be thus disposed of. Some quick growing plant like buckwheat, may be sown in the course of the season and ploughed under. Each of these crops not only takes out of the soil its appropriate food, but draws largely on the atmosphere, which is more or less charged with gases which form plant nutriment. Thus, when ploughed under, the land is enriched by the gain in growth, in addition to the improvement caused by exposure to the weather; besides which, it will be comparatively free from weeds, and in a good state to yield some useful crop.

2. *Deeper Ploughing.* A farm has been ploughed about the same depth for a series of years. There is only a shallow seed-bed. Mr. Mechi facetiously calls this, the "agricultural pie-crust," and says that even in England, it does not average more than five inches in thickness. Perhaps in this country, the average is not more than three or three and a half inches. This thin layer of surface soil is worn out. Just beneath it, hard and compact, there is, it may be, another layer, or perhaps there are successive layers, of rich earth. In such a case, if the plough be run down to a depth of eight or ten inches, it is as though a new farm had been found under the old one. Of course this can only be done where there is a good sub-soil. But even when the sub-soil is no better than the top-soil, deeper ploughing will, ultimately secure improvement, by exposing more soil to the action of the elements, and providing a deeper, as well as a better seed-bed for the growing plants.

3. *Clovering.* To sow clover and plough it under, is an excellent plan of improvement, and particularly well adapted to certain soil. Clover is a deep-rooted and broad-leaved plant; a deep ploughing lifts the sub-soil to the surface, so the clover by its long tap roots brings up not the soil itself, but the better parts of it to the top. At the same time its numerous broad leaves drink in supplies from the air, and so a two-fold process of enrichment goes on. When clover is sown it is well to give it a dressing of plaster, and it will pay to coat it lightly with well-rotted manure. The heavier the clover crop, the greater the enrichment it will yield the land when ploughed in.

4. *Root-growing.* Nothing has tended so powerfully to revolutionize the agriculture of the old world, as the culture of turnip and other root crops. From comparatively worn-out land, by a good dressing of barn-yard manure and some artificial fertilizer, a good yield of roots is obtained. These roots are fed to stock, and the manure made by them applied to the land, with remunerative returns, and constant improvement as the results. Root culture is an essential part of that system of mixed husbandry, which, under a well-regulated rotation of crops, enables the British farmer both to pay an enormous rental, and realize good profits. Root growing renders it possible to keep more stock,—with mere stock there is more manure,—with more manure, there is regained increasing fertility, and it is no longer complained that "farming does not pay."

5. *Light-pasturing.* Land that is not too valuable to be so treated may be rendered more fertile by so stocking it, that the consumption of herbage shall be less than the supply. Pasturage is usually overstocked. The exacting owner asks it to support two animals when there are scant resources for one. Both animals and land grow lean on this plan. A pasture used only for growing and fattening animals, to which grain, oil-meal, or other extra feed is given, will if understocked, visibly and rapidly improve. An example in proof of this will appropriately close this article:

"Three brothers, each having a small farm of his own, with pretty good meadow and plough land, but lacking in pasturage, bought three farms adjoining each other, two or three miles from their homes, to be held in common and to supply the deficiency of pasturage on their home farms. These three farms contained about 400 acres. The former owners had cleared nearly all the land, and had lived mainly by selling wood, lumber, and fencing timber. There were, however, rails and standing chestnut poles enough to enclose the whole in one great pasture. Their practice was at first to turn in rather late—not till the snow was fairly off the ground. By limiting the number they found that the animals became fat enough to attract the drovers early—as early in some instances as the 20th of June, and during the months of July, August, and a few days in September, the whole drove was off, at times when beef was then, as we believe it is now, in greater demand and at higher prices than later in the season. As their custom was not to turn in a second drove the same year, this not only enabled them to get the highest prices, but it also gave their pasture time to rest, or rather to grow for itself a heavy mulching for the coming winter, which, as all observant farmers well know, enriches the soil and brings in earlier growth of fresh grass the following spring; and this mixture of the new grass with the old affords a gradual change from dry to green feed more favorable to health and early fattening than a sudden change. Two or three years' practice of stocking lightly in spring and summer, and of pasturing little or no stock in autumn enabled them to increase the number of cattle, and yet have them ready for the drover quite as early as at first. The three brothers became rich, as the term rich then signified, and at the same time enriched instead of impoverishing their land."

Less Land and Better Tillage.

Joseph Harris, the retired editor and successful farmer, of Rochester, N. Y., gives his ideas of improved farming, in the *American Agriculturist*:—"My plan of improved agriculture does not necessarily imply the production of any more grain of any kind that we sell than we raise at present. I would simply raise it on fewer acres, and thus lessen the expense for seed, cultivation, harvesting, etc. I would raise thirty bushels of wheat per acre every third year, instead of ten bushels every year. If we summer fallow and ploughed under clover in order to produce the thirty bushels of wheat once in three years, instead of ten bushels every year, no more produce of any kind would be raised. But my plan does not contemplate such a result. On my own farm I seldom summer fallow, and never plough under clover. I think I can enrich the farm nearly as much by feeding the clover to animals and returning the

manure to the land. The animals do not take out more than from five to ten per cent. of the most valuable elements of plant food from the clover. And so my plan, while it produces as much and no more grain to sell, adds greatly to the fertility of the land, and gives an increased production of beef, butter, mutton, wool, cheese and pork."

A Very Good Compost.

A very good fertilizing compound is manufactured by the following substances according to the directions given. The mixture has been called "Lamb's great Fertilizer," as it is stated that it originated with him. This is doubtful, but it is a judicious and sensible combination, nevertheless, easy to prepare, and cheap. It will prove serviceable for corn, wheat, and the other cereal grains, and also for grapes. This amount will do well, applied to one or two acres, and will cost not far from \$16:

1. Dry peat, twenty bushels;
2. Unleached ashes, three bushels;
3. Fine bone dust, three bushels;
4. Calcined plaster, three bushels;
5. Nitrate of soda, forty pounds;
6. Sulph. ammonia, thirty-three pounds;
7. Sulphate of soda, forty pounds.

Mix Nos. 1, 2, and 3, together; then mix Nos. 5 and 6, and 7, in five buckets of water. When dissolved, add the liquid to the 1st, 2d, and 3d articles. When mixed, add 4th article. — *Journal of Chemistry.*

For each Field its Right Crop:

Many farmers in the selection of the crops they raise, are entirely indifferent as to the character of the soil on which they are to be grown. This is a great mistake, as every field of a farm should be turned to that use for which its soil best adapts it. Of course the experience gained by successive years of practical trial is the best monitor, but this is gained too often at the expense of poor crops and unnecessary discouragement. But a safe guide to the special capabilities of the soil can always be found in the indigenous trees and plants which are found upon it. Where nature is the planter we may rest assured that the seeds are placed in the soil most appropriate and congenial for them. A soil in which the common beech tree flourishes is always sure to retain considerable moisture, and as a general thing is a heavy, stiff clay, the pines and chestnut on the contrary are found flourishing in a light sandy soil. Close observation so strongly confirms this view, that it may be accepted as a law of nature; and from this we are enabled to determine distinctions in the soil, although their general appearance of color, etc., are apparently identical. The smallest indigenous plant is equally an exponent of the character of the soil, as the giant oak.

It may be laid down as a general rule, that a rich and varied natural vegetation, trees as well as plants, is indicative of a soil of good capacity; one which not only contains all the elements necessary for the growth of most cultivated plants, but free from any noxious substances, and in that physical condition to allow of its profitable cultivation, while on the other hand, a scanty vegetation, embracing few species only, indicate the absence of some important element, or some physical imperfection.

Forest trees and indigenous plants may be regarded as exponents of the physical condition of the soil, rather than of its chemical composition. A soil on which oak, hickory and tulip, or yellow poplar are the principal trees of the native forest, is most suitable for the growth of wheat. Maple and beech producing soil is better adapted to spring or summer crops, such as barley, corn and potatoes. The adaptation of "winto oak soil" to winter wheat, and the beech and maple to spring crops, shows that it is the physical condition that determines the fitness of the soils for cultivated crops; for we have only to bear in mind that winter wheat, barley, oats and corn are identical in chemical composition. In both varieties of soil the chemical constituents which are necessary to the growth of beech, maple, oak, poplar and hickory, wheat, barley, corn and potatoes are present, but the physical condition, or mechanical texture of the two is different.

Making Maple Sugar.

The first operation in this work is tapping the trees. This may be done by using a half-inch or three-fourths inch augur bit, boring a hole from one to two inches deep, according to the size of the tree, so inclined as to allow the sap to run out readily. Into the hole a spout is driven, having a small hole through it to allow the sap to run off into the bucket. The spout should be nicely fitted to fill the hole, but should be driven only through the bark of the tree, as it will prevent the flow of sap if driven into the wood within. Soft wood must be used as it is safer against leakage. Directly below this a strong nail is driven, on which the pail or bucket may be hung, or the pail may be set on the ground, though there is more danger of wastage.

As soon as possible after the sap runs it should be evaporated, which is done in kettles or pans prepared for the purpose; and here it should be remembered that the greatest care is necessary to have all the utensils used in the operation perfectly clean and free from taint, without which it is impossible to make good sugar, or an article that possesses the delicious flavor of the maple. Tin pails are best for catching the sap, as they are more easily kept sweet. If wooden buckets are used, they should be well cleaned with scalding water before using. Pans are best for evaporating, and where the business is extensive enough to pay the expense, it may be best to use the patent evaporator; but for a small business a cheap pan, which any one having a little mechanical skill can construct, will answer a very good purpose. It is made of very heavy sheet-iron, turned up six inches at each end, with wooden sides the same height. The iron is closely nailed to the wood, with a strip of cotton cloth dipped in lead paint between, to prevent leaking. It should be seven feet long and two and a half feet wide. An arch is built one and a half feet high, and six inches less in width than pan and level on top, over which the pan is set, the wooden sides resting on the wall are not exposed to the fire. Two handles on each side are necessary, through which poles some six feet long are pushed, to set the pan off the fire, when the syrup is ready to dip. In this fixture there is no danger of burning the syrup to the sides of the pan as when it is set into an arch. A sap holder should be set by the side with faucet feeding directly into the pan while evaporating. The syrup should be strained while warm, through a flannel cloth, and set away to settle at least twelve hours, when it is ready to convert into sugar.

This process requires care and attention, to avoid scorching, which destroys the flavor of the sugar. The most convenient thing for this that I have seen, to be used in a small business, is a pan made of sheet iron, some two feet square and six inches high, to set on the top of a common cooking stove, or a kettle may be used, though with more liability of scorching the sugar. Various articles are used for clarifying to render it white and pure. The most common, and I think the best, are eggs and sweet milk, beat well together and stirred into the syrup when cool; as it warms, it coagulates and rises to the surface, bringing all impurities with it to be skimmed off, which must be nicely done before boiling. Three eggs to one pint of milk is sufficient for thirty pounds of sugar. A moderate and uniform heat should be kept up till the syrup is reduced to sugar, by which time the experienced hand can tell by its boiling, otherwise by testing it. When done, it should be allowed to cool in the pan until crystallization begins to thicken, when it is ready to put into the caking pans. To retain the beautiful flavor and excellence of maple sugar, the strictest care and neatness must be preserved in its manufacture. The article we often meet in the market, dark colored, and mixed with cane sugar, possesses none of the aromatic flavor and beauty of the pure maple. There is no sweet more delicious to the taste, or more highly estimated, than this, in its purity, and the farmer who has preserved his maple grove, with proper facilities, will find a few days' attention to this business as remunerative as other branches of farm labor. — *Rural Home.*

Lime on Land.

R. Crothers, West Chariton, N. Y., writes to the N. Y. Farmers' Club his experience with lime: In the west part of Saratoga County, for the last half century, lime for farming has been quite generally used. The soil of our section is loam, interspersed with coarse sand, and sometimes small portions of clay. We are what might be called small farmers, the amount of land owned by each cultivator varying from 50 to 200 acres, and would average about 100 acres to each farmer; and we generally pursue what is called a mixed husbandry. We have valuable quarries of blue limestone, and several lime-kilns, which hold from 400 to 600 bushels of lime.

I came into possession of the farm that I now occupy in the spring of 1831. It had been rented to various individuals for eighteen years; the soil impoverished by continual ploughing could not raise 500 pounds of hay to the acre. The second year I put on 250 bushels of lime upon two and a-half acres, and upon the other part of the field of two and a-half acres, forty loads of barn-yard manure. On the 15th of September, after the ground was prepared, the quick-lime was scattered upon the top, and also the manure was spread upon the other part of the field, and upon that part of the lot that had been limed the crop was one-fourth greater than upon that part that had been manured. The next year sowed with barley and seeded. On that part of the field limed, the straw grew strong and bright, and in no way injured by worms; the grain was heavy and bright, and one sixth more bushels than upon the other part of the field; and for a number of years the difference was decidedly in favor of the limed part. Soon after I built a lime-kiln upon the farm, and every year up to 1872, have used from two to four hundred bushels of lime.

I have used it in various ways, but I think the correct way is to draw from the kiln in the shell, throw in a pile in the field, and let it remain until it is all slacked, then, after the ground is plowed and harrowed, load into a waggon, and with a shovel scatter as evenly as possible, at the rate of fifty to seventy-five bushels of stone lime to the acre.

While many of my neighbors are complaining of the destruction done by worms I have not lost one bushel of corn, or any other kind of grain, in twenty years by worms. On land that has been well limed the crops will not be disturbed by such troublesome customers as grubs or wire-worms. We consider it very valuable as entering into the straw, keeping it clean, bright color and also heavier grain.

From the closest observations that I have been able to make in the use of lime for forty years, I think the beneficial effects have been seen upon land that has had fifty bushels to the acre from sixteen to eighteen years. It enlivens, changes, and warms up cold land, and is peculiarly well calculated to produce a large crop of clover—and after that crop I never fail in getting a good crop of corn.

I have sold a good article of stone lime at the rate of \$10 per 100 bushels at the kiln; but now, with the increased amount of wages to laborers, it cannot be afforded (burned with wood) at less than \$18 per 100 bushels. But at that rate, taking into account the various beneficial effects, and the great durability of lime in the soil it cannot be doubted but that it is far cheaper than any artificial manures that can be obtained in the market. The most economical way is to take muck and make a compost. Take two parts of good vegetable muck with one part of unslacked lime and throw in a pile, and soon the lime will warm up the muck; then draw and spread just before the last harrowing. The same land that I formerly got only about 600 to 1,000 pounds of hay to the acre from, I now can, on an average, get two tons. I think the increase is owing to the use of lime. — *Mich. Farmer.*

TOP-DRESSING MEADOWS.—In my experience the best results can be obtained by applying the manure on the surface of the meadow as soon as possible after the grass has been cut. If it is cloudy or rainy weather at the time, or soon afterwards, so much the better, as the liquid from the manure will then be carried into the soil, to be taken up by the roots of the grass at the time when they need the stimulus the most, as they receive a severe shock by being laid bare to the action of the sun's rays at a season of the year when the weather is usually the driest. I have noticed that if grass is not cut close to the ground, it will start much sooner. If the manure is applied at the time stated, in a short time it will be covered by a heavy aftermath, furnishing a protection from the heat of autumn, as well as from the frosts of fall and spring. — *W. C. Sullivan County, N. Y.*

Grasses and Forage Plants.

LUCERNE.

Lucerne, if properly cultivated, in a soil and locality well adapted for its proper development, is one of the best and most profitable of green fodder plants; indeed it may be considered supreme among the artificial grasses. Lucerne was well known in the early days of Roman husbandry, and the writers of that period speak of it in terms of the highest encomium. Columella especially praises it and estimates it as the choicest fodder, lasting many years as a crop, and susceptible of being cut down advantageously four, five and even six times each year. He also asserts that it is a crop positively enriching to the soil producing it, exceedingly fattening to depasturing animals, and not unfrequently a valuable remedy in cases of sick beasts. He also tells us that "a measure of land (equal to about three fourth of an imperial acre) was considered amply sufficient for the sustenance of three horses during an entire year." Palladius gives similar testimony, and Pliny, whilst agreeing as to the frequency with which the Lucerne crop may be mown in the course of the season, differs from them in his estimate of its permanency.

Lucerne belongs to the order Leguminosae, and of the genus *Medicago*, of which although there are several species, only two have entered into English cultivation. The most important of these is the *Medicago Sativa*—common Lucerne—an erect growing perennial plant, with roots penetrating to a great depth in suitable soils. The flowers grow in clusters and of a purplish blue color when the plant reaches a height of about three feet, which it does in England in June and July. Under favorable circumstances, the resultant produce is very great, and owing to the perennial habit of the plant, the annual outlay for labor is much reduced. It is considered injudicious to cut the crop during the first year; a good bulky crop may fairly be gathered during the second year, but full maturity is not reached till the third year, and a vigorous growth may be calculated on for some six or seven years more, when the roots become symptomatic of decay, and the plant declines in vigor.

Medicago Lupulina—Yellow Clover or Nonsuch—is frequently, in England, mixed in small quantities with clover and other seeds in laying down artificial grasses. It is a great seed producer, and consequently cheaper than those of any of the clovers, and this fact may possibly account for its popularity with many English farmers, as although its produce is bulky, cattle are no great lovers of it, either in a green or dry state, and prefer it mixed with more palatable varieties of fodder.

Suitable Soils

Lucerne delights in soils of a deep dry nature in which its tap-root can descend without check to the subsoil and draw its requisite supplies of food and moisture. Of this character are vegetable moulds, light and friable loams and even gravels. Alluvial deposits on a sandy substratum are also well adapted for the crop. Clays and strong clay-loams are unsuitable for its proper development, as being too compact in their character to admit of that free penetration of the roots which Lucerne loves to display, not to mention the liability of such soils to an excess of moisture and consequent low temperature, of both of which it has an especial dislike. We must not however be understood as entirely discouraging the cultivation of Lucerne on clay lands, for it has not unfrequently been found that even on them large crops have been obtained; we would merely indicate that the lighter class of soils possesses preferential claims to its successful cultivation. As in the case of all the leguminous plants, Lucerne cannot thrive without a proper supply of lime in the soil, and this will be

fitly illustrated by examining the following analysis of Lucerne ashes by Sprengel:

Potash	14.03
Soda	6.44
Lime	50.57
Magnesia	3.64
Oxide of Iron, Alumina, &c.	0.63
Phosphoric Acid	13.68
Sulphuric Acid	4.32
Chlorine	3.23
Silica	3.46
	100.00

Lucerne can hardly be called a rotation crop, inasmuch as its permanency of habit gives it a distinguishing feature from the other forage crops, and indeed gives it a distinctive value, as it continues to be a productive crop during the entire period of our longest rotation. It is usually grown for its own intrinsic value as a crop yielding luxuriant returns to the grower, receiving peculiar special treatment according to the object for which it is cultivated.

Preparation of the Land.

In preparing the land for the reception of Lucerne it is a matter of urgent primary importance that it be thoroughly cleansed from weeds, whether annual or otherwise, as after the lucerne seed is sown it becomes almost an impossibility to extirpate weeds, which will speedily become formidable rivals to the cultivated plants, and ultimately acquire such a preponderance over them, as to greatly diminish their produce. Where sub-soiling is practicable, the use of the sub-soil plough is strongly recommended in order to afford greater facility for the rapid penetration of the roots of the lucerne plants, which have been discovered at a depth of four feet from the surface. The surface soil should be brought into the finest condition of tilth, so that the seed when sown may not be covered too deeply for successful vegetation. Manure is likewise an indispensable necessity for anything like a return equal to the capabilities in this respect, of lucerne; the proportion to be employed, being of course discretionary with the farmer, according to the nature and condition of the soil, bearing always in mind that much of the subsequent productiveness of the crop is largely dependent upon the liberal treatment received in the earlier stages of its growth. If these be favorable, the plant gets well rooted before the winter sets in, and in the following spring is ready to make a vigorous growth; on the other hand, if the land is not in good tillage heart, the plants will be thin and stunted, making themselves an easy prey to the severity of winter, which if they do survive, will likely render them weak and sickly, and struggling arduously for very existence. No better manure can be applied than ordinary farm-yard dung, which may be applied, either in its rotted or green state, either in autumn or spring, always remembering to make due allowance for the proportions requisite, when applied in these two different conditions, and also, that dung, in its green state is less immediately available as a fertilizer, than when it is well rotted. Gypsum may also very advantageously be used as a manurial application.

Quantity of Seed.

Care is requisite in the selection of seed, and it is most important that it should be well matured and quite fresh; even the second year a considerable percentage refuses to germinate, and renders necessary a larger quantity per acre, to insure a good take. The Dutch and French seeds are considered the best. "The seed is larger in size and paler in color than clover, and should always be plump and of a light appearance. To detect any impurities or adulteration, it is a good plan to take a piece of white paper, moisten the surface, and then lay the seed thinly over it, and carefully examine the sample with a low power magnifying-glass. Any coloring matter that has been used, may then generally be discovered, and the seeds of other plants mixed with it be readily identified." This test is equally applicable to clover seeds. The quantity to be sown per acre, varies according to the mode adopted, for drilling, from seven to ten pounds are sufficient; for broad-casting, about double that quantity, fifteen to twenty pounds are generally used. Drilling, however, is preferable to broad-casting; only half the quantity of seed is required, it is more equally distributed and deposited in the soil, and affords a better opportunity of using the hoe more freely in keeping

down the weeds, especially in the early stages of the growth of the plant. Lucerne is, now-a-days, generally sown by itself as a distinct crop, although it was the old practice to sow it down with a straw crop, and thus obtain a return from the field during the unproductive period of the lucerne crop. Whilst this plan, especially on light dry soils, has the advantage of shading the young plants from the action of the sun, and at the same time preserving the surface in a more moist condition, yet these advantages would be equally shared by the weeds, from which it is so essential that the young plant should be protected. In such cases too, it is strongly advisable to drill the straw crop at wide intervals, say 12 inches. The lucerne seed, which should be lightly covered, germinates very quickly, usually appearing above ground in seven or eight days. Where grown by itself, and drilled, the rows should not be less than 15 to 18 inches apart. This will admit of the ready application of the hoe in simultaneously stirring the soil and eradicating the weeds. It is advisable not to touch the crop the first year, although if the growth has been vigorous, and the plant strong and healthy, it may be cut late in the season, say the end of August or September, taking care not to cut too close to the ground, leaving two or three inches of stem untouched; but, in no case, should it be depastured by stock. The following spring a vigorous growth may reasonably be expected, and three cuttings in the course of the season may be calculated on; it is not prudent to take more the second year. In succeeding years, however, if due attention be paid to the crop, both as regards tillage and manuring, four, five, and even six cuttings, from 12 to 18 inches high, may be obtained in the course of the season, of a rich and succulent herbage of a highly nutritive character, and greatly relished by all descriptions of cattle. That these results may be obtained, the crop must be kept thoroughly well cleaned, and a generous dressing of manure, either farm-yard, or some tested auxiliary fertilizer, in combination with gypsum, to maintain the condition of the field. The crop reaches its maximum productive power about the fifth year, after which the weeds, even with the greatest care, make formidable headway, so that by the seventh or eighth year its value as a forage crop is so materially decreased that it is ploughed up.

Mode of Feeding.

Lucerne should be cut green, and after being exposed for a moderate time to the drying influences of the sun and wind, should be carted to the yards or stables for the cattle or horses. When cut, it should not be left in a heap, as owing to its very succulent nature, the heating process will speedily be set up, and the fodder rendered less palatable to the cattle. Indeed, lucerne has a tendency, under any circumstances, to act as a slight purgative to cattle when first partaken of; it is necessary therefore to give it cautiously at first, increasing the allowance as the animals become used to it. Free access to lucerne might prove disastrous to cattle, as they partake of it with such greediness that "hoven" would almost inevitably follow. If care, however, is exercised, both as to quantity and over-succulence, no great danger need be apprehended. In some countries, lucerne is made into hay, which is much valued for its nutritive qualities. The very greatest care and attention is requisite, not only in the manufacture of lucerne hay, but also in the stacking of it, owing to the presence of an extraordinary amount of moisture in the composition of the plant. Lucerne should be cut before the plant comes into flower; if after, the stalk becomes tough and fibrous. Some persons of skill and experience strongly affirm that lucerne is much superior to clover for soiling milch cows; at any rate, one thing is certain, that it causes a large quantity of milk of good quality, and keeps the cow in good condition and health.

Produce per Acre.

The gross produce per acre of green food when the crop is in full bearing, is from 25 to 30 tons, thus return being readily obtained, where the proper conditions to secure success have been observed. Lucerne is cultivated in Canada and the States to a limited extent, but, we know no reason why its more general cultivation should not be entered into. In the neighborhood of large cities, we imagine it would be a peculiarly easy and profitable crop to raise, and we confidently anticipate an increased attention on the part of farmers to the more extended cultivation of this important and valuable forage crop.

The price of Lucerne is from 30 to 40 cts. per lb., varying according to the season.

In the preparation of this article we have been indebted for much information to the exhaustive essay on the subject, by Mr. John Wilson, professor of agriculture, in the university of Edinburgh, Scotland.

Forest and Shade Trees.

EDITOR—GEO. LESLIE, JR., LESLIEVILLE, NEAR TORONTO.

INTRODUCTORY.

Forest, Shade and Ornamental Trees.

So much of the health, the comfort, the happiness and the prosperity of our people, is dependent upon having a large proportion of the soil occupied with the larger productions of the vegetable kingdom, that the subject of the preservation, protection and planting of forest, shade and ornamental trees is one of the most important that can occupy the attention and serious thoughts of all who, having the well being of our country at heart, directly or indirectly wield an influence over its destiny.

It is a subject worthy alike of the highest, most thoughtful and most careful legislation, as of the united and individual action of every owner or occupier of the soil. Yet in reality how few there are who give this subject more than a mere passing thought; how few who attempt to fathom the wonderful benefits to be derived from an extended practical application of an accurate knowledge of this subject; and how many there are who might, if they would, accomplish much, but allow season after season to slip by in sluggish apathy and indifference more worthy of the dark ages than this age of scientific culture.

Doubtless there are thoughtful minds in our midst who have long recognized the importance of this subject; but their experience and researches have not been sufficiently made manifest to the mass of the people of Canada, to induce anything like such an extended and thoroughly awakened interest in the subject in all its bearings as is desirable, and in fact necessary to preserve the natural beauty of our country. It is with the hope of arousing such public attention as will result in a determined practical effort to further the reforms connected with this subject, that we present the thoughts contained in these columns; with the hope of being able to point out the duties of public men in the premises; and to exhibit the lasting advantage and enjoyment that may be derived from a well directed effort for the preservation of forest and ornamental trees.

In the course of our remarks we propose to touch upon the following important points, namely: Our woods and forests; the importance of this subject as affecting the climate, and consequent thereon our health, comfort, enjoyment, prosperity and refinement; the importance of planting for shelter; how, where and what a farmer may and should plant; how a city resident may ornament his grounds, parks and pleasure grounds; the laying out of lawns for the farmer and the townsman; and what and how to plant generally.

Our Woods and Forests.

The high winds and intense frosts of this winter must have given many of the settlers in the older townships a rude glimpse of the miseries of a country denuded of its forest trees, and caused many a sigh to be heaved to the memory of the warm and sheltering bolts of timber which the hand of man has caused to pass away for ever.

The late newspaper accounts of winter life (or rather death), on "those rich alluvial soils" of the prairies of the far west, must have considerably taken the gloss off those highly colored advertisements of "Lands for sale," in those delightful regions, which have been so industriously circulated everywhere—and caused many who contemplated removal thence, to pause, and perhaps to have a greatly heightened appreciation of "this Canada of ours."

It is admitted with a feeling of the deepest regret by many old settlers that they kept on slashing and burning long after they ought to have halted, and become saving of their timber; and yet in the newer townships this experience is disregarded, and the work of slaughter still goes thoughtlessly on. In the

older settlements, even, the few remaining specimens are being fast swept away for the sake of a little present gain,—a suicidal policy, akin to "killing the goose that lays the golden egg."

This sweeping away of the forests, it must be patent to all, is having an adverse influence upon our climate in opening up vast tracts to the unbroken sweep of bleak and scathing winds, thus producing in winter a much lower and destructive temperature than would otherwise exist.

In proof of this the reader need only consult his own experience of the difference in temperature between the woods and the open plain on a windy day in winter, and however much animal life may feel and recognise this, the effects upon vegetation are even more marked.

Twenty years ago, in the neighborhood of Toronto, peaches, apricots, nectarines and quinces, could be grown anywhere with success, and crops of these fruits were expected with as much certainty as apples. A change however, has taken place; a change in direct ratio with the clearing away of the forests. Now no one thinks of planting trees of these fruits, except perhaps in some warm well sheltered nook. Even where this is the case, and under the most favorable conditions, so uncertain are and have been the returns of late years, that it is the experience of planters, that they would do much better to plant instead some of the staple fruits, sell the product and buy what they require in this line from those who enjoy a superior climate.

We have for years, at times, been treated to scientific and unscientific predictions of a favorable turn taking place in our conditions of climate, and that our winters would greatly moderate. One writer has even gone so far as to say that "it is not beyond the limits of his expectation to live to see the day when roses will bloom in the open air in the gardens of Ontario in April!" But our climate persists in taking a directly opposite course, and making false prophets of the originators of these predictions. To no other cause can be attributed this adverse change so much as to the evil mentioned.

Again, when the woods are wholly, or nearly so, removed, too much of the earth's surface is laid bare to the action of the scorching sun, permitting such an evaporation of moisture as results in the drying up of streams and water courses of more or less magnitude, and in injury to all manner of growing crops. The writer remembers several noted instances of the former of these evils, and has heard wonderment expressed as to the cause; and can point to where not many years ago were the beds of streams of sufficient volume to be useful for mill purposes that are now under cultivation. Moreover the rain-fall is made fitful and uncertain, exposing the country at times to long and desolating droughts, and at others to the action of violent storms. Thus when heavy rains occur little benefit is given to the soil, the water flowing away without permeating it to a sufficient depth to be useful.

Thus far we have treated of the evils arising from the destruction and clearing away of our forests, and an inverse mode of reasoning, will suggest to the reader many of the advantages to be derived from an avoidance of the evil. Of course in districts which are all in woods, settlements must be made, and farms and grounds made fit for cultivation. The question now naturally suggests itself, how much of our land should be kept in wood? To this we would say fully one-third, and this proportion should be fully maintained throughout the length and breadth of our land. We believe that this proportion of land in trees, judiciously distributed, would conduce much toward maintaining a more equable temperature, warmer in winter and cooler in summer, tend to retain moisture and prevent evaporation, and afford generally such a genial hospitable protection as would ensure much larger crops of grass, grain and fruit, than if this proportion were to any extent diminished.

To those in the older settlements who have still portions of the original timber on their estates, and are tempted to do away with it at a present profit, we would iterate a caution to weigh well the foregoing remarks, look to the future and exercise a sparing hand. To settlers in the newer districts whose lands are as yet mostly or wholly in wood, who are cutting and slashing and burning, their first object and care being to get as much of the soil as possible prepared at the earliest possible date for the plough, we would advise the exercise of a little thoughtful judgment and method in what they are doing.

By all means let your method be developed in allowing the timber on steep hillsides, the hollows, and all uncultivable ground to remain untouched; let a good deep "belt" be left upon the north and west sides of every farm, and on the east and south sides, also if it can be done, and a very few years will serve to convince you of the wisdom of it if you feel at all sceptical upon the subject.

Agricultural Chemistry.

Soils.

The crust of the earth is made of rocks of various kinds which, by crumbling away at the surface, produce the different varieties of soils. In order, therefore, to understand the causes which lead to the great difference in the soils of different localities, it will be necessary, in the first place, to examine the composition and character of the rocks from which they have been formed.

The rocks commonly met with may be referred to three classes.

1. Sandstones.
2. Limestones.
3. Granite and gneiss rocks.

The crumbling away of sandstone rocks produces a sandy soil, that of limestones a calcareous soil, and that of granite and gneiss rocks a clay soil.

Sandstone is composed essentially of *Silicic acid* or *Silica*. Silica is known to the chemist as a white powder, very insoluble in water under ordinary circumstances, but which can be made to unite with other substances forming compounds, which are known as *silicates*. Quartz and flints consist essentially of this substance. The so called "Quebec diamonds" consist of nearly pure silicic acid. Sandstones often contain small quantities of other substances. Oxide of iron is a frequent impurity.

Limestone consists of *carbonate of lime*. When they are burnt, they are decomposed, carbonic acid being driven off by the heat and lime left behind. This is the change that takes place in a lime-kiln. Chalk and marble have the same composition as common limestone, consisting essentially of carbonate of lime. When an acid, such as hydrochloric acid, is brought in contact with limestone, the carbonic acid is driven off and escapes as a gas with effervescence, leaving the lime in combination with the acid. By this circumstance of effervescing, on the addition of an acid, limestone may be recognized. Some limestones contain a considerable quantity of carbonate of magnesia. These rocks are called *dolomites* or *dolomitic limestones*.

Granite and gneiss rocks contain quartz, felspar and mica mixed together in various proportions. Quartz consists of silicic acid. It is, when pure, white, but most specimens of quartz are colored by the presence of some impurity. Felspar is silicate of alumina and silicate of lime. Mica is composed of silica, alumina, iron, potash, and magnesia. In addition to these constituents there are generally to be found in granite rocks small quantities of phosphate of lime and of other substances.

When a rock of this nature is acted upon for a long time by the weather the action of the alternations of heat and frost, together with the action of the rain, cause it to crumble away. The felspar is decomposed, and much of the potash washed away, as carbonate of potash, by water containing carbonic acid. The silicate of alumina thus left behind, together with a little free silicic acid constitutes clay. Clay then consists essentially of silicate of alumina. It always contains more or less free silicic acid, sand, lime, oxide of iron, &c., and these give rise to the different kinds of clay.

The kind of soil, then, will depend upon the rock, by the disintegration of which it has originated, and when a soil has been produced from two different kinds of rocks, it will partake of the nature of both. Thus the disintegration of sandstone will produce a pure sand. Felspar, on the other hand will, by crumbling away, give rise to a pure clay, but a mixture of the two will produce a soil containing sand and clay in proportions varying with the proportion that the rocks from which it was produced bore to one another. Such a soil would be called a *sandy loam*.

A soil which contains 80 or 90 per cent of sand is called a *sandy soil*; one that contains 10 to 40 per cent of clay, a *sandy loam*; if from 40 to 70 per cent of clay, a *loamy soil*; from 85 to 95, a *strong clay soil*; and if there is no sand at all it is a *pure clay*.

Soils containing from 5 to 20 per cent of carbonate of lime are called *marls*. If they contain more than this per centage they are called calcareous soils.

Apiary Department.

Exploring Bee-dom.

If the beginner in apiculture has taken our advice, and begun to read up in relation to the nature and habits of the bee, the result will be a great curiosity to verify some of the wonders of the hive by actual inspection. It may be safely affirmed, that if no such desire be felt, there is no call to bee-keeping. You may be cut out for a gardener, an angler, a poultry fancier, or a sheep-raiser; but you are not cut out for a bee-keeper unless reading on the subject fires you with a strong desire to see the inside of a hive.

With a movable frame hive, this curiosity can easily be gratified, and a vast amount learned about these remarkable insects, in a very short space of time. We will suppose that the reader having determined to begin as a bee-keeper, has purchased a colony in such a hive. It is bought in the early spring, when the risks of wintering are over, and brought from a sufficient distance (at least three miles off,) to prevent the bees, from their memory of localities, going back to the old apiary. There stands the newly acquired treasure, in a spot chosen for the season, beneath some not over thickly foliaged shade or fruit tree, where it can have at least partial protection from the fervour of the noonday summer sun. You have watched, first at a respectable distance, and then somewhat nearer, the goings out and comings in of the busy little workers, during those early spring days which were warmer than usual. The only peculiarity about them that you have noticed, has been that quite a number of them on returning to the hive, have their thighs laden with a yellowish or reddish looking substance concerning which you have said to yourself with a sense of inward pleasure, "That's honey." Well, it isn't honey, but it is something just as essential to the well being of the colony, as we shall see presently. Your out-door observations increase the curiosity which has been awakened by your indoor readings. Now for its gratification. But be sure to follow the directions about to be given, whether you can see the wisdom of them or not.

Choose an hour toward mid-day, when the weather is warm and pleasant, and the bees appear to be in rollocking good humor, making the air resound with their musical humming. Put on the close fitting veil and sheep-skin gauntlets, described in a former article. Get smoke of some kind, and gently blow a few puffs in at the entrance of the hive. Hark, and in a few seconds you will hear a peculiar buzzing, which you will by-and-by learn to recognize quite readily. It signals you that the smoke has taken effect. That's enough. Don't over-do it. Bees can be annoyed and angered by an over dose of smoke. Wait a few minutes. The smoke has created a slight panic in the hive, and the bees instinctively fly to their chief treasure the honey, and load themselves with it. In that state, they are indisposed to sting. A bee filled with honey is like an Englishman after dinner, very good natured. You may now proceed to open the hive, doing everything very gently and quietly, for bees are as nervous as people who drink strong green tea thrice a day. The least sudden movement gives them a start, and puts them on the alert. Having taken off the outer cover of the hive you come to the honey board. This is fixed fast with propolis or bee glue. Bees are not loose in their habits. They want every thing strong and solid, and so they gather and prepare a resinous material, which they spread on in a sort of viscid state, but which gets hard like sealing wax, except in the very hottest weather. But it is as brittle as sealing wax, and the point of a knife will usually loosen the honey-board in a moment. Now lift off the honey-board

carefully, and set it by the side of the hive, near the entrance in order that the adhering bees may, if they wish, readily re-enter the hive. At this stage, you will feel rather nervous most likely, especially if the bees should rush out at all, as they sometimes do. But keep quiet, take your time, blow a little smoke across the top of the hive, and down between the frames. This will still them. The frames are glued fast; as was the honey board, and must be loosened in the same way. Be very careful in drawing out the first frame. Make an opening for it by gently pushing the frames on either side. Fix it as a rule not to crush a single bee if it can be avoided. Having thus drawn out a frame from about the centre of the hive, begin to examine it. Of course the bees first attract your attention. Most of them, perhaps all that you see, if it be early in the spring, will be like the one shown in this cut.



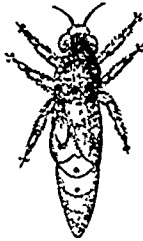
These are the *workers*. They are undeveloped females. On them all the labors of the hive devolve.

Later in the season, you will notice, on opening a hive, a proportion of larger bees. They are portly-looking, aldermanic insects, each with a jolly corporation of his own. There is no difficulty in identifying them. The accompanying engraving shows how they look.



They are "the lazy fathers of the industrious hive." They perform no toils, and lead a life of pleasurable idleness.

If you look sharply, you will perhaps be fortunate enough to find the queen. But she is modest and retiring, prone to hide in little knots of workers, and seems to take pains to elude observation; sometimes, however, she walks forth, with a slow and stately step, and with a sort of majestic air, which proclaims her "every inch a queen." Novices are very apt to mistake some drone more slender than his fellows, for the queen. This cut will aid in her recognition.



Her wings are short, her body long and tapering, and her movements peculiar.

As you proceed with your inspection, you will observe many cells containing a yellowish or reddish substance. This is *pollen*, the food of the young bees. You took it for honey as the workers were carrying it in, but it is not much like honey here in the cells.

It will strike you that the honeycomb is not all of the same size, and on careful observation, you will see that there are two sizes of cells; the larger size is known as drone-comb, and the smaller as worker-comb. The drones are raised in the one, and the workers in the other.

Peering into these cells you will notice little white things coiled up in them. These are the grubs or larva. If you search narrowly, you will see at the bottom of many of the cells, little whitespecks about the shape of rice grains. These are the unhatched eggs. They are all laid by the queen, who is the mother of the entire progeny. It is very interesting to note the egg, the newly-hatched grub, and all the various-sized grubs up to those that look so big and fat that the cells can hardly hold them. You will notice also many cells closed up, "sealed over," as bee-keepers say. These contain the young brood in the last stage of development, and if you watch closely, you will see some of them who are mature eating their way out of prison into that world in which they are to play such an active part.

This is a sufficiently long exploratory tour for the first, in the hitherto (to you), unknown realm of bee-dom. It has, to some extent, satisfied your curiosity. It has proved that you can handle bees without being injured. It has given you an insight into bee-life. It has opened to you a world of wonders, into which you will take many a journey, and if you are a devout student of nature, you will exclaim often, as you behold the revelations of insect art and skill; "Great and marvellous are thy works, Lord God Almighty; IN WISDOM HAST THOU MADE THEM ALL."

U. S. Bee Reports for 1872.

C. Sanders, of Chester, Vt., writes: What few bees 'ived through last winter have done well in this section. I wintered six swarms on their summer stands which came through all right. I like wintering on the summer stands better than housing. I have taken one hundred and ten pounds from one swarm, and one hundred and twenty-five pounds from another, nice box honey, and other swarms have done nearly as well. I use the Langstroth hive.

P. S. Van Rensselaer, of Port Clinton, Ottawa county, Ohio, writes: I am one of the put-off kind of bee-keepers. My bees suffered last winter. I lost ten swarms out of thirty-nine, and three were very weak and the worms took them. I tried to help them, but forgot them too much. I sold four swarms, the balance gave me four hundred and fifty pounds of box honey, four hundred pounds slung, and three sets of the slung frames are full of fall honey, to be used as required in spring.

Wm. Dyer, of Hastings, Minnesota, writes: My bees have done very well this season, taking into account their real condition last spring. I wintered in cellars last winter, putting in seventy-eight swarms and losing twenty, a number of them after I took them out in the spring. The most of my hives were much reduced in bees but had plenty of honey, so that I have not had much of an increase, only twenty-three swarms. From these I have taken in boxes and supers sixteen hundred and fifty (1,650) pounds of honey.

I have kept bees for the last seven years (in this state), and have wintered some every winter in the old box or tall hive, and have always found that the bees wintered with less loss and came out in better condition in the spring. Three years ago I commenced to build a new hive from a suggestion of Solon Robinson's, in his Facts for Farmers, which was to hang the frame so that they would open like the leaves of a book. My object was to get a greater depth of frame believing it to be a fact that when bees make their own selection, they never select a hollow that runs horizontal, but one that stands perpendicular and one that has more height than breath. Taking that as a basis, I constructed a hive with frames fifteen inches deep. The front of the hive opens, and the bottom and back which hold the frames (not forming the main hive) draw out and are supported by the bottom of the hive and back which extends far enough in front to support it, and the frames can then be opened to the right and left or taken off, as they are hung to a hook on the back, and the frames are so made that they never touch together. The hive is something like Mitchell's Buckeye hive, although I had never seen or heard of his hive at the time I got up mine.

I had eighteen of these hives last winter; they were placed along with the other hives in two cellars, and only two of them showed any signs of dysentery, and all came out strong and gave two swarms each. The second swarms were put back and the old stocks gave a yield of honey. The hive is not patented, and any one can have the benefit of it that may wish to try it.

D. D. Palmer, of New Boston, Ill., "Sweet Home," writes: My report for 1872 is as follows:—Forepart of season, very poor; a fair increase. I now have fifty-six hives, forty-six of which gave me honey to the amount of 2,650 pounds, mostly slung honey. My best hive was black, which gave me 205 pounds. "I might have taken more if I had slung oftener." My twenty best gave me 2,000 pounds, an average of 100 pounds each.—*Bee Journal*.

Product of Honey.

J. E. Crane, of Addison County, Vt., brought three tons of honey to the New York market, November 13th. About two tons of this honey was produced by seventy stocks of his own. One stock gave him 135 pounds box honey.

J. R. Stevens Otsego County, N. Y., brought 10,000 pounds of box honey to New York market. He says he has obtained but 150 pounds of box honey from one stock this year, whilst last year he got 200. He does not increase his stock, but when a hive swarms he puts it into a box and immediately removes the combs, cutting out all queen cells, sets the frames into the large hive (32 boxes) and returns the swarm to the hive. They enter the boxes and give up swarming for the season. In his experience bees do not work any better, if even as well, in top boxes as they do in the others.—*Bee-Keepers' Journal*.

Implement of Husbandry.

The Roller.

The principal uses of the roller are to smooth the surface of new meadows &c. in the early part of spring, and to press down grass and other seeds after sowing. On certain soils the use of the roller is most valuable at almost any time; light and especially sandy soils require a certain amount of surface-packing, to prevent the too ready absorption of solar heat, and the equally speedy evaporation of moisture. On heavy clay soils, however, its employment is not so beneficial; in fact, if used on such soils when wet, the result will be injurious, for it will simply form a close crust on the surface, through which neither heat nor air can pass as freely as it should.

The "PIONEER" ROLLER was very early in use in Canada. It has done and is still doing good service in the backwoods. It is made of a single log of wood, dressed, as nearly as possible, to a true cylinder—the greener the wood is, the heavier the roller. A round iron spike of one or one and one-half inches diameter is then driven into the centre of each end, representing the ends of its axis. A frame to which shafts are attached is next placed over the log, and rests upon the spikes which play in its sides, and the implement is complete. To increase the weight, if necessary, the frame may be so constructed that large stones or other weights may be rested upon it both behind and in front of the roller. The principal objection to the single-piece roller is that it scrapes the ground badly in turning.

The DOUBLE-PIECE WOODEN ROLLER is an improvement upon the pioneer in two respects. 1st, It adapts itself more readily to the inequalities of the ground, and, 2nd, it does not scrape the soil so badly in turning.

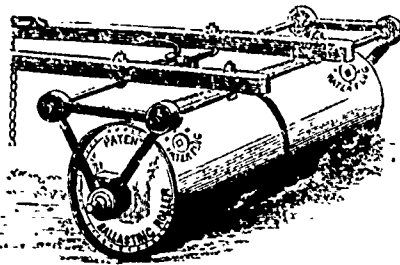
Single and double wooden rollers are also made in another way. The roller itself is made out of solid wood, but of pieces of well dried wood put together after the manner of a barrel, and hooped about with iron bands. Of course the axle in this case is one bar, extending the whole length of the roller, and any required pressure upon the soil is effected by placing heavy weights upon a platform which rests upon the framework, and is elevated a few inches above the roller.

A much better, heavier, and more durable article than any of those enumerated, is the IRON ROLLER which—even though it is considerably more expen-



sive—farmers generally adopt as soon as they are in a position to do so. Like the iron harrow, and all other iron implements as compared with those made of wood, it is impervious to the ravages of the weather, and that fact alone, even if it had no other advantage, should be sufficient to merit much consideration. But it has other advantages. As in the accompanying cut the iron roller is made of cast iron sections, each about one foot in length and about 27 inches diameter. It is mounted on a strong wooden frame, and weighs made as it generally is, of seven sections, 1200lbs. gross weight—the weight is however in proportion to the width of roller and can be increased at pleasure by placing stones upon the platforms. As the sections act independently of one another, the surface of the soil is not damaged or disfigured.

Another excellent iron roller, much used in England, and one which took first premiums at several English exhibitions, is constructed as in the accom-



panying engraving on the water-balkating principle.

The cylinders (two in number) are made hollow, of cast-iron, and their weight or pressure upon the soil may be regulated by filling them wholly or partially with water.

Clod Crushers.

The name of this implement explains its use. On clay soils it is well known that during cultivation, clods are abundantly formed, and that these, in dry weather, become so hard and solid

as to prevent not only the expansion of roots in search of nourishment, but likewise the proper intermixture of manure with the soil, without which much of their strength is lost. It consequently becomes of immense importance that these clods should be pulverized, and to do this, been devised, the simplest form of which is made out of a hollow log and called a "Drag Roller." A tongue, if for two horses, or a pair of shafts, if for one, is fastened into this log, and the implement is dragged not rolled over the ground. Of course the greater the diameter is the less liability there is to have it 'clog' or drag the clods before it. The annexed cut represents one of these one horse drags, and it will be found of great service in working, for instance, between rows of corn on cloddy ground. It, as well as the two horse 'drag' may be made of a half log with the round side downward. Simple as this implement appears, it has been often the means of pulverizing hard clay clods to a

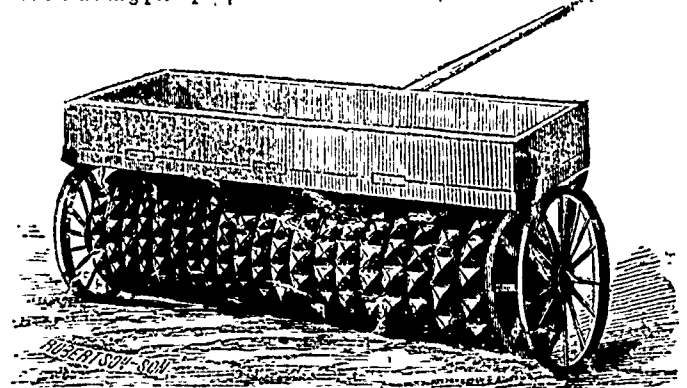


condition almost as mellow as ashes—and of thereby doubling the crops.

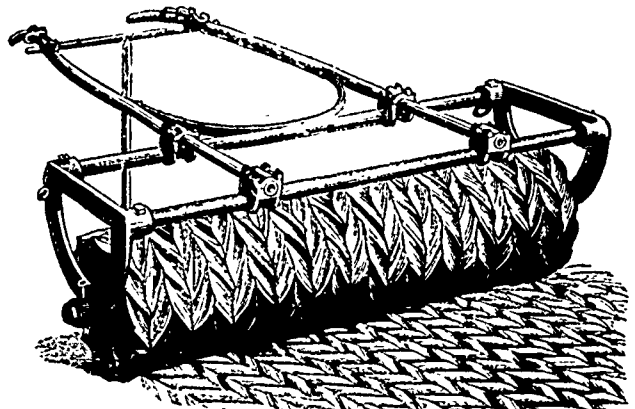
A much better, though of course more costly implement than this, is that known as "Crook's Clod Crusher" and modifications of it, used in many districts of Britain and America. It consists, as in the accompanying illustration of from 20 to 24 circular cast-iron discs, set loosely together upon an axle so as to revolve separately. Their outer circumferences are formed into teeth of various shapes, which cut and grind up the clods as the implement passes over the field. Every alternate disc has likewise a larger hole for the axle, which causes it to rise and fall as it turns over and thus prevents clogging. This implement is used only on very heavy clay soils.

And in every case let it never be forgotten, the clod crusher, of whatever description, is to be used only on dry ground, the drier the soil the greater is the benefit derived. On wet soil it will do more harm than good; because the clods in such a case will neither crush nor pulverize, but simply pack and clog.

The next cut represents SPENCER'S EXCELSIOR ROLL and clod-crusher, the discs of which are arranged as in the former one, to work separately. The advantage claimed for the Excelsior is that in addition to its clod-crushing capacity it affords an equalization



of pressure—particularly in packing the soil in about the roots of plants. The peculiar impression which it leaves on the soil, will be seen from the engraving—the maker claiming that it approaches nearer to the trampling of the sheep than anything else. He also claims that it effectually destroys the wire-worm and



grub; thoroughly pulverizes the clods, and obviates the objection to a row of clover coming immediately upon a row of wheat.

By means of the roller, says Mr. Waring, the following results are obtained:—

1. The soil at the surface is pulverized without the compacting of the lower parts, the area of contact being large.
2. The stones on the land are pressed down so as to be out of the way of the mowing machine.
3. The soil is compacted around seeds after sowing in such a manner as to exclude light and to touch them in every part, both of which are of essential advantage in their germination, and assist in giving them a good start.
4. When the soil is smoothed in this manner, there is less surface exposed for the evaporation of water with its cooling effect.
5. Light sandy lands, by being rolled in the fall, are rendered more compact, and the loosening effects of frequent freezing and thawing are lessened.
6. The earth is compacted about the roots of grass and grain crops early in the spring. The freezing and thawing of winter leave them usually partly uncovered, or surrounded by air spaces. Their best growth requires that these roots be closely pressed by the earth—and this pressure is given by the roller better than in any other way.

Horticulture.

EDITOR—D. W. BEADLE, CORRESPONDING MEMBER OF THE ROYAL HORTICULTURAL SOCIETY, ENGLAND.

THE KITCHEN GARDEN.

Preparing the Ground.

Most of our kitchen gardens are quite small and designed to supply the family only. These are most conveniently tilled by hand, and it is the object of this paper to give some suggestions as to the manner of putting the soil in such gardens in proper condition for receiving the seed. Assuming that all that is requisite in the way of drainage has been attended to in accordance with our previous suggestions, and the garden laid out, the next step will be to dig over the beds.

Beginning at one side of the bed, next to the walk, throw out the earth to the depth of one spit, throwing the soil into the walk. This will leave a small trench open across the bed. Begin now in the bottom of this trench and dig up the subsoil to the depth of the spade, turning it over and breaking it up as loose as possible, yet leaving it at the bottom of the trench. Now turn over another spit of the surface soil, throwing it into the opposite edge of the open trench, and pulverizing it with a stroke of the digging fork. This will form a slope running from the bottom of the trench first opened and rising a little above the previous level of the bed. When this has been done across the bed, a second trench will have been opened, the bottom of which should be dug up and turned over, making it as loose as possible, but the earth thrown down into the bottom of the trench in the same way as before; now throw from the wheel-barrow a good dressing of the compost, prepared as previously directed, upon the side of the slope which was formed by the surface soil, and proceed to cover it by another spit of the surface soil, turned over and broken up. In this way proceed over the bed, breaking up the sub-soil at the bottom of each trench, but not mingling it with the surface soil, and covering each slope of the surface soil with a good dressing of compost, to be in its turn covered with the next spit from the surface.

When the bed has been dug over, a trench will be left open at the end of the bed opposite to the place of beginning. This will be filled with the earth that was taken out of the trench first opened and thrown, for the time being, into the walk, which will need to be taken up in the wheel-barrow, and carried to the opposite side.

In this manner all the beds should be dug over, and the surface soil mingled thoroughly with the compost. No one of these items is unimportant. The breaking up of the sub-soil facilitates drainage, admits of the downward growth of the roots, supplies moisture in time of drouth, and brings to the surface supplies of mineral plant food, very important to vegetable growth.

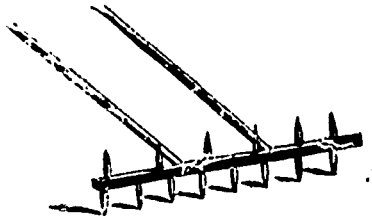
When to Sow Seeds.

Having dug over the beds in this manner, the surface should be raked quite smooth, and all lumps of earth, stones, etc., removed. The soil is now prepared to receive the seed as soon as the proper season for sowing each has arrived. It is desirable to sow the seed shortly after the ground is got in readiness, hence the gardener should prepare first those beds in which he intends to sow his radish, lettuce, peas, spinach, onion, parsnip, carrot and beet seed, for these can be sown as soon as the thermometer indicates during the day an average temperature of 45° in the shade. Afterwards when the temperature has

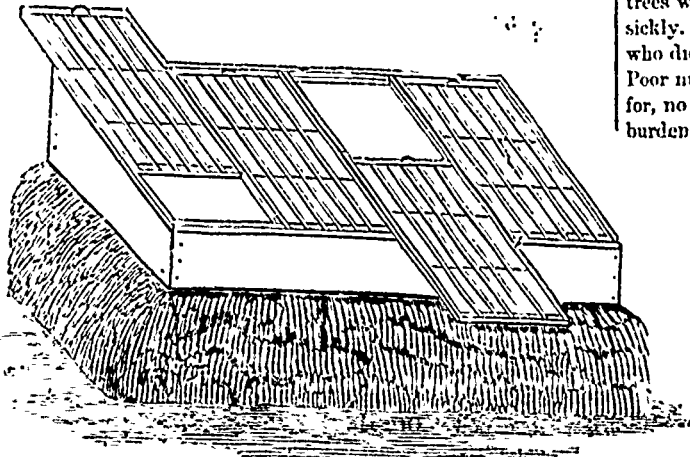
risen to an average of 60° in the shade, he may safely plant beans, corn, melons, squash, and cucumbers.

How to make the Drills.

The usual method of sowing seeds is to scatter them in shallow drills. We give an engraving showing the most convenient form of an implement for making these marks or drills. There are two sets of teeth, one on each side of the main bar, one set twelve inches apart, the other set nine inches apart. It is used by first stretching a line tightly across the bed, then set the outer to it against the line and



draw the marker steadily along the line. Having drawn it once across the bed, the out-side mark will now receive the outer tooth, and the instrument be drawn back to the opposite side of the bed. It will be at once seen that with such an instrument, seeds may be sown in drills either nine or twelve or eighteen or twenty-four inches apart as circumstances require.



The Cold-Frame.

Some vegetables are best grown by starting the seed in close bed or frame, and when the plants have attained the proper size, and the weather has become suitable, transplanting into the garden. This is the plan usually pursued in our climate with the tomato, lima-beans, melons, celery, early cabbage and cauliflower. The accompanying cut will show the form of such a frame at a glance. It is a simple board frame, ten or twelve inches high at the back, and seven or eight in front, having a covering of sashes, which in this way receive sufficient pitch to carry off the rain. This is placed over a bed of rich, finely pulverized, mellow soil in some sheltered spot. By means of the sashes the air is excluded, the heat of the sun retained and the moisture rising from the soil confined. This may be used during the latter part of April, and after keeping the sashes closed for a few days the soil will become warm enough to receive the seed, which may be sown in shallow drills. Care will be needed to keep the young plants supplied with a moderate amount of moisture and an abundance of fresh air, lest the plants become long, lank, weakly things, unfit for the purposes intended. Those not accustomed to the care of plants in frames are very apt to water them too freely and keep them too close. The sashes should be drawn off during the day when the sun shines, in whole or in part, according to the temperature. The object is to keep up a degree of heat during the day, but a few degrees greater than that maintained at night when the sashes are closed, and in this way to shelter the young plants from severe and sudden changes, thus promoting a steady, healthy and robust growth.

THE ORCHARD.

Preparation of the Soil.

It is surprising that so little attention is given to the proper preparation of the soil, for the reception of fruit trees. After what has been said on this subject in previous volumes of the CANADA FARMER, and by every experienced writer on the subject of planting fruit trees, it was to be expected that there would have been a decided reform—our readers need not be startled at the word, a *great reform* in the practice of our planters. To thrust a tree into a hole in a sod, or other hard unpulverized ground, very much as one would set a fence post, has been, and yet is, the common method of planting a tree. Is it any wonder that the trees so frequently die during the first summer after planting? Or if they do chance to keep alive, that their life is a continual struggle, kept up for a few seasons, tree after tree going down in the conflict, until at last the few survivors, with the planter himself, wear a look of dejection and despair.

The writer was once consulted by a neighbor with regard to his young orchard. It did not thrive. The trees had been planted three years. A number of them had died, the remainder put forth a few leaves but made no growth. He said that he believed there must have been something wrong with the trees when he bought them, they must have been sickly. We never saw a disappointed tree planter who did not throw the blame on the nursery man. Poor nursery men, they have smarts enough to answer for, no doubt; quite enough of their own without burdening them with those of the purchaser. We

went with our friend and examined his orchard. We found the soil a strong clay, and the trees standing in grass. It appeared, on inquiry, that the land had been seeded down the year before the trees were planted, that a hole was dug just large enough to get the trees into the ground, and the grass had remained ever since. At our suggestion he prepared a piece of ground, obtained a fresh lot of trees, planted them on it, took care of them after they were planted, and three years after he had a fine,

vigorous young orchard. The difference in the treatment had caused all the difference in the results. Put it down as an axiom in tree-planting, that the labor expended in properly preparing the ground for the reception of the trees will be fully repaid by their health and growth, and that no subsequent attention can compensate fully for the neglect of proper previous preparation.

Taking for granted that the suggestions as to perfect drainage, &c., given in the first number of this volume, have been well considered and duly heeded, the next step will be to prepare the ground by ploughing, and, if need be, by rolling and harrowing, so as to make it mellow. It is as important to young trees that they be planted in soil that has been thoroughly pulverized and made quite mellow, as it is to the grain to be sown on a mellow seed bed, if strong and healthy growth is to be secured and a remunerative crop harvested.

An excellent method of preparing the land for an orchard is to summer fallow it, giving it repeated ploughings and cross ploughings, and if the soil be what may be termed shallow, breaking up the bottom or subsoil thoroughly with the subsoil plough. If the soil abound in clay, so that it is full of lumps, these should be broken down with a heavy roller or clod-crusher. In short the ground should be loosened up, exposed to the influence of the atmosphere, made mellow, light and friable just as for a crop of grain. An intelligent cultivator makes his calculations before hand, and having decided to plant an orchard in a particular field, will cultivate it with reference to what he is going to do. He will first summer-fallow that field, ploughing as deep as the soil will admit,

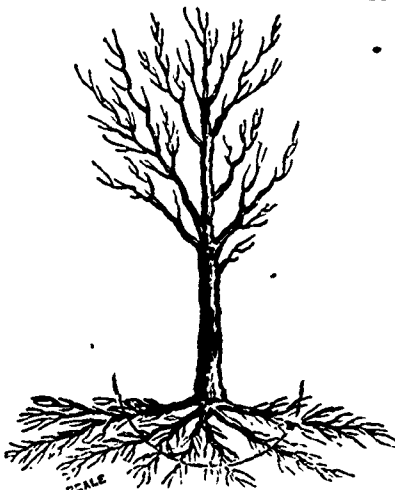
breaking up the subsoil, and manuring it as freely as it will bear. In the autumn he will sow it with grain and in the spring seed it down with clover, the large red clover. After harvest he will encourage the growth of the clover, and the next summer will cut a good mowing for his cattle. After having mowed it, he will allow it to grow undisturbed until about the first of September; then he will turn it under in season to have the sod well rotted before winter sets in. When spring opens, he will pulverize the soil, making it fine and mellow, plant out his trees, and cultivate the space between the trees with potatoes, beans, or some other hood crop. This sort of preparation is the best. The thorough summer-fallowing and sub-soil ploughing have put the ground in good condition for the red clover, the clover roots have penetrated the earth yet deeper than the sub-soil plough, and by their decay prepared the way for the roots of the fruit trees, while the mellow surface soil, in good tilth, is in just the right condition to receive the roots of the young trees and supply them with the food they require.

Selection of Trees.

The waste which marks the present age has seized also upon the planters of trees. They want them large, the larger the better; if they will bear fruit the same season that they are planted out, then they are just right. A tree is valued according to its size, and purchasers stipulate that they shall be so many feet long for a certain price. Nurserymen have conformed to the popular demand, and quote their trees accordingly. This demand for tall trees has compelled nurserymen to grow their young stock, so as to obtain the greatest height in the shortest time. In England, trees are valued according to the number of times they have been transplanted; that is, according to the supply of fine fibrous roots, for each transplanting increases the number of such roots. There they know that the subsequent growth and value of the trees, when removed to the orchard, depends upon the quantity of roots within the circumference, say, of a half-bushel measure. Hence the planter seeks to procure trees having, when dug up, a large supply of roots in proportion to the top, well knowing that having a large supply of roots, he can soon grow the top, but that if the supply of roots be small, he must wait until the tree can form roots before it can make branches.

Nurserymen in America transplant their young trees as seldom as possible, knowing that they will get no more for a tree that has been twice transplanted than for one that has never been transplanted at all, and that each transplanting increases very materially the cost of the tree to them. A large tree that has not been frequently transplanted will make long and strong roots, having their fibres at their extremities.

The accompanying cut will illustrate the appear-



ance of the roots of such a large tree. The fibres, small, thread like roots, are at the extremities of the

main roots. The larger the tree is the stronger will the main roots be, and the farther from the trunk of the tree will be the little fibres. These fibres are the roots that take up moisture and food from the soil for the nourishment and growth of the tree. It will at once be seen that in taking up a large tree, by putting in the spade at the dotted line in the illustration, all the fibrous roots will be left in the soil, and only the main roots, having their fibrous extremities cut off, will remain attached to the tree. The tree being thus deprived of those roots from which it mainly receives its supplies from the soil, must necessarily cease to make branches unless such roots are again formed. This loss the tree will, on being again planted, at once endeavor to repair, and if meanwhile it do not perish, it will in time, longer or shorter, according to circumstances, throw out new fibres and establish anew its connection with the soil.

But if the tree be small the fibrous roots will not be so far removed from the trunk of the tree, nor will the main roots be so large, but the roots will have the appearance indicated in figure 2. If such a tree be dug up by inserting the spade at the place indicated by the line, nearly all the roots will be retained, and a large proportion of them will be the small feeding roots, so important to the growth and health of the tree. Hence it is to the interest of the purchaser to obtain young, healthy trees, from two to not exceeding our years of age.

It may be said that nurserymen might dig large trees more carefully, and so retain the fibrous roots. So they could, and double as they would, if the tree planting public were willing to pay for that care. Now and then there is one who is willing to pay for it, but nurserymen cannot regulate their business to suit the demands of an occasional individual. So long as the bulk of buyers are unwilling to pay for the requisite labor and care needed to secure trees grown and dug in the best manner, nurserymen will give only what is paid for by them. Hence it is necessary for those who value their trees, to buy them of that size and age that is most likely to be supplied with the proper proportion of fibrous roots. If these are smaller than he wishes to plant out in orchard form, he can set them out in rows in nursery form, grow them in this manner for a couple of years and then remove them to the orchard. In this way he can secure what the purchaser in England obtains when he buys twice-transplanted trees, can transplant them whenever he is ready to the orchard and that without the loss of a single tree. This, in this country, is, at present, the true method to pursue, and those who have the forethought and patience to adopt it, will find themselves most amply repaid in the uniform appearance, growth and vigor of their young orchards.

Best Evergreens for Windbreaks.

The best evergreens with which to form windbreaks or screens in Canada are the Norway spruce, white spruce, Austrian pine, and white pine. These are all perfectly hardy and may be easily obtained. The Norway can be supplied in large quantities by all our nurserymen at about one cent for every inch in height. The white spruce and white pine are native trees, and may be obtained from our nurserymen or, if preferred, from the forest.

The Peach Crop Prospect.

A correspondent of the *Western Rural*, says: Having just returned from a trip to southern Illinois, where I examined many peach orchards, I would report that so far as I could see and learn from others, there are no live peach buds as far south as Cobden. The wood of all the peach trees seems injured; of course, of the old trees most. Many of the most experienced orchardists are heading their peach trees back to within a few feet of the trunk. From my own experience in 1864 I think this a wise measure, especially with old trees. Very soon a fine new head will be obtained, and good fruit is the result.

So far as I could see, the apple and other hardy trees were in good condition. Grapes in some localities are certainly injured.

Miscellaneous.

GRAVENSTEIN APPLE.—This variety, commonly used as an autumn apple, is stated by F. R. Elliot, of Cleveland, to keep till February and March in his cellar.

NEW PEARS.—An Indiana correspondent of the *Horticulturist* says that Souvenir du Congrès and Assumption are as good as the Bartlett, a few days earlier, and larger in size. Worthy of trial.

THE SPICED PEAR, according to a correspondent of the *Gardener's Monthly*, at Suspension Bridge, N. Y., is "wonderfully improved" by applying ashes, lime and bones, in autumn, and pruning and thinning out the thick branches early in spring.

TRIUMPH DE JODOIGNE PEAR.—P. Parry informs the *Hort. Home* that this year, which he thinks has been too much neglected of late, will keep in good condition till the end of December, and that on the 11th of last December, he received from J. M. Davis, of Fishkill, N. Y., very fine specimens, with high commendation of their value.

THE GREENHOUSE.

The Stephanotis.

There is no more beautiful greenhouse climber than the stephanotis floribunda. This plant is a comparatively recent introduction into this country, as it is not fifty years since it was first found in Madagascar of which island it is a native. It is usually grown in the stove-house, being particularly fond of a moist heat. The stephanotis belongs to the milkweed family, of which we have quite a number of representatives. Some species of milkweed or asclepias are very handsome, and all are interesting from the curious structure of their flowers. As usually grown in our moist stoves it is trained upon the rafters, but owing to the scanty foliage it seldom makes much show except when in flower. The best way is to train it upon a balloon-frame trellis. To those who do not know the meaning of this term we will say that this trellis is made of wire or pliable sticks of willow, of any desired length, from five to ten in number, according to the size of the plant. These sticks are thrust firmly into the soil at the rim of the pot, and the upper ends tied close together, making a trellis in form somewhat resembling a balloon. A circle of wire in the middle of the trellis will keep the sticks more firmly in place, and tend to preserve a regular shape. When trained in this way the plant can be easily removed to the dwelling-house when in flower. The flowers of the stephanotis are white and very fragrant, and have a waxy look, something like those of the *hoya carnosus*. Large quantities of them are sold in London markets for wedding bouquets. This plant is usually grown only in the greenhouse, but it would undoubtedly do well as a house-plant, if sufficient moisture and heat were supplied. The soil in which it thrives best is a rich loam, with at least one-third peat or leaf-mould and sand. Cuttings root readily in a warm greenhouse. The name stephanotis means "cared crown," and was given for the reason that the staminal crown has auricles or ear-like appendages.—*V. in The Farmer.*

COLD WATER AND FROSTED PLANTS.—The value of cold water on tender plants that have been nipped with frost is not so well known as it ought to be, especially amongst our amateur friends. A few days since I had some nice plants of Chinese Primulas standing on a shelf close to the glass in a cold house. One night the frost got in, and the next morning the leaves were stiff and looked quite black. I at once removed them from the shelf, set them on the floor, commenced to sprinkle them with cold water, and continued the operation every few minutes for nearly half an hour, until the frost was entirely removed, now they are looking as fresh and healthy as those that were not touched with frost.—*The Gardener's Magazine.*

CABBAGE FROM BUDS.—The *Pacific Rural Press* says: "Take a large head of cabbage, strip off the outer leaves, and slip off the buds found at the base of the leaves. Take these buds and simply set them in rich earth. The result will be a fine growth of cabbage plants, with heads larger and sounder than can be raised in the ordinary way."

THE EUMELAN GRAPE.—Peter M. Gideon, a well known cultivator of fruit in Minnesota, states that the Eumelan grape has done well with him for two years, and he finds it the earliest black grape, best for table, first in market, very saleable, great bearer, and with a lardy vine, bearing better than the Concord, and never dropping its berries.

A RARE PLANT.—The *London Garden* describes the *Godwinia gigas*, lately in full flower for the first time in that country. It is an aroid, with a very large leaf and flower. The flower, or more properly, spathe, was nearly 2 feet long and a foot and a half in circumference, on a stem only 18 inches high. It came from Nicaragua, where it is stated the petiole is often 10 feet long.

FUCHSIAS, FROM SEED.—According to the *Rural New Yorker*, may be easily propagated if the seed pods are allowed to remain on the plant until they fall off, laying them aside for a few days until they begin to decay, and then washing from the pulp. Sow in sifted leaf-mould and sand, and eighth of an inch deep, water, and as the plant become larger, change to larger pots. The seedlings usually vary widely from the original.

THE "SMILAX."—Peter Henderson says that this plant (which is the *Mysophyllum asparagoides*, belonging to the natural order *Smilacina*) has become so extensively cultivated within a few years, that green-houses devoted to it in New York and Boston cover a surface of 20,000 feet, and that large numbers besides are grown as window plants. We may add that its resemblance to the myrtle (whence its name) gives it its popularity, and it is well adapted to house culture, flourishing at a temperature of 50° to 75°, and doing well in shade.

THE FRUIT GARDEN.

M. B. Bateham, Secretary of the Ohio Horticultural Society, and residing near the shore of Lake Erie, where the climate is very similar to that of Southern Ontario near the same Lake, gives the following account of the newer varieties of raspberries.

Herstine—thus far hardy and productive, and a strong grower. Not yet sufficiently tested.

Clarke—hardest of Antwerp; rampant grower, and must be cut back in summer. Productive—fruit large and high-flavored.

Parnell—not quite so hardy as the *Clarke* needs a slight protection or shelter.

Belle de Fontenay—yielded, last summer, berries to the end of October.

Philadelphia—most productive on rich soil, berries rather soft, and not high flavored, and its dull color a great defect. It suffered for the first time from the severe winter last year.

Blackcaps.—Doolittle for early, followed by Mammoth Cluster, are the best. Davison's Thornless is not so productive as Doolittle, and is scarcely earlier. Mammoth Cluster would be queen of Blackcaps, if it were not rather soft to ship long distances. The common Miami ships better.

Chapman is a new Blackcap of high promise, and may be identical with Kentucky Mammoth.

Kirtland has succeeded well in nearly all part of the State, but cannot be shipped to distant markets; the same with the *Clarke*.

Mr. Bateham furnishes the *Rural New Yorker* the following actual measurements of the crops on a single bush of several varieties:

	1871.	1872.
Naomi.....	1 1/2 quarts.	1 3/4 quarts.
Frauconia.....	1 1/2 "	1 3/4 "
Belle de Fontenay.....	1 1/2 "	1 3/4 "
Clarke.....	1 1/2 "	1 3/4 "
Parnell.....	1 1/2 "	1 3/4 "
Philadelphia.....	1 1/2 "	1 3/4 "
Surprise d'Automne.....	1 1/2 "	1 3/4 "

THE FLOWER GARDEN.

CHLORIS RADIATA.—A singularly elegant perennial grass is chloris radiata. When blooming the stalks rise to a height of from 10 to 12 inches, having flower scapes up in a slender stem, radiating horizontally from the extremities of each scape, like the concentric spokes of a wheel. This plant is a native of East Indies, though termed a perennial, this grass can only be treated successfully in this country by being sown annually in spring, with such after treatment as half-hardy annuals require. — *The Farmer*.

Dr. Jeannel, a French horticulturist, highly recommends the following:—Nitrate of ammonia, 400 parts; bi-phosphate of ammonia, 200, nitrate of potassa, 250; chloride of ammonium, 50; sulphate of lime, 60; sulphate of iron, 40. These ingredients are pulverized, well mixed, and kept in well closed dry bottles. Sixty-five grains of this mixture are dissolved in one quart of water, and to each plant (in pots or in open ground) is given weekly a dose of from 400 to 1,200 grains. It is best to pour the liquid in the saucers in which the pot is placed.

PERFECT ROSES.—Peter Henderson, (in the *Agriculturist*) in allusion to the fact that all the good qualities of fragrance, beauty, hardiness, and constant blooming, are not to be found in one rose, quotes the words of a German neighbor, who came to him in great irritation, and said, "I have so much trouble with do ladies when dey comes to buy mine rose; dey wants him hardy, dey wants him doubles, dey wants him worldly, dey wants him fragrant, dey wants him nice gowler, dey wants him eberydings in one rose. I have sometimes say to dat ladies: Madam, I never often sees dat ladies dat was beautiful, dat was rich, dat was good tember, dat was youngest, dat was clever, dat was perfection, in one ladies. I sees her much not!"

Arranging Flowers for Bouquets.

It is an art, requiring no small degree of taste and skill to arrange cut flowers so as to form an attractive bouquet for the vase or basket. It is something, too, which comes to one intuitively, and it can hardly be described in words. However, it may be said in general that the more loosely and unconfused flowers are arranged, the better. Crowding is especially to be avoided, and to accomplish this, a good base of green of different varieties is needed to keep the flowers apart. This filling up is a very important part in bouquet making, and the neglect of it is the greatest stumbling-block to the uninitiated. Spikes and drooping flowers, with branches and sprays of delicate green, are of absolute necessity in giving grace and beauty to a vase bouquet. Flowers of similar size, form and color ought never to be placed together. Small flowers should never be massed together. Large flowers, with green leaves or branches, may be used to advantage alone, but a judicious contrast of forms is most effective.

Avoid anything like formality or stiffness. A bright tendril or spray of vine can be used with good effect, if allowed to wander over and around the vase as it will. Certain flowers assort well only in families, and are injured by mixing. Of these are balsams, holly-hocks, sweet peas, etc. The former produce a very pretty effect if placed upon a shallow oval dish upon the centre table. No ornament is so appropriate for the dinner table or mantle as a vase of flowers, and if you expect visitors, by all means cut the finest bouquet your garden will produce, and place it in the room they are to occupy. It will tell of your regard and affectionate thoughtfulness in a more forcible and appropriate manner than you could find words to express. If a small quantity of spirits of camphor is placed in the water contained in the vase, the color and freshness of the flowers will remain for a much longer period. Thus prepared, we have had flowers to keep a week, and at the end looked quite fresh and bright.—*The Maine Farmer*.

Window Flower Boxes.

Given fresh mosses, and leaves, a few trailing creepers and a spike or two of flowers, and the effect must be charming, whether framed in enamel or zinc, in ebony or deal. And for those who are ambitious only of effect, there are a dozen cheap and feasible methods of securing it. The box may be of tin, painted or of common white pine, stained and oiled, with a strip of moulding, or a few hickens and fir cones tacked on by way of ornament. Or, prettier still, it may be turned into a rustic affair by covering it with narrow horizontal lengths of rough-barked wood or virgin cork. Birch boughs or laurel, or both alternating, will answer, halved lengthwise with the saw, and cut into sections to fit the box, the shelf which supports it being edged with the same.

Or a gayly-colored affair may be made with narrow strips of oil-cloth, finished off with wooden moulding at top and bottom, a set pattern being chosen of bright solid colors, like the tiles which are so much in vogue for more expensive arrangements. In either case, unless the window-still is of unusual width, a strong wooden shelf must be adjusted in the recess to support the box and the edge which fronts the room must be ornamented to match.

The one essential of window gardening is sunshine. That secured, the rest is easy. A south window with a shade which can be raised or lowered at pleasure is best. The box provided and the shelf set, begin operations by a bottom layer of broken char-

coal. It is well to have the larger plants in pots, both for convenience of removal and to obviate the need of box drainage, which is a troublesome thing in a parlor. Set the pots on the top of the charcoal, arranging according to fancy, but keep the taller plants in the middle.

Free hardy bloomers, such as fuchsias, some roses, and geraniums—scarlet, rose and white—carnations, Chinese primroses, do better in the house, as a general thing, than tropical ferns and begonias which are so temptingly beautiful in conservatories and perish so quickly out of them. One or two foliage plants will also be pretty, and two or three German and English ivies. Fill in around the pots with light friable soil, one-fifth sand, and smooth the top over so as to cover the pots. Into the interstices you may tuck smaller plants—inignonette, lobelia, cernatium, sweet alyseum, jonquil bulbs, ivy, geranium, moneywort. There should be an Americ a creeper to arch the window.

Last of all cover the surface with mosses fresh from the woods, amid the roots of which will be tangled all sorts of sweet wild things. Water well, and sprinkle the surface every day with a fine rose or whisk broom. Later in the season, as some plant grows yellow or dull, you can lift it out and carefully insert a new one—a tall spiked heath, or a baby cactus; and the sudden brightening of the whole, by virtue of the addition, will startle you into fresh pleasure, like the lovely surprises of the spring. The water used for the plants should be tempered slightly when the weather is very cold.—*Et.*

Measuring the Height of Trees.

In his tale of "Monsieur Violet," Captain Marryatt tells us, as an instance of the great aptitude for applying simple rules possessed by the Shoshone Indians, that when they desire to measure the height of a tree at any time when its shadow was cast on the ground, they used to place a stick of a given length into the ground, and then calculating the difference between the length of its shadow and its actual height, and applying the same to the shadow of the tree, they ascertained its correct height, thus unknowingly working out a sum in the rule of three. Any person, however ill-informed, might easily get at the exact height of a tree when the sun shines, or during bright moonlight, by marking two lines on the ground three feet apart, and then placing in the ground on the line nearest to the sun a stick that shall stand exactly three feet out of the soil. When the ends of the shadow of the stick exactly touches the further line then also the shadow of the tree will be exactly in length the same measurement as its height. Of course in such a case the sun will be at an exact angle of 45°. Measurements of this character could be best effected in the summer, when the sun is powerful, has reached to a good height in the heavens, and when the trees are clothed with living green so as to cast a dense shadow. To many to whom this idea might not have occurred, it might be made annually a matter of interest, thus on warm summer days to take the height of prominent trees, and so to compare notes of growth from year to year.

Awful Prediction Concerning the Vintage in France.

A learned Theban named Louis Barrault has startled the French wine-growers by his prophecies respecting the failure of the vintage from the frost that may be expected in the approaching spring. He commences his prediction by saying:—"According to the observations made by me during the course of a long period, and the experience that has never deceived me for more than seventy years, this is what will happen in the spring of 1873. In the first place, the fructification of the vine will be exceedingly scanty and meagre. Secondly, the vines will be frozen in the spring, in the same manner that they were frozen last year, and even more extensively and generally. The summits of the hills and the vineyards, with an eastern and southern aspect, will form a partial exception, and suffer only in the lower half, whilst those looking to the north and west will be most injured by the frost, the result being a very short crop of mediocre quality. Last year I predicted that the vines would suffer everywhere, on the heights as well as in the valleys, and on the level ground of the plains. My prediction has been amply verified; for they were frozen in whole districts in the month of March, because February had been mild, and caused the sap to rise prematurely, so that they could not escape injury from the spring frosts when they began to shoot, especially in the low-lying vineyards. Therefore I advise the proprietors of vineyards to take such timely measures for their protection as they may have at their command."

Soiling.

(To the Editor of the CANADA FARMER.)

SIR,—Your article on the subject of soiling (Feb. 15) is opportune. The advantages of a good system of soiling are too obvious to need consideration; and our wisest course is to consider at once how the difficulties incident to such a change may be best and soonest overcome. In my case it is chiefly the question how to insure cleanliness, and the preservation of the manure; for I am unable to acquiesce in your suggestion to "feed with cut food in a yard or in a bush," which could only be done at the cost of cleanliness, or with loss of the manure, more than half of the advantage being thus sacrificed. To spend the time and labor necessary for producing and feeding these bulky crops would leave very unsatisfactory results, with the manure wasting in the bush, or with the cattle filthy with the dung of a yard.

The cattle must be tied up, either in the ordinary closed sheds of the yard, which would require much alteration to keep them warm in winter and cool in summer, or in sheds built specially for the latter purpose. There would, however, still remain the question of cleanliness, which can be only imperfectly secured without litter. The area for wheat and barley, which, upon well conducted farms, is now necessarily comparatively small, may perhaps be somewhat extended as the land becomes richer, and an increase in the growth and quantity of straw would be a result; but how could the quantity be doubled, so as to cover the demands of a larger number of live stock, both in winter and in summer, for litter? A plank floor without litter (an uncomfortable and dirty arrangement), seems to be the only resource for summer.

I should be very sorry to appear to wish to set up obstacles to a project so full of promise, for it seems, looking closely into it, worthy of all our energies. But its complete realization would create a change of prospect scarcely dreamed of in the philosophy of those who have not examined its possible results.

My only steps in the direction of soiling have hitherto been to fold sheep on the land upon green crops, and to grow 4 or 5 acres of fodder corn as an equivalent for full pasturage. Even these are worth doing, and they show me how much better they might both be done on a larger and complete scale.

In England sheep soiling is not now, I believe, limited to turnips, but is being extended to summer green crops. I am persuaded that in this department there is much to be accomplished here, a fair balance being held between cattle and sheep. Mr. Mechi mentions the statement of a farmer, that his yearly produce for sale is 220 pounds of flesh for every acre of his farm.

Yours faithfully,

DANIEL D. SLADE.

Oshawa, March 21, 1873.

How to Lay Out New Townships.

(To the Editor of THE CANADA FARMER.)

DEAR SIR.—Farmers are beginning to learn the value of trees. We are told that trees increase the rain fall, and many instances are given where the destruction of the neighboring forest has changed a fruitful land into a barren wilderness. Trees afford protection from the cold and noxious winds. The early settlers, in their small clearances, surrounded by bush, could raise better melons in the open air than we can under glass. They raised better crops of every kind, the fertility of the soil being equal. Where now are our level winter roads? Gone with the bush. A storm is king. One million of dollars would not compensate the Canadian farmer for the damage done by drifts on roads and wheat-fields left bare of snow.

In the case of unsurveyed townships, it appears to all, the remedy is simply let the government reserve for ever a belt of bush land from two to three acres in width round every 1,000 acres. The full grown timber, when it becomes valuable, might be carefully cut, from year to year, and sold for the benefit of the schools of the Township.

Farmers in general build on the concession, consequently, if they want wood or grain from the rear of the farm, it involves a trip of two miles. I would suggest, as an improvement, that the concession line should run across the centre of the lot; this would give the farmer fifty acres on each side of the line, and would save him one mile. Whenever he had occasion to visit the rear of his farm. In townships where the Government still own land they might be petitioned to reserve a certain number of lots, and on roads where the snow drifts down, township councils should see that cedar hedges were planted.

I am, &c.,

R. L.

The Canada Farmer.

TORONTO, CANADA, MARCH 15, 1873.

The Soiling System.

We publish with much pleasure the letter of Mr. Slade on this subject which appears in another column and to which we direct the attention of our readers. It will be seen that Mr. Slade has tried the soiling system to a certain extent. He grows 4 or 5 acres of green corn to make up for deficient pasturage in the heat of summer; and he folds sheep on green crops in the field. And his verdict upon the system, from these practical tests, is that "its advantages are too obvious to need consideration,"—the "project is full of promise,"—"worthy of all our energies,"—and "its complete realization would create a change of prospect scarcely dreamed of in the philosophy of those who have not examined its possible results."

We heartily thank Mr. Slade for hastening to send us this certificate of his experience—and we hope that many more of our readers who have tested the soiling system, will follow his example, and give us their suggestions upon it, whether favorable or otherwise. Statements by practical men of practical results, will go further to get this great reform generally adopted than pages of persuasive argument; and we are satisfied the system is so sound, so practical, so capable of modification, and so profitable when, that the more critically it is discussed, the better will it appear.

Mr. Slade objects to our suggestion that farmers who feel afraid that their cattle would be cramped and injured by confinement, can feed in summer with "cut food in a yard or bush," and he does so because he thinks this could only be done at the cost of cleanliness, or the loss of manure. As to cleanliness—that would depend entirely on the extent of the yard or bush, but in regard to the loss of manure, we entirely agree with Mr. Slade—and our suggestion was only made for the half-hearted soiler; firmly believing that he who once enters on the right path, will follow it on to the end.

There are fortunately various degrees of modification of the soiling system, any of which may be profitably adopted (in comparison with pasturing) by those who desire to test its merits before going thoroughly into it.

1st. You may continue to tread down the grass on your pasture lands, and merely raise green corn to tide over the weeks when the pastures are burned bare. This will benefit your cattle.

2nd. You may grow one acre of green rye, one acre of peas, oats and tares mixed, and one acre of clover, for every 10 or 12 head of horned cattle—which on fair land, well manured, will carry them safely over until hay is cut; and then you can commence treading down the pasture grass. The rye, peas, oats, tares and clover on this plan may either be fed to the cattle in a yard or bush; or it may be fed in the stable. If fed in a yard or bush, this plan will benefit your cattle and greatly increase your hay for the coming winter; but if fed in the stable, it will benefit your cattle, save the hay, and give you a great pile of first-class manure.

3rd. You may grow, 1st, green rye; 2nd, peas, oats and tares; 3rd, clover; and 4th, Indian corn, so as to provide in regular succession, full supplies of green fodder for all your stock, from the first opening of spring until winter feeding commences. You can feed in the yard or bush—or you can feed in the stables. If in the former, the cattle will be well fed, and all the grass lands will be mowed for hay once, or twice if you so choose; but if in the latter, the cattle will be thoroughly well cared for, the supply of hay for winter will be abundant and the manure-heap will be enormous.

4th. You may select any one of the foregoing plans, and modify it by keeping the cattle, in cool weather, all night in the stables and all day in the yard or bush; and in hot weather, all day in the stables and all night in the yard or bush.

5th. Or better than any other mode, in our judgment formed from practical experiment—you can have your stables built with double rows of loose boxes, a feeding passage up the centre, and a door to each box into an open yard along the side of the stable, where the cattle can be turned out in good weather for two or three hours daily, with plenty of fodder in racks for them to pick, and full supplies of pure clear water.

There is but one obstacle in the way of adopting the fifth of these plans; and it is the one on which Mr. Slade puts his hand—the difficulty of providing bedding sufficient to keep the cattle in thorough cleanliness all the year round. One ton of straw may be made to bed a full grown cow or steer for a year, but to do it as it should be done, a ton and a half are required. No doubt to provide this large quantity of straw is a difficulty; but it is by no means insurmountable—especially when we consider the vast supplies of manure obtained from the soiling system, and the large grain crops that can consequently be grown. Of course, as Mr. Slade suggests, we have the resort of sparrow floors, but we agree with him that bare boards are an extreme resort. Where saw-dust can be had or tan-bark, there is no difficulty; and when sand can be had on the farm for under bedding, it is greatly lessened. But the most natural and profitable remedy available to us in Canada is to pile the manure on the fields and grow large crops of rye. We have never seen an acre of rye straw tested by the scales; but grown under all the advantages of good soil, good culture and heavy manuring, the crop of straw as well as of grain, is sure and very large. We should say that a good crop of rye-straw must weigh about two and a half tons.

But, in truth no obstacle can ultimately stand in the way of the soiling system. Its advantages are palpably so great that be the drawbacks what they may, a way will be found to overcome them. We are all yet at the mere threshold of practical enquiry as to the best mode of prosecuting the system. We know that the thing is theoretically admirable; we know that all who have tried it, advocate it heartily; we all feel that if there is no great drawback yet to be disclosed, everybody should go in for it; but we hesitate to move until more is known. What is wanted is a thorough test. Who then will volunteer to solve this grand question? How many farmers in Canada will agree to plant this spring, one acre of oats, one acre of oats and tares; one acre of oats, tares and peas; one acre of clover; and one acre of western corn—all specially grown for green fodder, and keep a record of the mode of tillage, the weight of each crop, and the number of days sustenance got for a full-grown animal from each acre? Can we get twenty good men and true, who will do this thing for the benefit of their country?

Short-horns.

Mr. Thornton's *Short-horn Circular* for the quarter ending, December 31, has notices of the prominent sales of the coming season. They are not so important as they were last year, yet there are promises of several draft sales of great merit, and of some good herds of serviceable cattle to be dispersed, though not at present any rival announced to the great scrambles of 1872. Mr. Cheney's draft sale in July, has very fashionable blood to offer, and will no doubt be largely attended. The first sale will be a draft of some young bulls and heifers largely inheriting Dooth blood, at Mr. Bolton's, The Island, Wexford; this will be March 4; and will be followed, March, 11, by a similar one, Mr. Crabbie's, Ardfer; and in the next week by the dispersion of the late Lord

Southampton's herd, and a selection from Mr. Faulkner's. Beside these, nine high-class sales are announced, in addition to the show and collection at Bingley Hall.

Farming as an Occupation.

"Mr Smith has sold his farm." Indeed, why? "Oh, his two sons have left him, refusing to follow the occupation of a farmer." Such is the announcement one hears, ever-and-again, and most frequently from quarters where competence and comfort, if not considerable wealth, have been achieved by the father. Why should this be? Agriculture, as it is the original and natural, so also is it one of the highest and most independent occupations a man can follow. In England, Scotland and Ireland, it is the most aristocratic of pursuits. Princes, lords, and "first commoners," are not only among the most prominent of British practical farmers, but constantly contribute essays, letters, and speeches in promotion of the agricultural cause. The late Prince Consort's farm at Windsor, is a model of first-class husbandry in its various branches, and one it would be profitable for many here in Canada to imitate, even at a far-away distance. But in Canada the observation is constantly heard from farmers' sons, that farming is not a "genteel" occupation. It is a great mistake to suppose that it is the particular occupation of a man that makes him either of good manners or worthy of respect. We all know men in every position of life who by their uprightness of character and ability in their particular pursuit, dignify their occupation and win respect and esteem from all around them. No doubt farming in Canada, as elsewhere, is a laborious life, and demands from the man who aspires to great success, zeal and vigilance, from January to December; and perhaps it is just from the necessity for this toil and vigilance, that farming becomes distasteful to so many young men. But let it never be forgotten that constant industry and perseverance are quite as necessary to success in every other pursuit as in farming; and the chances of failure in the battle of life infinitely greater. Brain work is vastly more toilsome, more wearing to body and mind than physical labor. It seems very easy for the judge to sit on the bench hearing evidence and then deciding—but it is perhaps the most laborious of tasks when conscientiously performed. Every word uttered by the numerous witnesses and counsel must be noted and remembered, and weighed accurately—the mind is kept on the stretch for hours—every point of the law must be recalled before the decision is given—and when the court rises, the judge gladly seeks his home exhausted in mind and body. And so it is with the merchant, and tradesman, and master mechanic, and the rest of the human family. Toil is the lot of all humanity; and the happy lot, for the longer one lives the more strongly he feels, that the happiest life is that in which there has been constant, useful, remunerative, daily occupation. No more pitiable object can be found in Canada than the man who has no regular occupation, and walks about seeking how he can kill time. He may have as much money as he likes—he is a burden to himself,—and in nine cases out of ten, to all around him.

Agriculture as an occupation, is healthful, regular, independent, and far more remunerative, taking the average of those who follow it, than any other calling. Look all over the western peninsula of Canada, that but thirty years ago was a dense forest, and tell us where in all the world you can find a body of men of one occupation who have raised themselves in that short space, from nothing, to such comfort, and prosperity, and thorough independence as have the 100,000 farmers, who sit there now under their own vine and fig tree reaping the fruits of their early toil.

We readily admit that careless, sluggardly, discontented farming is a hard life; but the sluggard

will have that whatever he follows or wherever he goes. Agriculture rightly pursued furnishes constant, pleasant, elevating, employment for the mind as well as the body. The study and management of the soil, of the atmosphere, of plants, of fruits, of flowers, of cattle, of birds, of insects, are all of them directly connected with farming, contributory to success in its pursuit and most enjoyable. Moreover a thorough knowledge of agriculture, scientific and practical—that knowledge which is gained by perseverance, industry, enthusiasm and ambition—not only leads direct to wealth in Canada, but opens the door to the highest positions and the highest usefulness to his country, that a young Canadian can aspire to. Agriculture is the basis of our whole national fabric; and who would not rather be the foremost farmer in Canada—leading the van in all useful improvements, striving to elevate the system of agriculture, and rousing all around him to new life and progress, and success—than be the richest man or the highest official in the land?

One word to farmers and farmers' wives. With all the admitted folly of the young fellows in being carried away by the delusive seductions of town life, might not something be done to make home more attractive? Might not the surroundings of daily life, the internal economy and outward adornment of the homestead, be in some things improved? Might not the hours of labor be advantageously all round somewhat shortened? Might not the juveniles have fixed remuneration for their labor and some incidental interest in the success of their work? Might they not be encouraged to have specialties of their own, such as fine breeds of the various minor domestic animals and fowls? Might not pleasant evenings be culled out oftener, with friendly visitors around the tea-table, and books, music, magazines and fun to fill up the happy night? We know well that in thousands of farm-houses throughout Canada, all this and more is done now, and done well,—but is there not yet room for advancement on ten thousand farms?

Horse Supply in England.

A curious debate has just occurred in the House of Lords on the apprehended short supply and falling off in quality of horses in Great Britain. Lord Roseberry brought up the subject, and stated that horses were becoming scarcer and dearer, whilst in the opinion of competent judges they were also becoming less fit for the services required of them. They went earlier into hard, fast work, and were in consequence more quickly used up. They are exported in large numbers, 1741 having been thus lost during 1872; whilst during the last fifteen years 60,000 were estimated to have been sold to foreign markets, about 14,000 of which went to Germany alone. As a result of this continual drain fully one-half the horses in London were now required to be imported from Germany. More than one-half the cattle purchased for the autumn military manœuvres came from the continent, causing an average loss of £10 stg. when sold after their three weeks' campaign. In the event of war Lord Roseberry computed that 8500 horses would be required for the artillery and cavalry forces; but he was assured that even at double the present regulation price, 3000 horses could not be obtained in three months. The horse, said his lordship, was the adjunct of commerce, the implement of agriculture, and the engine of war; and it was a serious thing that England should be losing its position as a horse-breeding country, and should be dependent for its supply on foreign nations.

Lord Portsmouth, who had been a master of hounds for 23 years, bore strong testimony to "the extraordinary scarcity of horses."

Mr. Chaplin held very similar language. In the district of Clydesdale hardly any horses were bred now in comparison with what used to be, and it was

moderate to say prices had doubled. Dealers from all parts of the country asserted that there were more horses left unsold after a fair, some years ago, than are offered for sale at the beginning now; and the French agent who travelled through the country in 1872 writes that nine years ago five horses were to be found for sale for every one in Great Britain at present. This is the burden of all the agricultural societies in the country:—"Our breeders have been tempted to sell their best horses for transportation. There is a lamentable want of sound, strong, thorough-bred stallions in the country. The Cleveland mares, from which have usually descended our best coach horses, and from whose daughters, by thorough-bred horses, and again crossed by blood, have sprung all our best hunters, are nearly extinct; in fact, the foreigners have got them all." The carriage horses are bought from the foreigner. The price within a few years has risen 70 per cent., and there is no probability of a lower figure being reached, as when farmers can get 45s for a lamb they are not likely to speculate in breeding horses.

Earl Granville accounted for the rise in the price of horses by the increase of wealth and luxurious living. He said he preferred the strong, sinewy animals that drew such carriages as those of the Duke of Richmond, to the handsome cart-horses that drew his great grand-father's coach at the rate of five miles an hour. But side by side with those despised cart-horses were the roadsters who did their ten miles an hour with the regularity of clock work; and it should be remembered that without the "cart-horses" there would not have been the foundation for the production of the present beautiful breed of horses. But breeding upwards has been so much the rule that, while horses are models of shape and full of spirit, they are wanting in substance, and brood mares of the old stout, enduring type are nowhere to be found.

In Canada we have made great progress in the breeding of horses, and in no country in the world could animals be found combining so happily speed, and stay, and endurance. It is impossible to drive along a country road without seeing one span of horses after another pass which would be equal to any purpose for which a horse is required, short of racing against thorough-breds. There will happily be no temptation with us to fall into the mistakes which have been committed in England. On the contrary, it may be worth our while to consider whether we could not profitably export horses to Europe. There is a great demand for the very sort of animals we could supply. Italy goes to England for horses, and it would be nearly as cheap to send a horse from Toronto to Liverpool as from Hull to Civita Vecchia.

Tenant Farmers in Parliament.

The election of Mr. James W. Barclay, of Aberdeen, as M. P. for Forfarshire, Scotland, adds another to the list of tenant farmers who have managed to secure an entrance to the first legislative body in the world. His opponent, Sir James Ramsay, was like himself, a liberal, and a landlord of much local influence, but not so pronounced on the questions of hypothec and the game laws as Mr. Barclay, hence the preference of the farmers for the latter gentleman. Mr. Barclay recently made his maiden speech in the House of Commons, on the motion for a select committee to enquire into the working of the Contagious Diseases (Animals) Act, and was much applauded by both sides of the House for the practical sagacity of the views he enunciated. He showed very clearly that in Aberdeenshire, the system of slaughtering animals laboring under pleuro-pneumonia had been eminently successful in almost exterminating the disease. He stated that the total value of cattle and sheep of England and Scotland, amounted to at least £115,000,000, or probably double the value of the registered shipping of the United Kingdom.

This stock supplies annually, food to the value of £45,000,000. The value of the imports of foreign cattle, Mr. Barclay estimates at only one eighth of the home supply, or something under 12 per cent. of the whole production. He also estimated that an animal attacked even by the foot-and-mouth disease loses nearly 10 per cent. of its value.

Miscellaneous.

How to Pluck Poultry.

That farmer whose poultry is not troubled with the gapes, that has not been visited with the chicken cholera, knows what it is to prepare forty or fifty fowls for market, since the practice of scalding has been vetoed by the buyers. I have known persons on market day to go out and kill a dozen or fifteen at a time, and bring them into a room where there would be half a dozen women and boys pulling a few feathers at a time, between thumb and forefinger to prevent taring them. Now, for the benefit of such, I give our plan.—Hang the fowl by the feet by a small cord; then with a small knife give one cut across the upper jaw, opposite the corners of the mouth; after the blood has stopped running a stream, place the point of the knife in the groove in the upper part of the mouth, run the blade up into the back part of the throat, which will cause a quivering and tighten of the muscles, now say out time, for every feather you list as if by magic, and there is no danger of tearing the most tender parts, before he attempts to flap, you can have him as bare as the day he came out of the egg. The wise ones may discuss the reason—Only know the effects.—*Can. N. Y. Tribune.*

Sound Ideas on Farming.

The following views on farming were thrown out in a lecture at Baltimore, and they so entirely covered the ground of successful culture, that we give them a place for the benefit of our readers:

1. That the area of cultivation should be within the limits of the capital and labor employed, or in other words, that an impoverished land should not be cultivated more land than he can manure with manure and fertilizers, be it one acre or twenty.
2. That there should be a law compelling every man to prevent his stock from deteriorating on his neighbors' fields.
3. That green soil is more economical than horse pasture.
4. That deep tillage is essential to good farming.
5. That the manure heap is the farmer's bank, and that everything should be sold that will enlarge it, and increase at the same time its fertilizing properties.
6. That no farmer or planter should depend upon one staple alone, but should seek to secure himself against serious loss in bad seasons by diversity in products.—*Baltimore's Cult.*

The Brain During Sleep.

The experiment is made in this manner: A part of the bony covering of an animal's skull is carefully removed, and the brain laid bare, so as to study the circulation at the surface of the vessels. Then the ether form is administered to produce insensibility. In the first exciting stage of the action of the chloroform, the brain is observed to grow congested and to lap over at the edges; but as soon as the state of anæsthetic sleep is reached, the substance of the brain sinks in and grows paler, presenting a languid movement of capillary circulation, which lasts as long as the state of sleep or cerebral rest continues. For the study of the brain in natural life, a circular trepan is made on a dog's head, and the piece of bone removed is replaced by a watch-glass carefully adjusted to the exact opening so as to prevent the irritating action of the air. The animal subjected to the operation survives it; and observations on their brain through this sort of window, while awake and when asleep, prove that when the dog awakes the brain is always paler, and that a fresh afflux of blood is regularly noticed on his awaking, when the functions of the brain resume their activity. Facts analogous to those observed in animals have been studied directly in the human brain. Upon a person injured by a frightful railroad accident, the effect of a considerable loss of brain-substance was examined. The brain was visible over a surface of three by six inches. The patient suffered frequent and severe attacks of epilepsy and coma, during which the brain invariably expanded. Sleep succeeded these attacks, and the cerebral hernia gradually subsided. When the patient awoke, the brain again projected and rose to the level of the surface of the external bony table. In the case of another person, injured in consequence of a fracture of the skull, the cerebral circulation was studied during the administration of anaesthetics. With the first inhalations, the surface of the brain became brassy and filled with blood; the flow of

blood and throbbing of the brain increased, and then, at the instant of sleep, its surface subsided by degrees below the opening, while at the same time growing relatively pale and bloodless. Briefly, then, the brain is governed by the common law that controls blood-circulation in all the organs. By virtue of this law, when the organs are at rest and their action suspended, the circulation in them grows languid; and it increases, on the contrary, as soon as activity is resumed.—*Claude Bernard.*

About Wool.

Hon. T. C. Peters who is now in the United States Custom House at New York city, writes to the *Rural Home* about sheep and wool:

I met a member of a leading wool house to-day, and he said to me, "why don't your western New York farmers change their sheep husbandry? We have large consignments of their best Merino wool, which I am holding at 65c, and can get no offer, and yet I am selling English-bleed (good combing) at 85c. There is an active demand, and I could sell all that could be sent to us at that or at better prices." In a wool circular from a Liverpool wool house received lately, I read, "the supply of combing wool will be excellent, but high prices are expected, as the requirements of the trade are known to be large." The demand for cheap mutton food at all the consuming centres is so constantly increasing that a good mutton sheep is in demand at mounting prices, especially for early lambs or well fed sheep in the late winter or early spring, while the difference in price of wool, is in favor of coarser or medium grades. The demand for fine wool sheep decreases as the population of the country increases. Those farmers will be wise who govern their flocks accordingly.—*this Farmer.*

Profits of Sheep Farming.

For profit to the small farmer who farms high and pays every personal attention to his stock, there is nothing likely to prove so remunerative as sheep bred with the object of furnishing mutton to easily accessible markets. Meat is now at a high price, and likely to remain so for some years to come; and with the great increase in the tendency to breed sheep of the mutton type, it is also observable that mutton of a superior quality to what was formerly obtained from fine-wooled sheep is becoming better known and appreciated as wholesome food, and is at a fast driving even the farmers themselves to abandon pork as a diet. No class of stock that is kept on the farm can be made more profitable, by judicious management, than sheep. Unlike other stock, they give a triple return. First they yield fleeces of wool that always find a ready market; second, if of the mutton type, their carcasses come early to maturity, and can readily be sold to the butcher at any age between three months and five years, as the market may determine; lastly they are great improvers of the soil, through the manure they yield. The poorest land that ever was put under the plow can be readily and cheaply improved, and brought to a high state of fertility, by means of clover and sheep. Witness the domain of Mr. Coke, afterwards created Earl of Leicester, who reclaimed 20,000 acres of rubbish waste in Northampton, England, with clover and sheep, and turnips afterwards, and formed an estate that is counted among the best farming lands in England.

It is a very inferior type of sheep that will not yield a fleece of wool that will amply repay the farmer for the food consumed each year. But the profit to the farmer who cannot keep a large enough flock to make it an object either to breed for ram sales, or for wool alone, is to be found in turning over his capital invested as often and quickly as he can. Hence to succeed, he must depend more upon feeding and attention to markets than upon breeding to sell again for breeding stock. We know cross bred animals are as good as any—in fact better for his purposes than any one pure breed. Cross bred animals usually have this advantage: Being of two separate strains of blood, with no affinity, they are stronger, healthier, and possess better constitutions, and less liability to fluctuation than pure blood.

Take for instance a flock of ewes of mixed Leicester and Cotswold, or Merino and Southdown blood; select from these the animals having the largest frames full of flesh and full of character, good nurses and easily kept. Breed these to a pure-blooded Southdown or Leicester ram of high character, and the lambs resulting will be just such as will bring the greatest profit to feed for the butcher. An breeding stock, they would not sell high, nor would their wool command as high a price as that of a pure Merino, Cotswold or Lincoln, but it will bring as much if not more than either Leicester or Southdown wool.

The ram lambs can be made into hoggets, the best ewe lambs reserved for breeding to a ram of a different breed from their sire, say a Southdown, if their sire is a Leicester, or vice versa. The main object here is to keep up the flock to a certain standard as regards profits to be made by rapid development. At the same time it must be understood that no deterioration should be allowed and the sire should always be selected from good breeding flocks, and be of higher quality each year than the ewes to which they are bred. If it should happen that the season was very favorable for turning the whole flock over to the butcher after shearing time, another flock of ewes can be got together late in summer and bred up in the same way.—*Can. Cult.*

Healthful Education.

In reviewing a lecture recently delivered by Rev. Henry Ward Beecher, *Apphton's Journal* remarks: "If we hope to make general education contribute to the welfare of the people and advance the public interests, we must engraft upon this elementary formula an industrial department. The public can never be concerned in producing government schools a merely literary culture. We should make a fatal mistake if our course of education should widely, as it does now partially, simply stimulate fastidious tastes and precocious dilettantism, filling the young minds with unrest and a host of discontents, and opening up impracticable ambitions. Our schools at present serve to fill the ranks of the lawyers, the doctors, the brokers, the politicians, but pretty nearly empty the workshops. What we need in the great popular mass is honesty, healthful ambition in the avenue of honest toil, and such culture as shall elevate and sweeten, rather than fill with inquiet." There is much good sense in all this. It is difficult to estimate what the country owes to the Common School system, but there is reason to fear that of late years many of the teachers in these schools have lost sight of the practical in striving after the purely ornamental. Unmistakably the education is wrong which teaches the rustic youth to despise the farm, or the village lad to look with contempt upon the workshop. Our cities are overcrowded with young men in search of situation, whose labor the country stands much in need of. It is all very well to point to Horace Greeley as an illustration of what a rustic boy from the dull atmosphere of the farm can accomplish in the busy walks of the city, but it would be a sad thing for agriculture if all farm lads should decide to follow in the footsteps of the distinguished man who was laid in his grave last week. Town life has its fascinations but towns cannot live without the country. There must be producers before we can have traders; and without production and trade we could not lay up that wealth which is the foundation of ease and the creator of literature and art. Let us take care that we do not demoralize the masses and unfit them for work in practical fields of industry, by filling their minds with that wild ambition which begets unrest and leads to discontent.

THE SURPLUS OF GRAIN.—"In sight," in the States and Canada, on the first of the present month, was 23,627,528 bushels, embracing 7,124,155 bushels of wheat, 11,104,700 bushels of corn, 3,848,000 bushels of oats, and 1,650,673 bushels of barley.

VALUE OF CHAFF.—Chaff is worth for food twice as much as straw. Out-chaff stands first, wheat next, and cows will very readily eat and thrive on it when wetted and sprinkled with meal. The chaff should be husbanded with care.

A Cincinnati seamstress uses a grey squirrel as a motive power for running her machine, and well she does her work—not only sewing straight seams, but hemming and gathering a ruffle as neatly as could be done by human hands.

FATAL CATTLE DISEASE.—An epidemic is raging amongst the cattle in the vicinity of Lawrenceburg, Ind., with fatal results in many cases. In the pen at the Louisville distillery forty-nine out of a lot of sixty-two have died in two days, and numbers have died since. What the disease is has not yet been determined.

Orzo or Bees.—Fill a large glazed earthen jar with rose leaves, carefully separated from the cups, pour upon them spring water, just sufficient to cover them, and set the jar with its contents in the sun for three or four days, taking it under cover at night. At the end of the third or fourth day, small particles of yellow oil will be seen on the surface of the water, and which in the course of a few weeks will have increased to a thin scum. The scum is the otto of roses—take it up with a little cotton tied to the end of a stick, and squeeze it into a vial.—*Journal.*

The Horse and Stable.

Breeding Horses.

After the farmer has decided on the class of horses he intends to breed, his next step is to select his mare or mares to breed from, and on the judgment he manifests in his choice of mares, depends in a great measure his success as a breeder of horses. Whatever the class, the brood mare should be sound, healthy, of an excellent constitution, and exhibiting the chief points of excellence that characterize her breed, and young mares are considered by some breeders, superior to old ones, though age can scarcely be an objection, if the constitution remains unimpaired, and the vital organs in good order. The breeder of pure blooded animals must understand the points of that class thoroughly to succeed in raising them, and requires experience just as the breeder of the short-horn does for success with his herd. A mare should never be used to breed from, that is blemished, or has her vitality impaired in any way, and the habit among some farmers of using mares of this character for this purpose cannot be too strongly condemned. The choice of a stallion as a sire is of the greatest importance, though if the farmer wishes to use a heavy draught horse, he cannot at the present time go greatly astray in Ontario, for we have a class of draught stallions in this Province, of which any country might well be proud, and too much credit cannot be given to those whose energy and enterprise in importing such superior animals will doubtless have a marked effect on the rising stock of the country. The form, style, action, &c., of the stallion used are only of secondary importance compared with the stock from which he is descended, for his ability to transmit the faults of his ancestors to his offspring is equal to his power to perpetuate their points of excellence, and it is on this principle that horses are bred up to the high standard of the pure breed of either blood or draught; consequently it is wise to examine the breeding of the sire; and the majority of the cross-bred, mongrel stallions that perambulate the country during the season, insuring colts for whatever the farmer chooses to give them, should be avoided, as the few dollars saved in the price of insurance is often lost several times over in the failure of the stock, whilst the extra price paid for the service of a well-bred stallion is more than made up by the quality of the colt secured. The question should not be the price of service as is too often the case, but the breeding and value of the sire used. The question of working a brood mare is a disputed one, though, if the mare is gentle, slow light work with moderate feeding, it is generally considered, will do no harm. Some people err in feeding too high, for an excess of flesh is not desirable and tends to injure the constitution and development of the offspring, while others fail in the opposite direction, for a good healthy thriving condition of the mare is indispensable to the proper development of the colt. Over-exertion, over-heating, and fast driving should be carefully avoided while the mare is carrying her foal, and after foaling, she and her colt should be kept as much as possible from other horses, for most of the injuries among colts are caused by the foal, whose bone and tendons are so tender, being chased by other larger colts; and the practice by many of driving the mare on the road, and allowing the colt to follow, is a very injurious one to the foal. The bones of the colt are soft and naturally incapable of enduring fatigue, the young animal soon becomes tired by the over exertion, while the travel over the hard road injures the feet and legs often causing contraction, ringbone, &c. The pasture is the place for the foal until fit for harness. Great care and gentleness should at all times be used towards both the mare and foal, for harshness excites and injure the one, and has a pernicious effect on the disposition of the other. No cast-iron rule can be laid down as to the proper time for weaning colts, the farmer must decide this according to his circumstances, though the longer a colt is allowed to suck up to nine or ten months, the better.

Diseases of the Horse's Foot—Corns.

A corn is possibly the most common disease of the horse's foot, and consists in a bruise of the sensitive sole and laminated structure of the bars in the angle of the heel, and the extravasated serum. The result of the bruise produces a reddened condition of the horn of the heel. This disease has been called corn, from the affection known by the same name and so common in the human subject; but, although resulting from a bruise or undue pressure, it is of quite a different nature from a corn in the human being causes. Some horses are more subject to this disease than others, such as those with broad flat feet, or horses that have weak heels, and defective action, where the weight is thrown heavily upon the inside heel. The great exciting causes are hard work, fast driving, and bad shoeing. So long as horses are used upon the farm or soft roads, any kind of shoeing will almost do; but when a horse is badly shod and subjected to hard and fast work, upon macadamised roads or paved streets, a bruise is the result, producing a corn. Another common cause is allowing the shoes to remain on too long without removing regularly.

Symptoms. Lameness in the most of cases which, as a matter of course, varies according to the severity of the bruise, and in cases when the inflammatory action terminates in suppuration, the pain and lameness are very severe.

The horse, when standing, points or favors the affected foot; and the lameness is greatly increased when he is trotted out upon hard ground. The heels are hot, and the parts very tender if tapped with a hammer. When matter forms, the patient will knuckle at the fetlock, and this symptom is very apt to mislead as to the true seat of the disease. If the shoe is removed and the sole thinned, the discolored horn is easily noticed, although, when occurring in a strong foot, from being situated well up in the heel, it may be overlooked when not carefully examined. Lameness may occur before the horn becomes discolored.

In the treatment of corns, the affected parts should be carefully pared, and a shoe properly applied, so as to take the weight off the diseased parts, and this is best done on weak feet by the use of the bar-shoe. When the tenderness is great, it will be necessary to rest the patient, and allay the pain by poultices, or standing in cold water for a short time daily during warm weather, and in certain cases it is also beneficial to apply a leather sole. When suppuration occurs, the horny sole must be thinned to the sensitive structure, and the pus allowed to escape, or else it will find its way to the coronet and form a quitter, which is a most serious disease. The foot must be poulticed until the irritation is removed, and afterwards apply a well-fitting shoe. Very great harm is frequently done to the foot by cutting into the sensitive parts, and then pouring in nitric acid or other caustics, with the erroneous idea of burning out the corn. Horses affected with corns should be regularly shod every three or four weeks.

Stable Drainage.

Notwithstanding all that has been written on the important subject of stable architecture, there are a very few stables in the country where a really efficient provision is made for removing and utilizing the liquid manure that is furnished by horses and cattle, who pass a great portion of their time confined in stalls. Not only is there, in consequence, a great loss of valuable fertilizer, but the liquid excrement accumulates and rapidly putrefies, giving rise to various noxious gases, which contaminate the air, and cannot fail to prove injurious to the animals who are compelled to breathe the poisoned atmosphere.

In some stables we find no pretence whatever at drainage of any sort. In others, perhaps in the majority of such buildings, drainage is attempted, but on various accounts is ineffectual. For example, the floor is made of common pine plank, a soft material, which trampling and kicking of horses soon wears into hollows, in which the urine stands, a constant source of discomfort to the horse, and trouble to the groom. These floors, in most cases slope back to a gutter in the rear. This arrangement compels the animal confined in the stall, to stand always up hill, and puts a very uneasy strain on the sinews of the legs. To relieve themselves of this strain, we constantly find horses hanging back, and getting as far from the manger as the halter will allow. Then, again, either

from shrinkage or original carelessness in fitting the planks, and joints in the floor on each side of the gutter behind, are so open as frequently to allow more liquid to pass through below than is carried away in the desired direction. This very large proportion of the urine seeping through the floor, completely saturated the ground underneath; and thus being entirely lost to the farm, accumulates and putrefies in a hidden mass of filth, enough to generate the most malignant forms of disease. Besides all this, it too often happens that the liquid manure which does not find its way outside the stable it, for want of proper arrangements to receive and to dispose it allowed to flow over the farm yard, or is washed away by the first heavy shower of rain that falls. Now, this state of things so common on our farms, is both a serious waste of valuable material and a great detriment to health. It is a great mistake to suppose that any such impurity can be other than highly injurious to the animals in confinement.—*American Stock Journal.*

Care of Horses.

All horses must not be fed in the same proportions, without regard to their ages, their constitutions and their work, the impropriety of such a practice is self-evident. Yet it is constantly done, and is the basis of disease of every kind.

Never use bad hay on account of its cheapness, because there is no proper nourishment in it.

Damaged corn is exceedingly injurious, because it brings on inflammation of the bowels and skin diseases.

Chaff is better for old horses than hay, because they can chew and digest it better.

Mix chaff with corn or beans, and do not give the latter alone, because it makes the horse chew his food more and digest it better.

Hay or grass alone will not support a horse under hard work, because there is not sufficient nutritive body in either.

When a horse is worked hard its food should be chiefly oats—if not worked hard its food should be chiefly hay—because oats supply more nourishment and flesh-making material than any other kind of food; hay not so much.

For saddle or coach horse, half a peck of sound oats and eighteen pounds of hay are sufficient. If the hay is not good, add a quarter of a peck more oats. A horse which works harder may have rather more of each; one that works little should have less.

Rack feeding is wasteful. The better plan is to feed with chopped hay from a manger, because the food is not then thrown about, and is more easily chewed and digested.

Oats should be bruised for an old horse, but not for a young one, because the former, through age and defective teeth, cannot chew them properly. The young horse can do so, and they are thus properly mixed with saliva, and turned into wholesome nutriment.—*London Horse Book.*

Grooming a Horse.

Much care is necessary in handling the sensitive parts of the horse, viz: the belly, flank and inside of the thigh. Many horses are made troublesome by being constantly teased by a reckless groom. I believe that a currycomb should never be used upon a trotting horse during the training season. If the hide is once clean the stable swept twice per day as it ought to be, the bedding kept dry and clean, and the horse always rubbed dry when sweating, there will be no excuse for using anything except a rubber and brush. If a part becomes a little stained during the night, a little blood warm water should be used and the part immediately rubbed dry. Now, in rubbing these sensitive and all important parts, let the flat hand, covered with a rubber, be placed moderately firm upon the part, without any curling of the fingers, and without constantly removing it as many do during the process of rubbing, and the horse will soon believe that he is not to be tickled, and will be quite a different horse as it regards kicking or biting, and far less excitable in many other respects. A person will bear a hard rub upon the bottom of his bare foot with the flat hand, but if done with the ends of the fingers, he could hardly be kept in his skin. No words should be used to the horse that he cannot well understand, and they should not be repeated so often as to make him heedless, but they should be spoken in a mild tone of voice. The language and other signs in grooming, driving and all other exercises should not only be limited and to the point, but should be applied with strict regularity, that they may be well understood, and that the call and response may be mutual. A neglect in the horse to answer a call is an error in the manager when there is an error in the call.—*N. H. Farmer.*

Breeder and Grazier.

THE HEREFORD BREED OF CATTLE.

The Hereford breed of cattle—of which we present to our readers, on this page, portraits of a bull and cow—holds a very high position in Great Britain, and begins to attract considerable attention in Canada and the Western States. The old Hereford cattle were of deep-brown color, sometimes with a shade towards ochre, and entirely free from white; but the improved animal of the present day is invariably dark red, with a white face, white belly and not unfrequently a white back. The improvement of the breed began so far back as 1766. About that year Benjamin Tomkins, of Wellington Court, Herefordshire, commenced breeding from two Hereford cows which exhibited a singular propensity to fatten; one of the cows, a grey, the other a dark red, with a spotted face. The former he called "Pigeon," the latter "Moth." The produce of these two cows were separately bred, and from them are descended the two tribes known even at the present day by their names. Mr. Tomkins bred up a large herd from these two cows, and his stock was eagerly sought for by the best breeders of the day. At the sale of his stock in 1819, shortly after his death, the prices obtained at public auction fully supported the high estimate placed upon his herd by the breeders of Herefordshire. Fifty-two animals, including twenty-two steers, from calves to two-year olds, and two heifer calves, brought the sum of £4,633 14s., averaging £89 17s 6d (\$445) per head. A bull sold to Lord Talbot, brought £588 (22 \$70). These prices have

rarely, if ever, been exceeded in later days. Mr. Price and many others followed in the footsteps of Tomkins, having drawn their herds from the latter. A few years since, the Herefords were little known out of their own county, now they are distributed all over the British Isles, and there are many very fine herds of them. A Hereford Herd-book is regu-

cattle shows has always been vehement, and has continued for years with such varying success that it is difficult to gather the result; but it seems to be now pretty generally conceded that the Short-horn cow has usually beaten the Hereford cow, whilst the ox of this latter breed has oftentimes carried off the gold medal from his Short-horn competitor;



and this same distinction seems to prevail among store animals, a majority perhaps of graziers preferring to buy Short-horn heifers and Hereford steers. As working oxen, the Herefords have always been famous—though less active than the Devon, their greater weight and strength, together with their docility, places them first on heavy soils. Though not equal to the Short-horn in early ripening, the Hereford at two and a half years is generally fit for the shambles, and yields well-marbled beef, a little disposed to be coarse in the fore-quarter, and a fair amount of tallow. It is alleged, however, that a Hereford bullock shows every pound of meat, and rarely proves better than he looks. The Hereford produces less beef at the same age than the Short-horn, but consumes less food. The Hereford cow is not claimed to be profitable for dairy purposes—beef and work having been the prime objects of Hereford breeders.

The following are held to be the points of a model Hereford:—"The face, mane, throat, the under portion of the body, the inside and lower portion of the legs, and the tip of the tail, are beautifully white; the

other parts of the body a rich red, usually darker in the male than the female. The horn is white or light yellow, of a waxy appearance, sometimes tipped with black. The forehead is broad, with spreading horns; those of the bull straight and level with the poll, and of the ox and cow

larly published in England, of which several volumes have already appeared.

In size the Hereford ranks next to the Short-horn, attaining very nearly as great weight at not quite so early an age. The rivalry between these two breeds at the Smithfield and other English fat-

other parts of the body a rich red, usually darker in the male than the female. The horn is white or light yellow, of a waxy appearance, sometimes tipped with black. The forehead is broad, with spreading horns; those of the bull straight and level with the poll, and of the ox and cow

slightly curved, with an upward tendency. The eye is full, yet of a passive expression, denoting the quietness of disposition and temper characteristic of the Hereford, and which is of paramount importance to insure the profitable feeding of all ruminating animals. The cheek is fine, the head small in proportion to the carcass, which is long, level, and cylindrical. The hide is thick yet mellow, and well covered with moderately long soft hair, having a tendency to curl. The brisket is prominent, the chest well expanded, and the breed is eminently distinguished for neatness of shoulder, the bone being thin and flat, the kernel full up, the outside shoulder well covered with mellow flesh, the chine good, the loin broad, the hips wide and level, the whole back displaying a straight line, well covered with flesh from the neck to the tail. The twist flank and fore flank are good; the outside thigh is perhaps the most defective part. The whole body is well covered with rich mellow flesh, yielding with pleasant elasticity to the touch. The legs are short and the bone small, and the whole contour displays great constitution, and exhibits, perhaps, a larger proportion of flesh in proportion to bone, than any other breed."

Spring Care of Sheep.

Sheep are tender animals, and require gentle and generous treatment to produce a liberal return. Before yeaning time, they should be well fed with something better than straw or poor hay. The ewe has not only herself to support, but the growing foetus. This requires an abundance of nutritious food. The sheep seeks every opportunity to get to the ground for green food, but when fed turnips or carrots during the winter, they manifest much less desire to get to the earth. Roots possess the qualities of grass, and thus keep the digestive organs in a healthy condition. But oil meal and bran are the best substitutes to be given where turnips cannot be had. A quart of corn to six sheep, mixed with one pound of oil meal and one pound of bran, will have a wonderful effect upon the condition and health of the ewe at lambing time; and the cost of this feed, in most localities, would not exceed four cents, or two-thirds of a cent for each sheep per day, and nowhere would it cost more than one cent per head.

Gentleness cannot be too strongly urged upon the shepherd in handling ewes. If often, in feeding, they are kicked out of the way, or caught by the wool and jerked about, thus lacerating the skin and producing more or less congestion, frequently the incipient cause of death of the sheep. This will show the impropriety of catching sheep by the wool, they should be caught with the arm around the neck, so as not to pull the wool. The good shepherd will treat his sheep so kindly and gently that they will not fear him, but will like to be handled by him. At yeaning time, care should be taken that the ewes are well protected from all storms, and housed at night. In fact, the best shepherds regard the stables as the only proper place for yeaning, even in pleasant weather, at the ordinary yeaning season, which is usually from the first of April to the middle of May. The stable or close shed, well ventilated, is the best place for the health of the ewe and safety of the lamb. But in this case, it is understood that the sheep have been handled and so kindly treated that they are tame and will permit the attendant to pass around among them without rushing against each other and trampling on the lambs. The ewes, after a few days, should be so generously fed as to produce a liberal supply of milk for the lambs.

If the lambs are intended for the butcher, everything depends upon their getting an early start in the spring. Whilst one, who studies all the wants of the sheep and supplies them, will raise Cotswold lambs which will bring eight dollars per head, and more than an average of one lamb per ewe, another, who allows the sheep to take care of themselves and feeds in a slovenly way but once or twice per day, will raise only about one-half the number of lambs and get less than half as much per head. There is no animal that gives a better return for good care and generous feeding than the sheep.

Healthy ewes seldom need assistance in yeaning, but they should be closely watched, and help given if needed, and there should be no violence or hurry. "The natural presentation of the lamb is with the nose first and the fore feet on each side of it," and the assistance given, if needed, should be very gentle. Sometimes the womb is inverted and appears externally. In this case, Randall, in his excellent work, says: "It should be very carefully cleaned of any dirt with tepid water, washed with strong alum water, or a decoction of oak bark, and then returned. If again protruded, its return should be followed by taking a stitch (rather deep, to prevent tearing out,)

with small twine, through the lips of the vagina, by means of a curved needle, and tying the lips loosely enough to permit the passage of the urine. The parts should be washed often with alum water or a decoction of oak bark, and some of the fluid injected into the vagina. If this fails to effect a cure, and the protrusion of the womb becomes habitual, it should be strongly corded close to the body of the sheep and allowed to slough off. The ewe will not, of course, breed after this, but will fatten for the butcher."—*Farmer's Union.*

Age of Cattle for Market.

Daniel Webster, who was certainly a compeer in such matters, insisted that a fully matured animal made better beef or mutton than an immature one—that the flesh in the one case would be found of a deep red color, rich in juices, while in the other it would be pale, and comparatively insipid to the taste. Our own experience leads us to think there is a good deal of truth in this, though the great statesman put the proposition in a pretty positive, and rather too general a form.

If the animal is fine in bone, with flesh of delicate structure, full maturity will, we have no doubt, increase its excellence; it will be richer and more juicy, and age will not render it tough. But if the animal is naturally hard-fleshed, we should prefer a heifer or steer at two to two and a half years old to one of this tough variety at full maturity. But the quality of the flesh is not the only question the feeder has to consider; the question of profit is to him even of more importance than the excellence of the meat. Indeed, the poor encouragement the producer of good beef or mutton usually receives in our markets, tends to make feeders comparatively indifferent in regard to the quality. Even the breeders of blooded stock are giving to this point far less attention than formerly. The effect of this peculiarity in modern fashions in breeding, must be seriously injurious to the high character of the flesh of some of our most popular breeds.

The feeder looks first of all to profit; and here, we suppose, the question in regard to the proper age for turning cattle off to the butcher ought to be no longer a question for discussion. A well-bred steer can be made to weigh from 1,300 to 1,500 lbs. at—say 30 months old, with only such feed and management as any good farmer may profitably provide. The gain per month up to this period will be much greater than can be made afterwards; and we believe it is generally conceded that the gain made by the young animal is also greater in proportion to the amount of food consumed. With a breed of cattle that matures early, the flesh, at the age indicated, while it may possibly be somewhat inferior in richness to the flesh of the same animal a year later, will nevertheless be of a really excellent quality. It is, therefore, all things considered, the approved practice to turn off steers of good blood that have been properly fed and grazed, the fall or early winter after they are two years of age. If at this age they are ripe, it would not pay to feed them through the winter for the spring market, unless beef should be greatly advanced in price. If cattle of this age are kept through the winter, they should be grazed until the latter part of June; and should the market then be too low, they may be allowed to remain at grass until October or November. In giving two and a half years as the proper age to turn off cattle for slaughter, it will be understood that we are stating what in our judgment should be the rule for the grazier and feeder who has bred his own cattle, and has kept them rapidly thriving on good food and pasture from calf-hood. If a man wishes to handle a lot of steers for only six or eight months, he may find it equally profitable to buy them at three years old, in February or March, if he can get them at fair prices, in only moderate stock condition, as to purchase two-year-olds. Indeed, cattle of the common sort at three years are no further advanced than good grade Short-horns are at a year younger. Nor will they weigh more; neither can they usually be made to weigh as much by from one to three hundred pounds the next fall; so that if the choice were to be made between well-bred two-year-olds and cattle of the common sort a year older, the former should be preferred, even if the price were 20 to 30 per cent. higher per 100.

Sometimes it happens that a fair profit is made in feeding and grazing common and inferior cattle; but it is only when they are purchased at very low figures, and the market is brisk when selling-time comes. As a general thing, there is no money in them; if the market is good, they sell low as compared with better classes; and if they strike a hard market, they are docked in price and docked in weight, and the result is disastrous to the man who handles them.—*National Live Stock Journal.*

Uses of Salt for Cattle.

A correspondent of the *Mark Lane Express* calls attention to the great improvement in the health and general condition of animals that would result from a more liberal use of salt in their food. He says:—

"The presence of salt in sufficient quantity protects the animal economy against abnormal changes in its chemical constituents; its deficiency subjects the beast to the attack of disease germs. Dr. Carpenter declares: "chloride of sodium is needed for the conservation of the organic components of the blood in their normal condition;" and Liebig states that, "the other (3 out of 6) oxen, which daily had salt added to their fodder, remained healthy, even in the mode of life to which they were confined, which corresponded but little to the nature; and with excess of food and deficient exercise, their blood remained pure, and well fitted for all the purposes of nutrition. In the salt they had a powerful means of resistance to external causes of disturbance to health, which in the actual circumstances, was indispensable to them." "The body of the others" (which had no salt added to their food) "was, in regard to disease like a fire-place heaped with the most inflammable fuel, which only requires a spark in order to burst into flame and to be consumed."

Although common salt is added to the food of cattle and sheep, it is questionable whether it is given in the required quantity to compensate for the loss incurred by the daily excretions; since, as Dr. Carpenter states: "this salt is itself required as a component, not only of the solid tissues generally, but also of all the secreted fluids;" and "the excretion of urea, the ultimate product of organic change of matter, by the kidneys has a closer relation with the presence of common salt in the blood, than is generally supposed." On this point the same eminent savant further says: "In the oxen which only had as much salt as was contained in their fodder, the quantity was insufficient for the secretory process. There was wanting the means of transport for a number of substances which, out of the body excite disgust; their whole frame, the blood, flesh and all the juices were loaded with them, &c. &c." Allow me to repeat: for want of sufficient chloride of sodium to determine their expulsion from the system. It is however, not the mere administration of common salt, but especially the manner in which it is to be given to the cattle, to which I beg to draw the attention of farmers and cattle-owners. The salt should be dissolved in water (about two ounces to the gallon), and the cattle should have no other but salted water to drink. So taken, the salt will be absorbed into the system much quicker than when mixed with food; and it will not produce abnormal thirst.

Southdown Sheep.

Hon. John Wentworth, of Chicago, a large stock breeder, as well as a politician, in a recent circular, says:

"After trying all kinds of sheep, we have given the preference for general utility to the Southdowns. Upon fair grounds they are ranked as middle-wooled. They are half way in quality and quantity of wool between the common sheep and the best of Merinos. But their mutton is the best in the world, and their wethers grow the largest and command the highest prices in all the markets. The day is not far distant when all our beef and pork will be demanded for Eastern and foreign markets. The West must live upon mutton, and that of the fine woolled sheep is far from being palatable. Hence it is desirable that our farmers at once lay the foundation of a Southdown herd. Besides being the best of all food, there is no other that can be raised so cheap as Southdown mutton, as they are the hardiest, and can be kept in large flocks better than any others. The wool will pay for the keeping, thus leaving the carcass clear profit. For crossing upon the larger breeds of sheep, there are no superiors to the Southdowns."

I have fed corn ground in the ear for the last fifteen years, feeding from five to twenty head every winter, giving from one to six quarts at a feed, generally feeding twice a day. For the last ten years, it has been very extensively fed in this part of the country, and I have not heard of a single animal being injured, though I watched closely to see if I could detect anything of the kind, but came to the conclusion it was a false alarm. I do not claim there is any great nutriment in the cob; but when rough feed is scarce (as is the case here this winter,) there is a value in the cob for food; besides there is a great saving of labor in grinding corn in the ear instead of shelling and then grinding.—*Cor. Rural New Yorker.*

The Dairy.

EDITOR—L. B. ARNOLD, of ILLICA, SECRETARY OF THE AMERICAN DAIRYMEN'S ASSOCIATION.

Introductory.

In opening a communication with the dairy men of the Dominion through the columns of the CANADA FARMER, it will be the leading effort of the writer, as it is the declared purpose of the publisher, to make the Dairy Department both interesting and profitable. Great progress has been made within a few years, in the art and science of dairying; and though much has been done, much more remains to be done, and the concentrated effort of all concerned is required to push progress and investigation further. We announce at the outset that we very much desire the co-operation of the dairy readers of THE FARMER, both men and women, to aid in the furtherance of the common cause. It will be gratifying at all times to have them make statements of experience which they may deem valuable, to offer such suggestions as may occur to them, and to present freely such queries as they may desire to have solved. A satisfactory answer to every question that may be raised is not pledged. No single individual can be expected to explain, or to know, all that is, or can, or ought to be known, concerning dairy husbandry. The field is too broad, and the unsolved problems that are constantly looming up, like a succession of Alps, before the vision of the investigator, are too numerous and too great to be mastered by a single mind. But whatever has been gained by having been born and brought up in the heart of the best dairy district in America (Herkimer); by a life-long contact and intercourse with the best dairymen, and the best dairy writers and investigators in the country; and by an experience that runs back over a quarter of a century, in which study and manual labor in all departments of the dairy have been combined—be it much or little—shall be at the service of the readers of THE FARMER who may seek it. And if amid the conflicting opinions that prevail in regard to dairy matters, statements shall be made or views expressed which shall not appear sound, a friendly criticism will always be acceptable and is invited. There is plenty of room for all to improve, and it is very desirable that the best efforts of all should be contributed. Progress cannot be predicated so much upon the labor of any single individual, as upon the combined wisdom and experience of all, and it is to be hoped that the readers of THE FARMER will appreciate how much they can do for each other and the cause.

Advantages of Dairy Farming.

The introduction of the system of associated dairying, and the increased attention and study it has attracted to the subject, are steadily making the business of dairy husbandry a leading branch of rural industry. The more thoroughly the matter is investigated the more clearly does it appear that the dairy affords many advantages over grain-raising and the other ordinary branches of farming, especially in particular localities; and as a natural consequence, this branch of farming is steadily gaining adherents in all parts of our continent.

In favorable seasons, the annual returns from a grain farm and a dairy farm do not foot up with a very wide difference; but that difference, whatever it may be, is generally in favor of the dairy. But it is not the extraordinary margin of profit afforded by dairy farming that is making so many converts to the cause. The inducements which cause so many to give a preference to this industry are various; and first among them is the greater certainty it affords of uniform results. All that portion of North America included in the north temperate zone, is subject to great climatic variations and sudden

changes of weather, which more or less affect and interfere with the farmer's crops. Drought, early or late frosts, excessive wet and cold, and storms of wind and hail, are ever-and-again, the occasion of unfilled bins and empty pockets in one part of the country or other. On the prairies of the western States, it is estimated that the corn crop, (probably the most reliable crop in that section), is seriously injured on an average once in three years. And all over Canada and the north-eastern States, crops are injuriously affected by drought or other cause, to a serious extent once in four years. Grass is more tenacious of life, and grows at a lower temperature than almost any other farm product. Nothing is so secure against varying climate and sudden changes of weather as grass; and as the operations of the dairy farmer are based on this crop, he can count on results much more nearly uniform than the grain-grower. Though his cows are liable to accident and disease, his greater security against variable seasons and weather is equivalent to a considerable premium in favor of his mode of farming.

A second consideration in favor of dairy husbandry, is the greater uniformity in the price of butter and cheese, as compared with other farm products. The markets are often glutted with the different varieties of grain, meat, wool, &c., the price running down below living rates, to be followed perhaps by inflation. In dairy products variations are not so great. Periods of activity and depression occur, but there are no such wide fluctuations as in the grain market. Great extremes cannot be reached in the dairy. The cows of a country cannot vary suddenly. It takes four or five years to produce a cow—and the market cannot be suddenly glutted. In fact, the cows in any country generally maintain a uniform ratio with the number of inhabitants, varying very little, if at all. On this continent it has remained nearly the same from the earliest settlement of the country to the present time, varying little from twenty three cows to 100 inhabitants. A similar uniformity has prevailed in England and other countries of Europe. The relation, therefore, between the supply and demand of dairy products, cannot vary suddenly or very much. The relative proportions of butter and cheese may vary by reason of changes from the manufacture of one to the manufacture of the other. But an excess of cheese diminishes the product of butter, for the number of cows and the aggregate of milk remaining the same, if more is devoted to cheese-making, less must be to butter-making, and vice versa. Prices run up or down as the supply of either varies, but dairymen oscillate so easily from the manufacture of one to the other, that no great excesses or deficiencies can well occur. These circumstances have a controlling influence, and will in the future, as they have done in the past, keep prices comparatively even. The greatest variations are occasioned by good or bad seasons, when the aggregate of dairy products is swelled or diminished.

The difference in the severity of labor in grain-raising and dairy farming has also, probably, some influence in inclining farmers to the dairy; but perhaps the strongest inducement is the little exhaustion it occasions to the fertility of the soil.

How the usual modes of farming exhaust the fertility of the soil is well known. The stores of plant-food which untold ages had accumulated in the virgin soil are sapped away in a few short years of subjugation to the plough. The depleting process seems destined to over-run the whole continent. It sweeps steadily on, keeping pace with the removal of the primal forests, and leaves everywhere impoverished soils and diminished crops behind it. The exhaustion goes on till the yield is reduced below profitable culture, when some new mode of operating must be adopted. Stock-raising, dairying, fallowing, rest, green crops, plastering or artificial manuring must be resorted to, to increase the yield to profitable results, for such results may always be accomplished. However low the fertility may be reduced there is always still left in the soil an immense wealth of plant food, though unavailable for present use, because locked up in insoluble compounds which require time and the action of the elements to unloose. Here then is a vast extent of land thus reduced, for the restoration of which dairy farming is most appropriate and inviting. It stops at once exhaustion, but does not stop income. It brings good returns from the first

Forage crops grow well where grain crops pay poorly. Seeding down to grass gives time for air and water, heat and frost, to gradually unlock the tenacious compounds which hold the mineral elements of plants, as with a firm grasp, and lets them loose for the rootlets to feed upon, or to accumulate in the soil for future use. It gives time for the absorbent properties of the soil to take in elements of fertility from the atmosphere, from the snows and rains, and from the dews of heaven. In this way a farm that has been run down may be made to grow rich, and a rich one richer. This problem is often worked out practically by farmers with such satisfactory results as to strongly induce others to "go and do likewise."

The manure-heap is the all-essential thing with the dairyman. His mode of farming allows him to consume the products of his farm on his own premises, and to return nearly all that is taken from the soil, back whence it came. There is a steady exhaustion going on upon a dairy farm as well as upon a grain farm, but it is small in comparison. It consists chiefly of phosphates that are carried away in the milk, and which may be easily restored with bone earth. The waste is so slow with ordinary care of the manure, that it is not usually felt for very many years. By carefully saving all the liquid manure from the stables and the pens, the store which is already in the earth would hold out still longer. This a dairyman should always do. The liquid excretions of his animals are worth fully as much to the dairyman as the solid; because it contains just what dairy farming is all the time inclined to waste. To lose the liquid manure is to lose one-half the benefit to the farm from keeping a dairy. This fact is beginning to be pretty well appreciated. While dairymen are swelling the manure heap by every available means, they are at the same time adopting conveniences to save and utilize the valuable liquids which in former days were allowed to waste. And this increased economy in manures makes the contrast between a farm and farmer growing rich and one that is growing poor, so great as to attract the attention of observant men, who become persuaded, and keep more stock and plough less.

Limit of Lands for the Dairy.

The first limitation to dairying is climate. If it is either too hot or too cold to keep cows comfortable and healthy, their milk will be faulty and its products poor. The climate of Canada is generally favorable. But protection against the heat of summer and the severe colds of the winter is necessary.

The second limitation is the supply of water. If an abundance of good, pure, fresh water, convenient of access, cannot be had, thoughts of dairying had better not be entertained. Pure water is a "sine qua non" in dairying. It must be running water, or at least fresh. Stagnant or even standing water should not be used: it is unsafe. Local limitations on this account often occur. The prairies are almost excluded from dairying on this account.

The third limitation is the supply of food. The quality must be good, whatever it is. It is impossible to make good milk from poor material; and if such food cannot be supplied cheaply and abundantly it will restrict the operations of the dairy. The increasing value of land in the older settled portions of the continent, tends to increase the cost of cattle food, and to confine the limits of dairying on one side, while the increased occupation of new and cheap lands on the other, tends to the extension of the dairy in that direction. The immense extent of cheap land in the Dominion will defy competition for an indefinite period, especially in the production of cheese.

Peculiarities of soil have been supposed to set the most rigid limits to dairying, especially to the cheese interest. It is not easy to set definite bounds to the land from which good butter and cheese can only be made. Dairymen have been compelled to change their opinions in regard to the extent of dairying lands, and with more light they may have occasion for further modification. It is but a few years since the best informed dairymen believed that the limits of successful cheese-making were very narrow, and that the people of a few favored localities anticipated that they would enjoy for ever the privilege of supplying the world with cheese. It is but a few years ago that New York supplied Canada and the Western States with cheese, because it was then supposed that good cheese could not be made in either place. Now Canada is not only supplying herself, but is sending better cheese to England than New York then sent to Canada; and the western States

are beginning to imitate the example of their Canadian neighbors. Last summer cheese was sent from Wisconsin to England, the article manufactured there being considered suitable for the English market. Butter of tolerable quality, it was supposed, might be made in the west, or anywhere else that milk could be produced, but cheese was believed to have no such latitude. Now, cheese in the west is far better than butter; but if an equal amount of skill should there be applied to butter that there has been to cheese, it would be unsafe to say that the result would not be equally successful.

At the recent Utica convention of dairymen, Mr. O S Bliss, of Vermont, said, in reply to a question: "Milk that would make good butter would make equally good cheese," and the statement was accepted by the convention, no one dissenting. This assent by that large and intelligent body of dairymen is indicative of the change which has occurred in the minds of those best competent to judge of the extent of cheese-producing territory. Butter-making is carried on with tolerable success everywhere that cows can be kept in a healthy condition. It seems to be limited rather by climate and food than by soil; and it would seem from the foregoing that in the opinion of the best informed dairymen, cheese-making has no narrower limits.

The condition and circumstances of the soil have some influence on the quality of milk and its products. In milk from low, moist ground, both butyraceous and cheesy matter will be softer than in milk from land that is high or rolling. Butter and cheese from the two localities, though manufactured in all respects alike, will be quite different. Butter and cheese from low ground, besides being softer, will have less color, and when new less flavor than the same articles from high ground; and with age their flavor will grow strong and rank, and they will spoil sooner than those from the higher ground. If the high land is sandy or gravelly the contrast will be still greater. The caseum will prove to be as much too hard in one case, as too soft in the other. The milk from the low ground will taint or sour very much sooner than the other. We have noticed also a plain difference in the quality and products of milk from loamy and sandy or gravelly soils, both being alike rolling and the herbage the same. It is evident that milk different in quality should be treated differently. And the treatment and manufacture should in each case be varied to suit the variations in the milk; the probability is that the results in each case would prove alike satisfactory. Our observations and experience incline us to that belief.

The present state of the art of manufacturing cheese applies to milk from land of medium moisture, and does not succeed well with milk from soils very wet or very dry. In a more advanced stage, a wider range may be taken. But at present dairymen are advised to avoid extremes. Loamy soils with a rolling surface that will retain moisture without being wet; soils on which grass will remain fresh and green nearly the entire season, and on which a turf may be retained for a long series of years, produce butter and cheese of the best quality, and feed at the least cost, and are always to be preferred.

Milk of Different Breeds.

The following are the results of experiments that were very carefully tried in England, and they are so striking and interesting that they will bear repetition. They show a remarkable uniformity in quality of milk in the different breeds through all the trials, each breed holding its relative position in each to such an extent as to be a surprising evidence of the adaptation of different breeds to specific purposes:

No. 1. Feed—grass and hay only.	
Pure Brittany cow's milk	19.27 per ct. cream
Pure Jersey	18.65 "
Pure Durham	15.32 "
Pure Ayrshire	13.47 "
Pure Devon	14.87 "
Cross bet. Jersey & Durham	17.95 "
No. 2. Feed—grass, hay one lb. linseed cake.	
Brittany cow's milk	20.00 per ct. cream
Jersey	18.98 "
Durham	16.02 "
Ayrshire	14.14 "
Devon	15.31 "
Cross breed	18.21 "
No. 3. Feed—grass, hay, brewers' grains and one measure condiment.	
Brittany cow's milk	20.00 per ct. cream
Jersey	18.62 "
Durham	16.09 "
Ayrshire	14.09 "
Devon	16.07 "
Cross breed	18.84 "

No. 4. Feed—grass, hay, meal and feed extra.	
Brittany cow's milk	22.00 per ct. cream
Jersey	20.00 "
Durham	17.95 "
Ayrshire	13.94 "
Devon	15.09 "
Cross breed	19.05 "
No. 5.—Same feed, but change in proportion	
Brittany cow's milk	21.50 per ct. cream
Jersey	19.08 "
Durham	18.56 "
Ayrshire	14.84 "
Devon	17.00 "
Cross breed	18.60 "

Raising Calves for the Dairy.

In selecting calves to raise for the dairy, the dam and sire of the calf are of the first importance. If they have both descended from milking families, through several generations, their progeny will be almost certain to follow this habit of producing a large quantity of milk. The second consideration is the adaptation of the breed for that particular branch of dairy for which the calf is intended. When raising calves for a butter dairy, the best breeds for butter should be selected without reference to the quantity of milk produced. But should cheese-making be the object, a large flow of milk, rich in casein is the thing to be desired. Again, if the milk is to be sold in our cities and villages, a large flow of milk is the one thing to be sought for. I do not know that a small amount of cream would make all the city customers sick, but I do say that they are mostly entire strangers to pure milk; and what effects pure milk, rich in cream, might produce cannot be conjectured, for the reason that it has never yet been fairly tried.

The constitution of the sire and dam should also be considered, as well as the physical development of the calf at the time of birth. If the common opinion was correct, "that it costs as much to keep a poor cow as it does to keep a good one, a strong physical development would be of little value. But thus saying, notwithstanding its age is incorrect. There are dairymen who think a cow may produce a large quantity of milk on a small amount of food, and their cows accordingly; but a little careful attention will convince them that a cow which is a small eater will be a small milker, and that a larger milker will consume a large amount of food. Hence, in selecting calves to raise for the dairy, select from those cows which have the greatest eating capacity, for the more food the cow consumes, in proportion to her live weight, the greater her profits.

Calves of the large breeds should never be selected for the dairy if they are to obtain their food on steep hill sides, or long distances each day to obtain all the food they require. It is easy to adapt the breed to the pastures where they are to obtain their living, but certain pastures can never be adapted to all the different breeds of cows. Early calves, other things being equal, are much more valuable to raise for the dairy than late ones. An early calf well fed, and properly cared for, will come in at two years old and make better milkers than late calves, which seldom come in until three years old.

In raising calves for the dairy, I find the teats and their location an important matter for consideration, and always give them a careful examination before deciding to raise a calf possessing all the other requisites for a good dairy cow. To do this, I turn the calf on its back, and if the teats are defective, or deformed in any manner, or when the teats are all in a bunch, or if too small to be seen with the unaided eye, the calf will be better for veal than for a cow, however perfect it may be in all other respects. As soon as the cow drops her calf, if permitted to do so, she will lick it over many times. This appears to be a provision of nature for the thorough cleansing of the hair and skin, so essential to the health and growth of the calf, and whenever a cow does not lick her calf voluntarily I hire her to do it by sprinkling good, nice meal all over the calf. The cow and calf both do better tied near each other, and in most cases the calf will begin to eat hay within eight or ten days in small quantities, which is quite an advantage to the calf.

The calf should be allowed to suck all the milk it desires, for three or four days, but only at the regular time for milking. This length of time will enable the dairyman to judge of the digestive powers and general health of the calf, and if at the expiration of this time it is decided to raise it, I would suggest that the calf be fed from the pail. To do this take the mother's milk as soon as drawn, or so much of it as you desire to feed; give the calf one finger to suck, incline the pail toward the calf sufficient to clear the top of the pail from the calf's throat, so that it will not choke him while drinking, and

lower the finger as fast as, and no faster than the calf will follow it, to the milk in the pail, which the calf will imbibe while sucking the finger. This process, two or three times repeated, is usually sufficient to learn the calf to put its head into the pail and drink without further trouble.

The most convenient place I have found to learn a calf to drink, and to feed it from the pail, after it has learned, is the ordinary cow stanchion; with the calf tied on one side where it can put its head through between the stanchions with perfect freedom, but only so far as its breast will allow, and the pail on the opposite side it is very easy to feed the calf, and if the pail is kept at the proper distance, the calf cannot bunt it over and spill the milk, which most calves will do when they have sufficient freedom. Allow me to say that no force of any kind is necessary, nor should any be used in learning a calf to drink.—Harris Lewis.

Making Butter.

It is the scrupulous neatness in washing milk-pails and pans, in the management of the cream, in churning and packing butter, that secures an article that will pass for prime yellow, which always commands a remunerative price. I wish to impress on those butter producers who always complain of low prices, the eminent importance of observing only a few things which will enable them to make an article which may be forwarded to any of our fashionable hotels, where every pound will command the highest price.

1. See that every milk-pail, pan, churn, and butter-bowl is cleansed with boiling hot water every time it is used.

2. See that the udders of the cow and the hands of the milkers are as clean as pure water will make them, before an atom of milk is drawn.

3. Provide a neat and clean place for the pans while the cream is rising, where the pure breeze from the green fields may blow into one window over the cream and out at an opposite opening. Good butter can never be made in a filthy apartment, where there is offensive effluvia arising from anything, no matter what.

4. Cream ought to be churned every day; yet, if one can provide a clean corner in a cellar or milk-room, clean and cool, and keep the pail on a clean piece of flagstone, he can make superior butter by churning twice per week, providing the temperature of the cream is maintained from day to day about 60 degrees of Fahrenheit.

5. Always skim the milk soon after the cream has risen. Thousands of barrels of cream are ruined for making yellow butter, by not skimming the milk soon after all the cream has risen. The sooner the cream is removed after it has risen, the better the butter will be. Milk which should be skimmed at evening is frequently left till the morning, when the cream will be injured to such an extent that yellow butter cannot be made from it at all, neither will it make as many pounds as if it had been skimmed at the proper time.

6. Let the churning be done by a person whose hands and clothes are as clean and sweet as a blossom of red clover; and let the churning be continued until the butter has come. It is ruinous to butter to put cream in the churn, as is sometimes done, and churn rapidly for a minute or two every hour of the day, then in the evening all take hold in turn, and keep the cream dashing and splashing until midnight. If the cream is properly managed, butter will always come beautifully in less than half an hour.

7. The butter should be worked and thoroughly salted soon after it is churned. There is but little danger of salting too much. One ounce per pound is not enough for butter that is to be shipped any considerable distance. It is ruinous to the grain of butter to throw it into a dish pan and knead it with the hands. The best instrument for working out the butter-milk is anything that will cut deep gashes in the butter, into which the buttermilk will flow. The next day after churning, the butter should be worked again, and packed. A great many persons continue to work and knead their butter to its great injury after the butter-milk is removed, thinking that all the "crystal tear drops," which are not butter-milk, must be worked out.

8. Thousands of tubs and firkins arrive at the great marts containing what was once prime yellow butter, but which was spoiled by being packed before the tubs had been prepared by being soaked in brine. For the sake of saving a penny, worth of salt for preparing a strong brine in which to soak a firkin two or three days, many a frugal housewife has been obliged to accept half the price of prime butter, simply because the staves were not saturated with brine before the butter was packed.—X. in Scottish Farmer.

Poultry Yard.

Selecting Birds for Show.

We need scarcely say that the selection of the birds is very important. The most prevalent mistake amongst beginners, when they are led to suppose their birds are good enough for exhibition, is to send as many as possible; many and many a mistake of this kind have we made ourselves, and almost impossible do we find it now to resist the temptation. It is some trouble to send birds that we know are good, and fairly worth a high price. We are apt to forget that besides a mob of a chance, breeders, any of whom may unexpectedly show specimens of commanding merit, there are probably at least half a dozen really careful breeders who will compete with us. In simple fact, the competition at good shows is now so severe that only the best birds of any man have a reasonable probability of winning; and hence the most experienced exhibitors usually show very few, except in cases where they enter a number of cockerels for sale. To do otherwise is to lose much money in entrance fees; and we would strongly advise the beginner to send only his best cockerel, and his best pair of pullets or hens, or both. It may be hard to determine which these are; and it is a great advantage in this respect to put the birds into the pens we have already recommended for other reasons, where they can be closely scrutinized. Under such an inspection, many hitherto unforeseen faults become apparent; and it will moreover be found that those birds which appear best as they run in the yard are not always the best-looking when in the pen. Every extensive exhibitor uses such pens occasionally to make his final selections, and for this purpose, for the close and deliberate study of their points apart from the bustle of a show, or for preparing as already described in view of actual exhibition, there can be nothing which will be of more vital service to an amateur. The pairs of hens or pullets more especially, should be scrutinized to see if they match; and we may add that matching in heads and breasts is perhaps the most important to secure, though any great difference in the color of other parts would be also fatal in good company. English fanciers are far more particular in this respect than American, on account of much keener competition; and hence a first-class "matchel" pair of birds is worth a large sum, perhaps four times as much as a single bird of equal quality. Thus, if a fine single pullet be worth £5, an exactly matched pair of equal merit would probably realize pretty easily £20, on account of their greater utility for show purposes.

In thus selecting birds, distinction must be drawn between faults which are nearly fatal, and others which are matters merely of comparison. Thus, a lopping comb would be fatal to a Hamburg, and so would a white leg; but marking is simply a matter of greater or less perfection. In Spanish, a red face would be fatal; but the extent of the white face is matter for competition. It is of course necessary to go occasionally to such shows as are within reach, that it may be really known what quality of birds have a fair chance of winning; and it may not be advisable always to send the best specimens to a small show, where the spare birds may be good enough to win, but rather to keep them back for a more important one some time after, when the very height of condition and appearance may be needed to give a reasonable chance of success.

A very experienced breeder—no other in fact than Mr. F. Wragg—has often told us that he likes his favorite cockerels to be "kept well under" by larger or fiercer birds till some weeks before showing,—not of course to be regularly thrashed, but sufficiently driven about to keep them always hungry for their food and intent upon it. Then some fortnight or three weeks before showing, he would put a bird by himself with a couple of old hens, and the effect was wonderful, "making a man of him," as if by magic. He would set himself up, and learn to show himself off and assume airs and style which no other treatment would produce. To the truth of this we can personally testify and the hint may be useful to others.

Poultry Houses.

Success in poultry keeping depends very much upon the character of the premises the fowls are to inhabit; they cannot, any more than human beings, retain health and condition in unhealthy dwellings. The essentials to the health and well-being of poultry, so far as accommodation is concerned are few and very simple; but it is essential to see that they really are provided, in proper proportion to the size and number of the birds. Pure air, and shelter from wind and weather, are all that is required. Pure air, of course, implies both proper cleanliness and proper ventilation, and good shelter implies a retreat dry under foot as well as above which must also be open to the light, or the fowls will not resort to it.



FIG. 1. MODEL POULTRY HOUSE.

The house itself as a rule should be set apart exclusively for the inmates to roost and lay in, and should not be more than large enough to comfortably accommodate them, too much space will only increase the liability to cold and roup in winter, on account of the difficulty of maintaining a proper temperature. Where a choice is possible, a south, or south-east aspect should be secured for the house and yard. But with hardy breeds this is not of so very much consequence. In the very severe weather in the winter season artificial heat will be beneficial, but where warming becomes necessary, the temperature should not be allowed to rise above forty or forty five degrees Fahrenheit, or the birds in all probability will take cold on the slightest exposure to the air and perish. Concrete, made with hydraulic lime, will make the best floor for the house itself, and sprinkled with sand or earth, is easily kept clean.

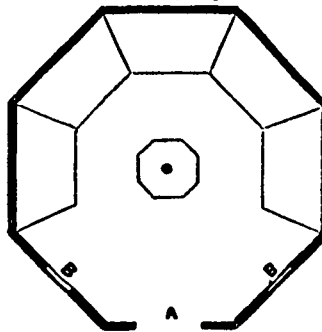


FIG. 2. PLAN OF POULTRY HOUSE.

The perch should be near the back wall, as near as will not damage the tail of the cock when at roost, but the height and size will vary according to the breed. For Cochins, Brahmans, Creves, or Dorkings, the perch should be a pole, five or six inches in diameter and not more than one foot from the ground. Other fowls can roost higher and the perches be smaller in proportion. The nests should be on the ground, except for small varieties, and may go in any convenient position where the manure cannot drop into them. Cleanliness in the house itself is very important. All the droppings should be taken away at least twice every week, which is easily done with a house-maid's dust pan and a small scraper, or a

board may be laid under each perch, and scraped at due intervals. A daily cleaning is best of all.

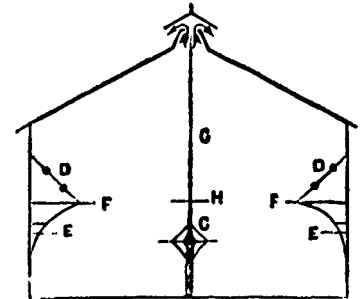


FIG. 3. SECTION OF POULTRY HOUSE.

In an early number of the CANADA FARMER a design for a poultry house is given, differing in arrangement from those usually constructed, which we now reproduce, believing it to be an improvement in several respects. The form of the house is octagonal, as greater internal space is comprised within the same extent of wall than afforded in the square form. Figures 2 and 3, show ground plan and vertical section with entrance door in one of the sides *b b*, the windows with entrance doors for fowls beneath, *c*, feeding box, *d d*, roosts, *e e*, nests, *ff*, floor. The roof is supported by a central pillar, *g*, and may have a latticed opening at the top for ventilation. The centre pillar is by far the best plan of supporting the roof, for if horizontal beams are used the fowls will unquestionably perch on them. The advantages of this arrangement are obvious. The nests being conveniently placed on the ground underneath the broad perch, need no top, whilst they are also well shaded, to the great delight of the hen. The shelf may be scraped clean every morning with the greatest ease and comfort, on account of its convenient height, and should be slightly sanded afterwards; whilst the floor of the house is never polluted at all by the roosting birds. For Cochins or Brahmans, the perch may be dispensed with, and the shelf in floor littered with straw, shaken up every night, and renewed when necessary. This arrangement of house, allowing as it does of the nests being placed immediately under the perch, gives a greater amount of floor space than any other, and also keeps the fowls from all upward draughts of air; but daily attention in this case becomes absolutely necessary, to keep the shelf from becoming foul and infested with vermin.

Early Chickens.

It is now time for those who want to have early chickens, and particularly those who are raising any of the pure breeds and expect to send their chickens to the fall shows, to make up their breeding stock for the coming season. If your breeding hens have been running with cocks of some other breed, or of mongrels it will not be advisable to set any eggs that have been laid under two weeks from the time of separation. But if the hens have been running with cocks of their own kind, no such period of probation is needed; and if they are put into light, dry, and warm quarters, where they can bask in the sunlight, and have plenty of food and water, they will commence laying very soon, and the eggs may be set at once.

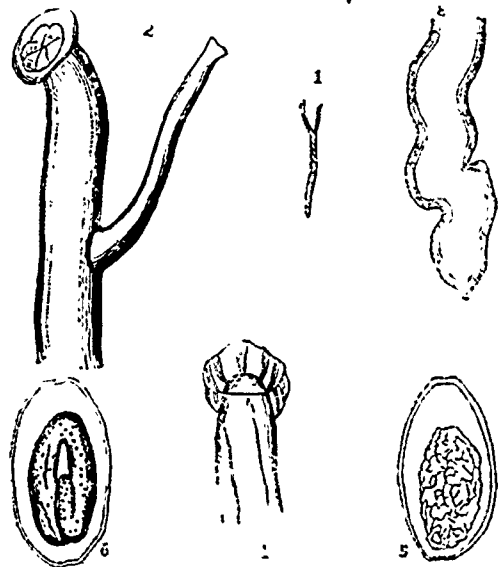
It is a mistake commonly made at this season of the year, to put too many eggs under a hen. Seven or nine are enough for the largest hen; for if she is so fortunate as to cover them all, and not allow the outer ones to get chilled, she will not be able to cover her chicks well during the long cold nights of spring. It is particularly essential at this season of the year that both food and water and a dust-bath be placed where the setting hens can have convenient access to them, for a very short exposure at this season chills the eggs.

Chickens that are hatched in February and March can be raised with a little extra care, and their fine size and appearance more than repay it. They should be kept in a warm and light place, and fed often. They must be fed early in the morning and late at night, or the long time which elapses between sunset and sunrise will more than counterbalance any gain that can be made during the day.

By setting a candle down in front of the coop at eight or nine o'clock in the evening, and throwing down food on a dark-colored board and calling them, they will soon learn to leave the hen and come out to feed; and by following this plan for a couple of weeks, the troublesome period may be bridged over, and the chicks started out in the spring thriving finely.—*National Live Stock Journal.*

Gapes.

The nature of this disease, so very common in poultry yards is not generally known or understood, we are induced therefore to give something of its history and cure, although the theory of its propagation is yet veiled in mystery. The disease is peculiar to chickens or young fowls, and consists in the windpipe being infested with small white worms, causing the chicken to gape for breath, waste away, and finally die from suffocation. The worm is known as *sclerostoma syngamus*; and in a memoir upon the subject presented to the Linnean society by Dr. Spencer Cobbold, he states that it has been observed in the trachea of the turkey, fowl, pheasant, partridge, duck, lapwing, black stork, magpie, hooded crow, green woodpecker, starling and swift. The probability, however, is that all birds are more or less subject to it. This gentleman performed an operation on a chicken between six and seven weeks old which was suffering from this disease, and extracted from the trachea, or windpipe, six of these parasites all of which were united in pairs, or double. The manner in which the operation was performed he thus explains. Having obtained possession of the chicken, I dipped a small piece of carded wool in chloroform and placed it in front of the bird's nostrils, it was soon rendered perfectly insensible. The skin of the neck was then divided, and the trachea slit up to the extent of about a quarter of an inch; and introducing one prong of a pair of common dissecting forceps, I removed the worms."



Explanation of Wood-Cut.

- Fig. 1. *Sclerostoma syngamus*, male and female, natural size.
- Fig. 2. Upper part of the same, showing more especially the six-lobed circular lip of the female, and the mode of union. Enlarged.
- Fig. 3. Lower end of the body of the female, with its mucronate caudal appendage. Enlarged.
- Fig. 4. Lower end of the body of the male, showing the cup-shaped bursa, hard rays, lateral muscles, digestive tube, and round tail. Magnified 30 diameters.
- Fig. 5. Mature egg. Magnified 220 diameters.
- Fig. 6. Egg, with contained embryo. Magnified 220 diameters.

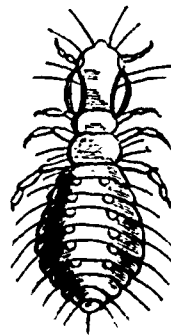
"Reverting now," says Dr. Cobbold, "to the worms extracted from the trachea, I observe, in the first place, the females have an average length of five-eighths of an inch, the males scarcely exceeding one-eighth of an inch. In both sexes the bodies are tolerably uniform in breadth throughout, and that of the female measures one-thirty-fifth, whilst the transverse diameter of the male is only, from one-sixtieth to one-fiftieth of an inch. The heads are relatively even more disproportionate. In the fresh

state, the mouth of the female was seen to be furnished with six prominent chitinous lips, (fig. 2)."

"In both sexes the surface of the body is quite smooth, but the female displays a series of spirally-arranged lines, which, at first sight convey the idea of a natural twisting of the body; this, however, is more apparent than real, being likewise more marked in some individuals than in others. The body of the female, towards the tail, exhibits a decided tendency to fold upon itself; and in one example this feature was very significant (fig. 3). The lower part of the body preserves a tolerably uniform thickness almost to the extremity, where it is suddenly constricted to form a short narrow mucronate tail, scarcely visible to the naked eye. Employing a pocket-lens, it is easy to observe through the transparent integument the spacious digestive canal, surrounded on all sides by sinuous foldings of the ovarium, tuba, and uterus—the vagina terminating laterally at a point corresponding with the line of the upper fourth of the body. Here the male is usually found rigidly affixed by means of a strong membranous sucker, which proceeds from the lower part of the body. This cup-shaped appendage is formed out of a folded extension of the skin which thus envelopes the centrally enclosed and rounded tail, (fig. 4). The eggs of *Sclerostoma syngamus* are comparatively large, measuring, longitudinally, as much as the 1-250th of an inch (fig. 5.)

So much having been ascertained, it still remains to be discovered the mode in which these worms enter the trachea, or in which way the disease is propagated. This is to some extent a mystery, and constitutes the history of the egg and its development, till the time when it is found fully matured in the infected chicken, on this subject little has been known beyond the fact that damp and dirt have been conclusively proved to have a marked predisposing effect. It is a noticeable fact, however, and one which has not escaped the observation of some breeders that if you keep lice off the small chickens you will have no gapes. A recent writer on this subject states that he noticed (as almost all breeders may have) on the heads of his chickens some large insects. They were not lice; and after examining them closely he concluded they belonged to the tick family. The insect was embedded in the skin of the chick's head so deeply that when pulled off the chick would cry out in pain. From what source these ticks are derived is a matter of conjecture, they have not been discovered in the hens, although to be found in the newly hatched chick. They cannot be hatched with the chick, for in experiments in hatching chickens artificially (by an incubator) not one thus hatched had any sign of the insects on them. He then argues, as it is well known that on all animals that do not perspire, the parasites that infest the body make their way to the nostrils to drink. And in some cases (sheep for one it is stated,) the parasite either penetrates the nostril and there deposits its egg, or deposits it at the opening of the nostril, and it is conveyed back by natural causes. This egg in time becomes larva or worm, and causes disease. In the chicken the worm follows the nostril back until it reaches the opening of the trachea and there makes a lodgment; as they grow they gradually fill the opening, and thus produce the gasping for breath consequent upon partial suffocation, which is called the gapes.

We give a microscopic drawing of the insect referred to, which at first sight would seem to belong to the louse tribe, but differs in habit, as evidenced by the strong hold upon the chick's skin when attempted to be detached. In the memoir by Dr.



Cobbold already referred to, he says, "by whatever mode the young (of the gape worm) make their exit from the shell, it is manifest that prior to their expulsion they are sufficiently developed to undertake an active migration; their next habitation may occur within the body of certain insect larvæ. It is important therefore that when detected in the young chick these parasites should be got rid of, for which purpose the following ointment, will be found an effectual remedy. Mercurial ointment, one ounce; pure lard, one ounce; flour of sulphur, one-half ounce; crude petroleum, one-half ounce; this ointment well compounded and applied in a semi-fluid state to the head of the chicken at the time of taking them from the nest will prove most effectual.

Gapes scarcely ever trouble a clean and dry yard; and the free use of carbolic disinfecting powder is an almost certain preventative, and on this as on every other account very desirable where chickens are reared in large numbers.

When the disease, however, has entered a yard, it may be checked in its progress by adding fluid carbonate, camphor, or even lime, to the drinking water. The sufferers themselves should be forced to inhale the vapor of carbolic acid. Some of the clear transparent quality may be placed in a spoon or metal saucer, and held over a candle or lamp, when dense white fumes of the acid will arise. In these the chicken's head is to be immersed till the bird is nearly suffocated; or if a large number have to be treated, the whole may be confined in a box and fumigated at once, being carefully watched through an aperture covered with a piece of glass, else the chickens will be killed as well as the worms.

How to Manage Poultry.

I am one of many who not only believe, but know from experience, that there is no stock kept by the farmer that will pay so large a return, for money expended, as a well-managed poultry-yard. As we cannot compete with our Western farmers in the production of pork, with grain at ten cents per bushel, let us devote more attention to poultry, that will pay us five hundred per cent. more than pork; and as to manure, will produce "for each bushel of food," a much more valuable quality of manure. Small potatoes, beets, pumpkins, cabbages—in fact any crop usually fed to swine, can be profitably dealt out to the fowls.

Now comes the question, How shall it be done? Without theorizing, I will give my method of keeping. Select 200 young fowls, Nov. 1st, in laying condition; place them in separate coops, from 12 to 15 in each; at night put one bushel of small potatoes, beets, or pumpkins into your boiler, "which should be convenient to the coops," adding one quart of onions; boil fifteen minutes; then add four quarts of corn meal; after well mixing, cover the mess, and in the morning your fowls will enjoy a warm breakfast at a trifling expense. At noon feed oats, and at night corn, taking care that they are supplied with clean water and plenty of shells. Salt the mess occasionally, and once a week a little fresh beef is very beneficial. A flock of 200 well-fed fowls can be kept at an expense of 75 to 80 cents per day. My winter eggs sell at the door at 40 to 50 cents per doz.; therefore the price of two dozen eggs feeds my flock; and when I collect from eight to ten dozens per day we can easily figure the profits. The manure fully compensates for the care of feeding, etc.

It is as necessary for the farmer to have a warm room to start his early chicks in as a hot-bed is for his early vegetables. Now is the time to heat this room. Sit every hen you can get, so that March 1st will find you with 200 or 300 hundred chickens; the young cocks will bring \$1 each in June. Here comes in your profit, as the same cocks would not command higher prices if kept all summer for Thanksgiving and your pullets will commence laying early in the Fall, taking the place of the 200 hens, which will be found fat and ready for Thanksgiving market. Having experimented with nearly every known breed, I unhesitatingly pronounce the Light Brahmas and the Partridge Cochins, as egg-producers and market fowls, far superior to all others.—J. S. Ives, in Rural New Yorker.

NEW SERIES

07

THE CANADA FARMER.

The Publishers of THE CANADA FARMER have the pleasure of announcing the commencement of a New Series of this Journal, on a higher and more efficient scale than has yet been attempted in Canada.

The exhaustion going on in a large proportion of the farming lands of our country, from improvident culture, and the consequent inability to obtain crops equal to the average of past years; the increasing cost of labor; the exorbitant prices of all manufactured articles, without any proportionate increase on the prices of farm produce; and consecutive seasons of severe drought—all at this moment unite in rendering necessary a prompt and vigorous effort on the part of agriculturists to maintain the high prosperity so long enjoyed by the farmers of Canada. The agricultural interest so vastly preponderates over all other industrial pursuits in Canada, and on its welfare so completely depends our material progress as a people, that the best mode of accomplishing this end may well receive the earnest consideration of all classes as a national concern.

The conductors of THE CANADA FARMER entertain the conviction that the one true remedy for these passing difficulties is better farming. They believe that the same resolution and energy that enabled the brave early settlers to overcome toils and hardships now happily unknown, and convert the wilderness into cultivated farms and the thriving towns, if now applied (with the better knowledge and ampler means of the present day) to the renovation of the soil and the general adoption of a higher system of tillage, would place the agricultural interests of our country in a far more secure and more profitable position than it has ever yet held. With higher cultivation greater variety of crops, improved implements, improved herds and flocks, higher feeding, and heavier manuring, the Canadian farmer can overcome all difficulties present or prospective, and command success.

It is with the earnest desire and hope of promoting effectively this movement that the new departure in the history of THE CANADA FARMER has been resolved on. During the nine years of the publication of this journal, the most gratifying acknowledgments have come constantly from all quarters of the valuable service rendered by it to the cause of agricultural advancement. But it is believed that the time has come when a more systematic treatment of each branch of the agricultural and horticultural professions is demanded—when the suggestions of writers combining thorough scientific knowledge with practical experience will command earnest attention—and when intelligent farmers in all parts of the Dominion are prepared to consider candidly, and test practically, whatever may be shown to be advantageous.

With these views and intentions the new issue of the CANADA FARMER has been entered upon. The work of each month will be classified under the following departments:—

- FIELD CULTIVATION.
- GRASSES AND FORAGE CROPS.
- FOREST, SHADE AND ORNAMENTAL TREE CULTURE.
- HORTICULTURE—including the management of the Orchard, the Flower Garden, the Kitchen Garden, the Conservatory, the Greenhouse, and the Vineyard.
- AGRICULTURAL CHEMISTRY.
- ENTOMOLOGY.
- RURAL ARCHITECTURE.
- DRAINAGE AND FENCING.
- IMPLEMENTS OF HUSBANDRY.
- FERTILIZERS.
- SEEDS AND SEED-GROWING.
- THE BREEDER AND GRAZIER.
- THE DAIRY.
- THE HORSE AND STABLE.
- THE VETERINARIAN.
- THE POULTRY-YARD.
- THE APIARY

Each of these Departments will be placed in charge

of a responsible Editor, thoroughly competent to deal with his special subjects; and the publishers have the satisfaction of stating that they have already secured the co-operation of a body of eminently qualified writers—men who, they believe, will enter with hearty zeal upon their work, and seek to infuse fresh energy into the path of agricultural industry. The names of many of these writers we are not at liberty to give to the public; but we may state that among them are those of our former able and experienced collaborators, Mr. D. W. Beadle, of St. Catharines, and the Rev. F. W. Clarke, of Guelph. Prof. Ellis, of the Ontario School of Technology, will preside over the Department of Agricultural Chemistry. The Rev. C. J. S. Bethune will deal ably, as in the past, with the interesting field of Entomology. Professor Smith, President of the Ontario Veterinary College, will edit the Veterinary Department. The Poultry Yard will be in the hands of a party eminently competent to deal with all its details. Mr. Anderson will take charge of Agricultural Implements. Mr. William Kaufman, the talented and experienced Architect of Toronto, will edit the Department of Rural Architecture, and furnish designs and specifications for the various illustrated structures. The services of Mr. L. B. Arnold, Secretary of the American Dairymen's Association, have been secured as Editor of the Dairy Department, in all its details. Mr. George Leslie, Jr., of Leslieville, will conduct the department of Forest and Shade Trees. The regular editorial staff will include a number of other able writers; and we are promised, besides, valuable contributions in the several departments from a host of agricultural friends.

The new issue of the CANADA FARMER will be published on the 15th and 30th of each month—instead of monthly as heretofore—and contain twenty pages in each number. It will be printed in the best style and plentifully supplied with wood-cuts in illustration of the letter-press articles.

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GEORGE BROWN, Managing Director.