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THE CANADA FARMER

Vol. X. No. II. (NEW SERIES) | TORONTO, CANADA, JANUARY 30, 1873. | $1.50 per Annum. SINGLE COPIES 8 CTS.

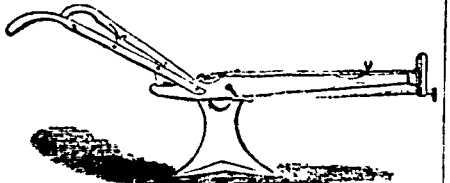
# The Field.

## The Cultivation of the Soil.

We continue from last number Mr. Waring's article on SUB-SOIL PLOUGHING.

The *sub-soil plough* is an implement differing in figure from the surface plough. It does not turn a furrow, but merely runs through the sub-soil like a mole—loosening and making it finer by lifting, but allowing it to fall back and occupy its former place It usually follows the surface plough, entering the soil to the depth of from eight to fifteen inches below the bottom of the surface furrow.

The best pattern now made (the steel sub-soil plough) is represented in the following figure: —



The sub-soil ploughs first made raised the whole soil about eight inches, and required very great power in their use, often six or eight oxen. The implement shown in the figure, raising the soil but slightly, may be worked with much less power, and produces equally good results. It may be run to a good depth in most soils by a single yoke of oxen

The motion of any part of the soil which is effected by this sub-soil plough is very slight, but it is exerted throughout the whole mass of the soil above the plough and for a considerable distance sideways toward the surface If the land is too wet, this motion will be injurious rather than beneficial, but if it is dry enough to crumble, it will be very much loosened If we hold in the hand a ball of dry clay, and press it hard enough to produce the least motion among its particles, the whole mass becom s pulverized. On the same principle, the sub-soil plough renders the compact lower soil sufficiently fine for the entrance of roots.

Notwithstanding its great benefits on land, which is sufficiently dry, sub-soiling cannot be recommended for wet lands, for, in such case, the runs of a single season would often be sufficient to entirely overcome its effects by packing the sub-soil down to its former hardness.

On lands not overcharged with water, it is productive of the best results, it being often sufficient to turn the balance between a gaining and a losing business in farming.

It increases nearly every effect of under-draining; especially does it overcome drought, by loosening the soil, and admitting air to circulate among the particles of the sub-soil, and deposit its moisture, on the principle described in the chapter on under-draining.

It deepens the surface-soil, because it admits roots into the sub-soil where they decay and leave carbon, while the circulation of air so affects the mineral parts, that they become of a fertile character. As a majority of roots decay in the surface-soil, they there deposit much mineral matter obtained from the sub-soil, and thus render it richer.

The retention of atmospheric manures is more fully insured by the better exposure of the clayey portions of the soil.

The sub-soil often contains matters which are deficient in the surface-soil. By the use of the sub-soil plough, they are rendered available.

Sub-soiling is similar to under-draining in continuing the tillering of grasses.

When the sub-soil is a thin layer of clay on a sandy bed (as in many parts of the country), the sub-soil plough, by passing through it, opens a passage for water, and often affords a sufficient drainage.

If plants will grow better on a soil six inches deep than on one three inches, there is no reason why they should not be benefited in proportion, by disturbing the soil to the whole depth to which roots will travel—even to a depth of two feet The minute rootlets of corn and most other plants will, if allowed by cultivation, occupy the soil to a greater depth than this, having a fibre in nearly every cubit inch of the soil for the whole distance. There are very few cultivated plants whose roots would not travel to a depth of thirty inches or more. Even the onion sends its roots to the depth of eighteen inches when the soil is well cultivated.

The object of loosening the soil is to admit roots to a sufficient depth to hold the plant in its position, —to obtain the nutriment necessary to its growth,— to receive moisture from the lower portions of the soil,—and, if it be a bulb, tuber, or tap, to assume the form requisite for its largest development.

It must be evident that roots, penetrating the soil to a depth of two feet, anchor the plant with greater stability than those which are spread more thinly near the surface.

The roots of plants traversing the soil to such great distances, and being located in nearly every part, absorb mineral and other food, in solution in water, only through the *spongioles at their ends*. Consequently, by having those ends in *every part of* the soil, it is *all* brought under contribution, and the amount supplied is greater, while the demand on any particular part may be less than when the whole requirements of plants have to be supplied from a depth of a few inches

The ability of roots to assume a natural shape in the soil, and grow to their largest size, must depend on the condition of the soil. If it is finely pulverized to the whole depth to which they ought to go, they will be fully developed, while, if the soil be too hard for penetration, they will be deformed or small. Thus a parsnip may grow to the length of two and a half feet, and be of perfect shape, while, if it meet in its course, at a depth of eight or ten inches, a *cold, hard* sub-soil, its growth must be arrested, or its form injured.

Roots are turned aside by a hard or wet sub-soil, as they would be if received by the surface of a plate of glass.

Add to this the fact that cold, impenetrable sub-soils are *chemically* uncongenial to vegetation, and we have sufficient evidence of the importance, and in many cases the absolute necessity of sub-soiling and under-draining.

It is unnecessary to urge the fact that a garden soil of two feet is more productive than a field soil of six inches, and it is certain that proper attention to these two modes of cultivation will in a majority of cases make a garden of the field—more than doubling its value in case of working, increased produce, certain security against drought, and more even distribution of the demands on the soil—while the outlay will be largely repaid by an immediate increase of crops.

The sub-soil will be much improved in its character in first year, and a continual advancement renders it in time equal to the original surface-soil, and extending to a depth of two feet or more.

## Ploughing Deep.

Mr. Mechi of Tiptree Hall, England, is a very strong advocate of subsoil as a manure. "Science," in a recent paper he says, "has indicated that in the subsoil we should seek for increased profits, for it teaches us that, in the great majority of soils, the earth at every depth contains a certain portion of the elements of plant food, which only requires aeration and amelioration, by disturbance, drainage, and manure, or by burning, to render them gradually available as plant food. Farmers, as a rule, have no faith in the subsoil, but, on the contrary, rather fear it, believing that there is something unwholesome under the cultivated crust, and that the interior of the pie is of the wrong sort. The fact is, that it is raw and uncooked, because it has never, like the top soil, been stirred, and exposed to the ameliorating and fertilizing influence of the atmosphere, and in too many instances for the want of drainage, air is completely excluded by the presence of stagnant water."

A correspondent of the *Country Gentleman* corroborates this view by his own experience. He says: "Some of the land on the homestead which I worked for many years, is of this nature. One lot in particular had a striking effect. The land was ploughed up to the beam, some 5 or 6 inches deeper than usual, bringing up a deep bed of raw soil, of a powdery and various colored nature. It was a hillside facing the south, and composed of sand, gravel, and clay, the clay in a pulverized state. The land was not very good and had been considerably run down, having never received any manure, grass and clover being depended upon for enrichment "The first year the crop was almost an entire failure; there was doubtless too much of the raw material. The grain started, but did not thrive. The next year was somewhat better, but not much; the same depth of ploughing continued. Clover and timothy were sown (with the grain), and a fair catch resulted. The clover did well, and the timothy following (after the clover was run out), was an improvement on former crops. But the land became better, the grass thicker and heavier. Grain followed—same depth of ploughing—also improved; all this time no manure used. There was a great depth of mellow soil; and this was thoroughly heated, being directly exposed to the sun. After this the land was stocked down to clover and timothy, and what seems a permanent sod is the result. Seldom is there such a growth, close, dark and rank, a thick mat of roots and grass; and such is the case now after many years of trial A few years since some manure was applied, and benefited it somewhat.

"Now, had this land been ploughed to the same depth as usual, working only the old over, there would have been a loss almost yearly, as in the case with too much land. Land treated in this way must have manure. But the undersoil brought up answered the purpose—that surely did it in the case I have related. Doubtless the strength of the land had somewhat worked down, and with the original fertility of the sub-soil, formed a rich bed for cropping. But it took years to bring it to the true state of efficiency. It acted as manure, and is much more lasting. The mechanical condition of the land had also something to do in the case, being worked so as to be deeply mellow, acting thus as drainage, and for gathering a retaining moisture. With more sand, or sand and gravel, the thing doubtless would have been different. But there was considerable clay, and this in a fine,

almost powdery state, still more reduced by the action of the air. The same soil carted on a meadow would have benefited it beyond any doubt."

"That a large share of our land needs working up from below, is as clear to the writer as any fact in agriculture. It is probably best to do this gradually, bringing up an inch or two of soil at a time; but do it at all events, if it has to be deepened at one ploughing. A fallow is a good means to treat soil in this way. The difficulty is, we are discouraged when we bring up considerable raw soil at a time, and it proves for a year or two to be no benefit, or even perhaps a hurt. It *will* in the end, and that soon, pay. Another correspondent says:—"I know by experiment and experience that there are subsoils (worthless, judging by the eye), that, used as top-dressing for grass lands, will give as large an increase of hay as a heavy dressing of farm-yard manure, phosphates of guano or any other manure I have ever used." Now this same soil, brought up in ploughing and exposed to the elements, must, from necessity, have the same effect, for the mere fact of applying it cannot alter the case; the soil is there, acted upon in the same manner. This at least is true, that such soil, or some soil, brought up to the surface, is an advantage to the crop, and forms an excellent seed bed for clover and timothy, with heavy yields following."

We may add, that, considerable scepticism was manifested by the members of the club as to the efficacy of Mr. Mechi's views. Admitting the sound policy of ploughing deep, the practice will for some time be difficult to popularize in Canada, from the fact that years have to pass before the full benefit of manuring the land with a desirable subsoil is realized, thereby reducing the immediate returns of the husbandman.

## A New Wheat, the "Square Head."

The best variety of wheat grown in Scotland, has for long been admitted to be the Fenton wheat, originally propagated by Mr. George Hope, of Fenton Barns. A competitor for the palm of superiority has however now come on the field that bids fair to distance the Fenton variety At a recent meeting of the East-Lothian Agricultural Society, the following incident occured in the proceedings:

Mr. George Hope (Fenton Barns) said he would take the liberty of drawing their attention to a variety of wheat named "Square Head," which Mr. Shirreff, Saltcoats, had advertised. He was not likely to say anything that might be considered unfavorable to his own wheat, the "Fenton," but he thought it only right to state his experience of this year. He had been induced to sow four bushels of the square head wheat last autumn by Mr. Scholey, of Easteroft Grange, near Goole, Yorkshire, who strongly recommended it for its uncommon stiffness of straw and its extraordinary prolific nature. He had made a small experiment with it as compared with Fenton, and found that it yielded nearly 6 bushels per imperial acre more than Fenton, and the latter was decidedly more lodged than the former. Of course this was a singularly wet year, but the grain of the square head appeared good quality; he could not tell what sort of flour it would produce, but he had no reason to suppose it would be inferior to other varieties of red wheat. This morning he had received a letter from Mr. Scholey in which he detailed an experiment with the square head, Fenton, woolly-eared, and Browick red, the results being: square head 150 stones, Fenton 138 stones, woolly-eared 112½ stones, and Browick red 124 stones; but in a hollow, where the square head was sown the grain was destroyed, so that Mr. Scholey calculated it exceeded the Fenton by nearly 6 bushels per imperial acre, as he himself found it to do. You would hardly believe the crops Mr. Scholey had grown in the two previous good years. He would therefore recommend the members of the Club to make a trial of it. He intends to sow all he had grown himself.

Mr. Shireff (Saltcoats) warmly recognised the generosity of spirit displayed by Mr. Hope, who having cultivated a wheat which he had established as the best in cultivation, had the candor, after trying another kind, to acknowledge himself beaten on his own farm. To the square-headed wheat they could not give too much manure. It had a big, bold head, and a golden straw nearly as thick as his finger. He advised every farmer to sow not all but half of his farm with it. It should be sown thick, at any rate a bull or five bushels to the acre, especially this year, when so many of the pickles had sprouted.

The handsome conduct of Mr Hope in this matter, was exactly what was to be expected. He is one of the first, if not the very first agriculturist in Britain, and as generous and liberal minded as he is able and successful in his profession. As many of our readers are aware, Messrs Adam and Charles Hope of Hamilton are brothers of Mr. Hope, of Fenton Barns.

## Top-dressing and Soiling.

Were I able, with pen or voice, to reach every young farmer in the land, and to secure his attention, chief among all farm operations I would urge upon him to fully understand, and thoroughly to practice two things, namely: to *top-dress* all meadows and fields of winter grain, and to *soil all their stock*. With all who have practiced it to any extent, applying manure and compost on the meadows and winter wheat and rye, it is found to be the most advantageous way to use manure, and to bring the most speedy profit for the operation. Spread on winter wheat late in autumn does much to prevent winter-killing, by preventing the plants from being torn out by frost or blown bare by the wind in dry times in winter, as is often the case. This mulching or top-dressing also shelters the young grain and grass from the early hot sun in spring, and prevents the moisture and ammonia from being evaporated, and thus entirely avoids, or largely lessens, the evils of drought. It also fertilizes and stimulates the growth of the young plants, by being leached and soaked into the soil gradually by the rains. We have succeeded in raising, and have seen others raise bountiful crops of first-rate winter-wheat on lands where none before ever did, or even expected to get crops, on account of winter-killing; but top-dressing or mulching makes winter grain a sure thing, where otherwise it could not succeed.

Then, we have taken old, dry, "sod-bound" meadows, and liberally spread manure and compost on them in the fall, and next summer cut three tons of good hay to the acre. The mulching kept the soil moist and soft, sheltered off the sun, leached down and stimulated the growing of the grass; we have also top-dressed right after the first mowing in June, so that the hot sun should not dry and scorch the ground and roots, and bare by mowing, and thereby obtained another good swarth of over a ton to the acre. This operation pays well if done once in two years, and will prevent a good meadow from ever "running out" or getting sod-bound, so that ploughing and re-seeding is never necessary, unless it is desired to plough occasionally and sow to grain; but if there be a good market for the hay, it is by this process more profitable than grain raising.—*Maryland Farmer.*

## Lucerne Soiling.

We believe the Agricultural Journals cannot well do their readers a greater service than persuading them of the great value of *Lucerne*, both as meadow and as a green soiling crop If sown on deep ploughed land it yields immensely, and never suffers from drouth, as it runs its roots deeply in the ground; if there be no unusual hindrance, it will run down many feet to find moisture, thus also acting as a subsoiler; we have found the roots of this nutritious plant more than three feet below the surface soil; they are nearly as large as parsnip roots, and when cut off by the plough, at a depth of from seven to twelve inches, they rot below that and leave a moist fertilizer or *humus*, which aids to keep the ground porous at that depth; while the portion above, which is turned under and mixed with the soil, furnishes a large amount of fertilizing elements. On deep, strong land it may be mowed several times in the season, yielding a vast amount of excellent feed, which is liked by all stock, and is first rate for milk. It sprouts early in the spring, and may be mowed earlier than clover for soiling.

"Mr. C. W. Howard, in the *Southern Farm and Home*, Memphis, Tennessee, says, concerning lucerne: As a forage plant at the South, lucerne is very far superior to all others. It is used for three purposes. First, for feeding green, or soiling; used in this way, it is best to cut the lucerne a day in advance, so as to feed in a wilted state. *It must never be pastured.* Lucerne hay is extremely nutritious, and is relished by horses, cattle and sheep. It is preferred by the domestic animals to any other kind of hay. The product of lucerne is enormous. Five tons of excellent hay may be cut from an acre. It is estimated that fodder, green and dry, may be obtained from an acre of lucerne for the support of five horses during the entire year. This included the great bulk of green food during the spring, summer, and autumn.—*La. S. C. Cor. Maryland Farmer.*

## Wheat—Winter-Killing and Tillering.

Winter-killing is constantly complained of by farmers without the causes being accurately known. When sown deep, wheat produces but few roots. When the ground freezes and thaws many times, these roots are broken, thus depriving the plant of necessary nourishment and support, when it either dies or only maintains a poor, sickly growth. Sometimes wheat is thrown entirely out of the ground, when it is sure to perish. The natural remedy is a good covering of snow; but seasons occur when no snowy blanket falls. The artificial remedy is underdraining; and if well done, it may be pronounced effectual against winter-killing.

One of the marvels of the wheat plant is that known as tillering. It is the secret of its great productiveness. Many experiments have been made to ascertain the limits of this faculty, and the results have been truly wonderful. An English gentleman sowed a few grains of red wheat June 2d, one of the plants of which had tillered so much by the eighth of August that he then divided it into eighteen others, all of which were planted separately. In a few weeks so many of these had again multiplied their stalks, that he had set out 67 altogether to go through the winter. With the spring growth all these began tillering, so that in March and April a new division was made, and the plants increased to 500. It was believed that another division might have been made, and that it would have increased the number to 2,000. The 500 grew most vigorously, exceeding plants as ordinarily cultivated. When harvested, a single plant yielded over 100 ears, and the whole number of ears produced was 21,109, or more than 40 to each divided plant; the grain measured 3¼ pecks, weighing 47½ lbs. All this was said to be the product of a single grain of wheat.—*N. Y. Tribune.*

## Too Much Land.

A correspondent of the Boston *Cultivator* thus writes:—

One of the greatest mistakes which farmers make is in cultivating too much land. It is a truth which needs no argument to prove, that it is cheaper by thorough manuring and cultivation, to raise 50 bushels of corn on one acre than it is by slovenly to raise that amount on two. If a farmer has plenty of manure and time to give to the two, then let him plant them by all means. Now the average yield per acre of any crop throughout the country is not half what it is upon the best cultivated farms. Supposing that farmers should give the same attention to one-half of the acres that they now do, they would be gainers in the saving of one half of the land for wood or pasture, while they would still have as much to sell. But it is not necessary to give the same attention; 50 per cent, more manure and labor would double the crop, for it requires the same ploughing and planting in either case. It is the thoroughness with which this is done, and the after cultivation, that tells; so that by planting one half as many acres farming would also save ½ of the expense, and these two savings would make a change from profit to loss. The great trouble with farmers is that they do not make sufficient calculation for drawbacks, as bad weather, sickness, breakage, and unstable help. It would be far better to allow too much the other way, and then after their crops where thoroughly tended, devote their spare time to improvements, such as fencing and ditching, than to be forever worried by the friction caused by being behind.

A NEW STEAM PLOUGH.—The *Scottish Farmer* of Nov. 18, makes mention of a new steam plough and subsoiler combined, just turned out of the Banff Foundry. The inventor is G. W. Murray, and it was made for L. Livingstone Learmouth, of Linlithgow. It is made of Swedish wrought iron, so that it can work among the stones and rocks of Scotland, steel ploughs being there too much addicted to the breaking of shares, "skifes," &c. The principal new feature of this plough is that there is a combination of the common plough and the subsoiler, or it can be used for ploughing without subsoiling. This particular implement cuts three furrows as a plough simply, or two with the subsoiling apparatus attached. The subsoiler loosens the soil in the furrow from three to nine inches, as desired; it simply breaks up or loosens, without bringing the subsoil to the surface. The cost of the implement is £125, or $625. This of course does not include the cost of the engine for running it.

# Grasses and Forage Plants.

## Clover.

We continue from last number our article on the culture of the Clover Crop :—

Any good wheat land may be considered good for clover, but there must be present, in considerable quantities, lime and other alkalies. Even sandy lands, after being well dressed with lime, produce good crops of clover.

Clover can be sown alone, or seeded down with grain crops. When planted alone, the seed should be sown at the earliest possible moment in spring. The almost invariable practice, however, in Canada, is to sow it with fall or spring grain. It succeeds in favorable seasons with all white crops—but decidedly the safest are rye in fall and barley in spring. By sowing clover with rye in the fall, injury done during the winter, can be corrected by replanting in spring. Clover is often sown with great success upon the late snows of March and April, and soon finds its way down to the soil, where it quickly germinates.

The quantity of seed best to be sown varies according to the character of the soil and the purpose to which the crop is to be applied. Experience on your own farm can only settle this accurately. As a general rule, however, when Clover is to be sown by itself, we believe from 12 to 15 lbs per acre to be the *minimum* quantity that can safely be planted—and we have known 20 pounds sown with great success. We further believe that the usual practice of sowing common Red Clover alone, is greatly improved by substituting a mixture say, from one-half to two-thirds Common Red, and the balance of Alsike, White and other sorts. When Clover is sown with Timothy or other grasses, the quantity of seed is of course proportionately decreased—but the advantage from a mixture of clover seeds remains the same.

Special care as to the quality of the seed is absolutely essential in planting Clover. Many failures arise from a deficiency in the quality of the seed. That which is ripest (which is shown by the greater prevalence of dark colors among the grains) is to be preferred ; and according as the seed is light in color an extra allowance should be made in seeding. If in one hundred grains there are fifty light, over fifty per cent. should be added to the amount to be sown per acre, and so on in proportion to the deficiency of dark seeds in the sample. The light seeds being generally immature and unripe, usually fail to grow.

In sowing the seed, it is of course essential that it should be evenly distributed over the land, a thing that can only be done by a first-class broad-cast sowing machine, of which there are now happily several, or by entrusting the operation to a thoroughly reliable and experienced hand-sower. A patch here and there, a little thicker than the rest, not only looks unsightly, but also makes the crop a very uneven one at haying-time. We too often see fields of clover that look as if they had grown in long strips with great gaps between. The sower blames the seed, but if the seed is bad, it is bad all over the field, and not in patches. The sole cause is careless sowing. The sower having nothing but his eye and memory to guide him, takes too wide a strip at a time, and in throwing the seed the bulk of it falls directly in front of him, leaving the edges of the strip he thinks he is covering with a mere sprinkling of a few scattered seeds. True, in some cases, the wind will so drive the seed as to make botch work of what even the best sowers can do. But when the wind blows hard, the sower should stop. We thoroughly believe in machine sowing, whether drill or broad-cast.

In cases where there has been a partial *take* of the clover, much may yet be done—after the grain harvest—by re-seeding every vacant space. This late-sown seed, three seasons out of four, will form plants strong enough to stand the ensuing winter, provided all stock are kept off, and the plants allowed to grow so as to make a top that will act as a winter mulch to them.

Some farmers are in the habit of turning their stock into the newly seeded clover immediately after the grain which covered the land, and acted as a mulch to protect the young plants from the scorching sun of summer, has been cut and removed. This is a very great error. The young plants at this time want to have every chance given them to increase in size and cover the ground, so as to act as a mulch to their own roots. It is better to leave such fields entirely shut up from stock until well on in September, when, if there is a good growth of strong plants with a heavy top, it will do no harm to feed down with stock to a moderate extent—that is, just so much as will still leave the plants strong and vigorous to resist the winter frosts. With a weak, thin growth of plants, it is better to keep stock out altogether, for the first season.

Clover cannot be ploughed under the first year with any profit. It is of comparatively little use until the soil is filled with its roots, which are the most beneficial part of the plant. It takes two years to get a crop of Clover into the best condition for ploughing under.

### Second Year.

Early in the spring of the year following that on which it was seeded down, the Clover-field should receive a dressing of Clover of from 100 to 250 lbs. per acre. An analysis of the ashes of Clover, by Prof. Horsford, gives, of potash, 16.101 ; soda, 40.712 ; lime, 21.914 ; magnesia, 8.289 ; showing clearly how important to its successful growth must be a full supply of alkalies. To act upon these alkalies, so that these essential ingredients may be made readily available, the presence of sulphuric acid is important, and this may be the secret of the value to the Clover crop of plaster. Of all fertilizers, none equals this in its magical effect upon the growth of Clover. Another thing is, that plaster fixes the ammonia it comes in contact with, the sulphuric acid being disengaged from the lime and combining with the ammonia, preventing its escape.

### Curing for Hay.

Clover should be cut for hay immediately after blossoming and before the seed is formed. It should be cured in such a manner as to lose as little of its foliage as possible, and therefore cannot be treated exactly as the natural grasses are. It should not be long exposed to the scorching sun, but after being wilted and partially dried, it should be forked up into cocks and left to cure in this position. The fourth or fifth day, when the weather is fair and warm, open and air it an hour or two, and it will then be fit to cart to the barn.

### After Haying.

As soon as convenient after haying, a dressing of plaster, or ashes, or superphosphate should be administered to the land, say at the rate of 100 lbs. per acre. The field should be shut up; and if intended to be pastured, a good growth attained before the cattle are admitted. A week's difference in the growth of Clover often makes an enormous difference in the feeding value of the crop—as careful analyses have frequently established. If intended for a second crop of hay, by keeping the field closed, a capital cut will be pretty sure to be got the same season If it is desired, however, to take a Clover-seed crop at this second cutting, the expectation of hay must be abandoned. After a crop of seed has been taken from a field of Clover, it is seldom worth cutting for hay again, so that it is rarely done except where it is intended to turn the land to pasturage, or break it up the following season.

### How to Cure Clover Seed.

When it is intended to make Clover seed from the second cutting, the first cutting should be got off the ground as early as possible.

The second crop should be allowed to stand until all or nearly all the heads are brown, and the stalks have commenced to dry. Some of the seeds may be lost by thus getting dead ripe, but the loss will be small in comparison with the quantity of seed that will pass through the machine unthreshed, if cut before it is nearly all ripe.

When the crop is in right condition, take your mower, put on the platform, and with a boy to drive, and knives sharp, start ahead. As the machine cuts it, rake it back on the platform till there is a good fork-full, and then rake it off the same as a bundle of wheat, and so on round the field The next time round, rake off the bunches at the same places as the first time, and so on till the field is done.

If it is likely to rain, draw it home immediately, as the seed will take no hurt if the straw is ripe when cut, and there might be some loss if the seed gets wet, as the hen hes might have to be turned to dry them, which would shell off some of the seed. In drawing, drive close to the rows of bunches, pitching on a bunch at a time.

By following this plan, Clover seed is saved with but very little loss ; but if mown, and then raked and bunched, or if the heads are picked with a Clover "picker," there is great waste ; for, in the former case, a great deal of seed is beaten off, and, in the latter, a great many heads are left unpicked. But, in cutting with a machine, graduate the height of the cut according to the height of the Clover, thereby saving nearly every head.

The time to thresh is in cold frosty weather, in the winter, as the straw is not so tough, and it is then much easier for the machine to save all the seed than it would if threshed in damp weather.

The Clover machines thresh the straw, as a wheat machine does wheat straw, and deliver the clean seed in a bag. It has to be run through a fanning mill to to fit it for market.

### Curing Alsike Clover Seed.

Alsike clover seed is more easily threshed than red clover-seed. When cultivated and threshed together, the Alsike always comes out of the pods before the red clover-seed. The ripened seed-heads of Alsike clover, however, fall off easier than those of red clover, and therefore in mowing Alsike that has been allowed to ripen, still greater care must be taken than with the seed of red clover. The mowing of ripe Alsike should always be effected either early in the morning or late in the evening, while it is moist with dew ; otherwise the riper seed-pods fall off, with the best and finest seed, however carefully the mowing may be performed. The mowed Alsike clover is left lying as it falls, and is turned once or twice while moist with dew, after which it is housed when dry. In carting home, canvas lining should be used in the carts, of sufficient size to cover the whole of the bottom and a part of the sides of the carts, so that those seed-pods that fall off in carting may not be lost.

Mr. Thomas, of Brooklin, thus writes, in regard to the management of Alsike Clover seed :—

The Alsike clover bears its seed in its first blossoms each year ; consequently, when I wish to save seed, I let the Clover stand about two weeks longer than I would for a hay crop alone ; then cut and house it as soon as cured the same as for hay. About the first of November, so that I can have the hay for winter use, I employ a clover-thresher, and thresh it out. They thresh about twenty bushels in a day. I then run it through my fanning mill, which blows out the dust and fine dirt ; but it will still be full of bits of broken hay ; and if there are any other seeds in it, they will be there still. I then take a very fine wire sieve, that will, with considerable shaking, let the Alsike seed through, and nothing else. This has to be done by hand, and it is too often dispensed with by farmers, when cleaning seed. The Alsike Clover yields from six to eight bushels to the acre; the Red Clover from four to six.

# Horticulture.

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

## THE KITCHEN GARDEN.

### Selection of Site.

It may not be always possible to choose such a spot for the kitchen garden as would be most desirable. In villages and city suburbs one may just take what he has got and make the best of that, and it is astonishing, often, what wonderful results can be achieved in the face of great hindrances. Yet he who chooses the most favorable site will always have the advantage, other things being equal, over his less fortunate neighbor. It is desirable, generally, in our climate, to select a piece of ground that slopes gently to the south or south-west, and if possible somewhat sheltered from the north and north-east. The ground should be most thoroughly drained, so that there is never any water standing in the soil within three feet of the surface. This is essential to success in all garden culture; and if no piece of ground can be found which is naturally of this character, it must be made so by putting down underdrains. It will be all to no purpose that a delightful sunny exposure is selected if the soil be full of water. The sun cannot warm such a soil, and the seeds that may be sown will either rot or lie long dormant; and when they do germinate their growth will be slow and sickly. If there be any intention of growing vegetables for market, such an exposure and such a character of soil are of the very greatest importance. The whole question of success or failure turns upon this point. He who can get his vegetables first into market will command both the best prices and the best customers, and it will certainly not be the man who has for his garden a wet, and therefore cold piece of ground.

### Choice of Soils.

Having succeeded in obtaining a garden site with a warm exposure and that is thoroughly drained, the kind of soil is not of so very great importance. Yet, even in this, there is room for a considerable measure of selection. A very light sandy soil, though it be loose and porous and easily worked, is a very hungry soil, and will need a very heavy annual expenditure for fertilizers. At the opposite extreme lies a very stiff clay soil, which, though it may not need such [illegible] and applications of manures, is in very [illegible] in its texture to admit of the [illegible] vegetables. But between [illegible] there may be found a number of soils [illegible] which both in their natural [illegible], by judicious treatment, [illegible] excellent garden. Doubtless the [illegible] the best suited to the purposes of a kitchen garden, is a rich sandy loam, in which there is enough clay to make it retentive of manures, and enough sand to be porous and easily kept in a friable condition.

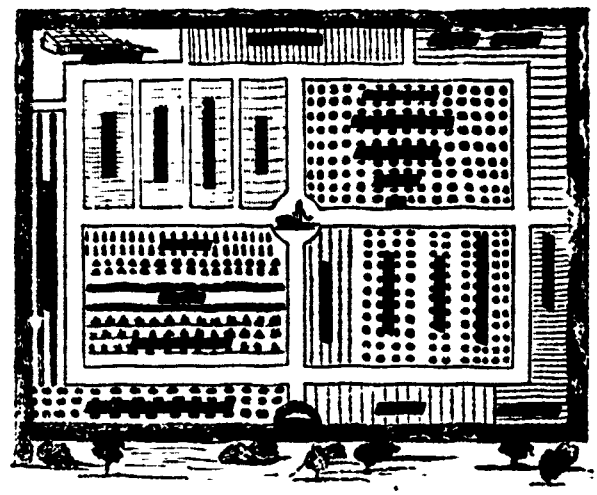
### Laying out the Garden.

Having selected the site and secured as far as possible the desired soil, the garden is to be laid out. As most persons combine within the same enclosure, both the kitchen and fruit garden, there is of course room for the display of considerable taste in the laying out of the ground, locating the walks and arranging the several beds. Much in this matter must be determined by the special conformation of the whole garden plot, the character of the surface and the direction of the boundaries. But as in such grounds the idea of utility and convenience is ever prominent, it follows that all merely fanciful arrangements are out of place. The usual and most convenient form of such a garden is a square, or a figure that nearly approaches a square. Around this a walk is laid out leaving a border of variable width, but usually not exceeding six feet wide, between the walk and the outer boundary. The portion of the garden bounded by this walk is then laid out in squares of convenient size by cutting walks through it, running at right angles to each other. The width of these walks may be varied according to the size of the garden, but should be wide enough to admit of convenient passing to and fro with the necessary garden implements; say from four to six feet in width.

The amateur will take pains to have these walks kept firm and smooth, and the ground being already thoroughly under-drained, he can readily do so by throwing out a little of the surface soil, and filling in with coarse gravel at the bottom, finishing off with finer gravel at the surface. If he can conveniently put down a couple of inches of fresh gas-house lime before he finishes off the surface with the finer gravel, it will be a long time before he is troubled with weeds in the walks.

Perhaps it would be expecting too much of most of our farmers to ask them to put gravel on their garden walks; but if they could be induced to take the trouble to throw out a few inches of the soil and fill up the space with stone rubbish mingled freely with the waste from some neighboring lime kiln, it would be found in the end a great help in keeping the walks solid and free from weeds. Those who cultivate market-gardens on an extensive scale, must lay out their grounds accordingly, and prepare their walks more as roads, upon which the cart and market waggon may travel. And these too, if they can readily spare the means, will find that a solid road bed will, by no means, be an unremunerative part of their investment.

A good basis for the laying out of a kitchen garden, may be found in the accompanying plan, suggested some years ago by an American contemporary.



PLAN OF A KITCHEN GARDEN.

## THE FRUIT GARDEN.

It will not be necessary to treat particularly of the location, soil or laying out of the fruit garden, as what has been said on these topics under the head of the kitchen garden applies with equal force to the garden devoted to fruits. Indeed the fruit garden is but an accompaniment to the kitchen garden, and is usually embraced within the same enclosure. The soils in the main that are best adapted to the one are well suited to the other, and the slight modifications that may be deemed desirable for the several fruits will be noticed as each is particularly treated.

### Strawberries.

The first fruit that claims attention under this head is the strawberry; both because it is the most delicately delicious of them all, and because it is the first in the season to gladden our eyes and gratify our palates. And as it is always very desirable to ripen this fruit as early as possible, there should be at least a small bed in one of the most sunny and most sheltered spots of the garden, where the soil has been well worked and well enriched to a good depth, and where, while the ground does not quickly dry out as the season advances, the earth soon becomes warm in spring and encourages an early growth. In such a spot, well sheltered from rough and chilling winds, the earliest variety of strawberry should be planted. It is of little moment whether the plants are set during the first days of September or in the month of April. Usually we have found that more of the plants live and thrive well if set out in April, than when planted at any other time. In small gardens, the plants may be set in rows eighteen inches apart, and one foot apart in the row. When planting is done on a somewhat larger scale, it will be found to be more convenient to place the rows three feet apart. In selecting the plants for setting, those of the previous season's growth are to be preferred, the young plants just nicely rooted on the runners. Some stress has been laid by writers on this subject on the particular plant of the runner, counting from the parent plant; but our experience has not confirmed any such preference, and we are disposed to consider it as more fanciful that practical. So long as the young plant has healthy leaves and roots, and an abundant supply of the latter, we have failed to detect any superiority arising from its numerical distance on the runner from the parent plant.

Other beds may be planted with this fruit, according to the wants of the family, and the season of strawberries may be considerably prolonged if some of the latest ripening sorts are planted where they will be shaded as much as possible from the sun and robbed of the quickening influences of the southernly breezes.

In all cases, strawberries will thrive best in deep rich soil, and if the best results are desired the surface of the ground between the rows should be covered with a dressing of manure in the autumn, and mulched just before the berries begin to change color, with a covering of newly cut grass. Fresh cut grass is to be preferred to any other material for mulching because it is free from ripened seeds, and the full dressing is for the same reason to be taken from the heap that has been most thoroughly composted.

The market-gardener, as well as the cultivator for merely family use, will find this liberal treatment of his beds of strawberries both in the way of winter and summer covering ample to repay all his trouble. Indeed upon these two things, and one can scarcely say whether the one be more important than the other, the crop, and with it the financial results, mainly depend. The culture beyond this is of the most simple kind. The weeds must be kept down and the soil kept open and friable if we expect the plants to grow. Yet after a time the old plants will have done their work and begin to fail. The wise gardener will have anticipated this by planting a fresh bed with young vines which will come into bearing in time to take the place of the old bed, which should then be dug over and cultivated for some years to other crops.

At another time we shall name some of the more desirable varieties of strawberries, and treat of the special culture more particularly adapted to each, their size, quality, productiveness and time of ripening.

## THE ORCHARD.

### PROFITS OF FRUIT CULTURE.

There can be no question but that the raising of fruit for market may be made a profitable business in all the temperate regions; and nowhere more profitable than in many parts of Ontario. The same energy and push requisite to success in more tropical climates, will be well rewarded here. A correspondent of the *New York Tribune*, writing from Virginia, says:—One thousand dollars from an acre of grapes have been realized in one year, near Charlottesville, and $75 from one apple tree in one year. The writer last year gathered 27 bushels of the best winter apples from one tree, and that not a large tree, and the product was sold from $4 to $6 per barrel.

### APPLE TREES SUITED TO NORTHERN CLIMATE.

The climate of Wisconsin is more trying to fruit trees than that of the greater part of Ontario, hence we think it would be interesting to our readers to see what varieties are recommended by fruit growers in that state. Mr. O. S. Willey writing to the *Wisconsin Farmer* says:—

I am asked for a list of apples for an orchard of 500 trees, in Juneau Co., Wis. Without knowing any of the particulars as to locality, soil or other consideration I make the following. Some sorts are named only in small lots. This is more to give variety and trial than for actual value. I name:

SUMMER.—35 Duchess of Oldenburgh, 20 Red Astrachan; 5 Sops of Wine;

FALL.—50 Fameuse, or Snow Apple; 15 St. Lawrence; 20 Haas; 20 Bailey Sweet; 5 Colvert; 5 Lowell.

WINTER.—75 Ben Davis; 50 Rawles Janet; 50 Golden Russet; 20 Jonathan; 15 Willow Twig; 15 Grimes Golden Pippin; 15 Bethlemite; 25 Plumb's Cider; 20 Utter; 15 Tallman Sweet; 25 Walbridge.

The above list would make a valuable collection, running from midsummer to late winter or even early summer again. I have put but few Walbridge on this list, from the fact that it has been on trial in so small a section of country. I have great faith in its value, but my experience is to move slow with untried sorts. Hyslop and Transcendant crabs may be added as best in their line, and valuable to graft on to when market is overstocked,

### THE LAWVER APPLE.

The *Horticulturist* says, we received specimens of the Lawver to test its keeping and other qualities when in prime. There has been a good deal of noise made about this apple. It has been described as of a "rich, mild, tingling acid; very much like the cranberry; fine flavor, leaving an excellent relish, etc." But we do not find it quite so exquisite in flavor as all this would imply. For long keeping qualities it proves one of the very best, while for shipping, it must be peerless, for it has a skin like the hide of a rhinoceros. Size, above medium; form flattened, one sided; skin thick, almost entirely overspread with dark red and speckled with grey dots; cavity rather narrow, deep; stem medium to long; basin rather narrow and shallow; core large, open; seeds very large, deep brown; flesh firm, darkish yellow, sprightly, acid, moderate juicy; may be reckoned *good*: season, February to July. On the whole, the Lawver has many good qualities to commend it.

### WINTER PEARS.

In answer to a young cultivator, the *Country Gentleman* recommends Beurre d'Anjou, Winter Nelis, and Lawrence to use up to about the first of January. After that the Josephine de Malines is the best, keeping till the first of February. Doyenne d'Alencon ripens about same time as the latter, but it is not quite so good in quality. It is, however, a hardy tree, good bearer, and on the whole a desirable sort. The Vicar of Winkfield ripens about mid-winter, but its quality, as ordinarily cultivated, is greatly injured by its being allowed to *over-bear*.

### ASHES IN THE ORCHARD.

D. W. Kauffman, of Des Moines, Iowa, writes to the Iowa *Homestead*, that ashes are worth one dollar per bushel to put about fruit trees, and that he would not sell his ashes at that price, and do without their use in the orchard. He has used ashes about fruit trees for fifteen years, and during all that time has never seen a borer where ashes were used. The borer is a terrible pest to the fruit grower, and if all other impediments to successful growing were as easily overcome, and completely controlled as the borer, then fruit growing would be very successfully practised.

At the recent meeting of the Fruit Growers Association of Ontario, Mr. Moodie stated that he had been in the habit of using unleached ashes as a manure for his fruit trees, and that he values them more highly for this purpose than barn-yard manure If our farmers knew the value of wood ashes for the garden and orchard and farm, they would not sell them for a few cents per bushel The ashes that they barter for a few pounds of soap would, if applied to the soil, so increase their crops of fruit and grain as to yield them ten times the value they now get for them.

## THE FLOWER GARDEN.

### HARDY FLOWERS—CROCUS.

All are familiar with this widely-cultivated flower of spring and autumn, for there are autumn as well as spring crocuses, only the former are not so often to be seen in the smaller classes of gardens as the latter. Both sections of the family have equal claims on the regard of the lover of hardy flowers. If the one is in some of its varieties among the earliest gifts of Flora, the other can be reckoned upon as among her last gifts in the year. In one hand she holds out from the short days of October an offering of brilliant crocuses in no way inferior to those which with the other she scatters so profusely in the earliest months. A good selection of these should be in every garden, large or small, for if we want flowers at any time more than another near our dwellings, it surely is when they cannot be seen elsewhere. The true autumn crocuses are not those which commonly bear the name. The colchicum, or meadow saffron, is usually, but erroneously, called autumn crocus. The true autumn crocus and the meadow saffron have nothing in common with each other except a similarity in the flowers externally, and in the circumstance of their flowering each in autumn or early winter. There is more variety of color in the variety of true autumn crocus than in the meadow saffrons. Some of them are rather rare, and consequently difficult to procure; but C. nudiflorus, C. sativus, and C. speciosus may be got from any respectable nurseryman. The latter is purplish blue, the second is violet, and the first is pale reddish purple, and the flowers of all are enlivened by the large bright, orange or yellow anthers which form such a prominent feature in all the true crocuses. Of spring crocuses there is greater variety, and perhaps none exceed in brilliancy of color the commonly cultivated varieties. One of the earliest of these is C. reticulatus, the bright yellow one with the bar of brown on the outside of the petals, to be seen in every garden. The purple, blue, and white varieties are all forms of C. vernus. The crocus is one simplest of flowers to cultivate. Any tolerably good garden soil suits them well, but they reach their greatest perfection in light, rich, well drained loam. They are commonly planted in the front line of flower borders and among shrubs, and when once they are planted a revolution of the garden arrangements in the majority of cases only is likely ever to bring about any change in their position; they are left from year to year for a lifetime to be smothered by each other and their more powerful neighbors. This is not cultivation; the crocus as much as any plant requires a little change, and though it will flower unfailingly every year under this neglectful treatment, yet the blossoms are poor and short-lived compared with what they are when generously cultivated. The roots should be lifted every third or fourth year in order that the ground may be dug and manured, when they should be separated and re-planted, placing them two or three inches deep and about an inch apart. This operation is best performed immediately after the leaves have died away. It is customary with many to lift the clumps bodily as soon as the leaves have declined, and lay them in a somewhat shady place to dry; they are then separated, and stored away dry till autumn, say October or November, when they are again planted in their former positions, or new ones. This can only be practised with the spring sorts; those that flower in autumn require to be lifted in the same way immediately after the leaves have declined, but they should be planted as soon as the ground has been prepared for them.—*North British Agriculturist.*

### LONGEVITY OF IVY.

"The English are fond of referring to the great longevity of the oak, but we question whether their ivy will not equal it. In this country the English oak, judging by the specimens in the old Bartram garden, will not last much beyond a hundred years, but the ivy shows no signs of any decay. One of our most beautiful gardens, "The Grange," the country seat of Jno. Ashurst, Esq., is famous for its beautiful specimens of ivy. The first plants were brought in a carriage from Judge Peter's celebrated place at Belmont, by Mrs. Eyre, 60 years ago, and look now as if they would flourish for centuries yet."

We have clipped the above interesting statement from the *Gardener's Monthly*, and would say to our readers that in our climate it will thrive best on the north side of buildings and walls. In those parts where the cold of winter is very intense, the thermometer falling frequently to fifteen and twenty degrees below zero, there the ivy will not thrive well in any exposure.

### HANGING BASKETS.

Plants with slender branches which naturally hang down, are most suitable for hanging baskets. "Mother of Thousands"—the "Wandering Jew" with its pretty marked leaves—the "Lobelias," and some of the trailing "Campanulus or Bell Flowers"—the well named "Rat-tailed Cactus," and the so-called "Ice-plants," are all more at home when suspended than when grown in any other position, unless it may be when placed on brackets each side of the window, where they have a very charming appearance. I would suggest that the suspended basket or flower-pot should be supported by a piece of cord passed through a small pulley, by which means it will be easily lowered down for the purpose of watering.

### HOUSE PLANTS IN WINTER.

Mr. James Vick, whose large experience as a florist makes him an unexceptional authority on the subject, gives the following suggestions with regard to the management of house plants in winter:—

"Few plants can endure the high temperature and dry atmosphere of most of our living rooms. The temperature should not be allowed to go above sixty-five in the day time, and not above forty in the night. As much air and light as possible should be given, while the leaves should be sprinkled every morning, A spare room, or parlor, or extra bedroom, is better for plants than a living room. A bay window, connected with a warm room, especially if facing the south or east, makes an excellent place for keeping plants in winter. It should have glass doors on the inside, which can be closed a part of the time, especially when sweeping and dusting. The main thing in keeping house plants in health is to secure an even temperature, a moist atmosphere, and freedom from dust. Sprinkle the leaves occasionally, and when they need water, use it freely. If the green fly, or aphis, appears, wash with soap-suds frequently, and occasionally with a little tobacco water, or a decoction of quassia chips. If the red spider comes, it shows the plants are in too dry an atmosphere. Burn a little sulphur under the plants, the fumes of which will kill the spider, and afterwards keep the stems and leaves well moistened. Occasionally, but not often, worms appear in the pots. This can be avoided in a great measure by careful potting. A little weak lime water is sometimes of benefit in such cases, also five drops of liquid ammonia to a gallon of water, though, perhaps the better way is to re-pot, removing the earth carefully, so as not to injure the growth of the plant."

BEGONIAS.—Begonia Rex will drop its leaves if kept too cool; it wants a temperature of from 60 to 75 degs. and air a little moist; pot with rich sandy loam and refuse hops.

PROTECTION OF APPLE TREES AGAINST RABBITS.—Paint the trees with blood and red clay. Have the clay pulverized and stir in the blood to the thickness of paint. It can be applied with a rag or brush; one application a year is sufficient, as the hardest rains will not wash it off. It is a sure preventive against rabbits, goats and sheep.

SINGULAR FREAK.—The peach trees near Piedmont, Va., known as the *Black* or Blood Peach, produced this year *white fleshed and white skinned peaches*—almost colorless in skin and flesh—some were of a light brownish yellow—all about the usual size, high flavored and fine, without any of the acid or peculiar characteristics of the Blood Peach. Was this caused by the intense heat and drought of the present year?

# Agricultural Chemistry.

## Water.

Water is a substance which is so common and so important, and which, at the same time, in its chemical relations is so remarkable, that we cannot do better than begin our study of chemistry, in its relation to agriculture, by a consideration of its composition and properties.

A plate of copper and a plate of zinc, the upper edges of which are in contact, or are united by a copper wire, and which are then partially immersed in a vessel containing dilute acid, constitute a *galvanic battery* in a simple form. By using a number of such batteries, and connecting the copper of one with the zinc of the next, and then the zinc of the first with the copper of the last, a compound battery of great power may be constructed. Platinum is often advantageously substituted for copper in such a battery. So long as the first and last plates of the battery are unconnected no galvanic action takes place; but if a copper wire connected with the copper plate of the first cell is made to dip into a vessel of water to which a little acid has been added, and a similar wire connected with the zinc plate of the last cell is made to touch the same liquid, a current is immediately established. The action is much facilitated by making the wires terminate in platinum plates which dip beneath the surface of the acidulated water. The termination of the wire connected with the copper of the battery is called the *positive pole*; that of the wire attached to the zinc, the *negative pole*.

No sooner is the connection in this way complete, than numbers of little bubbles arise from the water round each of the platinum plates which constitute the poles of the battery. These bubbles are caused by the escape of a colorless invisible gas at these points, which may be collected in glass cylinders inverted over the platinum plates from the surface of which the bubbles are arising. If the gases in the two cylinders are then compared together, they will present no difference to the eye except that the quantity of that collected over the negative pole is twice as great as that of the gas which was given off at the positive pole. If, however, a light lmatch be applied successively to the mouths of the two cylinders, very different results will be observed. The gas which was obtained over the wire connected with the zinc of the battery will take fire, and burn with a pale yellowish flame; the match itself will be extinguished if immersed in the gas. A lighted match thrust into the other cylinder will burn with very greatly increased brilliancy; and if blown out so as to leave the extremity still red hot, it will, if again plunged into the gas, burst at once into flame.

To the gas which arises from the positive pole the name *Oxygen* has been given; that which is evolved at the negative pole has been called *Hydrogen*. These two gases, united chemically in the proportion of two measures of hydrogen to one of oxygen, constitute water. This may be shewn by passing an electric spark through a mixture of the gases in these proportions. They explode with great violence, and form *steam*, which rapidly condenses into a few drops of water resembling dew, and the two gases are found to have entirely disappeared.

It will be well, then, to study these gases, which together constitute water, a little more closely.

*Oxygen.*—Oxygen may be obtained by decomposing water by means of the galvanic current, as just described. It is more easily procured, however, in another way. Chlorate of potash is a substance sold by druggists in the form of white or colorless crystals; it consists of oxygen in combination with another gas known as *chlorine*, and a metal called *potassium*. When this substance is heated, it gives off all its oxygen, leaving the chlorine in combination with the potassium. The addition of *black oxide of manganese*, or *peroxide of iron*, greatly facilitates the decomposition. From such a mixture oxygen may be obtained by heating it in a Florence flask, in the neck of which is fastened a cork perforated by a bent tube, which dips beneath the surface of water contained in a good sized basin. A glass jar is filled with water, and inverted over the end of the tube with its mouth under the water. The pressure of the atmosphere on the surface of the water in the basin will, of course, retain the water in the jar. On the application of heat the gas is given off in large quantities, and bubbles up into the jar, displacing the water which it previously contained. The jar may be kept inverted over a shallow dish of water, which will prevent the escape of any of the oxygen.

Oxygen is a colorless gas, with neither taste nor smell. In appearance, it cannot be distinguished from common air; it is a little more than one-tenth heavier than air. We have already seen that a piece of lighted wood will burn in oxygen more vividly than in air; the same is true as regards other combustible bodies.

A piece of charcoal will, if ignited and plunged into a jar of oxygen, glow intensely, throwing out sparks in all directions, and being in a short time entirely consumed. Phosphorus burns in oxygen with a light that is almost insupportable. But this is not all. Substances which are not usually regarded as combustible will readily burn in oxygen. If a bit of iron wire or a steel watch-spring be tipped with a little ignited sulphur, and then placed in a jar of the gas, it will burn most brilliantly, throwing off beautiful scintillations.

All these experiments are illustrative of *chemical combination*. Charcoal consists almost entirely of *carbon*, and carbon and oxygen have, at certain temperatures, an attraction for each other which causes them to unite together, with the production of great heat and light, to form a gas called *carbon dioxide*, which contains both oxygen and carbon. So, too, the iron wire or the watch-spring unites with the oxygen to form *iron oxide*; and in this instance, as in the case of the charcoal, heat and light are evolved in the act of union between the two substances. The atmosphere contains twenty-one measures of oxygen in every hundred, and all ordinary combustion is nothing more than the chemical combination of the burning body with oxygen. The heat and light of combustion are the effects of this chemical action. The reason why bodies burn with so much more energy in oxygen than in the air is now apparent, for air is only diluted oxygen. Chemical combination is always attended by heat, but not always by such intense heat as in the instances that have been given. In the air, charcoal will smoulder away until it is consumed; that is, until it has all united with oxygen from the atmosphere to form carbon dioxide. The effect is the same; and the same *quantity* of heat is generated as in its rapid combustion in oxygen, but it takes a longer time to accomplish the result. When iron *rusts*, it is slowly combining with the oxygen of the air—a process known as *oxidation*.

If a small animal be placed in a jar of oxygen, its heart beats rapidly, its breathing is hurried, its temperature rises; it is in exactly the same condition that the lighted carbon was in when it was plunged into the oxygen—it is being consumed more quickly. In respiration, the carbon of the blood unites with the oxygen of the air to form carbon dioxide; it consists, in fact, of a slow combustion of this carbon, and in pure oxygen this process of oxidation takes place more rapidly, and the animal soon dies, exhausted.

Animals are continually absorbing oxygen from the air. Plants, on the other hand, are, during daylight, always giving it out. If a bunch of freshly gathered leaves be put into a basin of water, and a glass jar filled with water and inverted, over them, bubbles of gas will rise into the jar, which may be shewn to consist of oxygen. During the night plants cease giving off oxygen.

Oxygen is an *elementary substance*: it has never been decomposed into any other simpler substances. Hydrogen, carbon, phosphorus and iron are also elementary substances, or chemical *elements*. Water, carbon dioxide, and iron oxide, on the other hand, are examples of chemical compounds. A chemical compound is quite different from a mechanical mixture. It exhibits properties which are usually quite different from those of either of the elements of which it is composed. Its formation is always attended by more or less heat, and, as we shall see hereafter, it always contains the same elements in certain definite proportions, which are never altered.

## FERTILIZERS.

### Guano Deposit of Peru.

Harry Meiggs the great railroad operator of South America, has discovered, on the main-land of the west coast of Peru, the most immense deposit of guano ever seen anywhere. This deposit is said to extend for many miles along the coast, and reached far inland. The Chincha Islands have heretofore been considered the richest in guano production, but this last discovery shows conclusively that it is of much better quality and much easier to handle than the former. Millions upon millions of tons can be dug cheaply, and transported to all parts of the world at a much lower figure than heretofore. This valuable fertilizer will no doubt be used much more extensively in America, as well as Europe, as the price at which it can be furnished will place it within the reach of all.

### Mineral Phosphate.

The business of phosphate mining seems to be very prosperous in South Carolina. One company mined 15,000, tons last year, and the production from river deposits alone amounted to 40,000 tons during 1872. It is expected that the entire product of the State will be increased not less than 40 per cent. during 1873. Mineral phosphates have been discovered recently in Siberia, Austria and France, but they are beyond the reach of immediate development, and are not favorably situated for the transportation of the products to a market. In these respects the South Carolina deposits enjoy great advantage.

### Compost.

Below find rule for preparing my "Domestic Concentrated Manure," which I have used for three years for corn; take two parts of decomposed sheep manure, (or fine cattle manure,) one part of hen manure, one part unleached ashes, one part of plaster, all incorporated together, and thoroughly worked over twice or more; keep under cover ten days. All ingredients are at the command of all farmers without much expense. I have experimented with it the past three years; spreading on stable manure, and thoroughly incorporating it into the soil with an ox cultivator, working the land with a corn-worker, marking the rows regularly both ways. Apply a handful to each hill. My crops of corn have been twenty-five per cent. better than before I went into the use of the composition. In 1871, York County Fair gave me the highest premium on corn.—*Correspondence Boston Cultivator.*

### Lime and Salt Mixtures.

Prof. Johnson recommends for fertilizing purposes to mix one bushel of salt and two bushels of dry Lime under cover, and allow the mixture to decompose gradually, thus forming an intimate chemical union of the two materials. For this purpose the mixture should be made at least six weeks before use, or still better, two or three months, the heap mentioned being turned over occasionally. This salt and Lime mixture, when applied at the rate of twenty or thirty bushels per acre, forms an excellent top-dressing for many crops. It acts powerfully on the vegetable matter of soils; fifty-six bushels applied to a turnip crop have produced as large a crop as barn-yard manure. It is also very destructive to grubs and insects in the soil. Like salt, it attracts moisture from the air, and is useful against drought. Its decomposing power is remarkable, and if three or four bushels of it are mixed with a load of swamp muck, the latter will be reduced to a powder.

### What Greeley thought of Plaster.

In one of his last agricultural addresses, Horace Greeley spoke as follows:—"As a fertilizer, I place gypsum or plaster first on the list, without supposing it to be of equal value everywhere, or even of any value under all conceivable circumstances. And yet I doubt that a hill or dry plain can be found ten miles inland on which a first application of plaster, to the extent of 200 pounds per acre, would not be repaid in the very next crop, more especially if that crop were clover. Wherever ground plaster may be had for less than $20 per ton (as it can be in some parts of the Union,) I hold that each farmer who has not yet tried it should buy at least one ton, apply it to ten acres in strips of two rods' width, alternating with a like breadth left unsown, and carefully watch the result. If no benefit is realized, he may safely conclude—not the plaster is a humbug—but that his land does not need it, or that he has not known how and when to apply it. In my own case, I judge that I have bought no other fertilizer that paid so amply and speedily as plaster.

### Potash as a Fertilizer.

Coleman's *Rural World* is credited as saying that potash forms one of the most essential constituents of a fertile soil, and one of the most important of all the fertilizing agents within reach of the agriculturist. In many plants it constitutes more than one-half of their ash, and in most at least one-third. In neutralizing acids in the soil and in the liberation of ammonia, it acts in the same manner as lime; but when it is desired to simply effect these last mentioned objects, the latter should be used, as being cheaper; and potash, generally available in the form of ashes, should be applied as a manure, using the word in its strictest sense, to indicate a substance that contributes directly to the building up of the structure of the plants. But considerable care should be exercised in the use of ashes, and they should never, as is the practice with some in manuring corn in the hill, be mixed with guano or the refuse of the hen-roost, inasmuch as the first rain that dissolves them will cause the potash to displace the ammonia in the same manner that lime displaces it from barnyard manure and similar manures, as we have just mentioned.

# Apiary Department.

## Bee Culture.

Among the lesser economics of the farm, the care and culture of bees well deserves to take a more prominent place than is usually assigned to it in this country. In Britain, a farm would be considered incompletely stocked, without a few hives, the busy inmates of which, are expected annually to contribute their *quota* to the profits. Until of late years, apiculture was a very crude affair. It was usually carried on with straw hives, inside of which everything was "fixed fast in fate," and except to far as outward indications could be studied, interior arrangements were beyond inspection and control. The bees were left to their own devices, and at the close of the honey season were robbed of their stores by brimstoning and exterminating the colony. Yet under these circumstances bee-keeping was found profitable, and formed one among the many sources of income and supply on which the husbandman was wont to count.

It was a great step of progress when movable-frame hives were invented. By the use of these, artificial swarming takes the place of natural swarming; and instead of the bee-master having to await the convenience and caprice of the bees, with the risk of losing swarms if watch of the apiary be intermitted, he consults his own convenience, divides the over populated colony, and avoids loss of swarms. Moreover, when stocks become queenless, and are in danger of extinction, a new queen, or brood from which to rear one can readily be supplied; moths can be exterminated; comb, bees and honey can be given to weak colonies; and surplus honey readily taken. The bees, instead of managing themselves under the guidance of mere instinct, are managed by the superior intelligence of their human lords.

It was a still further step in improved apiculture, when that eminent German apiarian, Major Horischka hit upon the happy device of emptying the well-filled honey-combs, by means of the mel-extractor, or as some American bee-keepers prefer to call it, the *melipult*. By the use of this simple machine, the yield of honey, in average seasons, is doubled and even trebled. The application of centrifugal force throws out the honey almost to the last drop, and on replacing the empty combs in the hive, the bees, as in duty bound, at once proceed to refill them. Often when they wholly suspend work and will not put an ounce of honey into surplus boxes, they will toil with might and main to replace the honey of which the extractor has deprived them. Instinct teaches them to keep the hive well filled with sweet stores; but putting into boxes is an overflow, only to be had when honey is very plentiful and hives are full of bees.

The importation and breeding of Italian bees is another progressive idea of no small value. Bees, like larger stock, deteriorate by in-and-in breeding, and there are common and superior tribes of bees as there are of cattle, horses, sheep, swine and poultry. The Italian cross would improve the ordinary black races of bees, even if they were intrinsically no better; but they are better, without question. They are hardier; more busy than "the little busy bee" we have known from childhood; more prolific; more beautiful in appearance; and last, but not least, more pacific—not so easily provoked, and consequently less inclined to sting when meddled with by man.

If, therefore, under the crude appliances of old-fashioned bee-keeping, it was a profitable pursuit, much more is it worthy of attention with the aid of modern improvements. The march of progress has not yet reached its limit; science and skill are busily engaged in experimenting; and it is reasonable to expect that, before many years, apiculture will take a much higher place than it now does among rural industries.

The great difficulty about bee-keeping in this country is the severity of our winters. But this difficulty can be overcome with proper management. Honey forage is abundant in all parts of the Dominion of Canada. The maple, which, when tapped, yields the sweet sap which we boil into sugar, furnishes honey in its early blossoms. The willow gives pollen, propolis, and, some say, honey. Our early wild flowers and fruit blooms give the bees something to do; and when white clover spangles the fields and roadsides, the honey harvest is in its glory. The late bass-wood blooms, the raspberries, asters, golden rods and buckwheat, protract the honey season into the fall. Only knowledge of apiculture is needed to make this no mean branch of our productive industry. The bees are the best farm labourers we can have, inasmuch as they work for nothing and board themselves.

A single hive of bees intelligently managed, may safely be counted on to yield at least ten dollars per annum. Suppose but one hive on every Canadian farm, and what an increase to the aggregate productiveness of our agriculture. And there is no reason why each farm should not have half a dozen hives at least. We look for the time, at no very distant day, when the apiary will produce as much as the poultry or even the dairy, as ordinarily carried on.

In this new series of the CANADA FARMER it will be endeavored, not only to draw attention to this department of rural economy, and persuade parties to engage in it, but to explain and expound the principles and practices essential to successful bee-keeping, and so while promoting other farm industries according to their relative importance, to advance apiculture. We believe in a system of mixed husbandry. To have more than one string to one's bow is neither safe nor commendable in love, but it is in agriculture. Farmers should never put all into a single venture. They should try all expedients to increase their gains, and if one source of profit fails, another will succeed. Nor should they despise littles, for according to the old proverb, "many a little makes a mickle."

## The Honey Extractor.

The Honey Extractor has become so well known that it is hardly necessary to give a description of it. No bee keeper who desires to obtain large quantities of honey, can afford to be without it. We are quite certain that two stocks properly managed with the honey extractor may be made to produce as much honey as six stocks in the ordinary way. Yet the bee keeper may easily overdo the thing, and ruin his stocks. To realize largely by the use of the honey extractor, the bee keeper should keep his hives very populous, with plenty of room for storing honey. If hives are small, they may be enlarged by adding a second story containing movable frames, the same as in the body of the hive; or if new hives are constructed they may be made larger so as to receive more frames. As soon as these frames are filled with honey they should be removed and the honey extracted and the frames replaced, if the stocks are populous and the honey harvest good, the frames, or rather combs, will be filled again very rapidly, when the honey should be extracted again; and this may be repeated as long as it is safe to do so. Here, however, the bee keeper must exercise his judgment, and not allow his greed for honey to cause him to rob his bees by extracting too late in the season. Even those who are more careful may miss it sometimes, as in the fall we sometimes have a sudden falling off in the honey harvest, and the bee-keeper finds that his stocks are unable to lay in a sufficient store for winter use; caution is necessary, therefore, that too much honey be not taken. In another way also, the bees may be injured by the use of the extractor, by taking combs containing larvæ. There is no danger after the larvæ has been capped, but at times before it is sealed over it is liable to be injured, as the force required to extract the honey may also throw out the larvæ. Great care should therefore be exercised when extracting honey from combs containing unsealed larvæ. In case the honey harvest should suddenly cease, and stocks are likely to fail to lay in sufficient stores, they may be fed on syrup made of white sugar, which for food for winter use is fully as good, if not better, than the best of honey. If honey extracted from the combs be immediately strained through coarse linen or cheese cloth, and put into self-sealing fruit jars, and sealed, it will keep any length of time without candying. It should be heated to nearly a boiling heat before putting into the jars.

## Bee Keeping in 1872.

The Spring of 1872 opened under very unfavorable circumstances. The "bee malady," for we can call it nothing else, had made sad havoc during winter, and continued through the early part of spring, and in some sections till as late as June.

Many who had gone into winter quarters with a large number of stocks found they had lost all; some were more fortunate, but nearly all throughout the Dominion and the greater part of the United States, suffered more or less. Those who did not lose all, found most of the stocks that survived greatly reduced. Though in some instances stocks were not at all affected, yet such instances, we think, were rare. The consequence was, there was a greater demand for bees than could possibly be filled, and many who would gladly have purchased were obliged to do without. It will take several years to replace the stock that perished, even if the disease does not again appear. The honey season has been a very good one, and in some sections large quantities of honey have been obtained. The honey extractor is coming more into demand, and it cannot be long before all leading bee-keepers will have one. This invention is likely to revolutionize the bee-keeping system.

The quantity of honey taken in some apiaries in the United States is almost fabulous. Where the honey extractor is used, the hives should be enlarged either by adding more frames or adding another story, and stocks should be large and populous. As a whole the bee-keeping interest is increasing, especially in the United States, where it is greatly promoted by State Conventions and agricultural journals.

The severe cold weather through which we have just passed, was very unfavorable for bees that are not housed, and bee-keepers would do well to look to all such stocks.

## How to Winter Bees.

Many are the enquiries we receive as to how we winter our bees. We have many times given our plan, but for the benefit of those who may not have seen it, we will give it again.

We prefer to winter in-doors rather than on the summer stands; and we have never found a better place than a large, well ventilated cellar. As soon as the severe cold weather commences we prepare our bees for their winter quarters in the following manner:

We first make for each hive a frame of inch-square stuff, the size of the honey board. On this frame we tack firmly wire cloth. We then remove the honey board and put this frame on in its place; over this frame we spread one or more layers of cloth, thick coarse cloth is best. If the stock is strong in numbers, one layer of thick cloth is sufficient, but if weak in numbers, several layers are necessary. The object of the cloth is to retain the heat, while it absorbs the moisture or allows it to pass off. The entrance to the hive should be closed and the caps may be left off. We consider stocks prepared after this manner in the best possible condition for wintering in-doors, where the temperature is just above the freezing point.

Of course, all stocks should be well provided with stores for winter use, and though we do not think it advisable to attempt to winter weak stocks by feeding, unless the feeding be done before cold weather sets in; yet if some stocks appear short of supplies at the time of preparing for winter quarters, and the bee-keeper thinks there is any risk, two or more pounds of candy-sticks, made of white sugar, may be spread over the top of the frames before putting on the frame covered with wire cloth. If the bees consume all their honey they will make use of the candy given them. We have always been most successful when we followed closely the above plan. When there is no disease among the bees, nearly all stocks carefully prepared according to the above plan will winter safely.

# The Canada Farmer.

TORONTO, CANADA, JANUARY 30, 1873.


## The Wheat Prospect for 1873 in England.

The prospect of the wheat crop for the coming season in Great Britain does not seem very flattering. Mr. Gilbert Murray, of Derby, a high authority on such matters, thus writes to the *Mark Lane Express* on the 13th of January:

The past autumn is, we believe, almost without a parallel in the annals of agriculture. In the North Midland counties the rainfall of the quarter has been nearly double the mean of the last 20 years; it has only been on rare occasions that we have had 48 hours dry in succession, and the land has continued so thoroughly saturated as to preclude all attempts at wheat-sowing, except to a limited extent in a few favored localities where the soil was naturally dry, or had been thoroughly drained, and even where this is the case, in the furrows and low places the plant has perished. So far the prospect of the wheat crop is gloomy; but giving way to despondency and brooding over our misfortunes will not extricate us from the difficulties of our position. By taking advantage of every favorable circumstance, we may yet, at least to some extent, avert the impending cloud. On the strong clay lands of this country autumn sown wheat yields better than spring sown. This is principally to be attributed to the wider extension and development of roots in the early sown enabling the plant to extract from the soil a greater amount of food. In the case of spring sown, it should be the aim of the farmer to place within the reach of the growing plant a sufficient supply of artificial food in an easily assimilated form, which would tend to increase the yield and also hasten the period of ripening. On all the medium and light soils, if the seeding is performed under favorable circumstances of soil and weather, wheat may be sown for the next six weeks with the fair prospect of an average crop. The great danger at present to be avoided is undue haste. The land should be in a fit state to receive the seed, otherwise it will end in disappointment and loss. Where the land was ploughed in the autumn it has become completely sodden and quite unfit for a seed-bed until it has been aerated. The steam-cultivator will best effect this; by its use the treading of horses is avoided, one great benefit in the present state of the soil. When once stirred, a few fine days would soon bring it into a fit state for the drill. The choice of seed is another point on which success or failure considerably depends. It is now generally conceded that the different varieties of wheat in cultivation originally descended from one common stock, and that the various types and modifications we now meet in practice are due to the variation of soil and climatic influence. We are taught by practical experience that the wheat-plant is capable of adapting itself to a variety of circumstances. When sown at spring for several consecutive generations it gradually assumes distinct characteristics, the most important of which to our present purpose is that of early ripening. The farmer, in making his selection of seed, should be careful to keep this in view, and choose from a stock which had been spring-sown the preceding year. The best varieties of white wheat for spring-sowing, are the Essex Rough Chaff; it is best suited to deep loams, rich in manurial condition. On such soil it crops well, straw short, grain of fine quality; it is not, however, well adapted to a late climate. The Red Strawed White is a hardy variety, grows a stiff straw, and on medium soils gives a good return. Talavera may be sown to the middle of April; it is best adapted to warm, rich loams, and seldom succeeds well north of the Trent. The red varieties best adapted for spring sowing are Spalding's Prolific, Essex Red, Nursery, Browick, Rivet's and Bearded April. Spalding's on land in good condition, as its name implies, is very prolific, but the grain works soft, and is only considered of medium quality. The Essex Red, Nursery, and Browick are well-known varieties; they are all good croppers and highly esteemed by the miller. Rivet's is the most productive of any, and may be grown on inferior soils, but the grain is coarse, and the flour much disliked by bakers. The Bearded may be sown to the middle of April; the straw is soft and easily lodged; the grain is of fine quality, thin skinned, and weighs well to the bushel; we have known the yield to be five quarters per acre when sown so late as the first week in April; but when ripe it readily sheds with high winds.

## Sprouted Wheat.

The season of 1872 was so wet in Great Britain that much wheat sprouted; and Lord Kinnaird of Perthshire, Scotland, deemed it important to ascertain what is the chemical effect of sprouting in wheat. He accordingly sent samples of sound and sprouted wheat to Mr. King, the eminent chemist of Leith, for analysis and comparison, and communicates the result, as follows:—

"I think it may be interesting for many of your readers to know that sprouted wheat is found—as shown by the accompanying analysis—not to have lost any appreciable amount of its nutritious properties, and although the color of the flour produced from such wheat may be darker than that obtained from ordinary wheat, and though the former may not be capable of being fermented, owing probably to the gluten having undergone a peculiar change, and therefore rendered unsuitable for the preparation of bread, it will, with the introduction of a little carbonate of soda, make excellent and very cheap scones or bannocks, and will be found suitable for other domestic purposes. The cost of the sprouted wheat—indeed, of all coarse wheat—being 3s per quarter, and the flour consequently about 7d per peck, against sound wheat at 6s per quarter, and flour at 1s 1d to 1s 4d per peck, there will thus be a great saving by the use of the former."

Mr. King in his letter to Lord Kinnaird, with his analysis, says:—

"These results are satisfactory in one way, but disappointing in another. They show, for instance, that whatever other change has taken place in the wheat by being damaged, it has lost none of its nutritive power. They fail to indicate, however, in what it is the sound and unsound wheat differ. The damaged wheat, I can understand, will not do for making bread, because the fermentable portion, although not lost or removed, is so changed as to be incapable of undergoing the necessary fermentation."

Analysis.

| | Mixture of Strong Black Land. Grass & Fallow. Per'd. | Stiff Carse. Clay. Uns'nd. | Stiff Carse. Clay. Uns'nd. | Sound. Crop'72. |
|---|---|---|---|---|
| *Albuminous Compounds (flesh former) | 10.50 | 8.50 | 11.88 | 11.75 | 11.25 |
| Oil (heat givers) | 2.25 | 2.94 | 3.19 | 3.05 | 0.69 |
| Starch, Sugar, &c. (heat givers) | 64 58 | 66.92 | 65.92 | 67.06 | 66.01 |
| Woody Fibre (undigestible) | 2.96 | 2.96 | 2.9. | 2.60 | 2.80 |
| Ash (bone former) | 1.93 | 2.12 | 2.16 | 0 80 | 2.04 |
| Moisture | 17.76 | 16.56 | 16.40 | 16.90 | 16.40 |
| | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| *Containing Nitrogen | 1 68% | 1.80% | 1.84% | 1.88% | 1.56 |

## The Corn Crop of 1873.

Although the farmers of Illinois seem to be sensible that they are growing too much corn and sowing too many oats, and although they are ready to admit that another such crop and another year of such prices would ruin them—still as many acres are ready for corn to-day as there were last year at this time. If the spring is favorable, there will be as many acres planted in '73 as in '72. And the reason for this seemingly illogical conduct is this: It is one of the admitted half truths, common to the country, that seldom more than two and never more than three full crops of corn, follow in succession. Nobody among the farming community hoped, wished or expected more than half a general corn crop in 1872. In 1873, nobody expects more than the third of a crop at best; and therefore every field that will carry one will be so planted. Whether there will be too much rain or too little, whether there will be too late frosts or too early ones, nobody knows, and whether the crop will be made on high land or dry land, on new land or old land nobody can guess, but every available acre will go into corn, in hopes the crop will be sure to catch somewhere. Again, the experience of 1871, and that of 1872 notably has shown that just as good corn crops may be grown on shallow plowed land, nay even in many cases better crops, than on soil plowed and stirred to the depth of five, six, seven or eight inches, and remembering this recent experience, the effort will be to enlarge the area planted at the expense of depth and thoroughness. Any attempt to change our system of corn and oat growing, radically and suddenly, has little chance of succeeding; but constant discussion, new light, new experience, new men, and new ideas, may finally show us there is something more than corn and something better than oats.—*Country Gentlemen.*

## English Farming.

An American gentleman who recently returned from a visit to Great Britain has addressed a meeting of farmers in the State of New Jersey, and given an account of what he saw. In the course of his observations Mr. Wall calls attention to the fact that in less than a century, the production of wheat in England had risen from 16,000,000 to 100,000,000 bushels. This enormous increase he attributes to systematic attention to all the requirements of good farming; to the skill and exactness with which all the operations are performed; to their careful selection of the best varieties of seed, and to the extensive and good use of their barnyard manure. Nothing is left to casualty or chance. No expectations are indulged in that an unusually favorable season will atone for shortcomings or neglect. He alludes to the business-like liberality of the English farmers in restoring to the earth, by means of purchased manures, the elements of fertility exhausted by cultivation, and says that in 1837, the first year in which bones came into general use as a fertiliser, the foreign bones imported were valued at the custom-house at $1,500,000, since which time it is estimated that the amount paid for imported bones alone amounted to $150,000,000. Since 1841 upward of 500,000 tons of guano have been used. Mr. Wall believes that the English farmer's rotation of root and grain crops comes nearly to perfection, and that the care which is bestowed on root cultivation has been the salvation of England.

Commenting on these observations of Mr. Wall, an American cotemporary says:—

It is certainly true that the culture of root crops has been the salvation of English agriculture. The cultivation of these crops may as truly be the means of improving the soil in our Eastern States. We had once hoped that the manufacture of beet sugar would enable Western farmers to avail themselves of this root as a fallow crop, but we fear that this will prove not to be the case, just yet; perhaps time may give us cheaper labor by which it may be done. Fortunately, we have Indian corn, which enables our farmers to clean their land in an admirable manner if properly attended to. Still, it can never take the place of tap-rooted plants. The turnip crop will probably never be available in the West, even if we could afford to to make it take the place of corn as a feeding crop, for the reason that our hot summers are not suited to the plant.

## Live Stock to Population.

Professor Thorold Rogers, of Oxford University, England, has made up a curious return of the proportion of domesticated live stock to population in the most prominent countries of the world. It shows the following results:—

Great Britain: one cow to every 12 persons; one sheep to every person; and one pig to every 10 persons.

France has a cow to every 6 persons; a sheep to every person, and a pig to every 6 persons.

Sweden has a cow to every 3½ persons; a sheep to every 2½ persons; and a pig to every 13 persons.

Norway has a cow to 2½—a sheep to 1—and a pig to 18 persons.

Denmark has a cow to 2—a sheep to 1—and a pig to 4½ persons.

Prussia has a cow to 5—a sheep to 1—and a pig to 5 persons.

Wurtemburg has a cow to 4—a sheep to 2½—and a pig to 7 persons.

Bavaria has a cow to 3—a sheep to 2½—and a pig to 5 persons.

Saxony has a cow to 6—a sheep to 8—and a pig to 8 persons.

Holland has a cow to 4—a sheep to 4—and a pig to 12 persons.

Belgium has a cow to 7—a sheep to 9—and a pig to 8 persons.

Austria has a cow to 6—a sheep to 2—and a pig to 5 persons.

Switzerland has a cow to 3½—a sheep to 5—and a pig to 7½ persons.

The United States have a cow to 4 persons—a sheep to each person—and a pig to 1½ persons.

The Dominion of Canada is not included in Mr. Rogers' return—the figures not having yet been made public. So far as the Province of Ontario is concerned, we think the census returns of 1871 (if they are ever forthcoming) will compare satisfactorily with those of any other country.

## Foot and Mouth Disease.

This destructive disease has made sad work for for many months past among the herds of Great Britain, but at last it seems to have been in a great measure overcome. An essay on the history, character and treatment of the disease has just been published in England by Messrs. Day & Co., which has attracted much attention. They say:—

"We have had this epidemic upon our senior partner's own estate in Kent, and quickly relieved the animals from suffering and loss of flesh without losing one single head of stock. The treatment we recommend at first is our red drench, with four ounces of Epsom salts and a quart of strong ale, with or without half a pound of treacle; half the quantity for lesser animals, a third for calves, and a fourth for sheep, When the bowels are free the red drench alone is needed. The mouth should be washed three times a day with our aluminate of borax, and if this is not at hand, one part of carbolic acid with 40 parts of water is a useful lotion. It should be applied with a large syringe to the whole of the sore surface. As soon as possible the vesicles should be opened with a common lancet, When the matter is forming about the hoof it should be well cleansed with the carbolic lotion just named, and then dressed daily, or every night and morning, with our aluminate of zinc ointment. It may be applied on a piece of tow. As long as the febrile symtoms last there is nothing better than our red drench. When the fever has subsided, our gaseous fluid will be a valuable restorative to the shattered system. Where abscesses are forming, hot water and poultices are necessary. Where matter is burrowing and causing pain and local mischief, it should be liberated at once. Nourishment should be given as soon as the animals can take it. Mashes of barley, oats, malt, and linseed meal are necessary; green clover, grass, turnips, and swedes are also useful. Stables should be kept clean and well ventilated; a few pails of water with an ounce of carbolic acid to the pail should be thrown down daily."

## System in Farming.

At a recent meeting of Farmers, Professor Miles of the Michigan Agricultural College said:—

Farmers should cultivate habits of investigation, and go to the bottom of questions, and when recommendations are made, they should consider all the surroundings. The great defect of American farming is a want of system—the want of a proper comprehension of the relations which one department of the farm bears to other departments. If we raise stock, it should be with reference to raising of grain, and if we raise grass and grain, it should be with reference to raising stock. We cannot always afford to raise that which pays the best, because of its influence upon other departments. There are, of course, locations where the farm can be given to a specialty, but as a general rule, mixed husbandry, giving a variety of products, is the best. The labor question is a troublesome one, and farmers will find it to their advantage to so shape their systems that they can employ their labor all the year round, and thus avoid the evil of paying high wages a portion of the year. He did not believe the absolute exhaustion of Western soils practically impossible; but it is possible to bring the land into such a condition, that it will not profitably produce the same crop year after year. But the farmer should grow those crops which, other things being equal, will give the most value in manure; and this value can be measured, because it depends upon a few elements which have a commercial price. The value of the manure made from a ton of corn is worth $6; and from an acre of stalks, $3.36. The value of the manure made from an acre of clover is worth $22.76, and of timothy, $9; and the value of manure from permanent pasturage would be about the same as timothy.

## A Map of the Farm.

The *Rural Sun* advises every farmer to have his farm surveyed, and a map of it made for daily use. It says:—

We know of no better plan to secure a convenient and economical laying out of a farm than to make a map of it, putting down every natural feature in its proper place, and then marking off the fields according to some settled plan of rotation of crops, and laying down the roads so as to occupy the shortest possible route to and from the fields. Nothing will so much conduce to the adoption of a system of working the farm as a well prepared map, hung where the farmer can see it every day. It will be sure to set him to thinking and planning how best to pitch his crops, and how best to work to save work. And once the the farmer adopts a system of farming, he starts on the road to success. It matters not that the system is not the best that could be devised, so long as it is a system it is infinitely to be preferred to the haphazard practice of many farmers. We therefore advise every reader who owns a farm to make at once, or have made, a map of it and hang it up where he can see it every day. And having made it, study it.

## Consumption of Timber.

The United State Commissioner of Agriculture says:—

"If for twenty years to come the demand for lumber shall advance in the same ratio to the population as in the past twenty, more than $200,000,000 worth of American sawed lumber will be needed each year, denuding more than a million acres of land. About 7,000 are cleared each week-day in this country. Of the annual crop $72,000,000 worth goes to fuel, and twice as much to fencing. The locomotives in this country consume about 7,000,000 cords a year, or 500 acres a day. This is a startling revelation, but there is no doubt that it is substantially true, and the day is not far distant when every acre of timber land will be immensely valuable. Coal will soon be used for fuel by all our locomotives, and also by factories. But if we would keep up supplies of timber, even for building purposes, we shall need to plant trees to take the places of those now being destroyed. Why not organize tree planting commissions, whose duty it shall be to promote this most useful interest.

## Paint Farm Implements.

Almost all implements in use on a farm are now laid by, and many a stormy day may profitably be employed in painting them. "Paints costs nothing;" so says an old Dutch friend of mine, and he is right. If a merchant could expend his capital as profitably as a farmer can, in buying paint, paint-oil, turpentine and brushes, and also the time occupied in using these articles, he would assuredly make far more on his year's business, than he does at present; and yet numbers of people allow their farm implements to waste by decay and neglect, due altogether to the absence of paint, to an amount of annual depreciation equal to double the cost of paint material and labor; thus in reality losing what if preserved would amount to two hundred per cent. on the cost of preservation. Whereas a merchant thinks himself well paid at an annual profit of twenty per cent. sale of his goods. It is true there are only a few dollars expended, and the amount of the benefit, not to mention the greatly improved appreance, is not actually felt to come back in money directly, but it as surely is a profit made, and an amount saved. So paint all farming implements at any and all convenient seasons, and be assured a man will never feel the poorer but considerably the richer for the outlay.

## Intelligent Horticulturists.

We exhort our readers, and especially the younger ones, who intend to make horticulture their vocation, to so fit themselves for their honorable calling, by a careful study of those sciences that appertain thereunto, as to become so familiar with the soil which they till, the nature and growth of the plants which they may cultivate, the insects, birds and other animals that may affect their business favorably, or unfavorably, the principles which affect atmospheric conditions and changes, that their labor shall be a *mental*, as well as a physical exercise.

These excellent suggestions are taken from the *Rural Home*, and are worthy of attention. "Knowledge is power," as truly in the cultivation of the soil as in any thing else. They who *study* their business, who in their farming, gardening or fruit-growing operations call into exercise all the activities of their minds, will be the men who will be most likely to accomplish the greatest success. There is great need of more intelligent farming and fruit-growing; and there is scope in all these departments of industry for the exercise of the highest powers of the human mind.

## A Pleasant Country.

Our English cousins have the fixed idea that Canada is a country of interminable winter, but a return made up by Mr. Fletcher, M.P., for Cockermouth, and just published in the *Carlisle Journal*, of the rain-fall in Cumberland during the year 1872, exhibits a picture that no Canadian has cause to envy. At Scathwaite the number of wet days in 1872 was 228, and there fell no less than 186 inches of water! At Taylor's Gill there fell during the year 224 inches; and at Stye the same enormous quantity! Only fancy, nineteen feet of solid rain!

## Butter Factories.

These useful co-operative companies are fast increasing throughout the United States. At a recent meeting of dairy farmers, Mr. Hawley, of Onondaga Co., said that the reason why factory butter is better than dairy butter is from the fact that the milk is thoroughly mixed before setting, and in common dairies each cow's milk is set separately. The cream in the factory is all exactly alike, while in dairies that in one pan differs materially from the next. Part of the value of butter is due to its aroma. This is derived from the food of the cows. The grasses in the pastures must be sweet, as also the hay. If the butter is kept in a cool, sweet place after it is packed, it never loses its aroma. It does not keep in the warehouses in cities. Factories are usually located on a running stream of pure water. An occasional one uses well water.

## How much Land for a Cow.

We asked two experienced Wisconsin dairymen: How many cows will a good dairy farm of 160 acres support in an average season, keeping besides only the horses needed, and, perhaps, a few hogs to use up whey, etc.

One, who has been many years in the business, as this was in private conversation, we do not mention names, said that on his farm of that size, on which were twenty acres thickly covered with timber, and worthless for pasture, he could keep forty. The other's estimate was forty also for the 160 acres. Of course both included the use of such land as was necessary for the usual orchard, garden, etc., but not for the production of anything for sale except the products of the cow in milk, cheese or butter.

Both of the dairymen to whom we refer believe heartily in the value of sowed corn, believing it a cheaper feed than hay. One says that he would want one and a half acres of pasture for each cow, to last until after haying. After that time he pastures the meadows, and feeds green corn fodder, etc., with the usual pasturage. The other would have two and a half acres of pasturage for each cow for the whole season, also feeding corn fodder in the fall. He so plants this that while it produces a large amount of stalks and leaves, it also matures a considerable quantity of corn. On this he relies largely for the winter.—*Western Farmer.*

## The Fruit Growers' Association of Ontario. Report for 1872.

In the forthcoming report for the year 1872, proof sheets of which we have been permitted to inspect, will be found much very valuable information concerning the varieties of fruits which are grown in various parts of the Province and the value of each in the several counties. It is to be illustrated with a very handsome colored lithograph of Beurre Clairgeau pear, carefully executed from nature, and giving a very accurate representation of this fruit, trees of which were distributed to the members of the association last spring. Besides a full report of the discussions which gave so much interest to the regular meetings, and the address of the President, so replete with useful hints on the growing of pears, there is a very interesting account, by Mr. Vice-President Saunders, of his experiments in hybridizing, and a most valuable summary of the answers received to the questions sent out by the Directors. We congratulate the members who are to receive the report on this most valuable addition to their library of knowledge on fruit growing in Ontario. Did they receive no other returns for their annual fee of one dollar, they would be most amply repaid. When the report is published and we have time to examine it more carefully, we may refer to it again.

# Breeder and Grazier.

## Points of a Short-Horn Cow.

The following are the points considered of the highest importance in judging a Short-Horn Cow:—

PEDIGREE.—Showing unbroken descent on both sides, from known animals, derived from herds found in the English, American, or Canadian herd books, without which an animal cannot compete in classes of thorough-bred cattle.

| Points Maximum. | |
|---|---|
| 3. | HEAD—Small, lean and long, tapering to the muzzle. |
| 2. | FACE—Somewhat long, the flesh part of the face of a light, delicate color. |
| 2. | EYE—Of great significance; should be *prominent, bright and clear* ("prominent" from an adipose accumulation in the back parts of the socket, which indicates a tendency to lay on fat; "bright," as an evidence of good disposition; "clear" as a guaranty of the animal's health. Sluggish eye belongs to slow feeder). |
| 1. | HORNS—Light in substance and waxy in color; *symmetrically* set on the head. *Legs* large, thin, with considerable action. |
| 2. | NECK—Rather short than long, tapering to the head; clean in the throat and full at its base, thus covering and filling out the shoulders. |
| 14. | CHEST—Broad from point to point of the shoulders; deep from the anterior dorsal vertebræ to the floor of the sternum, and both round and full just back of the elbows; "thick through the heart." Most important points in the animal. |
| 5. | BRISKET—Very attractive and selling point; indicates a disposition to lay on fat throughout the frame. |
| 4. | SHOULDER—Whose weight, as in Short-Horn, is the object, should be somewhat upright and of good width at the points, with the blade-bone just sufficiently curved to blend its upper portion smoothly with the crops. |
| 3. | CROPS—Must be full and level with the shoulders and back (most difficult points to breed right in Short Horn). |
| 8. | BACK, LOINS AND HIPS—Should be broad and wide, forming a straight and even line from the neck to the setting on of the tail; hips or hucks round and well covered. |
| 5. | RUMPS—Laid up high, with plenty of flesh on extremities. |
| 2. | PELVIS—Should be large; indicated by width of hips and the breadth of twists. |
| 3. | TWISTS—Should be so well filled out in its "seam" as to form nearly an even and wide plain between the thighs. |
| 3. | QUARTERS—Long, straight, and well-developed downwards. |
| 4. | CARCASS—Round; ribs nearly circular, extending well back. |
| 3. | FLANKS—Deep, wide, and full in proportion to condition. |
| 2. | LEG—Short, straight, and standing square with body. |
| 2. | FLANKS—Of the belly, straight, and thus preserving nearly a straight underline. |
| 2. | TAIL—Fine and broad at its root, fine in its cord, and placed *high up*, and on a level with rumps. |
| 2. | CARRIAGE of an animal gives style and beauty; the walk should be square and the step quick; the head up. |
| 15. | QUALITY—*Very* important point, indicating thriftiness, feeding properties, and general value of animal. If "touch" be good, some deficiency of form may be excused; but if it be *hard* and *stiff* nothing can compensate for so unpromising a feature. In raising the skin from the body between the thumb and finger, it should have a soft, flexible, and substantial feel, and when beneath the outspread hand, it should move easily with it and under it, as though resting on a soft, elastic, cellular substance, which, however, becomes firmer as the animal "ripens." |
| 2. | COAT—Should be thick, short and mossy, with longer hair in winter; fine, soft and glossy in summer. |
| 3. | UDDER.—Pliable and thin in its texture, reaching well forward, roomy behind, and teats standing wide apart, and of convenient size. |

100 points constitutes a perfect animal.

## Keep only the Best.

Any one who will take the trouble to inspect the quality of our market supply of hogs, and make the necessary enquiries, will not remain in doubt as to the most profitable breed to raise; and every farmer who keeps a careful account of the cost of his pork, will speedily arrive at the same conclusion. We often hear it said that it costs more to fatten the hog than the pork sells for, and with some breeds, this is doubtless too true; but with a good breed and the right sort of food for them, and ordinary attention to their cleanliness and comfort—hogs can be made to pay in money and manure, far better than any grain crop.

At present the general feeling of breeders points to the Berkshires as most nearly fulfilling what is wanted to make a profitable hog. The Berkshires are of rapid growth, early maturing, and produce first-class meat, worth always a higher price than ordinary hogs. In buying animals of this class for raising stock, those well covered with hair should have the preference. The nose should be *short, coarse and broad*. The feet should not be large, and clothed to the hoof with thick hair. The tail, on the contrary, should be thin. The chief characteristics of the Berkshire is the projecting poll, and deep, wide chest, broad shoulders, and full round hams. Keeping these points in mind, and getting well-bred animals, the farmer, even if he pays a high price to commence his herd, will have a breed of hogs that will pay him an excellent return.

The farmer who establishes on his place a good bred of hogs, will soon find a valuable return in his manure heap. Berkshires, of course, contribute no more in this way than common Canadians, but instead of keeping a few *razors* ranging about, the farmer will soon find that good hogs pay for good feed, and largely increase his herd, and with it his manurial supplies. It should never for a moment be forgotten that a plentiful supply of manure is the basis of successful farming—that we can only get such a supply in Canada from our live stock—and that no animal contributes more largely to this end in proportion to the capital and labor bestowed on him than does a well-bred hog.

## Straw for Fodder.

It seems to be a controverted point whether there is much real value in straw, especially wheat straw, as fodder for stock. As I have been a close observer and a practical experimentor in the use of straw as feed for horses and sheep more particularly, I propose to give the numerous readers of your valuable paper the benefit of my experience.

Three years ago I thought I would try the experiment of wintering my work horses on straw and grain, without any hay. So I began on Dec. 1st to feed my horses exclusively on barley straw and cut hay, mixed with about 4 quarts of coarse middlings, giving about one bushel of the mixture to each horse in the morning; at noon I gave them 12 ears of corn, at night about 3 quarts of oats. They seemed to do very well, but the rack of straw was hardly ever empty, showing conclusively that barley straw was not eaten with much relish. I think the barley beards made their mouths sore. As I had a quantity of oat straw I began feeding that, and fed it about 4 weeks with the same quantity of the above mentioned grain. They did not eat much more of the oat than they did of the barley straw. I think unless barley and oats are cut quite green, there is a toughness to the straw that stock do not relish. I then fed wheat straw until the first of April, with grain as before. I found the racks empty, or nearly so, every morning, which was conclusive evidence to me that the horses eat it with better relish than barley or oat straw. I never had my horses go through the winter in better health or condition for spring's work than they did that spring. Since then I have fed wheat straw, because I consider it better than barley or oats, with the same result, although I would mention that if the horses were steadily worked I would increase the grain.

Having succeeded so well in wintering my stock, I thought I would try the experiment last winter. I wintered 53 fine wool ewes. I began on Dec. 1st, to feed them wheat straw, with an occasional feddering of corn-stalks for a change. I fed one half bushel of barley, unground, daily, until Feb. 27th, when my grain barns were all burned to the ground, with all my fodder. My sheep were kept during March and April by my neighbors, and fed straw, corn stalks and bean fodder, without any grain, and they never came through the winter in so good condition. I would say that down to the time of the fire they had lost but little flesh; in fact, most of them were fit for the butcher. Most of them raised lambs and sheared 7 9 16ths lbs. of well washed wool. In wintering barn-yard stock, such as young cattle and horses, I have found straw of great value, with one feddering a day of corn stalks. They will winter very well, with a little hay after warm weather begins in the spring.—*Cor. Boston Cultivator.*

## Value of Whey for Feeding.

Mr. C. H. Wilder is reported as saying at the late North-western Dairymen's Association that "he had experimented largely in the feeding of whey and proven to his satisfaction that it was of but little value. He had figured it down to 2½ cents per ton." I do not know that Mr. W. is interested in any cheese factory as overseer or otherwise, but I have heard that his opinion as to the feeding value of whey is quite generally endorsed by factorymen. However that may be, I think he is entirely mistaken. I have had considerable experience in feeding whey to calves and pigs, and have raised some very fine ones too. Three years ago I milked, I think, 12 cows, and raised 7 calves which had nothing but whey during cheese-making season, except the grass on about a half acre pasture in which they ran all summer. They drank about two pails full each per day of sweet whey. These calves were admired by all who saw them. One yoke were sold at 3 years for $100, one do at 2 years for $66. In other years I have kept hogs growing, and in good order upon nothing but sweet whey. Ten years ago I was through the State of Vermont "among the cheese-makers" and observed they were raising the finest grade stock I ever saw, the calves exclusively on whey, while making cheese lasted. And as further evidence of the value of whey I noticed that in one large dairy, the whey was allowed to stand from one milking to another and then skimmed, and the skimmings were used to dress the cheese with in place of butter. Upon the whole my experience teaches me that with plenty of sweet whey I can raise as good calves as I can with sour milk, though I always feed more whey than sour milk. Mr. Wilder says "the extreme eagerness of the patrons of cheese factories to get whey leads to much scrambling" &c. Would there likely to be much scrambling for an article only worth 2½ cents per ton?—*Corr. Western Farmer.*

## Importance of Feeding Regularly.

Success in feeding operations does not depend altogether upon feeding liberally. The usual supply of food should be given with regularity; and when the time comes at which the stock should be fed, nothing should serve as an excuse for delay. The system becomes accustomed to the times at which food is taken; and if the food is not taken at these times, derangement and injury is sure to result. When the stock is not fed at the proper times, the animals are disappointed and thrown into a state of nervous excitement and anxiety, highly derogatory to their improvement. And any one who has seen a lot of cows lowing up and down the yard, or seen and heard a lot of pigs squealing and rushing from one side of the pen to the other, because the hour at which they had become accustomed to receive their food had been suffered to pass without it, need not be told that such animals are not only not in the way of improvement, but that they are actually losing ground. But this excitement and worry is not the only evil result which follows the delay in giving food, the appetite and digestive apparatus become deranged, and some animals will gorge themselves to such a degree as to become quite uncomfortable, even if not made actually sick, while others will not take so much as they require. The successful farmer will never allow his stock to become hungry even for the shortest length of time, and finds it to his advantage to keep his stock *comfortable*, to preserve them from excitement of all descriptions, and to keep their digestive organs in a state of the highest health. To secure success, there should be stated intervals for feeding, and these intervals should be *strictly* observed.—*National Live-Stock Journal.*

## The Dairy Cow.

In an address recently delivered at a Farmer's Convention, Professor Miles, of Detroit, gave his opinions on the subject of the right cow for a dairy farm as follows:—"We often have an animal recommended to us because it eats but little. But, gentlemen, I want nothing to do with that kind of stock. I want an animal that will eat a large quantity of food, and give the largest returns for it. The returns are the matter which should be considered. The cow is a machine to turn the vegetable products of your farms into animal products. But you need with your system a secondary quality—you want an animal that will fatten up well, and so you must be contented with moderate dairy qualities in order to secure fair beef qualities; but I believe many dairymen are disposed to cultivate these fattening qualities to too great an extent. The native cow giving a certain quantity of milk, is certainly as valuable for its mere milk, as a thoroughbred giving the same quantity. But when you a find a remarkable milker, you desire to reproduce it. But you cannot do this with the native, because she has no fixed type, and the character of her offspring will depend largely upon accident. With the thoroughbred, however, you can rely largely upon securing a transmission of the same qualities to the offspring. I do not suppose that dairymen will confine themselves exclusively to thoroughbred animals. If their price did not preclude such a thing, the limited number of the animals would prevent. But they must consider the means by which these thoroughbred races have been formed and developed, and follow the same course. The first requisite is to form in your own mind a standard of excellence, and select those animals which comes the nearest to your standard and adhere to the line you have chosen. The law that like produces like is not one which is confined to the external form; it may be years before you perceive it, but it is nevertheless true. A pedigree gives an animal no value, only as it enables you to trace its ancestors, and ascertain their qualities; for by comprehending the character of the ancestors, we can the more accurately understand the character of the animal of to-day. The fact that an animal is pure-bred is not all that is required, for there is a great difference in the value and qualities of pure-bred animals. We must consider the character of the ancestry. When you have a herd to suit you, you should select the males for use with great care and with a view to their capacity to develop and fix the best qualities you have already in your herd. And in breeding up your herd you should not only endeavour to develop the good qualities, but to weed out the qualities which are undesirable. And this you can do the more readily by selecting your male animals with a special eye to this purpose, and you will fail in it if you select such males as are most convenient. The highly-bred animals, those which have been more successful in stamping their impress upon their progeny have always been clearly inter-bred. Does not believe however that inter-breeding of itself improves the animal. It simply fixes the qualities of the parent in the offspring, and it fixes to just the same degree the desirable and undesirable. It is a dangerous thing when practiced indiscriminately. The male you use in your dairy herd should have a well-defined character, and be descended from milking families. And if I had a bull which suited me, and he had no undesirable qualities, and I could get no other, I should use him, selecting the females with judgment—for one generation at least upon his own heifers. The great breeders always had highly-bred females in their herds, from which they bred males for use upon the herd generally.

In selecting females you should not only select those of good qualities, but those free from serious defects. The dairymen should raise their own herds, and if they were as careful about this as about the manipulation of their products, their herds could be greatly improved. They should not endeavor to breed from all their cows, but select the best; breeding from them, and weeding out every one which does not come up to the required standard. Do not leave one of them because it happens to belong to a pet family. There is great danger of mistake by adhering to minor points—color for instance. You cannot secure two things at once. You cannot build up a herd of remarkable dairy qualities and at the same time of a definite color. We are too liable to make up our mind from general appearances. We see an animal and we say that suits us; and when asked why, it may be because of a handsome head or a symmetrical horn. We should study points, and connect them with desirable qualities. The dairy cow should have the quality to give large returns. The head and tail should not be large, as they indicate a coarse organization and too much bone. The chest should be full, thinning away upon the chine. There are other points upon which men rely. Many good dairy cows have been rejected because they did not happen to fill these points. Guenon, for instance, lays down the theory of the escutheons, and in the main it is correct. Should prefer to have a good eschutcheon but I have seen good milkers with poor escheutcheons. The skin should be soft and pliable. The milk veins have no decided connection with the udder, but when these are full they indicate a good circulating system in the animal, upon which the quality of the cow depends.

## The Cow-House.

Strict attention should be paid to all parts of the cow-house; sound feed, cleanliness in the stalls, punctual feeding, likewise place the cows according to their temper, not two evil disposed animals together, also as the one or the other loves a warmer or cooler spot. The cow-house should be airy, but not exposed to draught. The strewing of straw should be well attended to, the more the better for the cows, particularly in Winter, when cold. The stalls must be cleaned three times a week, and the feeding floors or troughs swept twice a day. In fact, everything in the cow-house should be calculated to make the animal feel comfortable in it. Perfect cleanliness throughout the cow-house, to keep out the stench, should be the rule, else the milk will suffer from it, even during the milking. And here I would call attention to an unpardonable neglect so often met with in cow-houses. I mean the perfect disregard of the valuable manuring fluid which is produced in cow-houses and from dung-hills, and which so often is left to run into a ditch or creek near by, instead of being caught in some vat or vessel and used as a most valuable manure. Yet every farmer knows that without manure worn land cannot be cultivated. One must have seen European farms, where they cannot afford to waste anything, to make this great error in some American farms right glaring.

Currying cows as an act of cleanliness I would recommend, and the daily washing of the udder must be attended to by all means. All this has considerable influence on the health of the cow, as well as on the productiveness of milk. It now and then happens that a cow, heretofore good, suddenly shows a decrease in her milk. This never should be a reason for neglecting her; on the contrary, she should have a very comfortable, clean, airy, but warm place, and the best of feed. She will soon recover, provided an actual disease has not set in. In the tending of calves in the cow-house, special regard should be paid to those which show the marks of future great milk productiveness, and as such are intended to be added to the stock of the dairy-farm.—*Weekly Times.*

## Milch Cows.

The extreme sensitiveness of the mammary functions in cows to the influence of cold, fatigue, excitement, unpleasant odors, etc., is indeed surprising. We have been greatly interested in observing the effects of cold upon the milk secretions as seen in the herd of cows upon the farm. During the past summer, in hot days of July and August, the animals resorted to the lake to drink, and after slaking their thirst, they would wade into the water and remain sometimes an hour or two with the legs half immersed. This habit, it was found, invariably diminished the flow of milk at night, and in order to learn the extent of the diminution, careful observations were made. It was ascertained that standing in the water an hour diminished the flow to the amount of eight or ten quarts in a herd of thirteen cows. The loss was so great that whenever they resorted to the water they were driven away to the pasture again at once. The nature of the water supply, and the conveniences of access, are most important points in the management of milch cows. A draught of ice-cold water, taken by a cow in winter, cuts short the milk yield for the day from one to two pints. The influence of a cold current of air, and cold drinking water upon cows in milk, is not of a transient nature; it extends for a longer period than a day or a week. Many fine animals are ruined by careless exposures every year, and self-interest and feelings of humanity should prompt all cow owners to keep diligent watch over welfare and comfort. The right man in charge of a herd of twenty cows, which have been badly managed will in one month raise, the lacteal products so that the increased cash returns will pay his wages. This is a statement which has been verified more than once.—*Farmer's Union.*

## Keep Cows Quiet.

It is a curious fact that any excitement to which a cow is subjected causes a very large loss of cream on the milk. At a meeting of the Mass. State Board, Dr. Sturtevant, said: "Under the same feed, and under the same circumstances, the same cow gave, one day, nine and a half per cent. of cream and another day eighteen per cent. of cream." Mr. Lewis, an old experienced dairyman said: "I have taken a good deal of pains to test the value of my milk that I have worked into cheese. I have graduated glasses for the purpose, and I have found a cow whose uniform percentage of cream was eighteen per cent. reduced to six, in twelve hours,—not from any change of food, but from a little excitement. I have known a cow abused by a furious milker, and the percentage of her cream went down one-half. It is astonishing what an effect excitement has on the percentage of cream in the milk that a cow produces. I have known a cow, excited from natural causes, to drop in her percentage of cream in her milk from fourteen to six per cent. in twelve hours. So I would again repeat, whoever abuses his cow knocks out of his milk a large percentage of the cream."

The worry by dogs, the hurrying and hollowing of boys when driving the cows home from pasture, the kicking and pounding of an angry milker, or any similar cause of excitement will be sure to reduce the quality of the milk to the extent of several per cent of cream. This fact is too well attested by many careful and experienced dairymen to admit of a doubt, and the first object of concern with the butter dairyman, especially, should be to see that his cows are treated with the utmost gentleness all the time.—*Mass. Plowman.*

## Ayrshire Cows.

The attention of farmers and dairymen is turned toward an improvement in dairy stock. They find it costs no more to keep a good cow than a poor one, and while some native cows do not yield over fifteen hundred quarts per year, good Ayrshires range from three to five thousand quarts per year. This additional production, at the same cost of food and care, is greatly to be desired.

Different breeds of cattle possess different distinctive merits. The Durhams, or Short-horns, are distinguished for their early maturity, their readiness to fatten or take on flesh, and the small proportion of offal or waste in the carcass. Some families are very respectable milkers, and although they are excellent for beef, they require succulent pastures, high feeding and careful protection. The Ayrshires are a medium sized, hardy, docile breed of cattle. Their milk is richer than that of the average native cow, although not so rich as that of the Alderney. They are easily kept, and will thrive on coarse food and scant pastures. Extensive breeders of Short-Horns and Ayrshires, express the opinion that three Ayrshires can be maintained in good condition on the food required to sustain two Short-Horns, and added to this is the fact that in proportion to their weight they will yield a larger amount of milk than any other cattle. The general claim made for the Ayrshires is hardiness of constitution, tendency to fatten easily, small bones, symmetrical figure, and a capacity of yielding a large quantity of rich milk, giving a large return, both in milk and flesh, for the food consumed. These are desirable as well as profitable qualities, and have been attained by years of careful selection in breeding.—*Duchess Farmer.*

## Kicking Cows.

A few years ago I had considerable experience with kicking cows, and by far the best remedy out of quite a number that I have tried, was the strap of surcingle drawn tightly around the cow just in front of the hips and close to the bag. Tighten it up till she does not attempt to kick. I never knew it to fail. You can gradually loosen it until it will be sufficient simply to lay it on her back. But be cautious, and do not loosen or leave it off until she makes no effort to kick with it tight or not. Kick she cannot with the strap tight. The first cow I tried it on was the worst I ever saw. With both hind legs tied together she would kick backwards like a horse; and then, in addition, one fore leg was tied up; and she would stand upon the other and kick with both hind legs, as soon as an attempt was made to milk her, till she tumbled down; then would get up and kick again until tired out; so the milk was generally left on the stable floor, and it was decided to dry her up, and beef her as soon as possible, though an extra cow.—*Cor. Country Gentleman.*

# Poultry Yard.

## Leghorns.

Considerable attention is now being given to the useful and deservedly popular variety of fowls not only in this country but in England also. Like all other breeds of fancy fowls their origin is buried in obscurity. Some breeders assert that it was the result of a sport—others of a cross with a Hamburgh, and others again of a cross with a Black Red Game and a Spanish. Against these assertions, American breeders loudly protest, and maintain that they have been bred pure in the New England States for over twenty years, and when first introduced were of all colors, from black to white, and that they originally came from Leghorn, Italy, or the Mediterranean. Be this as it may they are now an American breed of fowls, separate and distinctive in their markings and equally entitled to recognition as much so as are the Brahma and Cochin breeds.

The general characteristics of Leghorns are sprightly and handsome carriage, the tail in the cock carried perfectly erect and exceedingly well furnished with sickle feathers; comb erect, evenly serrated, and in the hen falling over like that of Spanish hens. Abundant layers of full sized eggs, the hens rarely showing any inclination to sit, but laying the whole year round, except during the time of the annual moult; active and good foragers.

Leghorns are of two varieties, White and Brown, and like Brahmas these may again be subdivided into pea and single combed, each of which latter varieties have their admirers and detractors.

The White variety is more numerous than the Brown and are thus described: Cock—comb, single, very erect and evenly serrated; face, rich bright red; ear-lobes pure white; wattles very long and pendant, well rounded on the lower edge; beak, bright yellow; plumage pure white, the less of the yellow tinge the better. Tail well sickled, and carried well up; legs bright yellow, and of medium length, free from feathers. Hen—same as cock, except the comb, which falls over to one side, and in good specimens, nearly covering one side of the face; carriage very proud and quick motioned.

The Brown Leghorn is far more highly prized by fanciers than the White, and are said to be even hardier—they lay somewhat larger eggs and commence laying earlier in the year. The shape of the body is like that of the Minorca, face red and deaf ear white, although good breeders differ on this point, some insisting that it is no disqualification to have a brown spot on the ear-lobe. Combs, as in White—cocks erect and evenly serrated; hens, falling over. The plumage in both cock and hen somewhat resembles that of the Black Breasted Red Game, the hens breast approaching to a salmon color, hackle gold, striped with black and wings partridge marked. The breast of the cock is black, as is also the bars of the wings and tail; hackle, bright red, striped with black; wing-bow red; secondaries rich bay, and saddle the same as hackle; legs yellow.

The chickens of both varieties mature early and are easily reared. They commence to lay when from four to five months old. Their sex can be told at the end of two weeks, the comb of the cock beginning to grow at that time. When six and a half weeks old, the cockerels begin to crow. They are of medium weight and their flesh is tender and white. They bear confinement equally as well as the Brahma.

Our illustrations show a cock and hen of the White variety.

## Feather-Eating Fowls.

The unnatural vice of fowls devouring each others plumage, even till the blood flows, is of no recent date, but of all breeds of fowls peculiarly subject to it the French breeds seem to predominate. Malays also are predisposed to the unnatural appetite. No unfailing specific has hitherto been discovered; in some cases the most opposite remedies have answered, and this, joined to the fact that the vicious propensity is almost invariably confined to hens, would tend to prove that it is somewhat analagous to the strange fancies for unusual articles of diet frequently observed in the female sex generally. Giving raw meat daily has been known to stop it, and so has leaving off meat; giving purgatives to deplete the system, and tonics to strengthen it, have both proved effective; while other cases have baffled all means which have been tried, and tend to prove that there is some craving of the female system as yet unsatisfied. Cocks will stand still to be pecked at till they are covered with blood without appearing to object in the least, and rarely if ever retaliating. On the other hand, cases have been known where Brahma cockerels—a breed rarely subject to this affection at all—in a small grass-run suddenly manifested the tendency in a very aggravated form, as well as the pullets in the same yard, proving that the view we take of it cannot account for all cases.

A bran and linseed mash, twice a week, has been known to afford marked benefit; and a case is known where no animal food had been given, yet a perfect cure was obtained by giving daily fresh or raw bones crushed small. The most general success, however, appears to have attended the copious use of lettuces, especially if running to seed; and the medical qualities of this plant led us to advise the trial of a sedative. The following prescription has been given with marked effect. One-eighth to one-fourth of a grain daily of acetate of morphia, with a grain of calomel in addition, twice a week, and the addition of carbonate of potass to the drinking water in proportion sufficient to give a decided alkaline taste. In one case this treatment cured the vice within one week, and also in others it has succeeded. External applications are also necessary. Short stumps of feathers must be extracted, and all the parts attacked copiously anointed with a very stiff lather made from carbolic disinfecting soap, in order to nauseate the unnatural appetite of the birds.

From observations frequently repeated, it has been proved that the *immediate* exciting cause of this most disgusting propensity, in nine cases out of ten, is *thirst*. Again and again, fowls have been observed to commence it when the fountain was empty or absent, or filled with sun-warmed water, and this conclusion verified repeatedly by withholding water from a hen known to be addicted to it for a few hours in warm weather. The inference is obvious; keep *cool*, fresh water always in reach, and many cases at least would be avoided. Idleness is also a great cause and we have known a whole yard cured by burying corn in the ground, so as to give the birds occupation in scratching. It is, for this reason, very useful to hang up a whole cabbage by a string just within reach of the birds; by its bobbing about it gives occupation and green food at the same time. By combining such measures with the medical treatment above and secluding any particularly wicked fowl till the habit be in a measure forgotten, and any bleeding fowl till healed, we believe this disgusting appetite may be successfully checked in the majority of cases.

A writer in a poultry paper says that, after thirty years' experience in keeping fowls, he concludes that the vice is contracted by the want of dry food, such as dry corn leaves or hay leaves. "I have never" says the writer, "had the first hen pull feathers when running in the yard where I stack my corn-stalks, or in yards containing a plentiful supply of such things. If a bundle of well-cured corn fodder is put into a pen where fowls have had nothing of the kind, it is surprising to see the quantity of blades they will strip off and eat in a short time. My practice is to put a bundle of corn fodder, and occasionally some hay leaves from the mow in each pen, and when the fowls strip the leaves off pretty well, give them fresh ones, and I am not troubled with fowls eating one another's feathers."

## Mating Fowls for Breeding.

The first care of the skilful breeder is the judicious mating of his birds for next season. Experienced breeders have found that in the case of fully mature pullets, or of hens that have well got over the moult in good time, laying generally commences within three weeks to a month of pairing with the cock; and therefore in all cases where early chickens are desired, the breeding yards should be made up as soon after Christmas as possible. This is a very important business, and no study and pains are too great to devote to it; for the successful production of high-class birds, may be said to depend exclusively on two things: first, proper mating of the parents; and secondly, the rearing to proper size and condition of the chickens, the first of which only we are considering. Each hen is to be carefully looked over, point by point, both her merits and her defects being carefully taken into consideration, until sufficient for one pen presenting the same general characteristics can be grouped together, after which the cock has to be chosen to accompany them. Whatever faults the hens may have must in him be carefully compensated, or at least absent, or they will be sure to be aggravated by the double influence. When put together, the scrutiny is repeated again and again, and what will probably be produced by each bird, thus mated must be most carefully considered; for every thing must have a definite object in this business, and if any one thinks such study ridiculous he had better not attempt to breed prize poultry. Often, after many an inspection has

taken place and only confirmed the first impression, some hitherto overlooked feature will suddenly strike the eye, and at once necessitate mating with quite another bird to that originally intended. In the case of adult birds, what they have already bred with the same or other mates must also be taken into consideration. A hen may have been matched up the previous year apparently with judgment, yet the produce may have been most greviously disappointing, for such mishaps may occur occasionally to any amateur. In such cases, by studying the character of the unforeseen result, and tracing the probable causes, success for next season with the same bird, but differently paired, may be almost insured, and the loss thus more than repaid, Some of these unexpected disappointments are very curious, and for a long time were thought unaccountable. They usually occur at the commencement of a strain, or when a cock is purchased for fresh blood to recruit an old one.

With regard to the ages of the birds which are to be bred together, there is no universal rule. Cocks and hens in their second season, will always breed well together, and the chickens usually fledge more kindly than the produce of either older or younger birds. The offspring of cockerels and pullets mated together are worst in this particular, and in large breeds are also more subject to leg-weakness. A cockerel mated with adult hens is preferred by most amateurs, and usually produces very vigorous and large chickens but if only two or three hens be put with him there is almost sure to be a preponderance of cockerels. An adult cock mated with pullets is also a good arrangement. A valuable hen may be kept and her eggs set as long as she lays; but except in rare cases, a cock is of little or no use after he is four years old, unless for exhibition, for which purpose some birds have been preserved for seven years and even more. In some cases productive vigour may be maintained beyond four years; and so long as a breeding bird of proved value shows indisputable liveliness and vigour it would be a pity to discard him.

It has long been verified by general experience that the breeder has some control over the sexes of his produce by adhering to definite rules, though numerous exceptions will occur. 1. If a vigorous cockerel be mated with not more than three adult hens, the cocks almost always largely predominate in at least the early broods; later this becomes, uncertain. 2. If an adult cock be mated with not more than three pullets, the result is very uncertain, the one sex being as likely to occur as the other, but usually there is a decided predominance on one side rather than equality. 3. If an adult cock be mated with five or more pullets the pullets are generally in excess; and what cockerels there are will be most numerous in the earlier eggs. 4. young birds or adult birds mated together are very uncertain; but the fewer hens and the more vigorous the cock, the greater is the proportion of cockerels, which are always more numerous in the earlier eggs of a season than the later. It is also a curious fact that chickens hatched late in the season are often perceptibly more short-legged than the earlier birds, From these facts, while nothing like certainty can be obtained, it is manifest that the breeder possesses considerable power of obtaining such results as are desired.

After the birds are properly mated, they should not, if possible be disturbed, as such disturbance frequently leads to unforeseen disappointment. A cock separated from the hens he has been mated with, and put to others after an interval, not unfrequently turns sulky and thrashes them severely, instead of showing them proper attention. For this reason it never answers well to make a practice of exhibiting stock birds during the breeding season once carefully mated, let the brood stock remain quietly in their runs till the season is over, when the chickens will probably do credit to the parents from whom they are descended.

Poultry Difficulties.—I notice, once in a while, some poultry fancier is troubled with a hen that eats her eggs, and another who has hens that pick the hackles off the cock. The surest and only remedy in either case is to burn the end of the bill off, from an eighth to one-quarter of an inch, with any piece of iron, heated to a white heat. In a case of feather-pulling, after burning the end of the bill, take a sharp knife and scrape the edges of the bill near the point so they can get no hold upon the feathers. After this treatment the fowl can pick up grain, gravel and all necessary to sustain life, but cannot break the shell of the egg, or pluck the cock, and by the time the bill has again grown out, the habit is forgotten. Don't be afraid of burning too much, especially on a strong bill. In case of egg-eaters, if one burning won't do, burn again. In case of roup in brood, cock, or hen, cut the head off, as, although palliatives may be resorted to, the disease is surely generated. In the case of very valuable fowls, of the coarse cold blooded strains, out crosses will absorb the disease.

Hens That Eat Eggs.—The best way to break hens of egg-eating is to break their necks and re-stock with birds that have not acquired the habit. Fowls that are expert in egg-eating first attack the egg with their bill. If it is a thin shell, a few strokes will break it, and the rest is an easy job. If, however, the shell is a thick one, they generally fail to break it with their beak; then they begin to scratch in the nest, and, with their feet, throw the egg against the hard sides of the box until it is broken. First of all, make hens lay hard shelled eggs, so hard that they cannot be readily broken by a hen's bill. This can be done by feeding freely with slacked lime, ground or broken bones, oyster shells, etc. To prevent breaking against the sides of the box, the nests should be high and lined upon the sides with cushions filled with hay or other soft material. Their only chance then is that they may throw two eggs forcibly against each other. To prevent this, I rob them of the nest egg, and gather the eggs several times a day. It is a good plan to leave a few China eggs near the nest for them to work at, which will make their bills so sore that they will strike the real egg with less force. —*Cor. Poultry World.*

## The variety of Pigeons you should Keep.

Under this heading Wiltshire Rector, in the *Journal of Horticulture* furnishes a very readable article, from which we make the following extracts :—

"Fancy pigeons are very numerous as well as very beautiful, and there are almost infinite varieties of form, as well as blending of feather. Where will you find such varied beauty? Nowhere, I think, in one class of bird. Hence tastes the very opposite may be gratified. Does the eye delight in color? That can be gratified; witness especially some of the German Toys, especially the Suabians. Does another delight in gracefulness of form? That can also be gratified; witness the slender Dragoon, and stronger Carrier; or another delight in size? Runts the long, and Pouters the tall, will please; or another delight in smallness and colour? there is the Almond Tumbler.

"Now supposing, gentle reader, you are in good easy circumstances, and that you delight in a country life, revel in a landscape, delight in a garden and green-house. Then if it is so, you have the greatest source of pigeon pleasure at your command, for you can keep all the varieties. You can go in for elegance of structure; a breeding-place furthest back, three sides of a square, shut in when needed from all cold, where you can sit in winter among your pets, or stroll round from box to box, cigar alight. This innermost compartment may open into a wired space for flight, that again opening into another, where a fountain may play a gentle jet only, and a shallow gravel-bottomed space beneath where the birds can wash; and pretty creepers may be outside both wired enclosures. A rookery and a fernery flanking all this would be ornamental, not detrimental, in a garden. Within, the pigeons of all varieties—the tall bulky Pouter beside the tiny dappled Tumbler; the long-beaked beside the short-beaked; the turned-crowned beside the smooth-crowned; the whole-feathered, the pied, the chequered, the magpied, the pure white, the raven black, the mottled, the splashed, the black-headed, the white-headed, the soft-feathered, the hard-feathered. What a lovely assortment of feathered pets you would be able to enjoy, and how much pleasure you would derive from them! If still a busy man at times, you would the more enjoy the leisure hour spent with your birds; and if quite a retired man, having sheathed your sword with which you cut your way to success in life, then you would, looking back, and talking over your past active career, have an agreeable pastime for your well-earned repose. You would be the very man I should, if I dared, envy.

"But all are not rich enough to possess all the varieties, therefore the best plan is to adopt one variety at a time, and study its capabilities, and breed it to perfection. Then each variety of man may be suited with some variety of pigeon. Thus there is in the world a walking class of men—a genus to themselves are these great walkers—they greatly benefit their shoemaker and their butcher, while their doctor regards them with great disgust. I know the men at once—these men, long-legged men, what there is of them is all bone and muscle; they have a tanned cheek, and peculiar expression of face. These are the men who might have been colonists, explorers, travellers; and they are the men who keep homing pigeons. They always want a walk and an object. Let them keep Antwerps. Further and further they may extend their walks, and toss their birds on some lone hill or breezy down, and timing their flight from their hand, stride home eager and hot and anxious to find how long their birds got there before themselves.

"But all men are not great walkers; habit, business, infirmity, or taste, keep some at home. To such their house and garden are all in all. They may suitably keep, if on a hill, or in an open spot, high flying Tumblers, who, like themselves, are "true to the kindred points of heaven and home," face upward, watching their birds or tending them, in which there is always a special interest, as Tumblers are the cleverest and tamest of pigeons. Little, confiding, bold fellows they are, who will feed out of your hand, and finding nothing in it, peck sharply at your fingers.

"Then there are the still more home-keeping varieties, who rarely fly save from the ground to the top of their house, and therefore, never stray away and annoy neighbors; at least, neighbors fancy they annoy them. Or, again, you are a little pleasant smiling fat man, with a dot for a nose, a double chin, and double the stomach alloted to most men, and with a little weakness for tasty viands? Then, if so, the full-fleshed Runt must be your love; not the prize birds, which are bad breeders, but the smaller, yet large-bodied, and exceedingly appetising in pie or spit. Then, if you reside in town, where cats in brigades abound on roof or wall, and make night hideous with their music all out of time and harsh, and who would pounce on any poor bird if at liberty, still if you hanker after bird pets in the form of fancy pigeons, that hankering can be gratified by keeping the Londoner's pigeon, his bird for a century at least, the elegant-shaped and elegant-colored Almond Tumbler, or his kindred Short-faces. A little room or a tiny green-house will do, an invalid may tend them and enjoy them; as they must not fly they are the birds for the city, or for those persons who are obliged to remain in-doors.

"But there are the ladies: I can suit their special tastes, too. The older, who remember how neatly the cottage bonnet looked, and neater the face inside, they may have reminders of both in Jacobins, whose modest folding feathers half hide their pretty faces. Or a young lady of the present day, with chignon and tiny bonnet pinned to her hair? Then the Helmet and the Turbit will do for you. Are you Catholic? There are Nuns, Priests, Monks, and Carmelites for you. Or does some enamoured swain declare in your listening ear (foolish fellow!) that you are an angel? You can keep Archangels for company. Or are you matron, and has the lord of the house and of your heart begun to lose his ambrosial locks, and that youngest pet—*his* pet—thinks it fine fun to stand tip-toe behind papa's chair, and kiss the bald place, and run off with a shriek, hoping to be run after? Then like master like pigeons, for there are Baldpates to match; or has he a hirsute chin? there are Beards. Or are you tender on 'a soldier covered with lace,' as the nursery rhyme has it? you can have dashing Dragoons, or heavier Horsemen, or puffing Trumpeters. Then ladies always love the pure White Fantail—the ladies' pigeon. If you do, be sure and have both varieties, the stouter and flatter tailed Englishman, and the tiny tremulous Scotchmen. Some ladies, too, seem now-a-days always making point lace; they may keep Lace pigeons. Then, again, there is the odd little air Tumbler, or rather house Tumbler, which, though it cannot fly up to a bench without tumbling, delights some persons."

White-Face in Hamburgs.—This class of fowls are subject to a disease known as *White-face*,—that is, the face first appears partially spotted with white, which steadily increases until the whole face and comb become covered. It is contagious, and birds in the same coop soon catch it. The following is said to be a certain cure for it: A little oil mixed with the flowers of sulphur, and rubbed on the parts affected will speedily cure it.

# The Dairy.

## Dairying as a Business.

A meeting of the Wisconsin Dairymen's Association was recently held at Whitewater, at which Mr. S. Favill, the President of the Association made the following most sensible suggestions :—

There are many reasons which I might give, would time permit, why I think it would be entirely safe for farmers to turn their attention to dairying to the extent of the capacity of their farms. But unless the farm is naturally or can be artificially supplied with an abundance of pure water, it is useless to expect success in dairying, for an abundance of pure water is as much a necessity as food for the dairy cow. And then again there are a good many farmers in the West who are not naturally adapted to dairying. They lack the *patience* and the *perseverance*—qualities so necessary to the successful dairyman. If there are any of this class present who are thinking of going into dairying as a business, to such I would say be sure that you count the cost before you decide the matter. The successful management of the dairy is so different from the management of the grain farm, that you want to consider well your qualifications before deciding. Don't forget that he that would succeed with the dairy must give it his constant, personal attention. I would not be understood as discouraging persons from going into dairying for a business, but what I want is to have them go into it understandingly, so that they may make it a success. That many persons in this part of the State are thinking of substituting the cow for the plough I am quite certain, and I am equally certain that many more must do so soon, or bankruptcy will stare them in the face. We now hear complaints on every hand about hard times, and the farmers all agree that something must be done. They agree that the system of farming hitherto pursued by most Western farmers will not do any longer. They have been selling their soil by the bushel for the last twenty-five years, until they have nearly exhausted it. Then comes the question what shall be done? Gentlemen get the very best breeds of dairy cows to be had in this country or any other, remembering the best is the cheapest always; and when you have them be sure that you give them the very best of care, for it is worse than folly to expect satisfactory financial results from a half-fed and poorly sheltered cow. "He that would get milk in the pail, must first put it into the mouth of the cow." Stick to your business. Do not be tempted by the temporary ups of other branches of agriculture to change. You know by experience that it is not an easy thing to get together a herd of really good cows, and you know, too, by experience, that the better the cow the larger the profits derived from her. Then, I repeat, gentlemen, stick to your business. Study to know it more thoroughly, and to such as do thoroughly learn their business and carry it on with energy and skill, I feel very confident I am not promising too much when I say, that the profits of the dairy, one year with another, will be decidedly larger than those of other branches of Agriculture.

## Cheese Making.

At the recent meeting of the National Dairymen's association, held at Utica, Mr. L. B. Arnold, of Rochester, called attention to the fact that dairy farmers were going too much into cheese making, and too little into butter making. He reminded them that the best cheese was nearly all being sent to the European market, which injuriously affected the home consumption. He urged that their own people should be educated to eat first-class cheese. Cheese, if well made, is a healthy, nutritious article of food; as much so as good beef. Much waste of the nutritive properties of milk takes place in the manufacture of butter or cheese. He thought the time would come when, in order to save all the nutritive properties of milk, it would be used, condensed (like "Borden's condensed milk"), and consumers would get the whole. Cheese is popularly supposed to be constipating in its effects upon the stomach and liver. This is true as regards green cheese, and untrue if the cheese has been allowed to ripen. If it is kept until it softens down, somewhat like butter, it is then ripe, and as easily digested as tender beef. Ripe cheese may be known by its having lost its elasticity under pressure of the finger; it keeps soft after cutting—not drying up readily—and melts in the mouth like a ripe pear. Cheese made from impure milk will not live to a decent old age. The most of our cheese, besides being short-lived, is deficient in flavor. Carrying to factories, as now practiced, is detrimental to flavor. The milk should be aerated and cooled as soon as drawn from the cow. A taint can be prevented but not cured. Want of pure air in factories is also injurious to the cheese. There is, usually, too much sour smell from whey spilled on the floor, or carelessness in washing the floors. Rennets, also, smell badly. He advises the use of a bag of charcoal in the rennet-jar to absorb the bad odor.

## Cheese Making in 1872.

At the late Dairymens' convention Mr. Willard said the returns of the business had been as satisfactory as could reasonably be expected for the past year. Prices ranged much better than in 1871, and there is good ground for hope that they will not decline during the present year. He takes no stock in the idea that we are over-producing, or that we are likely to reach that point for some time to come. All the facts connected with the trade go to show that there is no unusual surplus stock in the country, while reports from England indicate that the quantity of cheese on hand is rather below than above the usual supply at this season. These things being true, there is little ground for fear that ample market will not be open for the cheeseman. More real cause of alarm, however, arises in the comparative small quantity of cheese turned out per cow from the majority of our dairies. The average, it is believed, falls below 400 pounds, at least, is not above that figure. Now, if the products of the herds could be increased to 500 or 600 pounds to the cow, most dairymen would be fully satisfied with receipts at last year's prices. Six hundred pounds of cheese selling at 12 cents per pound would come to the same money as 400 pounds at 18 cents, and a product of 500 pounds would be the same as 400 pounds at 15 cents. If prices are low dairymen are apt to complain that there is no profit in the business, but by increasing the product you see the same result is reached on low prices as by increasing the price on a minimum product. Dairymen must be at least partially responsible for allowing the product of their herds to fall so low as 400 pounds to the cow, and there must be some fault in factory management when more than 10 pounds of milk are required to make one of cheese.

## No Profit in Poor Butter.

We cut the following admirable article on the making of butter from the Utica, N. Y., *Herald*, and earnestly commend its careful perusal to all our agricultural readers :—

Poor to ordinary butter is worth from 10 to 20 cents; a better quality is sold up to 25. Creamery and other choice brands bring readily from 40 to 50 cents, and fancy articles even more. Here is a difference that is nearly all difference. Yet the ten-cent butter costs as much as the 40 and 50 cent, and the still dearer, some of which reaches near a dollar per pound.

Do butter makers realize this? One would seem to think that they were not aware that the pound which sells for 10 cents might have brought 40 or 50 or even more. *It is all in the making*, beginning with the cow and its feed and persevering up to the time it reaches the market. Why this neglect? It must be ignorance, or carelessness, or both. It does not pay to make poor butter. It does at *all* times pay to make good butter. And there is a fortune to be realized in making the best or a fancy article—establishing a reputation and living up to it. If it pays to make butter at twenty-five cents, what is realized above that is all clear gain, whether it is 15, 25, or 50 cents, which the best brands command—command over and above the cost. The secret is: Secure good milk; keep clean throughout; and have the proper temperature. This sums it up.

Butter making has of late assumed a very hopeful aspect: It is in the factory system. Creameries, we are safe to say, have the past season given much encouragement. Mr. MacAdam, of Fort Plain, the owner of several creameries, has sold his butter, the summer through, from 5 to 10 cents above the highest price for State firkin. His factories drain a considerable area, the milk of which *all* is worked up to the highest advantage. Before this, up to the present season, much of the milk produced from this territory was made yearly into poor or ordinary butter, selling *at less than half* what is realized now; showing what an enormous loss the country is suffering from an imperfect make of the article. Could the figures be obtained, they would probably seem incredible, for there *is* a large proportion of poor or ordinary butter made. The creameries show clearly what can be done, so that there is no excuse. Butter now poorly made, commanding but a low figure, can as well be made to realize a high price as not. It only needs the care which is taken at the creameries or dairies of first-class product. Cleanliness, the proper temperature (for milk, cream and churning, that is, the dairy room,)—summer and winter,—and the great desideratum is met. The feed to secure this milk need only be good hay, with some meal or roots; or, early cut and well cured hay alone, as has been sufficiently demonstrated, as is demonstrated now, and will be practised more in the future, until the natural feed (grass) of the cow will be almost the only feed. In this way he included the clovers and the grasses, particularly for a winter feed the red clover (medium size) and timothy; also the orchard grass where it will flourish well. Corn stalks too may be fed to advantage; so may the straws of the different grains, particularly barley and the oat. Any experienced good butter-maker is pretty sure to know that it will not do to feed garden stuffs and other unsavory material for the production of butter. Cabbage is objectionable. Roots will prevent a first-class article of butter from being made. Timothy, with most of the other grasses, if cut when tender and well cured, will make the best feed for milk in winter, being scarcely inferior to the June and October make. And this is the cheapest feed as well, including clover, which, as a single feed, is the cheapest of all, securing a rich, full flow of milk. But the fault generally is not in the milk—as the creamery testifies—but in the handling of the milk. The stables must be clean at the milking, the atmosphere if infected tainting the milk. The vessels in which the milk are put must be kept scrupulously clean; so the jar that holds the cream; so the churn particularly, and the butter bowl in which the butter rests after salting, else there will be a wood taste with the old lurking odors of previous absorptions. But most of all the room or atmosphere must be kept pure. It is so objectionable to keep milk in a room inhabited in winter, that only a poor article can be produced however clean and perfect all the other ordering may be. Smoke, the culinary odors, the air repeatedly breathed until charged with foul carbonic and other gases, all are attracted constantly by the milk and the cream, so that they are entirely unfit for use at the table, and much less so when made into butter. Another thing: such a room is not unfrequently apt to have its temperature raised to 80° and over, which produces decomposition and rancidity, however carefully the other operations may have been conducted. Then again there are times when the milk reaches almost or quite the freezing point, making a change sometimes in twelve hours of fifty degrees, which is hurtful.

## Washing and Packing Butter.

We approve of washing butter as it comes from the churn, that is, using so much water upon it while properly working it with the ladle or butter worker, as will remove all traces of buttermilk. When butter comes as it should, but very little water is required to take out the buttermilk. When the moisture that flows from the butter is clear as the water that is poured upon it or is not discoloured as it passes off, the washing process is completed and no more water should be used. Excessive washing injures butter and of course some judgment in the matter is necessary. We are aware that many good butter makers are opposed to washing butter, holding that some of the more delicate flavouring oils are carried off by that process, and consequently that "washed butter" has not that fine aroma which unwashed butter possesses. Possibly this may be so in some instances, but as there is always danger of over-working butter and spoiling the grain in feeding it of buttermilk without the use of water, while at the same time there is danger of not expelling the buttermilk, we think it safer and better to wash it. A large majority of butter makers who make "fancy butter" wash the butter. Washed butter keeps better than that which is unwashed. This has been proved over and over again by the fancy product made under the two systems, both of which come into the London market. Butter in which there is a large proportion of caseine retained, will not keep well for any considerable length of time and a common sense view of the matter must show that washing most readily frees the butter of its caseine.—*Home Journal.*

# Veterinary Department.

## Structure of the Horse's Foot.

We have no hesitation in stating that two-thirds of the cases of lameness occurring in connection with the fore extremities of the horse, are due to some lesion or diseased condition of the foot, and as diseases of the feet are of such common occurrence amongst horses of every kind, we intend to devote several articles to the causes, symptoms and treatment of the various diseases. That our readers may more readily comprehend the nature of these affections, we deem it advisable to notice the structure of the foot, and in so doing we will first notice the outer or insensitive portion which contains neither nerves, bloodvessels, or absorbent vessels, but consists entirely of horn, and is familiarly known as the hoof.

The hoof represents a box or casement which envelopes the lower extremity of the limb, and is closely applied to the sensitive structures, being united to them by reciprocal elevations and depressions which beautifully fit into each other.

Viewing the general form of the hoof it appears cylindrical, the oblique section being the solar surface of the foot. Apparently the hoof is formed of one horny mass, but by the process of maceration it can readily be separated into three distinct parts, these three parts being known as the wall, the sole, and the frog.

The wall, also called the crust, is the part visible when the foot is on the ground, it is highest in front, gradually decreasing in height as it proceeds backwards, where it takes a sudden inflection inwards at an acute angle; the angle of inflection is called the heel, and the portion passing inwards to the centre of the foot and uniting with the horny sole is called the bar; the front part or bow of the hoof is known as the toe and comprises about two-thirds of the superficies of the wall.

The wall is connected above (around the coronet) with the skin, and its inferior border rests upon the ground, and to its circumference is united the circumference of the sole. The internal surface of the wall presents throughout its whole extent, parallel plates formed of semi-transparent processes of horn, and called the horny laminæ, in contra distinction to the vascular plates which are situated on the wall of the coffin-bone, and called the vascular or sensitive laminæ, the sensitive and insensitive laminæ dovetail into one another, forming a firm bond of union between the organic and the inorganic structures of the foot. On the internal side of the superior or coronary surface of the wall, is a well marked depression, forming a groove in which is lodged a very important and vascular body called the coronary substance, its secretions penetrating the groove by numerous small orifices.

The sole of the hoof is the thick plate of horny matter comprised between the inner circumference of the wall and the bars, and therefore occupying the inferior portion of the foot, its external or inferior surface in the healthy foot is more or less concave, the inner or upper surface being correspondingly convex and is studded with numerous minute orifices into which are received the secreting villi of the sensitive sole.

The frog is the mass of spongy horn, somewhat triangular in form, and situated between the inflections of the bars; its under surface is marked by a triangular cavity called the cleft of the frog; this cavity being always broadest in the well-formed foot. The inner or superior surface of the frog receives the insertion of the vascular or sensitive frog, and also shows a triangular longitudinal hollow, which is divided by a conical projection designated the frog stay. The protuberant parts behind are called the heels or bulbs of the frog, and continuous with these parts and passing around the upper surface of the wall is a band of considerable thickness, called the coronary frog band, which serves to unite the thin outer coating of the wall with the cuticular covering of the limb.

Having noticed the outer or insensitive part of the foot, we will now briefly describe the internal or sensitive structures, which consist of bones, ligaments, tendons, synovial membrane, blood vessels, nerves, and absorbent vessels, the sensitive laminæ, sole, frog, and coronary substance.

The bones in connection with the foot are the coffin, navicular, and coronet bone, the latter is only partly within the hoof, its upper part entering into the formation of the pastern joint. The coffin bone is very irregular in shape and is extremely hard and porous, and is divided into the wall, sole, articulatory surface and wings. The wall is the part to which is attached the sensitive laminæ, and in shape it is similar to the wall of the hoof, having on its upper part a well marked prominence for the attachment of the tendon which extends the foot. The sole surface of this bone receives the attachment of the sensitive laminæ, and also the insertion of the tendon which flexes the foot. The wings are formed of the protuberances projecting from the back part of the wall; each wing is divided by a notch into two processes, the upper one is called the basilar process, and to it is attached the lateral cartilages. These cartilages are two thin plates of fibro cartilage, and from their elastic nature, they materially protect the sensitive frog and soft structures of the foot.

The navicular, sometimes called the shuttle-bone, is small and is situated between the wings of the coffin bone, and entering into the formation of the coffin joint, its lower surface is covered by fibro cartilage, and is in close contact with the flexor tendon. The coffin joint is a large and important joint, and is formed by the union of the three bones above mentioned. In our next issue we will describe the other sensitive parts of the foot.

## 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 good 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.

Sprinkle the hay with water that has salt dissolved in it, because it is pleasing to the animal's taste, and more easily digested. A teaspoonful of salt in a bucket of water is sufficient.

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.*

## Another Horse Epidemic.

The *Melbourne Argus* alludes, in the following terms, to a remarkable affection among horses:

For the last three or four years the young thoroughbred stock in Victoria have been subject to a peculiar disease which has been named by racing men the nasal disease, from the swelling on each side of the face which is the chief indication of the complaint. From the first it was observed that the disease only attacked young thorough-bred horses, and always those in training, though one case is said to have occurred where the animal was brought up on pasture. Several racing stables suffered from the disease, and a number of splendid animals died from the disease, after suffering from it for months. There was now quite a panic among racing men, as the complaint was thought to be contagious, and from its mysterious and fatal nature everyone was afraid to invest in race-horses. A post-mortem examination was held on the body of Knavesmire by four veterinary surgeons, when the non-contagious character of the disease was at once established. The internal portion of nearly all the bones in the body was found to be quite soft and spongy, and from the general post-mortem appearance the disease was considered by the medical gentlemen to be of a rheumatic character, and identical with that known to European veterinary surgeons as osteo-porosis. The disease is under the careful consideration of the medical gentlemen who attended the post-mortem examination, and an exhaustive report on it is expected shortly. Commenting on the above the London *Field* says:—

"We have no doubt that the opinion of the veterinary surgeons as to the nature of the disease was correct; at least, if the disease was not identical with "osteo-porosis," it was very closely allied to it. Isolated cases of this peculiar softening of bone, in the horse and other animals are occasionally met with; but we recollect only one instance of the affection assuming an epizootic character, and extending to all the animals of the stud; the case is recorded in the *Veterinarian* for 1860.

"At first the disease was indicated by the following symptoms: Defective action of one joint or limb, followed by swelling, heat, and tenderness in the part. Shortly afterwards another limb would become affected in the same way, while the one first attacked would partially recover. In some cases all the limbs were thus successively attacked, and the head and other parts of the body participated in the diseased condition. Ultimately, from the excessive pain, the animals suffered in their general health, the appetite failed, and emaciation occurred. Treatment failed to relieve their sufferings, and, after in some cases many months, they finally succumbed.

"Post-mortem examinations were made, without leading to the discovery of any disease of the vital organs. The osseous structure generally was found to be swollen and porous, and the ends of the bones were commonly ulcerated. A most remarkable symptom was the detachment of the tendons and ligaments from the bones with which they were connected. This accident, when it happened, naturally reduced the animal to a pitiable state of helplessness.

"Microscopic examination of the diseased bones revealed a curious state of affairs. In osteo-porosis the softening of bone is associated with dilatation of, and deposit of fatty matter in, the Haversian canals; but in these cases the enlargement of some of the long bones was due to the deposit of fat in the dense tissue outside the canals, while in the bones of the head the Haversian canals were so much distended as to alter the microscopic appearance of the bony tissue altogether. No facts which were ascertained during a critical inquiry sufficed to explain the origin of this remarkable malady. The animals attacked were all horses, none of the mares on the same farm being affected. There was no extension of the disease beyond its point of origin.

[A disease of a similar nature has been occasionally noticed amongst horses in the United States, and especially in the Southern States, and it is generally termed "Big-head," from the abnormal enlargement of the bones, due to an altered condition of their cancellated tissue. We believe the disease is always due to some local influence, either resulting from the condition of the soil or from the nature of the food. There is a very fine pathological specimen in the museum of the Veterinary College in this city showing the peculiar enlarged condition of the bones of the head. The specimen was forwarded by Mr. Harthill, veterinary surgeon, Louisville, Kentucky, a graduate of the Ontario Veterinary College].—*Vet. Ed. Canada Farmer.*

Lice on Cattle.—May be removed by pouring a small quantity of kerosene on the card with which they are carded. The application should be frequent, though in small quantities, till the lice all disappear. The lousiest herd will be completely relieved of them in ten days by this application alone. Tobacco juice is also an effective cure.

# Implements of Husbandry.

## Introductory.

Nothing is more interesting than to spend an hour occasionally in looking back on the manner in which the early farmers of this world cultivated their estates, and tracing the progress made from age to age since the ancient Israelite tilled with his wooden scraper and "head" ox-yoke, down to these palmy days of tripple furrow ploughs and six-thousand-dollar steam-cultivators. The path of improvement was a long one; but if slow, it was still onward—and in the last fifty years the march of progress has been greater than in the sixty centuries that preceded them

In all countries the improvement in implements of husbandry has of late years been very great—but in no part of the world has it been so great as on the continent of North America. A new country, dependent at first on other lands for its machinery, is unfettered by old customs and prejudices; and its people are apt to look keenly when importing for the article best adapted for the special work to be done, rather than for that which common use and want has accepted. And when home manufactures spring up in opposition to the imported implement, the mechanic strives hard by improvements on the old articles to meet local ideas and suggestions, and thereby distance his foreign competitor. In North America he has every chance in his favor of doing this. Large landed estates are here not numerous; fifty, one hundred, one hundred and fifty, and two hundred acre farms, are the rule all over the continent. On these farms, the lord of the manor is the farmer in occupation; and he is his own bailiff, ploughman, and herdsman. He is up with the morning sun and stands at the head of his 'hired help' as the master power in all the operations of the farm. He sees the work done; he sees how it might be done better; he sees wherein an implement fails—he is interested in the defect being remedied, and he hastens to the machinist and suggests the idea which is elaborated into a valuable and permanent improvement.

In Canada our farmers, blacksmiths, and implement makers have done their full share in this work of progress. It is true, they have not only invented, but availed themselves liberally and promptly of the inventions of our friends across the lines and across the seas; and these improvements have been most cleverly applied. As a rule agricultural implements are turned out in Canada in a style of workmanship that for strength, simplicity, and finish is worthy of all commendation.

The implement manufacturer of North America has another great advantage over his competitor across the Atlantic, in the higher rate of wages paid here and the difficulty even then of getting a sufficient supply of skilled labor. The result is a steady and ever increasing demand for implements of all sorts by which labor can be economized—and when a new implement or new improvement of this kind is announced the demand is at once enormous and the profits remunerative. The mowers, reapers, and threshing machines of the present day, when contrasted with those of but a few years back, give ample demonstration of all this. And the work of improvement still goes on as steadily and satisfactorily as ever.

In assuming charge of this department of the CANADA FARMER, it is the intention of the writer to commence his work with a brief description of the various agricultural implements now available to the Canadian farmer and horticulturist. Those manufactured in Canada will of course, receive primary attention—but where advantage can be gained by importation from the United States or Great Britain, such implements will be described and when possible illustrated. All new inventions tending to reduce labor will be duly noted and the improvements from time to time made will not be forgotten.

## PLOUGHS.

We begin our series with the first implement of importance to the farmer—viz., the plough. And amongst our hundreds of thousands of ploughmen, how few there are who really know how to perform their work properly! How many are satisfied with the most erroneous impression that all that is necessary is merely to turn over the largest area in the shortest time! When the country was new, and the soil retained all its natural strength and elements undisturbed, this notion might be tolerated; but as crop after crop comes to be raised off the same ground, a sad degeneration, both in quantity and quality of production, soon convinces the husbandman that good ploughing is of vital importance. What is the plough designed to do?

1st, To pulverise the soil to a proper depth for the roots.

2nd, To submerge in this pulverized soil all vegetable matters already growing on the surface, in order to facilitate and hasten their decay, and thus convert them into a soil-strengthening manure.

3rd, To mix the partially exhausted surface-soil with that which is untaxed, and consequently stronger, below.

4th, To divide the land off into "rigs" of suitable width, high in the middle, and rounding down towards the dividing furrows at each side, so as to permit the escape of any surplus surface-water, which would otherwise prove injurious.

On newly cleared land with stumps, the soil is usually so strong that a simple turning over or pulverizing is all that is necessary for two or three seasons. The implement to be aimed at in such a case is one that can be readily handled and guided amongst the extending stump roots—one that can be speedily unearthed to skip over a root, and as speedily dipped into the soil again on the other side of it. In short, the quantity of the ploughing and not the quality is what is looked at in new land. The plough best adapted to this purpose must have a short sole, with short beam and handles, and a quickly curving mould-board. Two very serviceable implements of the kind, and well known over western Canada, are the "No. 4 Plough" and the "Amsterdam," both of which have done good service in new land. In selecting either of these, or any other of a similar kind, a steel mould-board will be found preferable to a cast-iron one, as being less amenable to the effects of the decayed vegetable matter at the surface.

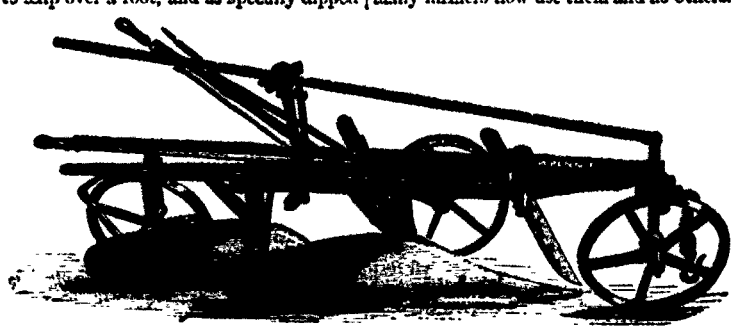
Next comes the general purpose plough, by which we mean a plough adapted to all kinds of work on a cleared farm; really the most useful one on any farm. It should have a beam of medium length, with the handles so proportioned as to give the ploughman full control over it and his team; a mouldboard with a nice easy curve that will pack the furrow well when ploughing 10 inches deep. In heavy clay or black loamy soils, steel mouldboards are preferable, because they clean more easily and better, whilst in light gravelly or sandy ground, cast-iron ones are equally good and cost less. We notice what we consider a decided improvement in ploughs, becoming general among manufacturers, viz., a wrought iron beam with wooden handles—giving the strength and durability of an iron plough, at a little more than half the cost. It would be a difficult task to select any one or two general purpose ploughs from among the large number manufactured in the country and recommend them as superior to all others; for there is scarcely a district of 15 miles area within the Province, in which ploughs are not made, specially adapted for that district, and perhaps not nearly so well suited for any other. But we may mention one plough, patented some years ago by a Mr. Hill and called "Hill's Patent," which is now being manufactured in various parts of Canada, and is a universal favorite.

"Fancy ploughing," is that style which is obtained by setting the ploughshare and coulter so that each will form the side of the furrow slightly hollowed, and thus show a fine sharp 'comb' when the furrow is turned over. Ploughs for this purpose should have a long regularly curved mouldboard to turn the furrow easily and evenly without breaking it.

Iron ploughs are mostly used for this purpose, with the irons specially set—making the peculiar kind of ploughing so popular at ploughing matches; although it is a question of grave doubt whether it is the style of ploughing adapted for general use. These same ploughs, however, without the peculiar set in the irons, form good sod ploughs, and are the best suited for forming a seed furrow when the seed is hand-sown and harrowed in. The grain drill is now getting into such general use that this is becoming of less consequence; and we already see the general purpose plough gradually taking the place of its more expensive rival.

The "jointer" or double shear French plough is often erroneously called a subsoil plough. The functions of the two are quite distinct.

The "jointer" is an ordinary plough, with the beam of sufficient length to admit of a small skim plough in front of the other. This skim is set so as to cut not more than 1½ inches off the corner of the turning slice, which it rolls over like a ribbon into the bottom of the furrow. The "jointer" is designed to cover all roughnesses so that a field of clover for instance, after being ploughed down by it for manure, should not show a single green blade. A wheel at the front of the beam serves to steady the plough and regulate the depth. These implements are specially adapted for ploughing down sod, manure, clover or any roughness, and we are glad to observe that they are getting into more general use—indeed many farmers now use them and no others.



DOUBLE FURROW PLOUGH.

The "double furrow plough" is designed to plough two furrows at once. It is mounted on wheels with lever for raising it out of the ground, when turning at the ends of the furrows, or for regulating its depth. It is worked by three horses and, inasmuch as each ordinary plough requires two horses, making four horses for two ploughs, there is a saving of one horse by using the "double furrow." We are of opinion that this two-furrow implement is a great success, and will soon be in general use over Canada.

We have recently seen a "three furrow" plough, imported from Britain, which was designed to be operated by three horses, but which requires four. In other respects it is the same as the "double furrow," with a third plough added.

Both the "double" and "tripple" furrow ploughs are best adapted for cleared farms where there are no stumps or other obstructions, and where the soil is not too heavy.

The "subsoil plough" is designed to follow another plough, and loosens the subsoil without bringing it to the surface—the object being to break the under pan or cake which forms in land that has been ploughed for several years to a uniform depth. It is built on the principle of an ordinary plough, but without any mouldboard, and it has a slide extending backwards and upwards from the share, over which the soil must pass. An admirable implement of this class is made by Mr. Watson of the Ayr Agricultural Works.

The "double mould" or ridging plough is used for the purpose of making drills, or laying the earth up against potatoes, turnips or other roots. Having a double mouldboard, which can be contracted or expanded to any required width, the advantage is obvious: viz.—that in one trip along the furrow the work of two trips with the ordinary plough can be accomplished.

# Miscellaneous.

## On Swedish Butter Factories.

In the last part of *The Journal of the Royal Agricultural Society of England*, there is a report on this subject by M. Juhlin-Dannfelt, Superintendent of the Royal Agricultural College at Stockholm. A condensed statement of some of its facts may not be uninteresting to the readers of THE CANADA FARMER.

The Malar-Lake Dairy Company was the first of its kind, established a few years ago in Sweden. Experiencing many difficulties in purchasing milk for cream-setting at district milk-houses, the Company resolved to confine itself to the purchase and working of cream—not of milk—leaving it to the producer or purchaser of the latter to utilise the skim milk in the manner which, under different local circumstances, he might consider most profitable—a change that has proved advantageous to all parties. As the Company do not receive less than 6 gallons of cream at a time, small farmers sell their milk to parties who take it to milk-houses established by the Company at convenient distances, where the milk is measured and a sample tested before it is left for cream-setting. The butter milk is either sold in the vicinity or made into cheese. The milk-houses are plain buildings, having a room containing two cisterns, one for ice and water, and the other for cooling the milk; a room for receiving the milk, a wash-room, and the dairymaid's room. Such a house, with shed for storing ice, costs about £144 sterling, on which the Company receives six per cent. as rent.

Cisterns made of planks 2 inches thick, 9 feet long, and 3 feet wide, are used for cooling milk; such a cistern is large enough for cooling about 115 imperial gallons. The more speedily the milk is cooled down, the more completely is the cream separated from it; consequently, the coldest water is used, and the pails for setting the cream reduced to a small diameter. Ice water, being of much lower temperature, is used in preference to well water for the purpose of cooling milk. The ice is chopped in pieces of about 3 to 4 inches square, to increase its cooling power. The quantity of ice used is calculated to be equal in measurement to the quantity of milk for the cooling of which it is intended. At the central factory at Stockholm (June to September 1871), 1590 cwts. of ice were used in churning 103,680 imperial gallons of cream, yielding 2500 cwts. of butter.

The milk should be delivered as soon as possible, and carefully transported. To cool the milk during the process of milking has been considered an advantageous practice; but it has of late been contended that the more original heat is retained, the more cream will the milk yield. The cooking room should be kept in summer at as low a temperature as possible, and, if practicable, not below 50° Fahr. in winter. If the cream is not sent to the butter factory at once, it should be put into the ice-water bath without delay, and in summer it should not be kept more than two days before being churned, and in winter three days. It may be considered as a fact, that "*the fresher and absolutely sweeter the cream is, the better will be the butter.*"

The Swedish Government has much increased the quantity and improved the quality of both butter and cheese by the establishment of dairy schools, in which the principles of the manufacture of dairy products are practically taught and applied. It is thought that the supply will shortly exceed the home demand, and competent persons have been sent to open up markets in foreign countries.

Skim milk in some localities can be more profitably employed in the rearing and fattening of calves than in the manufacture of cheese. The color of the veal is said to be darker from skim milk than from new, which can be obviated by giving the animal sweet milk a fortnight immediately before slaughtering. It is also recommended, in order to utilize a portion of the skim milk, to give it more copiously to servants, with a less quantity of new milk. The price of the latter has varied between 3s. 9d. sterling to 4s. 3d. per gallon during summer, and 4s. 3d. to 4s. 5d. per gallon in winter.

Soon after the Malar-Lake Butter Company had got into successful operation in 1870, a number of applications were received from different parts of the country for the Company to extend its operations, and establish churning places in other districts. The directors, with a desire to avoid direct responsibility and at the same time promote the dairying interests of the country, agreed to advance to competent parties the necessary funds for such objects, and to supply qualified persons to conduct the operations—a proceeding that has met with very general approval. Besides, several competing companies have recently arisen, which, if well managed, cannot fail of success.

A temperature of the cream of 57·2° to 60·8° Fahr. is found the most suitable for making butter, but something depends on the quality of the cream, and the natural condition of the atmosphere in relation to moisture, warmth, &c. The churns employed are adapted to steam or water power, and consist of a barrel, somewhat conical at top, resting on a frame, and vertically movable on trunnions. A churnstaff, provided with two wings, rotates at a speed of 120 to 150 revolutions per minute, depending upon the size of the churn, which generally contains from 17 to 60 gallons. The butter is usually obtained in about 45 minutes, and is separated from the butter milk by straining, placed in a tub or tin, and afterwards worked by hand on a board, usually of oval form, to separate the butter milk completely. It is then carefully tasted, and arranged into one of three divisions, according to quality. Before churning, fluid annatto, manufactured by Messrs. N. N. Blumensaat in Odense, Denmark, is added to the cream in quantities suitable to the seasons, giving the butter the color which is required for different markets.

The different assortments are carefully worked separately, with from 2 to 5 per cent. of refined Swedish salt, and ¼ to ½ per cent. of sugar. When the butter has a uniform waxy firmness, it is packed in casks made of beechwood, previously well saturated with brine, containing from 60 lbs. to 100 lbs. of butter each. The casks are branded with the mark of the Company, weight and quality. The best brands, after having been kept in a cool and well ventilated cellar for two months of hottest summer weather, have sold in the London markets for the same price as English fresh butter of the best quality.

What is termed Parisian butter, for Russian and home demand, is manufactured from perfectly sweet cream, heated to from 176° to 194° Fahr., and allowed to cool again to the usual temperature before being churned. The ordinary methods are followed in this case, except that neither annatto nor salt is applied. Heating the cream imparts to the butter a slight almond taste, and seems to promote its keeping quality.

It would appear from this Report that dairy husbandry has been long and much neglected in Sweden, and that its recent revival promises to give a much needed impulse to the national agriculture.

## Annual Address of the President of the Entomological society of Ontario, 1872.

*To the Members of the Entomological Society of Ontario.*

GENTLEMEN,—It is my happy privilege once again to congratulate you upon the completion of another year of progress in the annals of our Society. As you have already learnt from the very satisfactory report of our excellent Secretary-Treasurer, the list of members of the Society has been largely added to during the past twelve months; the library has been increased by the purchase of a number of valuable entomological works; a cabinet and microscope have been bequeathed to us by our late lamented member, the Rev. Professor Hubbert; and our collections have been much improved; a comfortable and commodious suite of rooms has been procured in a central locality in London, Ont.—the present head-quarters of the Society; the *Canadian Entomologist* has been regularly issued with, we trust, no diminution in the value and interesting character of its contents; our Second Annual Report on noxious and beneficial insects, prepared by Messrs. Saunders and Reed, and myself, and containing notices of the insects affecting the apple, grape, plum, currant and gooseberry, wheat crops, potato, cabbage, cucumber, melon, pumpkin and squash, has been duly published by the Legislature of Ontario, and no doubt has long since been in the hands of you all. Such, gentlemen, is our record for the year that is now brought to a close, and, having in addition, a satisfactory balance-sheet from the Treasurer, we feel that mutual congratulations are not out of place, and that we who have been honoured with official positions in the Society, can look back upon our efforts in its behalf with at least the agreeable feeling that they have not been altogether in vain.

If we turn, moreover, from our own special interests to the condition and prospects of American entomology in general, we find much to afford us satisfaction and encouragement. No large work, indeed, on any particular order of insects has appeared during the past year, but many valuable reports of State entomologists and portions of serial publications have been issued from the press,—among the latter, I may be pardoned, I am sure, for especially drawing attention to the exquisite illustrations of North American butterflies contained in Mr. W. H. Edwards' invaluable work, which has now reached its tenth part. It speaks well, too, for the growing popularity of this branch of natural science, that Dr. Packard's useful "Guide to the Study of Insects" has already reached a *third* edition. A pleasing recognition of American entomological work has recently, I may add, been manifested in England by the publication there, in a collected form, of the writings of the late Dr. Brackenridge Clemens, on the *Tineina* of North America, under the editorial supervision of Mr. H. T. Stainton, the well-known authority in that department of lepidopterology.

Apart, however, from the position attained by the growth of of our entomological literature, the science has this year received a recognition that cannot fail to be of great and permanent benefit to it. I allude to the formation of a special sub-section of entomology at the recent meeting of the American Association for the advancement of Science. It will now be practicable for American entomologists—to whatever part of the continent they may belong, whether to a Province of the Dominion, or a State of the Union, from the Atlantic to the Pacific—to meet together for mutual conference on matters entomological. Questions affecting the science in general can hardly fail to arise from time to time, and demand the consideration, and, possibly, the decision of some such united council. Certainly, the proceedings of such a gathering will be of great interest and value to all who take part in them, if not, indeed, to the whole circle of Canadian and American Entomologists.

At the informal meeting at Dubuque, in August last, one subject was specially brought forward for discussion, which I cannot forbear alluding to more particularly here, especially as it may justly be considered the great question of the day in the entomological world. I refer to the subject of the specific and generic nomenclature of insects. For some few years past indications have not been wanting of a growing inclination amongst the mass of entomologists to resist the efforts made by some few able and distinguished writers to impose, year after year, new sets of names upon our common insects. This has been done partly by the revival of the long-forgotten names published at the close of the last century, or the beginning of the present one; and partly by the perpetual formation of new genera, and the re-distribution of species. The ability of the writers and the good work they have done in other respects, have caused these annoying changes to be acquiesced in for the most part, even though the object in view appeared to be rather the exhibition of their powers of research among antiquated tomes, or the supposed immortalization of themselves by the attachment of their own names to those of our familiar insects. I do not say that these men were actuated entirely by such motives, but assuredly one can hardly be accused of ill-natured criticism in ascribing much of the work to such causes. All must admit, I think, the nomenclature is but a means to an end, and that end is surely best attained by the preservation of all names that have been in universal acceptation for a period of years, and that cannot be set aside without disturbing the cabinets of every entomologist in the land.

Matters in this respect have been brought to a climax by the recent publication of Mr. Scudder's "Systematic Revision of some of the North American Butterflies." I esteem Mr. Scudder so highly as a friend, and value so greatly the good scientific work that he has done, that it pains me exceedingly to say a single word against anything that he may put forth. His projected "revision," however, is so sweeping and so revolutionary, that I cannot forbear to make some remarks upon it. I know that his scientific labors are perfectly unselfish, and that he is entirely destitute of any of the conceit that I have just now referred to; I feel sure, too, that he is actuated only by the desire to benefit the science; yet I do deeply deplore the mode that he has adopted, and am convinced that if his views are pressed, a very great obstacle will be thrown in the way of the advancement and popularization of this department of natural history. We all, I am sure, look forward with eager anticipation to the publication of his great work upon North American butterflies, and have no doubt that it will be the most complete, the most scientific, and the most conscientious work of the kind in America, but assuredly its value will be very greatly marred and its general ac-

ceptance impaired, if he continues to insist upon all these radical changes.

To show you what these changes are, I will briefly state that in the pamphlet already published, and which is intended as a forerunner of the author's great work on the butterflies, the following alterations are made in the received nomenclature:—The 223 species enumerated are distributed among 90 genera—almost a genus for every two species; of these 93 genera, 42 are entirely new, and 39 others are obsolete names of Hubner and others that have never been generally adopted; there are thus 15 familiar generic names left, but of these several are transferred from their present position to entirely different groups of species; for instance, the name of *Papilio* is removed from the genus of "Swallow-tailed Butterflies," and handed over to the sole use of the insect at present known as *Vanessa antiopa*. Further, among the 93 genera there are no less than 45 that include but a single species apiece; and among the 223 species there are only 16 left with their present names unchanged! These figures are surely quite enough to show that I have not misapplied the terms "sweeping," "revolutionary," and "radical," as characterizing this work of revision. I would, then, most earnestly entreat Mr. Scudder, for the sake of the science itself, to re-consider his projected changes,—to discard all antiquated names in favor of those that have been for years in general acceptation, and to reduce his list of new genera to as small a number as he conscientiously can. If he does not; if he persists in his revision, I fear that his great work—most valuable as it will undoubtedly be in all other respects—will introduce more confusion, trouble and discord into American entomology than a generation can get rid of. If these difficulties can be avoided in no other mode, it will remain for us all to unite together and agree to ignore all old forgotten names that may be brought forward, and retain all remaining of familiar species, until a general settlement of the question can be satisfactorily arrived at.

I fear, gentlemen, that I have now completely exhausted your patience; I shall therefore hasten to a close. But before doing so, let me remind you that, since our last annual meeting, our Society has lost by death one of its most valued members, Mr. B. Billings, of Ottawa, Ont. He was one of those devoted lovers of science who do good service by their honest, hearty work, but who, from their innate modesty and retiring disposition, shrink from all publicity. At times he contributed valuable papers to our little periodical, but he could never be induced to make any display of the knowledge he had acquired by his patient diligence both at home and in the field.

Permit me now, gentlemen, to resign into your hands the office that you have done me the honor of investing me with. I thank you for your kindness and courtesy towards myself and my colleagues, and with every wish for the continued success and prosperity of your Society.

I have the honour to be, gentlemen,
Your obedient servant,
CHARLES J. S. BETHUNE.

TRINITY COLLEGE SCHOOL, PORT HOPE,
September, 1872.

## Mixed Food for Cattle.

A correspondent of the Buffalo *Live Stock Journal*, states some important facts relating to this subject in a very plain way. Not all who feed ground food to cattle understand fully what is meant by rumination and its relation to the question of economy in feeding. He remarks:

"The stomach of ruminant animals is a compound organ. It is divided into four compartments. When grass, hay, or any coarse food is eaten by the ruminant, it passes, after a partial mastication, down the œsophagus, or meat-pipe, and is lodged in the rumen, or first stomach, more commonly called the paunch.

"It is retained in this receptacle or reservoir till the animal has leisure to remasticate it. It does not lie at rest, but is constantly stirred up and kept in motion by the peristaltic action of the sack that contains it, and is mixed up and softened with mucus; by this means and by fermentation, preparation is made for the work of digestion, if it is not in the strictest sense actually here begun. For the purpose of remastication, according to Youatt, it is gradually moved into the second stomach, a honey-comb bag, and then, by a spasmodic motion, to the mouth. After sufficient mastication, it is swallowed again, but instead of going back to the place from which it was raised, or to the receptacle where it went the first time it was swallowed, it now goes, according to the authority just cited, to the third stomach, or manyplies, where it undergoes a further and material change, and thence to the last division, or fourth stomach, where the process of digestion is completed.

"Though digestion proper is only carried on in the fourth division of the stomach, it is evident that the action of the other divisions of that compound organ is useful to the digestive process, or they would not have been placed where they are. That the changes wrought upon the food in passing through the several divisions, hasten and perfect the action of the true (fourth) stomach, can hardly be questioned.

"MEAL ALONE NOT REMASTICATED.—But the food eaten by cows does not always pass through all the appendages to the real stomach. This complicated arrangement of the ruminant stomach, was made for coarse, herbaceous food, and not for that which is finely pulverized or very concentrated, and hence it does not manage such food alone to the best advantage. When meal alone is fed to cows, it drops in the fourth stomach, missing entirely the other three. It does not even stop at the third division, where the food that has been made fine by remastication goes. I learned this fact by accident some years ago. Finding, one spring, that I had not hay enough to carry my cows through, and believing that it was cheaper to purchase grain than hay, I bought corn-meal and middlings for a substantial support and barley straw for bulk. The straw was well cured and early cut, and with six pounds of ground feed per day they did well on it, rather better than they did on hay, and it was cheaper. After a while they seemed to get tired of the straw, and, to make them eat it up clean, I wet it and spread the meal over it. As I expected the straw was eaten up clean, but I found in a few days what I did not expect, that their milk increased a little in quantity and considerably in richness, the quantity of meal and straw being the same in each way of feeding. I changed the mode of feeding several times during the spring with the same result every time. The difference was not very large; I cannot now say exactly how much. The experiments were made for my own satisfaction only, with no thought of publishing, and the figures were not preserved. As the difference was evidently due to the manner of feeding the meal, I determined to be positive as to where it was lodged when eaten, conjecturing that it failed of perfect digestion from not being carried to the rumen where they would receive the necessary preparation for complete digestion. With this intent, I followed to the slaughter house a pair of four-year-old bullocks, sold to the village butcher, and, just before killing, fed them a peck of corn meal.

"As soon as the stomachs could be reached, they were examined, and the meal was found deposited in the fourth stomach. Not a particle could be found either in the first, second, or third divisions. Since then I have several times made similar tests with cattle slaughtered on the farm, with like results. Whether the meal took this direction by the will of the animal, or whether the papillæ which line the rumen and lower part of the gullet, were too large to grasp and work along into the rumen such fine food, as they are supposed to do with the coarser food, I cannot say. It must suffice for the present to know where it went. But I will say on this point that finer food goes into the rumen or paunch of young cattle than into that of old ones. When I fed corn in the ear to cattle, one, two or even three years old, just before killing them, I found nearly all of it in the paunch, but when I fed full grown cows in the same way, especially old cows, I found nearly all the corn in the fourth stomach. Nothing but the whole kernels or large pieces went into the first stomach. But I found all of it there when the ears were fed with a wisp of green hay wrapped around them. In this way corn may be fed with very little loss from having it pass the cattle whole. The masticated corn mingles with and adheres to the hay, and goes along with it to the first stomach, the natural reservoir for coarse food, whence it passes through all the digestive apparatus and receives the most thorough digestion.

"MEAL TO BE FED WITH STRAW.—So when straw or hay, cut or whole, is well wetted, and finely ground meal is sprinkled on and mixed with it, the whole goes, in like manner, to the first stomach, and the action of every part of the stomach is made available for complete digestion. Not only can the dairyman derive better results from meal when fed in this way, but more of it can be consumed in a given time; because more of it can be fed without producing scouring. Meal produces scouring when more is fed than can be digested. It is imperfectly digested meal, more than anything else, that disturbs the bowels in this way. Less meal will produce scouring in cattle when fed alone than when fed mixed; evidently because, when mixed, by having the action of the first three stomachs upon it, the work is well along by the time it reaches the last division, and hence will be done not only more thoroughly, but also more easily and rapidly."

## Abortion in Cows.

*Over the signature of "Physician" the following article appears, in the National Stock Journal:*

While it would be impossible always to assign an undeniable cause for abortion, it is certain that many circumstances contributeing to bring about so unfortunate an event are within the scope of our knowledge, and are, to some extent, controllable.

As gestation in the cow is a purely physiological condition, it is apparent that in order to bring about a premature expulsion of the ovum, embryo or calf, there must be engendered, either from within or without, a diseased condition, of sufficient gravity to cause premature expulsive action of the womb muscles. This may, certainly, arise, 1st, from morbid conditions within the cow; 2nd, from disease affecting the ovum or embryo; 3rd, from external violence; and 4th, from roots, plants, or seeds taken as food, and which have the medicinal effect of exciting the motor power of the womb.

The cow may have a diseased womb, which, of itself, would operate as a fruitful cause of abortion, or, if free from such disease, she may, from some unknown cause, or through the influence of excessive or irritating food, be attacked with profuse scouring, diarrhœa, or, as may happen, with discharge of acrid burning urine, either of which could, by the sympathy existing between the uterus and the intestines and urinary apparatus, set up premature action of the womb, with consequent expulsion of its contents.

Again, while the cow may be healthy and remain free from intestinal or urinary affections, abortion may occur from causes operating upon the ovum or embryo calf, and originating in anything which compromises its life. The membrane forming the sac or covering of the embryo, and which contains the liquid in which it floats, are like other structures, subject to disease. The after-birth, through which all the blood of the cow must pass on its way to nourish the embryo, may be diseased, and thereby rendered unfit for the performance of its important functions; or the after-birth, from disease or other cause, may separate, either wholly or in part, from its attachment to the womb; or the cord connecting the cow with the embryo may become twisted, knotted, or compressed in such a manner as to cut off the flow of blood necessary to its nutrition and growth, and, consequently, to its life. And in either of these events there ensues embryotic death, which is followed, sooner or later, with expulsive uterine efforts, resulting in abortion.

Again, while neither the cow, the embryo, nor its belongings are diseased or mechanically disarranged, abortion may be produced by violence, such as falls, blows, concussions, excessive or sudden exertion, straining, or severe coughing, producing separation between the ovum and the uterus.

Lastly, it is probable that among the many causes inducing premature expulsion, it is frequently the result of medicinal agencies unwittingly taken with the food. The fact that abortion occurs with frequency in certain localities where the members of a herd, subject to it, are similarly grazed and fed, while neighboring herds, with dissimilar surroundings and different food, escape this accident, would seem to indicate that either in the plants, seeds, or roots growing with the grass or cured with the hay, and partaken of by the aborting cows, there resides a power capable of exciting contraction of the womb and consequent abortion. Among these may be mentioned spurred rye, tansy, Indian hemp, and the root of the cotton plant.

As abortion can, and does, occur from any of the above-mentioned causes, and having once taken place is likely to repeat itself again and again, it becomes a matter of moment to determine the cause in each particular case, and apply some remedy for its prevention.

When the cause exists in uterine disease, or in a diseased condition of the ovum or its membranes, or in the after-birth, no remedy can be applied, but much can be done to prevent the accident by carefully guarding the cow from external violence. If, during gestation, active diarrhœa or the discharge of acrid urine should occur, these diseases could be successfully treated with appropriate remedies. Again, if a disposition to abort developes itself in a herd, it may be taken for granted that the pasturage, or other food, contains some one of the medicinal herbs or roots which act through the blood of the cow upon the uterus, and in this case it would be necessary to change both pasturage and food at once.

If any cow has aborted one or more times, and a record of the period in gestation at which the acci-

dent occured has been kept, the appropriate plan would be to stable the animal and exclude her from all causes of excitement for some time prior to and after the period at which abortion theretofore occurred. If, notwithstanding this, it again occurs, the animal should run farrow for a year, when, upon again breeding her, it may be found that the habit of aborting has been broken.

## The Chester County Milk Company.

A recent visit to the establishment of this company at Hopewell satisfies us that it is destined to become an extensive concern. A description of the large four story building has been given, says the *Oxford Press*, but the very complete manner in which the machinery and fixtures have been arranged with a view of saving labor is well worth a word. The basement is arranged for accommodating the milk of 1,500 cows, in the regular spring house order, the pans resting on the brick floor and surrounded by water pumped by power from an outside well. (While mentioning this, it might be stated as a curious fact in these dry times that the well from which the spring house is supplied contains only two feet depth of water, yet the supply shows no diminution although 6,000 gallons are pumped from it daily. In digging it the workmen struck a stream at a depth of twelve feet so strong that they could only sink it two feet deeper.) The milk is received on the second floor, where it is measured in a large can and the account of each farmer or dairyman is kept on the milk roll at the time of delivery. It is emptied into a large box in the middle of the floor, from which it is conveyed in a pipe running through the bottom of the box and the floor to the room below, to which is attached a hose pipe and it is thereby conducted to the oblong square pans on any part of the spring house floor. This is a most convenient and labor-saving arrangement. The second floor room is also used for the manufacture of ice cream, cheese, &c., a counter shaft water power and engine running along the ceiling to drive the machinery for these purposes. The third and fourth stories will be used for storing cheese, &c.

Very convenient arrangements for butchering hogs and manufacturing them into sausage, scrapple, &c., have also been made. The company intend to make a part of their business, and have already done considerable butchering.

We have often spoken of the Chester County Milk Company, started for the annual benefit of farmers, for we are anxious for it to succeed, and would urge those now living within reach of the manufactory, to avail themselves of the opportunity of selling milk at prices that will pay. It has clearly been proved by statistics given by George Geddes, in his article to the New York *Tribune*, that it takes 14 quarts of milk to make one pound of butter, taking the average for a year. Now this, at 3½ cents per quart in winter, gives 49 cents per pound, and at 3 cents in summer, 42 cents per pound for butter, at home. This is above the average price received for butter by most of our best dairymen.

In a dairy of ordinary cows, the average number of quarts per year for each cow is about 1,900. If they are improved stock, they will overrun this amount. Counting 1,900 quarts, at 3½ cents, we have $61.75 for milk, and a calf worth $2.50, a total cash return of $64.24 for each cow kept by the farmer. This is only a fair statement of facts; but if the return should be only $50 per cow, it will pay much better than raising grain for market.

In about four months, up to November 1st, the Company made and sold 7,460 quarts of ice cream, 1,153 quarts of plain cream, 900 of milk, and 1,010 pounds of butter. When they started, July 8th, the season for ice cream was more than half over, and besides this they had their trade to build up. For another season they have a prospect of selling 400 to 700 quarts of ice cream per day.—*Chester Co. (Pa.) American.*

## Rental of Land in England.

In a paper read before the Institute of Surveyors, London, Mr. W. Sturge said that for the purpose of illustrating the fluctuations in the value of land during the last 100 years, he would divide the century into the following periods:—(1). 23 years ending, 1794, during which there was no great increase in the price of produce, but a gradual advance in rent. (2.) 20 years, from 1795 to 1815, when a range of high prices of all kinds of agricultural produce prevailed consequent on the French war, and (during a great part of the time) an inconvertible paper currency, the rent of land doubled. (3.) Seven years, from 1816 to 1822, during which prices rapidly fell, notwithstanding a corn law intended to maintain wheat at 80s per qr. This relapse, consequent on the exhaustion caused by the long war and the resumption of cash payments, reached its culminating point in 1822, when the price of produce fell fully 50 per cent. below its maximum 10 years before. This was a period of great agricultural distress. Landlords struggled to maintain their advanced rents. Tenants were unable to pay them. The fall of rent, consequently, from its war maximum may be estimated at about 33 per cent. (4.) 26 years, from 1823 to 1848, exhibiting a gradual recovery in the prosperity of the country and in the prices of produce, and a recovery of, say, 10 per cent. in rent. (5.) Four years, from 1849 to 1852, exhibiting a very low range of prices of all articles of agricultural produce consequent on the repeal of the Corn Laws. Rents were generally reduced about 10 per cent. In some cases landowners were obliged to submit to a reduction of 15 to 20 per cent. (6.) Twenty years, from 1852 to 1872, during which an unexampled extension has occurred in trade and manufacture, and the consumption of all kinds of agricultural produce has enormously increased. The price of corn has been kept down to nearly its previous average by foreign competition, but the prices of meat, stock, and dairy produce has advanced upwards of 50 per cent. The rent of dairy, grazing and stock farms has advanced 33 per cent., and is now as high as it was during the French war. The rent of arable farms has advanced 10 to 20 per cent., but it has not generally reached the maximum attained during the war; nor is this surprising when we recollect that during the 20 years from 1800 to 1819, the price of wheat ruled more than 50 per cent. higher than it has ruled during the last 20 years. The present high prices of meat and dairy produce are no doubt mainly due to the increase of the population, and to the greatly increased consumption of the working classes, and also, though in a less degree, to decreased production caused by the droughts of 1868 and 1870.

## Quebec Poultry Show.

A very successful poultry show has just been held in the ancient capital of the Province of Quebec, which His Excellency the Governor-General and the Countess of Dufferin honored by their presence, the show being held during their visit to Quebec city. The committee of management consisted of Messrs. T. Gale, President, W. Lee, A. Fraser, junr., and James Carrel assisted by Mr. W. Poulin. Wire cages were kindly furnished by Mr. Wm. McGibbon, of Montreal. The following prizes were awarded:

DARK BRAHMAS.—*Fowls*,—1st, W. Lee; 2nd, do; h. c., A. Fraser, junr. *Chickens*,—1st, A. Fraser, junr.; 2nd, do; h. c., W. C. Richardson.

LIGHT BRAHMAS.—*Fowls*,—1st, T. Gale; 2nd, Richard Heap; h. c., T. May. *Chickens*,—1st, T. Gale; 2nd, W. Lee; h. c., T. May.

BUFF COCHINS.—2nd, W. Lee.

PARTRIDGE COCHINS.—2nd, W. Lee.

DORKINGS.—1st, J. Burstall, 2nd, Lt.-Col. Caseault; h. c., J. Burstall.

GAME.—*Black-breasted Red*,—1st, Mr. Malone; 2nd, F. Lampson.—*Brown-breasted Red*,—1st, Mr. Malone; 2nd, F. Lampson; h. c., W. B. R. Marns; h. c., Thomas Ben. *Duck-Wing or other varieties*, 1st, M. Malone; 2nd, do; h. c., do.

HAMBURGS.—1st, T. Beckett; 2nd, W. Lee; h. c., do.

BLACK SPANISH.—1st, V. Boswell; 2nd, J. Bowen, junr.; h. c., F. Lampson.

LEGHORNS.—1st, T. Gale; 2nd, J. Bowen, junr.; h. c., do.

CREVE CŒURS.—1st, F. W. Andrews.

GAME BANTAMS.—1st, W. C. Richardson; 2nd, W. H. Wilson.

SEBRIGHT BANTAMS.—1st, W. Lee; 2nd, E. C. Barton; h. c., F. W. Andrews.

WHITE BANTAMS.—1st, T. Gale; 2nd, Master Wilson; h. c., W. Lee.

TURKEYS, WHITE.—1st, W. Little; 2nd, J. D. Poulin.

AYLESBURY DUCKS.—1st V. Boswell; 2nd, Lt. Col. Caseault; h. c., J. Smith.

ROUEN DUCKS.—1st, R. R. Dobell; 2nd, J. Burstall; h. c., T. Beckett.

GEESE.—*Bremen*,—1st, F. W. Gray.

MISCELLANEOUS CLASS.

*Dominiques*,—1st, M. Welsh. *Pigeons*,—1st, W. Lee.

*Guinea Fowls*,—1st, J. Boswell; 2nd, do.

*Parrots*,—1st, J. B. Robitaille.

## Soup for Horses.

HARRIS relates the following in the *Agriculturist*. This summer my horses got badly run down. We fed them liberally, but they did not eat well. They had no appetite, no digestion, and no strength and spirit. They came home at noon and night fagged out, and their night's rest did not refresh them. I sawed a barrel in two, and placed the ends on the platform of the pump. These are for watering the horses. Into one of them we put a pailful of corn meal and mixed it with the water. The horses at first did not like it, and would only drink a little when very thirsty. After they had drank what they would they were allowed pure water. In a few days, however, they drank this corn meal soup with a relish, and in less than a week there was a decided change for the better in the appearance of all the horses. We do not let them eat the meal, but merely let them drink the milky water. I have no doubt that it is as good for them as a plate of good soup is for a tired and hungry man before dinner. It seems to stimulate the appetite and aid digestion.

It is a capital thing for cows as well as horses, but it is not so easy a matter to give it to the cows, as they soon learn to stick their heads in the water almost up to their horns to get the meal that settles at the bottom. It is necessary to have a large trough with false bottom.

## What to do in case of Accident.

Prof. Wilder of Cornell University, gives the following short rules for action in cases of accident, which it will be found useful to preserve or remember:

For dust in the eyes, avoid rubbing; dash water into them; remove cinders, etc., with the round point of a lead pencil.

Remove water from the ear by tepid water; never put a hard instrument into the ear.

If any artery is cut, compress above the wound; if a vein is cut, compress below.

If choked, get upon all fours and cough.

For slight burns, dip the part in cold water; if the skin is destroyed, cover with varnish.

Smother a fire with carpets, etc.; water will often spread burning oil, and increse danger. Before passing through smoke, take a full breath and then stoop low; but if carbonic acid gas is suspected, walk erect.

Suck poisoned wounds, unless your mouth is sore; enlarge the wound, or, better cut out the part without delay; hold the wounded part as long as can be borne to a hot coal or end of a cigar.

In case of poisoning, excite vomiting by tickling the throat or by warm water and mustard.

For acid poisons, give alkalis; for alkaline poisons, give acids—white of egg is good in most cases; in a case of opium-poisoning, give strong coffee and keep moving.

If in water, float on the back, with the nose and mouth projecting.

For apoplexy, raise the head and body; for fainting lay the person flat.

## Thorough-bred Stock in Nova Scotia.

The Hon. Frederick Watts, Commissioner of Agriculture of the United States, writes as follows in his monthly report of the Department of Agriculture at Washington:—

The friends of agriculture and the public authorities in Nova Scotia are making a laudable effort to encourage the more general diffusion of thorough-bred stock throughout that province. The board of agriculture, under the authority of the provincial legislature, have imported a number of entire English draught-horses, Short-horn, Ayrshire, and Devon bulls, bull calves, and cows, and Cotswold, Leicester, Shropshire, and Southdown rams and ewes, which were offered for sale at public auction at Halifax on a recent occasion, under the restriction that the animals were to be kept in the province for breeding purposes. The idea of improving the stock of the country by importing pure breeds and selling them at auction is borrowed from the Belgians, who have long been in the habit, under the countenance and direct support of the government, of importing Durham bulls and heifers, and disposing of them by public sale in the different provinces of the kingdom.

THE CANADA FARMER is printed and published by the GLOBE PRINTING COMPANY, at 26 & 28 King Street East, TORONTO, CANADA, on the 15th and 30th of each month. Price one dollar and fifty cents per annum, *free of postage*.

GEORGE BROWN, Managing Director.

# Advertisements.

I was the first to introduce to the public the Hubbard squash, American Turban Squash, Marblehead Mammoth Cabbage, Stowell's Evergreen Sweet Corn, Phinney's Water-melon, and many other

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As stated in my Catalogue, all my seed is sold under three warrants,—1st: *That all money sent shall reach me.* 2d. *That all seed ordered shall reach the purchaser.* 3d. *That my seeds shall be fresh and true to name.*

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v 10-1-4t Marblehead, Mass.

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BY

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I have sold to Mr. A. C. Attwood of Vanneck, Ont., the right to manufacture and sell my PATENT BEE-HIVE throughout the Dominion in all the territory not heretofore sold.

Also all my interest in the CANADIAN BEE KEEPER'S GUIDE, and in breeding and selling Italian queens.

In fact have turned over the entire bee business into his hands. Hereafter all orders for hives, rites, territory, Italian queens, and Canadian Bee Keepers' Guide, Honey Extractors, &c., &c., must be addressed to him.

*J. H. THOMAS.*

v 10-1-2t

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