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THE CANADA FARMER

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The Field.

Indian Corn.

Maize or Indian corn, belongs to the family of grasses, (*Graminece*). Its botanical name is *Tea Mays*, and is expressive of the life-sustaining property of the grain; *Tea* being derived from a Greek verb signifying, to live, while *Mays* is thought to be derived from a Livonic word meaning bread, or "staff of life."

In Britain and on the European continent, the word *corn* is applied indiscriminately to wheat, rye, and bread making grains generally, but in this country the word is exclusively appropriated to maize, and in the United States it has been legally decided that the term is a good and sufficient description of Indian corn.

This plant was unknown to Europeans prior to the discovery of America by Columbus. Among other curiosities of the new world, Indian corn was found to be under cultivation by the Indians. It has greatly improved, and sprouted out into a large number of varieties as the result of the treatment given it by civilized and scientific agriculture. The range of territory over which this plant may be grown is very extensive. It is found from Maine to Oregon, from Manitoba to Patagonia, and while its growth is most rank and luxuriant under tropical skies, yet the yield of grain increases as you journey northwards, the largest product to the acre being obtained in the cooler instead of the hotter sections of its home. It is most extensively cultivated at present in the Middle and Western States. Indeed for many years past it has been the great staple product of the West, where corn may be as truly said to be king as cotton ever was in the South during the palmiest days of slavery. The prairie soil of the West seems peculiarly adapted to this crop, and though it is illustrative of the most prodigal and reckless kind of farming, it is also evidence of the richness of the land and the suitability of the climate, that in many instances, large crops of corn have been grown twenty years and more in succession, without any application of manure. This crop is largely raised in New England, chiefly for the grain—also in New York and Ohio; and in many parts it is highly valued and extensively grown as a forage crop. It has also been used, with the best results, as a manure, ploughed under when in its green and immature stage. In this country corn receives much less attention than it deserves. Where there is an American element in the population, it is more or less cultivated, but old country farmers prefer peas as a fattening feed. In this they err, for corn surpasses all the other cereals as a fattener. Eighty per cent. of its composition consists of fat-forming material. It is four times as nutritious as the potato, and inferior only to wheat in its value for food. While a rich, mellow, sandy loam suits it best, it makes itself at home on all manner of soils. "Indian corn," says the *Farmer's Encyclopedia*, "can be cultivated on land long after it has ceased to afford compensating crops of any other grain. It contends with poverty better than most other plants, and may be advantageously grown in any soil fit for cultivation, not excepting blowing sands or retentive clay." "Corn will grow," says Mr. Joseph Harris, "on all soils from the lightest sands to the heaviest clay, among granite rocks, and on the richest bottoms." The average yield per acre is from thirty to thirty-five bushels, taking the whole range of country over which this grain is raised. But the difference between the average yield and that obtained by the best farmers is very great. There is a vast deal of slovenly, careless corn culture, which lessens the general average, but scores of cultivators in every locality raise their hundred bushels per acre, and even more. The banner crop of this grain was grown in South Carolina some years ago, and amounted to the enormous yield of two hundred bushels and twelve quarts of shelled corn to the acre. While this plant is patient of hardship, and capable of enduring much neglect and poverty, it repays most generously, the bestowal of liberal culture and abundant manuring. Whether as food for man or beast it is well worthy of culture. The native ears are a most wholesome and delicious vegetable, the "pop" varieties take the place, both for amusement and dessert, of the nuts of the old world, the grain in a whole state is excellent feed for horses, pigs and poultry, and the meal or flour makes good porridge, puddings and bread. A recent farina known by the name of corn starch, is coming largely into use for jellies, custards, ice-cream and other articles of cookery. Nor is the entire value of this product limited to the grain by any means. The stalk crop is remarkable for its luxuriant growth and large yield. Indeed no part of the plant need be lost, or thrown aside as worthless. Even the cob is ground, and it is considered of special value for some stock feeding purposes. If necessary, sugar of good quality could be obtained from the stalk. Sorghum, from which sugar has been manufactured to a considerable extent, is a variety of Indian corn.

We are inclined to think that some who have experimented with this crop, have arrived at unfavorable conclusions in regard to it, from failure to plant the proper kind of seed. It is useless to expect that the varieties grown in the Middle and Southern States will yield remunerative returns in our northern climate. Some of these varieties will not ripen in our latitude, however favorable the season may be. It will be as well to state, therefore, that the New England Eight-rowed, Canada Yellow, King Philip, Dutton, and such other kinds as are known to be hardy and acclimated to a northern region, are those our farmers ought to plant, for a grain crop.

The culture of Indian corn is very simple. It prefers a deep, rich, and mellow soil, thoroughly tilled. Land should be prepared for it much as for other crops, a thorough and careful ploughing in the first place, being the prime requisite to success. Good crops are often raised on newly-ploughed sod, but this entails more work in the after culture, which is more than repaid, by the excellent state in which the land is left for other uses. After ploughing, the land is marked off in rows about three feet six inches apart each way, when the variety to be grown is a small one, as it must be in this country. It is very necessary to use a corn-marker to map out the rows. This is merely a huge rake, having teeth the requisite distance apart, and drawn by one horse. Planting is either done by hand, or by a machine, of which there are various kinds in use. Four or five kernels are dropped in a hill. An old agricultural rhyme prescribes six:—"One for the blackbird, one for the crow, one for the cut-worm, and three left to grow." Many cultivators soak the seed for some hours before planting, as a means of preventing the spoliation of insects, birds and squirrels. After soaking, for which purpose tar-water is thought specially useful, the seed is coated with ground plaster, ashes or lime. Drill-planting is preferred by some, and generally speaking, larger crops can be got in this way, but the labor of hoeing and cultivation is greater. The seed should be covered from one and a half to two inches in depth. When the plants are two or three inches above ground, the first hoeing should be given them. Three hoeings are usually thought sufficient, but the oftener the soil can be stirred about corn the better. It should be done often enough to destroy all weeds, and keep the land moist and mellow. Hills are usually made around the plants at the last hoeing, though some think level culture the best. It is common to plant pumpkins among corn, but this, there can be but little doubt, somewhat lessens the yield.

Indian corn should be harvested when the ears are glazed, but before they become hard. Some farmers cut the tops above the ears a little before this time to hasten the ripening and setting of the grain. At the proper stage of ripeness, the plants are cut near the ground. A knife made for the purpose is the best tool for this job. The crop is either taken to the barn to be husked, or "stooked" as it is called, for a time in the field, and husked out-of-doors. But the subject of harvesting corn, so as to save both grain and stalk in the best possible condition, is of sufficient interest and importance to deserve a future article. A similar observation might be made concerning the growing of Indian corn as a green fodder crop. For soiling purposes there is no plant so useful as this. Every farmer should have at least a small breadth of green corn to feed the milch cows, when the pastures get bare and burnt in July and August. For this purpose, the grain may be sown

either broad-cast or in drills. The large kinds of corn grown in the Western, and Middle, and Southern States are best for this use. They throw up a prodigious growth of green stalk. The horse-tooth or dent corn, to be found at all our flour and feed stores, is an excellent variety to sow. A rich bit of land, near the barn, devoted to Indian corn for green feed, will be found a perfect treasure in a dry, hot time, and will keep the cows "up to their milk" when they would otherwise fall off sadly.

Hay-Making.

Haying will soon be upon us, a season formerly anticipated with no small dread, as a time of anxiety, hard toil and painful back-ache. The advent of mowing machines has greatly changed all this. It is not needful now to scour the country in search of stalwart fellows to swing the scythe, nor is the farmer distressed in view of a big crop of grass to be saved, and a scarcity of hired help. He knows that he has a trusty piece of machinery, with which he can make his team do the mowing, far more expeditiously and thoroughly than it used to be done by a gang of laborers. He can ride round his meadow instead of toilsomely marching through it all the livelong day, and his back is as sound and comfortable at night as it was in the morning. In-doors the revolution is [illegible] great and welcome as it is out-of-doors. The [illegible] wife is not crowded out of house and home with boarders, nor overwhelmed and done-out with excess of cookery. On a well-managed farm, now, haying necessitates but little change from the ordinary systematic routine, which goes on all the time. Other labor-saving implements and facilities have followed in the track of the mower, so that, altogether, this department of farm work may now be [illegible] with pleasure, instead of being anticipated with dread. It will be opportune to refer, just at this juncture, to a few matters connected with haying, in regard to which a large number of farmers yet need to be informed and instructed. One of these is the

Proper time for Haying.

The mistake is too often committed of leaving grass and clover too long before cutting. So soon as they are in full bloom the mowing machine should be started. The rule current among our grandmothers in the good old days of "herb-tea," contains the correct philosophy of hay-making. The maxim about gathering herbs was—"cut in the blossom, and cure in the shade." When the plant is in bloom, the sugar is in the stalk, ready to perfect the seed. Earlier than that, the sugar is not formed, and later on, it has become converted into woody matter. An experienced agricultural writer says:—"Early in its growth, grass is watery; as it approaches blossoming the amount of sweet, nourishing juice increases; after blossoming, and as the seed ripens, the sugar diminishes, and the hard, woody fibre increases. The best time, therefore, generally, is to cut within a few days after the principal portion of the crop has appeared in flower. For milch cows, it should be cut a little earlier than for working oxen and horses. Hard-stemmed grasses, as orchard grass and timothy, should be cut earlier than softer sorts. A little reflection will convince any one of the correctness of these views. Grass, it is well-known, is highly fattening. Why is not hay equally so? Because of the loss of the nutritious elements of the plant. If cut, and properly cured, at the stage when these fattening properties are most abundant, it is evident that the hay must be more valuable than if left to a later period. Maturing seed is an exhausting process, and unless the special object be to grow seed, mowing should be done at the time of blossoming. All who have had experience with early-cut, well-cured hay, testify to its superior value, and if any one, who has been in the habit of deferring haying until the period of ripeness will try the early plan, our word for it he will be convinced that late mowing is a serious blunder."

Curing Hay.

Next to the importance of seizing the "nick of time" for cutting hay, is the importance of curing it wisely and well. Good hay should be green when dry. This may seem a strange remark to many, but both science and experience prove its truth. If newly cut grass were to be at once dried by some artificial process, it would be green. It is long exposure to sunshine which takes the color out of it, and gives proof that the curing process has been badly done. Hay is often sunburnt, fairly scorched and "done brown." Every observant feeder knows, that horses and other stock do not eat such hay with any relish, and often refuse to eat it at all. The goodness is all drawn out of it by the power of the sun's rays, and it is little better than straw. Here the wisdom of the old herb rule shows itself: *cure in the shade.* As fast as grass is cut, it should be sent flying into the air, and before night it should be made into cocks. A heavy dew-fall is almost as bad as rain. When grass lies in the swathe just as mown, the sunshine scorches it on top, the damp ground prevents it from curing underneath, and the dew gives it a wetting well-nigh equal to a shower. Put speedily in cocks, a slight heating process takes place, and the hay "makes" both faster and better, than if left just as mowed. Hay should be wilted only in the sun, and cured in the cocks. It had better be a little too green than too dry. If, on hauling it, there is any danger of heating in the mow, a little salt can be sprinkled over it. This will make it safe, and cattle will like it all the better. The *Valley Farmer* well observes: "The whole science of hay-making consists in three things; *first*, cut the grass when in the bloom; *second*, dry it not too much; *third*, let it go through a sweating process before it is put into the barn. On these three things depends the quality of the hay. Hay should be grass preserved. The nearer to the fresh, tender, succulent grass you can get it the better."

But it will perhaps be urged, that this advice about curing hay hardly squares with what was said at the outset about the freedom from hard, back-breaking labor, which is characteristic of modern hay-making. It would require quite a force of hay-makers to stir the newly cut grass without cessation, and to get it speedily into cocks. We reply it will pay to do this, if need be, by hand, but a horse hay-rake, if strongly made, as it ought to be, can be pressed into the service [illegible] the hay-sweep, another labor-saving implement. There is however a machine exactly adapted for the purpose, which is unfortunately but little known and still less used by the farmers of this country, although it has been extensively employed in Great Britain and the United States, for a number of years past. We refer to

The Hay Tedder.

This machine is intended to follow in the immediate wake of the mower. It is mounted on two drive wheels, and is furnished with a number of revolving spring forks, usually about sixteen, which when in motion resemble the action of huge grass-hopper legs, which, kicking and flying about in a most lively manner, stir up and toss about the newly-mown grass, exposing all parts of it equally and thoroughly to the action of the sun and wind. It is drawn by a single horse or stout pony, and does its work in the most effectual manner possible. By its means hay has often been cut, cured, and put into the barn on the same day—although we hardly think this good practice, as the quality of the article is undoubtedly improved by a slight heating before housing. By the use of this machine the need of extra help is obviated, and the curing process expeditiously and perfectly accomplished. Early cut grass cured by means of the tedder, is far more valuable for all feeding purposes, than if cured on the old slow-coach plan, by which a large proportion of the nutritious matter is wasted.

Keeping the Machines in Order.

Too much stress cannot be laid on this. It is essential to their smooth, pleasant, effective working, that they should be thoroughly attended to. Every farmer who buys a mowing or other machine, should take pains to understand its nature and what is necessary to its working rightly. He should have a box of tools attached to the mower, especially a good monkey-wrench, rivetting hammer, whetstone, file, and the best quality of sweet oil. He should never start work unless the machine is in proper working order, and the utmost care ought to be taken to keep it so. If a nut gets loose, it should be tightened at once, if anything goes wrong it should be put right *instanter*, and all the parts exposed to friction should be kept well oiled. The mower should be started steadily without jerks, and if any difficulty occurs, backed gently, and the matter understood and adjusted. Many machines are greatly damaged, if not utterly spoiled by want of attention in these and similar respects. It is wise policy to get the best machine that can be had, and then to keep it *always* in the best possible condition.

Stacking and Housing.

On these points but little need be said. Owing to limited barn room, and slender means, many are obliged to stack their hay. But it is a wasteful practice. A farmer of sound judgment and long experience, on calculating the matter, estimated his loss in stacking hay at twenty-five per cent. As his hay crop was sometimes one hundred tons, and he had been accustomed to stack a considerable part of it, he was not long, after making this calculation, in resolving to have more barn room. Many will doubtless think this estimate wide of the mark. Let such reflect on the loss from moulding at the bottom of the stack, and from weathering at the top and sides of the stack; let them consider whether there must not be some loss of aroma and nutritive quality from exposure throughout the whole stack; and finally let them take into account the general conviction as to the superiority of the barn stored hay; and we think they will not find the calculation very far out of the way. But if the hay in the meantime must be stacked, the stacks should be carefully built on a foundation of some sort, well up from the ground, thoroughly covered in, and the wasteful practice of feeding stock at the stack, wholly eschewed.

Agricultural Implements.

Mowers.

Before entering upon the general subject of mowers and mowing, it would be well perhaps to discuss briefly one or two relative points by way of introduction. The first of these is the question whether it is more profitable to buy a combined machine than a single mower and reaper. By a careful scrutiny of facts, we think we can arrive at a pretty correct and satisfactory answer—one which may serve as a general rule.

In the first place, the impossibility of both mowing and reaping with the same speed is now received by all manufacturers as a truism. A combined machine therefore, in order to perform both functions, must have its gearing somewhat more complex and cumbrous than that of the single mower or reaper. This will, of course, increase its weight and draught (however little) as compared with one of the others.

Nor can it reasonably be expected that the combined article will perform its work, however well in either the hay or grain field, quite so perfectly as a single implement, specially constructed for, and adapted to one purpose only. These then constitute the principal points of difference between the two kinds of machines: viz., weight, complexity of gearing, draught and perfection of work. True, the degrees of difference may be slight, and no doubt they are so in many cases—still they must exist to a greater or less extent.

But again, taking the five-shift crop theory, which is fast becoming popular amongst the agriculturists, about 50 per cent of cultivated land may be said to be under grain and hay together—that is fifty acres to every hundred. This then would be the quantity of work which a machine would be required to cut annually on an ordinary 100 acre farm—or 100 acres on a 200 acre farm and so on.

Now it has been discovered by experience that the usual life time—so to speak of a reaping or mowing machine is close upon twelve years—say ten, and it has also been found that a combined machine on a 100 acre farm will last as long as the two single machines on a 200 acre, or larger farm. The reverse of this however is not true, viz., that if a combined machine on a 100 acre farm lasts ten years, therefore two single and separate machines should last twenty years on the same farm. The castings might and probably would stand the time with care, but the fact is that ten year's hard rattling tells heavily upon the frame work of anything. The

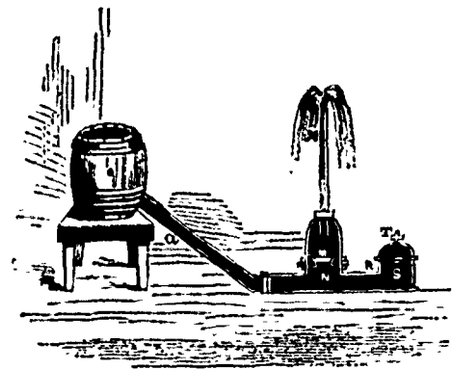
wood work begins to creak, the joints come loose and the entire fabric cries for relief—in other words it is done.

Now for the financial considerations. A good single mower will cost say $90; a single reaper say $120; and a combined machine $140. Here, of course, there is a purchase saving of $70 in favor of the combined machine. But remember it is good only for ten years on the smaller farm—in other words it will cut 500 acres before it is done—whereas the other two together are good for double that amount on 1,000 acres. In short, cutting may thus be done on the smaller farm with the Combined Machine at a cost of 28 cents per acre, and on the larger farm, with the two separate machines, at a cost of 21 cents per acre. Our answer then to the question at first proposed will appear manifest, viz.: If you own a 100 acre farm, by all means get a combined machine, and if you have 200 acres or more, have two separate ones—one for mowing and the other for reaping.

The next point is still more important. It is this. Be sure, whatever machine you purchase, that the knife will cut as much as the machine passes over—that none of your grain is dragged instead of being cleanly cut. This fault is undoubtedly a fact in some machines, and one which cannot be too strongly condemned, because it not only adds unecessarily to the draught, but causes the work to be performed in a most unsatisfactory manner. Straws are left growing here, there and everywhere over the field, with their heads torn off and simply lost.

The fault arises solely from miscalculation on the part of the manufacturer But any farmer can easily discover it for himself where it exists. Of course to one versed in figures, a simple calculation from a few wheel measurements would detect the thing at once; but this knowledge is not absolutely necessary. Let the farmer, before purchasing, mark the spot of ground on which the driving-wheel rests; then let him draw forward the machine until the driving-wheel has made one complete revolution—*and count the number of knife-strokes in that distance*. Next measure the distance passed over by the driving-wheel, and the length of one of the knife sections from its cutting base to its point, and the calculation is made thus.

Suppose the distance for each revolution of the driving-wheel to be eight and a half feet or 102 inches, and that the knife section measures two inches, then the knife must make 51 strokes to cut clean—or the knife-crank must make 25½ revolutions, because at each crank-revolution the knife makes two strokes, an outward and an inward one. Hence the rule; divide the distance passed over by the



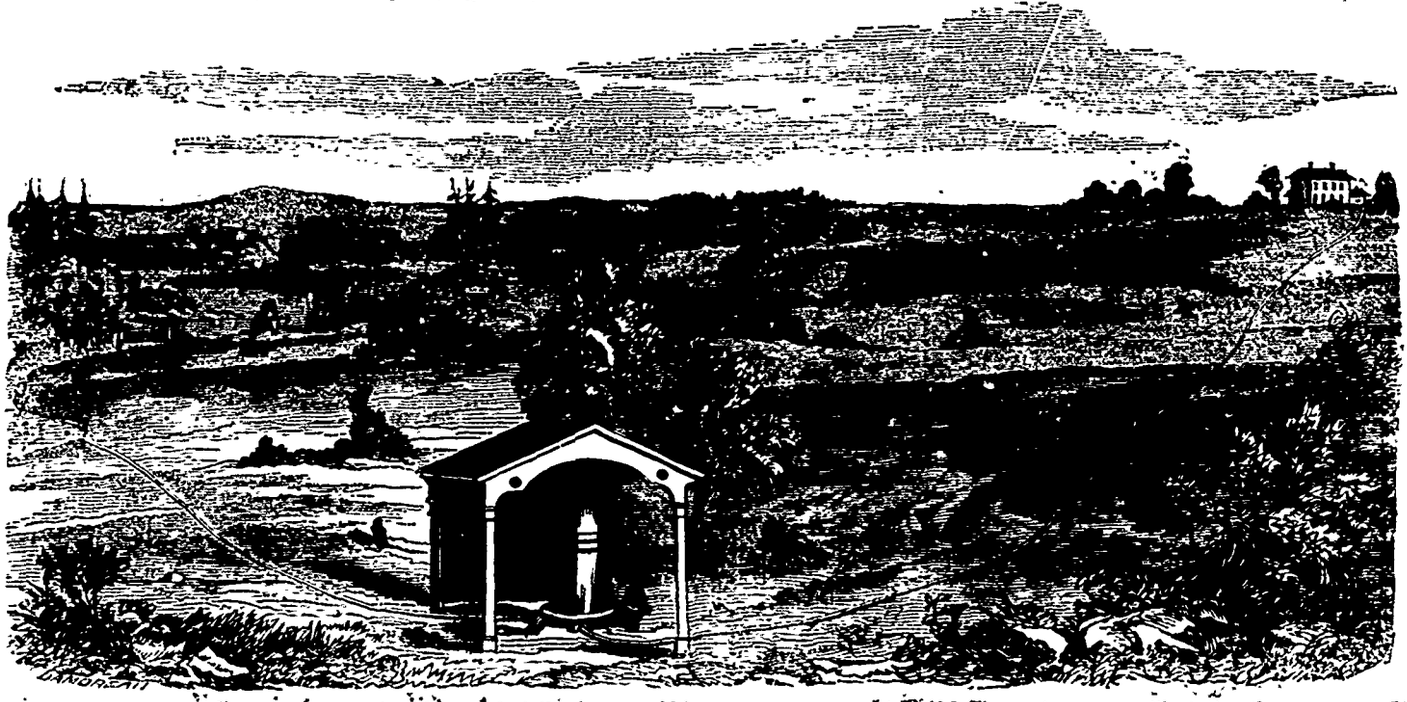
driving-wheel, or the circumference of the driving-wheel, *in inches*, by the *cutting* length of the knife section, and the result will be the number of strokes for each driving-wheel revolution.

If, in the case given, the knife gave 60 strokes instead of 51, there would be an unnecessary waste of material, for 51 are amply sufficient as we have seen to cut clean. If, on the other hand, the number did not equal 51, then clean cutting could not possibly be effected. In selecting your machine then, choose the

exact number when you can, but when you can't, then take the larger in all cases in preference to the smaller.

The Hydraulic Ram—(*Continued.*)

Ten feet for every foot of fall is the usual average now for the improved machine. The following engraving illustrates it. The bartel is supposed to be full. A pipe *a* leads from near the bottom of the barrel (to gain the extra pressure) to the ram and to a valve beyond it, which is kept open by the weight *t*. The water rushing through the pipe and gaining momentum as it flows onwards, strikes against, the under side of the valve *s* and closes it. The course is thus stopped, but the momentum cannot be so easily overcome; that part of the column of water nearest the barrel still endeavors to escape, and as it cannot do so through *r* and *s*, it forces open the valve *n*, and rushes up the centre tube *r*. The momentum ceases and *s* again opens to be immediately closed again, however, by a fresh supply from the barrel, and up rushes another jet through *r*. So rapid does this action become that the valve *s* is kept in incessant vibration and a constant stream of water through *r* is the result. The whole thing is self acting, and will continue to work so long as there is water in the barrel, and nothing goes wrong with the pipes.



The next engraving illustrates the very same principle applied to the purpose of carrying water from a stream, dammed up to form a pond at a distance, to the dwelling house or barns—always remembering that ten feet of a rise are gained for each foot of fall. The volume of water furnished will depend on the size of the ram. The feed pipe must be larger than the delivery pipe, and the latter may be increased in proportion to the former. The nine dollar machine already spoken of will throw a half inch stream, which, constantly running, will supply a large amount of water. The principal expense over and above such a machine is the piping, but this of course depends on the distance The pipes should be made of iron, or lead, lead is best, and they should be laid below the reach of frost. The ram itself will work in any kind of weather unprotected, although for order' sake it might be covered in as in the engraving—still this is not at all necessary.

The third cut illustrates the simplicity and cheapness of an arrangement that will answer any purpose.

Look then to your water sources and streams, however insignificant they may appear. You may discover that with an outlay of a few dollars, and a little trouble and pains, you can render them the source of the greatest utility and ornament about the place.

Agricultural Chemistry.

Plants.

We are all familiar with the fact that when wood is burnt there is always a certain proportion of *ash* left after all the combustible matter of the wood has been burnt away. When hay, straw or grass is burnt, more or less ash is always left behind; and this is true of all plants and of every part of them. This ash consists of the various incombustible and *fixed* mineral substances which existed in the plant. By "*fixed*" is meant incapable of being driven off in vapour by heat. The following substances are always found in larger or smaller quantities in the ash of all plants:

Potash.	Chlorine.
Soda.	Sulphuric acid.
Lime.	Phosphoric acid.
Magnesia.	Carbonic acid.
Oxide of iron.	Silica.

Other substances are sometimes found in addition to these. Thus the ashes of the beet root seem always to contain a minute portion of the rare metal rubidium.

The amount of ash is very variable, as the following table of the average percentage of ash in the dry plants shews.

	Percentage of ash.
Clover	7
Timothy	7
Turnip tops	15
Carrot tops	17
Potato tops	5
White pine wood	0·3

We see from this that different plants leave, when burnt, a very different percentage of ash. Thus dry carrot tops give 50 times as much ash as an equal weight of pine wood.

Under similar circumstances, there is but little difference between the percentage of ash in plants of the same species, but many circumstances tend to increase or diminish the quantity of ash even in the same plant. The nature of the soil has some influence upon the amount of inorganic matter. Turnip bulbs raised on sandy soil have been found to contain, on the average, 2 per cent. more of ash than similar bulbs grown on a loamy soil, while oats grown on limestone contains nearly 4 per cent. more inorganic matter than when on siliceous land.

The age of the plant makes a great difference in the amount of inorganic matter that it contains. The proportion of ash is, as a rule, diminished with the age of the plant. A diminution of 3 per cent. has been found in the proportion of ash left by oat plants from the same field in six weeks. On the 18th of June, Arendt found some oats on which he was experimenting to yield 8 per cent. of ash. On the 31st July they only gave 5 per cent. In some parts of the plant, however, the ash may increase as the plant grows older. A very great difference is observable between the quantity of ash contained in different parts of the same plant. The average percentage of ash in rye straw is 5·3. In the grain it is only 2. Pine wood, as we have seen, contains 0·3 per cent. of inorganic matter, but pine bark gives 3·3 per cent. In Arendt's experiments on oats, to which we have already alluded, when the entire plant gave 5 per cent. of ash, the leaves gave 10 per cent. and the ears only 2½. As a rule, the upper and outer parts of a plant contains the largest proportion of inorganic constituents.

This is a fact of the utmost importance in practical agriculture. The leaves of forest trees contain a very large quantity of ash compared with the wood. The wood of the elm, for instance, gives 1·9 per cent. of ash while the leaves contains 12 per cent.; and the wood of the birch yields 0·4 per cent. whilst its leaves give 4·2 per cent Since the leaves of these trees fall off every year and give up to the soil by their decay all the inorganic matter that they contain, it is clear a very large proportion of the substances necessary to the growth of the plant are each year restored to the soil by this means, and hence we see one cause of the fertility of forest land and one reason why trees continue to flourish for so long a time on the same soil. Precisely the same effect is produced when straw, for instance, is returned as manure to the soil on which it grew. In a crop of wheat of 25 bushels of grain and 1½ tons of straw we should have 1500 lbs. of grain and 3000 lbs. of straw. The grain contains 2 per cent. of ash and the straw contains about 5 per cent.; and this would give us 30 lbs. of ash in the seeds and 150 lbs. of ash in the straw. Altogether a single crop of wheat would take from each acre of land 180 lbs. of inorganic material which is essential to the growth of this crop, and of course the land would be so much poorer at the end of the year. But if the straw were returned to the land as manure 150 lbs. of these valuable substances would be restored to the soil, while only 30 lbs. would be altogether lost. Experiment has shewn that these ash ingredients are absolutely indispensable to the life of all plants, and that variable as the proportions are there is probably a limit to the amount of inorganic material in each part of every plant below which the plant cannot thrive or even maintain its existence. The proportions may, however, rise considerably above the limit from various circumstances and the ash ingredients be considerably in excess of the usual or normal amount without injury to the health of the plant.

Every part of each kind of plant has in all probability a certain standard proportion of ash ingredient but the causes which have been alluded to above, such as age and differences in soil and climate, produce variations in this proportion and make the quantity of inorganic matter to be either above or below this standard.

The composition of the ash is pretty nearly the the same in similar parts of the same plants grown under like conditions. The same circumstances, however, which produce variations in the quantity of the ash cause its composition to vary. Different plants contain the different ash ingredients which have been mentioned as being always present, in very different proportions. The following table shews the composition of 100 parts of the ash of wheat, of beans and of potatoes.

	Wheat.	Beans.	Potatoes.
Potash	23·7	33·5	55·7
Soda	9	10	1·9
Lime	2·8	5·8	2·
Magnesia	12	8	5·3
Oxide of iron	0·7	0·6	0·5
Phosphoric acid	50	33	12·6
Sulphuric acid	0.3	1	13·6
Silica	1·2	1·2	4·2
Chlorine	trace	0·7	4·2

This table shews us that there is a great diversity in the composition of the ash of these three agricultural products. The potash contains more than twice as much potash as the wheat grain, while the wheat contains four times as much phosphoric acid as the potato. The bean in both cases occupies an intermediate position. We also find that whereas there is only a very minute quantity of sulphuric acid in the wheat and in the bean, there is a comparatively large quantity in the potato.

Different parts of the same plant vary greatly as to the composition of the ash which they yield. For example the ash of wheat straw, contains only about 3½ per cent. of phosphoric acid, while that from the grain gives 50 per cent.; and on the other hand, the ash of the straw contains 65 per cent. of silica, while the grain yields an ash containing only a little over 1 per cent. of this substance. The same is true with all the other cereal grains, but as the grain of barley is not usually separated from the husk like that of wheat its ash contains a large amount of silica.

This difference in the composition of the ash in different plants is a very important one in an agricultural point of view. It is a matter of every day remark that certains soils will suit some kinds of plants excellently, while others will not thrive on them at all. Each plant has its favorite soil on which it arrives at the greatest perfection and the soil that is best suited for one plant may be totally unfitted for another. We now see one cause for this fact. Different plants require different quantities of certain inorganic materials for their proper nourishment, and a soil which may contain a supply of some particular ingredient which is ample for one plant, may be utterly unable to furnish it in a quantity sufficient for the healthy growth of another A soil for instance which contains plenty of phosphoric acid to support a crop of potatoes might be quite unable to afford a quantity of that substance adequate to meet the wants of a crop of wheat. So also a crop of wheat must take from the land far more phosphoric acid than a crop of potatoes would, and hence, as far as phosphoric acid goes, successive crops of wheat would exhaust the land much sooner than successive crops of potatoes would. A rotation of crops permits the land to recover by natural processes from the losses which it has suffered from a crop of one kind while it is at the same time supporting a crop of a kind that does not require a large supply of more substances which the soil was obliged to furnish in large quantities to the preceding crop. When the supply of these inorganic materials is exhausted, it becomes necessary to add them to the land by means of artificial manures. If it is true, as it undoubtedly is, that each crop takes away from the soil a certain proportion of these inorganic substances, it is quite clear that if year after year crops are raised on the land and no attempt is ever made to restore to the soil what the crops take away, sooner or later the supply of these materials in the soil will be inadequate to meet the demand which successive crops make upon them and, as a natural consequence, the land will cease to be fertile. This process may be, nay must be slow, but it is nevertheless sure and when it has once taken place, it is only by great labor and enormous expense that the land can again be rendered fit for successful cultivation.

It has been found by means of a number of experiments that of the various constituents of the ash of plants that have been already mentioned, the following five are essential to the growth of the plant viz: potash, lime, magnesia, phosphoric acid and sulphuric acid. Unless supplied with these the plant cannot live.

Soda is invariably found in plants, but the quantity is exceedingly variable constituting as much as 30 per cent. of the ash of some plants that grow upon the sea shore, while in grain and in potatoes it sometimes exists in quantities too minute to be weighed. The quantity of chlorine, too, is very variable, and it has frequently been set down as altogether absent. It seems probable, however, that more or less is always present, although the amount may be exceedingly small.

Only a very minute proportion of oxide of iron is necessary, but some portion of this substance is absolutely necessary. There is a considerable variation in the amount that is found. In grains for instance the amount varies from a trace up to 3 per cent. If a plant is made to grow in a soil destitute of iron, it loses its green color and becomes pale and unhealthy like a potato sprout growing in a dark cellar. The property of assimilating carbon and liberating oxygen from carbonic acid upon which the growth of the plant so much depends, resides in the green portion of plants. Their green color is due to a substance called *chlorophyll* which exists in the cells of the exterior of the leaf, and of other green parts of plants, and this *chlorophyll* seems to preside in some way over the important changes by which the mineral substances, carbonic acid and water are decomposed and their carbon, hydrogen and part of their oxygen converted into organic matter and applied by the plant to its own nutriment. When iron is absent the leaf cells contain none of this green coloring matter, and hence the plants present the pale appearance already alluded to. Hence too, they cannot grow in a healthy manner by assimilating new plant food, and it soon sickens and dies. If, however, before the plant is too far gone, a few drops of sulphate of iron be added the green color is quickly restored to the plant and healthy growth is resumed. The quantity of iron requisite to produce these effects is in most cases very small indeed.

Silica is always found in the ashes of plants grown in the usual way, but it appears from some interesting experiments that some plants may be grown almost without this substance. The cuticle of plants of the grass family usually contains a considerable quantity of silica. The bamboo contains a large quantity, and concretions of silica are found occasionally in its joints and known as tabasheer. The straw of wheat, &c., also contains 50 or 60 per cent. This was generally supposed to maintain the upright position of the stalk and prevent the plant from "laying," but a number of experiments seem to have shown that plants of oats and of Indian corn nearly free from silica were just as firm in stalk as those which contained the usual quantity of this substance, and the sulphuric and phosphoric acids are the source of the sulphur and phosphorus that have been mentioned as being essential ingredients of certain parts of plants.

Entomological Department.

A Humming-Bird Moth.

At this time of year, when the lilacs and other fragrant shrubs are in full bloom, one often sees at dusk hovering over the flowers like a humming-bird and extracting nectar with their long proboscis; many a lovely species of moth; later on in the season they frequent petunias, larkspur, the evening primrose, and many other flowers. Most of these moths are so active and swift in their movements that it is almost impossible to catch them without a net, and consequently very few except entomologists are familiar with them. They belong to various families of the order, but the largest and most bird-like are members of the Hawk-Moth family (*Sphingidæ*). In their larval state they are caterpillars of a green color, usually ornamented with oblique bars or stripes of different hues on the sides, and furnished with a stiff projecting tail—an appendage that is sometimes mistaken for a horn, or even a sting! When disturbed the caterpillar puts up his head in a threatening attitude, and presents an appearance somewhat like that of an Egyptian sphinx: hence the scientific name of the family.

We have been led into these remarks by the receipt of a very pretty moth from Mr. John A. Gemmill of Pakenham, Ont. He writes that he has "never met with it in any other place except on his neighbor, Mr. Richey's lilacs." He adds "I have plenty of lilacs within 100 yards, but never saw one of them on mine." The specimen is a Hawk-Moth or Sphinx, know to entomologists as the *Deilephila Chamænerii* (Harris); it has no common English name. Its expanded wings measure nearly three inches from tip to tip, and the body about an inch and a quarter. Its general color is olive-brown, with white markings about the head and thorax; the fore-wings have a conspicuous buff-colored, slightly wavy, stripe extending from base to tip; the hind-wings are chiefly rose-colored, with a dark border, and a white spot near the base. The larva is very rarely seen—we have never met with it ourselves: Harris states that it is "bronze-green above, and red beneath, with nine round cream-colored spots, encircled with black on each side, and a red caudal horn;" and that it feeds on the great willow-herb (*Epilobium angustifolium*). It is said also to feed upon purslane.

We have never observed its restriction to a particular locality, as remarked by one correspondent, but have found the moth almost every year hovering about the blossoms of the lilac, and have captured specimens in various parts of the province—from Cobourg in the east, to Sault Ste. Marie in the north-west.

Our correspondent appears to have found extreme difficulty in killing the specimen for transmission to us. He says that he tried in succession coal oil, ammonia, concentrated tartaric acid and olive oil, without much success. We generally employ chloroform for killing moths, and find it instantaneously effective, a few drops poured upon the body will kill the largest moth in a moment, but care must be taken to exclude the specimen from the air for a little while, else it would probably revive. Smaller specimens may be readily killed by dropping them into a bottle or box containing a lump of cyanide of potassium. As these substances are extremely poisonous, the collector must exercise care in their employment, and be very particular not to leave his boxes or bottles within reach of children or careless adults.

We have another species of moth in Canada very similar to the above mentioned, but considerably larger, the *Deilephila Lineata*; it also is found about lilacs and other flowers, though seldom in such numbers as its congener.

The Luna Emperor Moth.

A specimen of this most lovely insect was recently brought to our office by the Rev. Mr. Ross. As it is not very common, flying only at night, we present our readers with a life-like illustration of this "Queen of the Night." Its wings are of a delicate green color, with a purple-brown margin on the front of the fore-wings. A transparent eye-like spot near the middle of each wing, and the inner angle of the posterior wings, prolonged into remarkable crescent-shaped tails, as shown in the illustration. The body of the Moth is covered with snow-white down. The caterpillar feeds upon the hickory, walnut, beech and maple.

Toads in the Garden.

Toads often come to the surface in the newspapers, and pretty soon we may expect them to come again to the surface of the ground in search of the summer insects upon which they exclusively feed. We know gardeners, who certainly know what they are about, who buy up all the toads they can get, and they amply repay their cost in the destruction of insects and larvæ. Many persons have a loathing of this really interesting, but certainly not handsome, *bufo*, the result of superstition or want of education. It is time we learned that they cannot bite any more than a garter snake, and if they could, that bite would be equally as harmless. We suppose the fiction that they carry a jewel in their head is no longer believed, Shakespeare to the contrary notwithstanding; yet the latter is more true than the former—indeed it is half true. They carry two; their eyes, at least, are as bright as any jewels that ever sparkled in a diadem. They are the most innocent of creatures that ever ate indiscriminately anything that had life that they could swallow, that came within reach. They are worth more per head to the horticulturist than chickens, even allowing that chickens did not scratch, and to put our readers thoroughly in good humor with these insect devourers, we reproduce the following story by Dr. Harris:—He supposed the odor of the squash bug (*Coreus tristis*) would protect it from the toad; and to test the matter he offered one to a grave-looking *bufo* under a cabbage. He seized it eagerly, but spit it out instantly, reared up on his hind legs and put his front feet on top of his head for an instant as if in pain, and then disappeared across the garden in a series of the greatest leaps a toad ever made. Perhaps the bug bit the biter. Not satisfied with this, Dr. Harris hunted up another toad, which lived under the piazza, and always sunned himself in one place in the grass, and offered him a squash bug, which he took and swallowed, winking in a very satisfied manner. Twenty other fine bugs followed the first in a few moments, with no difficulty or hesitation in the taking or swallowing, though from the wriggling and contortions, it appeared their certainly did not set well with him. The stock of bugs then being exhausted, a colony of smooth black larvæ was found in a white birch, each about three-quarters of an inch long, and over one hundred of these were fed to the waiting toad. Touching one of them with the end of a straw it would coil around it, and then when shaken before him he would seize and swallow it, at first eagerly, but with diminished zest as the number increased, until it became necessary to rub the worm against his lips for some time before he could decide about it. He would then take it and sit with his lips ajar for a short time, gathering strength and resolution, and then swallow by a desperate effort. There is no telling what the number or result would have been, as the dinner bell rang as the 101st disappeared, and by the close of the meal he had retired to his hole, nor did he appear for four days in his sunning place. It is to be hoped that he slept well but there might have been nightmares.—*Western Rural*.

Destroying Curculios.

A correspondent of the Germantown *Telegraph* says: "I have seen various methods for keeping these insects off plum trees, but none so simple, nor yet so effectual as the following: Soak corn cobs in sweetened water until thoroughly saturated, then suspend them to the limbs of the trees a little while after blossoming, being sure to burn the cobs after the fruit ripens, as they will be found full of young insects. A good plan is to change the cobs every few weeks. My theory is this: that the insects deposit their eggs in the cobs in preference to doing so in the young plums. The first season I tried it upon one or two only, and in the summer was rewarded by a good crop of as fine plums as ever ripened, while those on the other trees fell off when about half grown. Next spring found sweetened corn cobs dangling from the limbs of all my plum trees, and the summer found them full of delicious fruit.

Horticulture.

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

THE FRUIT GARDEN.

Peaches and Nectarines in Pots.

If bushes of only a moderate size be required, 11 inch pots may be used It is surprising to see the vigorous growth and fine fruit of peach trees in 11 inch pots; for owing to the compost being rammed down, a large quantity of nutriment is comprised in small space. I may as well, however, state once for all, and for all descriptions of fruit, that if fewer and larger trees be required, larger pots may be employed; thus, 13, 15, or 18 inch pots may be used with equal success A peach or nectarine tree may thus, in two or three years, be made capable of bearing many dozens of fruit: but I must confess that my taste inclines to small prolific trees, because one can have a greater variety in a small space; and small trees are pretty, and easily looked over, so that each leaf and bud, each blossom and fruit is known. If peach trees already in pots, and in a bearing state, can be purchased, so much the better, for then a year is saved; but as such are more expensive than either "maiden" or "cut-down" trees, these had better be purchased. I may here state that "cut-down" trees are two years old, and if nice healthy trees with fully ripened shoots can be found, they are better than "maiden" trees. But as they are not often to be met with, I will first give the treatment required by one-year-old or "maiden" trees.

Pruning.

The trees have one shoot, more or less vigorous, which should be well furnished with buds towards its base. This shoot must be cut clean off with a sharp knife at the seventh bud from its base, and the tree then potted towards the end of October. This season is recommended, but it may be departed from; for my peaches and nectarines are sometimes not potted till March, yet they make fine growth. The following summer every bud will, or ought to produce a shoot. If there are seven shoots the tree is formed for the season; they need not have their tops pinched off, but will merely require the laterals (small side-shoots) pinched off to within two buds of their bases, as soon as they are four inches long. This will induce the ripening of the shoots, so that by the end of the summer they will be full of blossom-buds. At the end of August the point of each shoot should be pinched off, and they will then only require the annual pruning, either in autumn or in spring, for which directions are given. If the tree puts forth a fewer number of shoots than seven, the tops of all should be pinched off early in June, each shoot will then put forth three or more young shoots; all that are not required to form the tree must be pinched off in the same way as laterals, leaving seven, or, if the tree be vigorous, nine shoots to each tree. These trifling manipulations are easy to do, but difficult to describe; so, to make the matter as clear as possible, let us place a young tree before us early in June, with five branches, each 12 inches in length; then let us, with a sharp knife shorten each branch to nine inches; then, at the end of June, let us take the same tree in hand, and we shall find that each shortened branch has put forth two or three shoots; we must pinch these so as to leave on four branches two, and on one only one, making nine shoots, which as they grow should have their laterals pinched off regularly; they will then make vigorous trees in one summer, and form an abundance of blossom-buds. No other pruning is necessary the first season; and if abundant ventilation and syringing daily have been attended to, the fruit buds will, towards the end of August, begin to be fully developed. The experienced gardener can at once distinguish them: such a person may prune his trees early in October Let me endeavour to tell how to distinguish a fruit-bud, which, by the way, is the only bud to prune down to.

Fruit-buds and Wood-buds.

Towards the base of each of your seven or nine shoots, you will find four or five pointed single buds, covered with their brown coats: these are leaf-buds. Next to these, and higher up the shoots are triple buds—a plump silver-coated one on each side, and a thin one in the centre; these plump silvery buds are blossom-buds, and the central one a leaf-bud, which produces a shoot so necessary to the well-being of the blossom-buds, that without it they would be abortive Be sure to have on each shoot, if possible, nine to twelve of these triple buds, and cut off the shoot close to one of them; if this cannot be found at the proper place, so as to be able to form the foundation of a nice, regularly-shaped, bush-like tree, cut off the shoot at a leaf-bud. If the trees be pruned in autumn, the buds are difficult to distinguish; it will, therefore, be better for the beginner not to prune his peach and nectarine trees till March, when every bud will plainly show its character. If the shoot be cut off at a single blossom-bud, it will die down to the next leaf-bud; this must, therefore, be carefully avoided.

Spring Pruning.

Let us now proceed to the culture of our maiden tree. A season has passed; it is early spring, and our tree, with its nine branches of the last summer's growth, is before us, three of these should be cut down to within five buds of their basis, to give a supply of young shoots for the succeeding year, and six should be cut down, so as to leave on each branch ten or twelve triple buds. These are the fruit-bearing branches for the present season—and so it must be every year; a few branches, say one-third, must be cut closely on opposite sides of the tree, to give young shoots, and the remainder left as above to bear fruit. Those shoots that have borne fruit will often require to be cut out, to make the tree dwarf and prevent its becoming naked, as the spurs die after bearing, unlike those of the apricot and plum, which continue to bear fruit for many years. Much will depend upon the sort cultivated, and the vigour of the tree. One thing must be borne in mind—do not let the tree become bare of young shoots towards its base, and tall and straggling If pruned in spring, the nature of every bud may be seen, and the tree formed, by the proper use of the knife, into a fruitful beautiful bush. When the trees are in a bearing state, many short spur-like shoots, from four to six inches long, will be made every season on the stem and towards the base of the principal branches. These will be generally covered with single blossom buds and a terminal leaf-bud: they may be removed if too much crowded, but never shortened. From twelve to fifteen leading shoots should be left, in summer pruning, on each tree when in full bearing state. I have thus endeavoured to follow the "maiden" tree to its fruiting state. The "cut-down" tree, which should have four or five branches, should be potted in autumn and pruned in early spring: each branch must be shortened to six inches; these will put forth numerous young shoots, which in June should be thinned out with a sharp knife, leaving nine or more shoots to be pruned the following spring as above directed

Summer Pinching

Pruning of bush-trees by summer pinching only has been practised here to a large extent. As this is the most simple of all the methods of pruning known, and may be practised by any lover of gardening who does not mind employing his finger and thumb when walking in his orchard house, it is worthy of a few lines of description A peach or nectarine tree of the usual bush-like form, two, three, or four years old, may be potted in the autumn. In March its shoots should be shortened to about half their length, forming the tree into a round bush. In May it will put forth young shoots. As soon as they have made four or five leaves, the fourth leaf, with the end of the shoot, must be pinched off, leaving three leaves, exclusive of one or two small leaves at the base of the shoot, which are without buds; every shoot must be thus operated on. In eight or ten days a fresh crop of shoots will show itself, for from the bud at the base of every leaf a shoot will spring forth. These, so soon as they are ready, must all be pinched down to three leaves, and so on all through the summer with every fresh crop of young shoots till the end of July; for if the pinching be continued till the end of August, a great number of the shoots will be a mass of blossom-buds, without a terminal shoot or leaf-bud; and although they may be cut out, and yet leave more blossoms than the tree can carry on to a fruiting state, it is as well to have most of the spurs with a terminal shoot or leaf-bud If bush-trees are in very large pots, or planted in the borders of a large house, and it is desired to have them increase more rapidly in size than pinching to three leaves will lead to, the pinching should be at the sixth or eighth leaf, leaving five or seven in every operation instead of three. This is applicable to all kinds of fruit trees under summer pinching, when large trees are wished for. My trees, under this useful pinching, are sturdy bushes, full of blossom-buds, and quite pictures of robust health, and the fruit they bear is always large and high-colored, owing to its full exposure to the sun In March it will be good practice to thin out some of the numerous blooming spurs and clusters of blossom-buds, with a sharp penknife, otherwise the trees will be too much crowded with blossoms. This thinning out may also often be done in summer with advantage; for, if the trees grow very luxuriantly, the young shoots become crowded, and the thick mass of leaves shades the fruit, too much; in such cases the young shoots may be thinned out in the month of July much to the advantage of the tree, this simple and charming method of pruning, only occurring to me in 1858, was fully carried out in the summer of 1859. I am quite at a loss to account for its not having been discovered earlier. As far as regards myself, I think it was the fear of inducing, by incessant pinching, too many young shoots to break out that deterred me from practising it. Reasoning from theory only, I imagined it to be impossible for young shoots made in August to ripen, forgetting the warm autumnal atmosphere of the orchard house. I do not hesitate to assert that this simple step forward of pruning by incessant summer pinching is one of the most successful advances that have ever been made in fruit-tree culture under glass. I may add, that if by any neglect the pinching of the shoots in June and July has not been attended to, so that the trees have made shoots of from 2 to 3 feet in length, these may be shortened with a sharp knife to ten or twelve leaves. The bud at the end will then form itself into a leaf-bud, and even make some small growth, while all the buds below will remain fruit-buds, and quite dormant till spring. I tried this experiment in August 1861 No anxiety need now be felt even by the lady orchard-house cultivator—no advice need be asked of the too-often-unwilling-to-give-it-gardener. Thinning in early spring those pretty clusters of blossoms with a penknife (for they are always too numerous, and at least half of them may be cut out), and at the same time shortening shoots that are irregular; and in summer pinching off the ends of the young shoots, always fragrant, so as to give symmetry to the tree and make it pleasant to look on, are all agreeable operations. The climate of the orchard house will do all the rest, and a peach tree in a pot *will* bear fruit even under very adverse pruning circumstances, much more under a lady's loving yet pinching care. All that seems to be required is to make the tree symmetrical, and prevent its bearing too bountifully; for it must be borne in mind that fruit from a tree overloaded, whether under glass or in the open air, is never of fine flavor. *Peaches, pears, plums, apples, and indeed all descriptions of fruit, suffer in flavor to an extent scarcely thought of, if the tree be allowed to bear too many.* It is better to have one dozen of peaches large, and of fine flavor, than two dozen small and inferior; besides this, a tree suffered to bear too large a crop will be sure to fail the following season. There are two methods of cultivating these fruits in orchard houses both equally favorable to their well-doing; one is to cultivate the trees in pots, the other to plant them in the borders of the houses. With the large houses, the most eligible form of tree to plant in pots is the pyramidal; this most interesting form succeeds better in pots than when planted in the borders; the roots being confined, the shoots are not so gross as those on trees planted in the ground, the sap does not rush to the top so rapidly, leaving the lower branches in a weakly state; in fact, it seems more regularly distributed, so that for many years a pyramidal peach or nectarine tree, in a pot from 15 to 18 inches in diameter, will gradually increase in beauty, and by the simple operation of pinching all the young shoots formed during the summer to two, three, or four leaves, a fruitful and beautiful pyramid, 10 feet or more in height may be formed. Such trees, placed among others planted in the borders, are most ornamental, showing, as they will do if attended, to, perfect cultivation. The health and fertility of such trees is kept up by giving them every season

some fresh food in the shape of a rich compost formed of loam (if tenacious, all the better) and manure, thoroughly decomposed, in equal quantities. This operation should be performed about the last week in October, by removing the surface soil, generally a network of fibrous roots to a depth of 4 inches, and replacing it with fresh compost of the description just given. The most important matter connected with the culture of trees in pots is keeping their roots dry during the winter months, so that they are not too much excited - they are never at rest; the shoots then become dry and ripe, and in a fit state to put forth their blossoms in spring, which, owing to the trees not being subjected to the gr atmospheric changes incident to the open air in winter, they do with great vigor To make success doubly sure, this dryness of the soil in the pot must be strictly attended to The trees should be well watered when top-dressed, and again before the middle of November; they may then, if in the large pots I have mentioned, remain without water till early in March, when the blossom buds begin to swell Many failures in the pot culture of fruit trees have occurred from the fears entertained by cultivators that trees must always have their roots in a soil saturated with moisture. Before I leave the subject of pot culture, I must mention the necessity of giving the trees extra food during the summer months. This is best done by placing on the surface of the mould in the pot a layer of some rich compost, about 3 inches in depth at the outside, and made concave around the stem of the tree, so as to retain water. This compost may consist of manure chopped into small pieces, and saturated with liquid manure; or horse droppings from the roads, and kiln-dust from a malt-house, equal quantities, also saturated with liquid manure, the latter compost is the most valuable surface dressing ever invented, for not only do the roots of peach trees come to the surface to feed upon it, but vines, if dressed with it, show extraordinary vigor. If a vine in a pot has a dressing of it from 6 to 8 inches deep (this must of course be supported by pieces of slate stuck inside the rim), the roots ascend rapidly, and seem to devour it with avidity, so that by the autumn a mass of this compost on the surface of the soil in the pot, in which a vine has been growing all the summer, will be found a complete mass of fibrous roots, hard and compact, the virtue of the compost being seemingly absorbed.

Planting out of Peaches and Nectarines.

I have thus far endeavoured to give an outline of the pot culture of peaches and nectarines in unheated glass structures. The other method of cultivation, by planting the trees in the borders, must next be considered; this is neither more nor less than planting a peach garden. Still, as a glass structure is of more value than a piece of uncovered ground, care must be taken that it is made the best of. There is a peculiar feature in most stone fruits their love of a firm soil A light, porous soil is generally fatal to the health of a peach tree, at least in the gardens of Europe. In orchard houses, I am now able to assert, with full confidence, that a firm border for peach and nectarine trees is a *sine quâ non*; there is no sound prospect of success without it; and I may add, that if such a border is calcareous or can be made so by mixing one square yard of chalk to ten of the natural soil, so much the better for the fruit trees. In forming the borders, the soil should be refreshed with a slight dressing of manure, and then stirred to a depth of 20 inches—no other preparation is required. The trees should be planted in this rather shallow border, heavily watered, and suffered to remain for a week; at the end of that time the entire border should be gone over with a rammer, and rammed firmly down; a wooden rammer of about 10 lbs. weight will be found the best implement. The border thus rammed and levelled should remain solid, and never again stirred, except to be slightly pricked with a fork in spring—to admit water to the surface roots of the trees. After being watered, a slight dressing of rotten manure, about 1 inch in depth, should be laid on the surface of the solid soil, and no other disturbance of it should take place. So obnoxious is the disturbance of the soil to the roots of peach and nectarine trees when planted out although the inert surface mass of fibrous roots may be removed from trees in pots without injury—that I have seen, in an otherwise well-managed house, fine and well-grown half-standard trees quite bare of fruit, owing to the borders having been carefully dug 6 inches in depth in spring, every blossom having consequently dropped without setting its fruit. – *Thomas Rivers in The Orchard House.*

The True Way to Water Trees.

If trees standing in grass ground are watered, the surface around about the body, for three or four feet in each direction, should be covered with mulch of some sort, to retard evaporation. It will be labor lost to water trees on the lawn without exercising this precaution, as the water will disappear before a hundredth part of it has reached the roots. Straw, hay, lawn-grass, weeds, shavings, or tan-bark will make an excellent mulch. Spread the mulch three or four inches deep, pour two or three pailsful of water around each tree, and the water will permeate the entire soil, keep it damp, and supply the moisture which the tree must have, or die. If the soil is in a tillable condition, draw the earth away from the tree to the depth of one or two inches, pour in two or three pailsful of water, and return the mellow earth, which will keep the surface from baking. Yet mulch is far preferable to the latter mode. When the soil appears nearly dry to the touch, the roots cannot possibly derive the needed supply of water to keep the leaves and branches from injury during the rapid evaporation which is going on night and day. When the atmosphere is as dry and hot as the air in a huge lumber-kiln, it will have the moisture in every tree and plant and the moisture of our bodies, even "if it (the hot air) has to take it (the moisture) out of the hide." Hence, we must drink, and the roots of the trees and plants must be supplied with water or they wither and die. A great many persons scatter the grass from their lawns and the weeds from their gardens in the highway, which is bad horticulture in many respects. If they would spread such grass and weeds around their growing flowers or around any garden vegetables, the mulch would save the labor of carrying many hogsheads of water to supply the plants with necessary moisture, and the covering would keep the surface mellow, keep the weeds down, and save a vast deal of manual labor, and the crops would be heavier.—*Our Home monthly.*

We desire to call the attention of those of our readers who are thinking they must water their newly planted trees to the above sensible suggestions. Many kill their trees by watering them, not because they water them too much, but because after having applied the water, they leave the ground to bake under the blaze of our summer sun. Mulch—mulch—mulch—and then watering, if needed at all, will do good.

Comparative Value of Fruits.

The comparative value of apples, pears and oranges in our markets does not favor the south, for while the past has been one of general success and abundance of the apple at the North, as well as of the orange at the south, yet now we have to pay in New York city one-third more for common fair apples over that of the best Havana oranges. We think we have within the past two days asked prices of apples, pears, and oranges from one hundred dealers, and when we give the dozen price we also give the comparative wholesale price, which is forty cents a dozen for oranges, sweet Havanas averaging fourteen to sixteen inches in circumference, and sixty cents a dozen for apples averaging eight to ten inches in circumference, or what we term our second class fruit. Pears now in New York City, sell at prices according to varieties, the Beurre d'Anjou bringing from thirty to seventy-five cents each, while Vicar of Winkfield brings fifteen to twenty-five cents each, and Bananas at five cents each. The wholesale rates are in proportion. Showing plainly that notwithstanding we grow large quantities of fruit, their keeping is a point our people do not fully understand. —ADDI, *in Cleveland Herald.*

Pinching Berry Canes.

Although the season is late, the young canes of raspberries and blackberries have already got a good start, and will soon require pinching to make them grow strong, branch freely, and make compact, self-supporting heads.

When the new canes have attained a growth of from one and a half to two feet, pass rapidly over them and pinch off the terminal bud. After the lapse of a week, pass over the plantation again, and you will find some that were too short the first time but are then the proper height for pinching. It will probably be necessary to go over them three or four times to make certain that none have escaped, but after they have been carefully pinched twice the operation will be a short one.

All kinds of fruit-bearing canes should be pinched in this way, with the exception of tender varieties of raspberries, as Brinckle's Orange, Hudson River Antwerp, and Franconia, that require covering for winter protection. These should be allowed to grow without pruning that they may be bent down without danger of breaking, when winter arrives, and covered with earth.—*Rural Home.*

Black Raspberries.

Willits & Co., of 95 Murray street, New York, write us that dried raspberries are worth 34 to 36 cts. per pound Where are those croakers that insist that Raspberries (especially the black sorts) are "played out?" It takes 3 to 3½ quarts of fresh raspberries to make a pound, and by this method they bring from 9 to 10 cents per quart with no expense of baskets, boxes, &c. We will grow them as long as we can sell them for 6 cents per quart and do better than farmers who grow wheat at $1.50 per bushel, or pork at $6 per hundred, or wool at 50 cts. per pound. We say to all who have large plantations of black raspberries, see that your drying house is got ready, and when your raspberries get lower than 9 cts. per quart put them into the drying house.

Remember that last season was one of the most abundant fruit seasons that has ever been known, and yet dried raspberries are selling at 34 to 36 cts. per pound, with a prospect of their reaching 40 cts. —*The Fruit Recorder.*

Caterpillars.

Now is the time to look out sharply for caterpillars. They are busy weaving their nests and stripping the leaves of the apple trees. It is the best way to take them while they are young and small, for if neglected till the leaves are full grown there is necessarily greater injury to the tree, to say nothing of the destruction they cause in the process of growth. Fix a brush upon the end of a long pole and go at them. If the trees are kept perfectly clear of them this year, you will have less next, unless some careless and slovenly neighbor lets all his go to seed. Caterpillars are a sign of careless farming.—*Ex.*

Following Nature.

Nature nowhere trims back the grape vine annually to four or five buds; but the successful grape-grower does it. Nature seldom cuts back or heads in the peach or apricot; but many of our best fruit culturists do it. Nature never blanches the celery plant but our gardeners do it. Nature sows the most of her seeds directly upon the surface of the soil; farmers and gardeners generally give to seeds a necessary covering. Nature seldom transplants a tree or mutilates its roots, or propagates by grafting upon sections of limbs or roots; Nursery-men do it.

Best Morello Cherry.

F. R. Elliott, writing to the *Cleveland Herald* says that the *Louis Phillipe* is the best of all the sour or half sour cherries. Downing, in his great American Encyclopædia of fruits, says that the fruit is large, of a rich dark, almost purplish-black red, with a red flesh, which is juicy, tender, sprightly and mildly acid; quality *very good* or *best*. Free vigorous and very productive. Barry, in his *Fruit Garden* says it is ripe from the middle to the last of July, and is a very valuable sort for dessert, canning, cooking or market.

After trying trellises of various kinds we like nothing so well for supporting raspberry canes as good strong stakes, high enough to sustain the top of the canes. They should be tied rather loosely at the top and again midway. In using a stake the stalk expands in every direction and is exposed freely to the sun and air. Besides the fruit is more handily picked.

Cherry trees, to be long-lived, should not have their roots disturbed by digging about them. We have found them to do best in grass. Care must be taken not to bruise the bark of the trunk, as it will canker and may destroy the tree. It seldom recovers entirely from a bruise.

THE KITCHEN GARDEN.

Asparagus Culture.

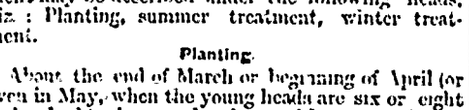
Mr. Niven's Method of Culture.

We take the following article from *The Garden*, and commend it to the careful attention of all lovers of the Asparagus, and especially to those market gardeners who are in the habit of cutting the Asparagus buds as soon as they break through the ground, with several inches of the white, tough, fibrous, useless stalk attached. We have often called attention to the folly of cutting the stalks several inches below the surface for the sake of obtaining that which might please the eye with its whiteness, but which could be of no other possible use; and hope that the opinion of one who has been such a successful cultivator as Mr. Niven of Drummondra, will have some influence in banishing a custom so absurd.

Any time during the winter or spring choose any portion of the surface of your garden, with an open exposure; it matters not much what the soil may be on which the plantation is to be placed—provided the surface-water, in winter, does not stagnate on, or about it—but a soil of sandy quality is always to be preferred, where it can be obtained, but where not to be had, it is easy to add a few loads of sand in the surface preparation. Having fixed upon the space to be occupied, a layer of half-rotted leaves, or rotten hot-bed dung, may be spread over the whole, about three inches thick, to which might be added, where it can be obtained, a stratum of sea-weed. This should be slightly dug into the surface, leaving the surface in narrow ridges, to receive the action of the weather. Or, it may be done immediately before planting in spring; the former time of preparation is, however preferable. This process of surface management may be described under the following heads, viz: Planting, summer treatment, winter treatment.

Planting.

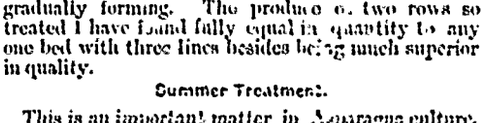
About the end of March or beginning of April (or even in May, when the young heads are six or eight inches high), choose a dry day, and have the ridged-up surface neatly levelled down, after which slightly dig the ground over again, which will thoroughly mix the surface with the manure and sand first applied; then tread over the whole, regularly, with the feet, and proceed to mark off, with the measuring rod, the places for the intended lines at four feet apart, studying to run them as nearly north and south as possible, marking the place of each line with the corner of a draw-hoe, as for peas. This being done all over the plot, at the distances described, have a quantity of compost ready, such as one-third rotten leaves, or rotted dung, one-third fresh soil (a hazel-colored sandy loam from the corner of any grass-field is best), and one-third river or sea-sand. If this has been for some time previously prepared, so much the better. Along each drill or line lay a small ridge of the said materials, so that, when ready for planting, a section of the surface of the plot will appear thus:—



Choose, if possible, good strong two-year-old plants, a quantity of which may always be kept in a reserve seed-bed for successional plantations in any odd corner of the garden. As it is of essential importance that the roots should be as little exposed as possible during planting to a drying atmosphere, it may be best to proceed thus:—carefully lift the plants, and cover them over in the barrow or basket with a little sand; proceed to set them on the little ridge or saddle prepared for them, as a man sits upon horseback, at about six inches apart from each other, having a person to follow with a barrowful of sand, which, with the spade, he lays over the roots and crowns, about one inch thick, observing to tread successively both sides of each line as he proceeds, with one foot to firm the sand to the plants, so as to secure them from the action of the air, until the process of planting is concluded, when a second and final covering of about four inches of the compost is to be put over the ridge or lines, which is to be firmly trod to the line of plants as before. A small portion of the original surface between may then be thrown up with the spade, right and left, pressing neatly between every two lines as you proceed, and the process of planting, which is exceedingly simple, is finished. A plantation so made, containing from 140 to about 200 square yards, and requiring from 700 to 1,000 plants, or so, would be sufficient to supply Asparagus during the season for any ordinary family—the expense of which, apart from the plants, would be a mere trifle, particularly where sand and leaves or rotten dung can easily be had. I may remark that I much prefer the single line method of culture to beds, chiefly on account of the greater facility in the subsequent management, and because the plants derive more equal nutriment from the artificial surface that is gradually forming. The produce of two rows so treated I have found fully equal in quantity to any one bed with three lines besides being much superior in quality.

Summer Treatment.

This is an important matter in Asparagus culture. The plantation being finished, as has just been described, a good watering or two, should the weather be very dry, would be advisable. When the short grass-mowing begins, a portion of it is to be brought to the Asparagus lines, and shaken in between, quite to the necks of the plants—say, so as to fill up the hollow spaces between nearly level, when a section of the plantation would, at this time, appear thus.



The object of this application, which must be renewed about once every month during the summer, will be at once evident, namely—the retention of moisture, and the production of vegetable food, and the slight fermentation that accompanies the decomposition greatly accelerates the growth of the plant besides ultimately adding to the mass of vegetable matter is formed, into which, on both sides, the succulent roots of the Asparagus plants run freely. In this way, from the proximity of the roots to the surface, the genial influences of solar heat, and due atmospheric action, are enjoyed by the plant, without the least danger of its ever suffering from drought, in consequence of the non-evaporating nature of the vegetable mulching or covering alluded to, which receives and retains, as a sponge, the greater portion of the moisture that falls, while, in the common Asparagus bed, the surface during the dry part of the year is almost completely exposed to the action of the sun and air, and, during any continuance of dry weather, may be seen to crack or rend in every direction, to the destruction of the roots in very many instances. After the shoots have begun to come up, we immediately begin to look regularly and carefully after the thinning. When the plants have pushed two or more heads each, the weakest are regularly cut away, as the strongest heads appear, so that by the end of the first season, not more than two, or at the most three shoots, are left to grow to maturity on each plant. Proper attention to the thinning of Asparagus, in the first instance, immediately after planting, during the first and second years and afterwards, after cutting for use, is of essential importance toward the future welfare of the plant. In consequence of proper attention not being paid to the subject of cutting, arising either from carelessness of the consequences, or from over anxiety on the part of the gardener to send to table a good dish, much evil ensues to the plantation; for, frequently, instead of leaving a sufficient supply of strong shoots regularly over the bed, they are all cut away, and the weakest left, the inevitable result of which is a supply of comparatively small buds for the crop of the year following.

Winter Treatment.

In November, or as soon as the tops of the Asparagus become yellow, the whole should be cut over and the soil along the crown of the ridge or line cleared away a little with the hand, when about four inches of sea or river sand should be laid along over the line of plants—this chiefly for the purpose of providing against the depredations of slugs in spring, and the clean, free progress of the heads the following season. In the spaces between the lines, a few barrow-loads of rotten dung, leaves or sea-weed may be laid, and the whole should be neatly levelled with a three-pronged fork, stirring up the surface between the lines very slightly, as the levelling of the fresh material proceeds. No further care will be required till spring, when, just as the first heads begin to appear, the whole may be slightly stirred on the surface, and over the lines a little of the sand raked off. The process of mulching with short grass, or, instead of it, other vegetable or decomposing animal matter, is to be followed up, as already described, from year to year. The second year some of the thinnings may be fit for use, but by no means should any of the strong heads be cut for that purpose, except where there are too many to one plant, as the patience and forbearance now exercised will be amply repaid by the produce next year, when the crop may be regularly cut for use. In gathering Asparagus, a habit prevails of cutting the heads a few inches below the surface; but for what useful purpose I am at a loss to conceive; inasmuch as the white or blanched part of the grass is usually so hard and stringy as to be scarcely fit for use; whereas, by allowing the heads to grow the proper length above the surface, say about eight inches or so, they will not only still be compact, but the whole of the "grass" will be tender and eatable.

THE FLOWER GARDEN.

Tulips.

The tulip has long held sway as the queen of bulbous flowers, and for generations has been emphatically the chief "florist's flower" among bulbs. Its gorgeousness in colors is all that could be desired by the most fastidious, and by its bold, brilliant appearance recommends itself to all. Planted in beds or masses, the effect is most striking, unique and complete, and cannot fail when arranged to give the most entire satisfaction. The tulip is by far the most easily grown and satisfactory of all bulbs, and, as it does not deteriorate, a good stock will last for years. The tulip will succeed in almost any good soil, still it should be borne in mind that not only the tulip, but all bulbs will succeed best in light rich soil. The bulbs should be planted in October or November in deep, well enriched soil. Plant them three inches deep and six inches apart, and if convenient mulch the bed with coarse manure, etc., during winter—the effect when in bloom will be much finer. When the plants are through blooming, they may, if desired, be carefully lifted and replanted thickly together in any convenient spot in the garden, where they may remain until again wanted in the fall, and the bed from whence they were removed be filled with summer flowering plants. Some people prefer, when the foliage begins to ripen, to take them up, dry them and keep them in the house until they are again wanted.—*Briggs & Bro.'s Catalogue.*

The Washington Lily.

(*Lilium Washingtonianum.*)

This beautiful American lily is found on the western slope of the Sierra Nevada, in California, along the water-shed of the streams running into the Sacramento, and occurring in the woods here and there, from the Yosemite to the Columbia River. The botanist recognizing its beauty, gave it the name of Washington Lily. The flower stalk bears from six to twelve, to eighteen flowers, according to the strength of the bulb. Each flower is from eight to nine inches broad, white, more or less tinged with purple or lilac, and sweet scented.

We are not aware that this new lily has been grown in Canada, and call the attention of our gatherers of floral treasures to this most handsome of American varieties, hoping that when they have fully tested its adaptation to our climate, they will give the readers of the CANADA FARMER the benefit of their experience.

Eschevería.

Echeveria is now an interesting genus of several species of glasshouse plants, allied to the well-known "house leek," and resembles it in habit and thick succulent leaves. No one unacquainted with it would imagine that it bore flowers, by seeing the species without them, yet it is very prolific in that faculty. In February last, we saw in the greenhouses of Miller & Hayes, Philadelphia, two plants of *echeveria splendens* in bloom, one had four flower-stalks four feet, high, all crowned with rich waxy pink blooms, the other had four flower-stalks three feet high, and one of the stalks had five long branch stalks all of them crowned with blooms. One *echeveria pumila* had three flower-stalks three feet high all crowned with white waxy blooms. All the species thrive in hanging baskets or rustic stands kept in warm parlors. The *sedum* and *cactus* genera may be set along with them for variety-sake. All need but little water. They look so curious, and are always attractive. Many nurserymen have got them.—*Ed.*

Apiary Department.

Seasonable Operations.

Just now, two of the most interesting questions with bee-keepers, who wish to manage their apiaries on the most approved principles, will be how to control swarming, and how to transfer the combs from old box-hives to movable frame hives. These questions are well answered in the following extracts from "*Bees and their Management*," a useful hand-book of apiculture:—

Swarming.

Bees increase the number of their colonies by swarming. In early spring, all being right with them, numbers of young bees are reared until the hive becomes crowded. Then drones are reared, and queen cells are built, in which eggs from which workers are usually reared, are deposited, and by different feeding and care, are transformed into young queens. When these queen cells are capped over, some fine day, the old queen and a part of the bees leave the hive to seek a new habitation. The hive, however, is left full of brood, which is hourly hatching, and soon becomes as populous as ever. A young queen hatches in about eight days after the old one leaves, and, if she is permitted, will destroy all the other embryo queens. If the bees intend to swarm again, they prevent her from doing this, and then, second, third, and often more swarms come out, led by these young queens. One of the evils attending natural swarming was the uncertainty attending it. In some years bees did not swarm at all, and no increase was secured; in others they swarmed so frequently that all were small, and poor and the parent hive was left so weak as to be worthless. Many of these swarms too, left their owner for the woods, in spite of watching and care to prevent it. It is now found that bees can be controlled perfectly in this matter, divided as much as the owner finds desirable, or swarming prevented entirely if he so desires. This plan of artificial swarming very much simplifies bee-keeping, as it saves long tedious watching, and also enables one to choose his own time and divide his colonies at his leisure. It is best every year to secure a moderate increase,—this may be done and still twice as much honey obtained as if no swarms were taken. But if any swarms are allowed to come or are taken but little if any surplus honey will be obtained. Young bees are nourished and fed with honey, and much is consumed for their use, and it would be as reasonable to expect hens to afford eggs and chickens at the same time, as to look for surplus honey, when all the force of the colony is engaged in rearing bees for new swarms.

Time and Manner of Making Artificial Swarms.

When drones appear, any strong colony may be divided with safety. It is necessary, however, to choose a time when honey is abundant in the fields, and also when the nights are warm. After one has a few colonies in movable comb hives, dividing them is a very simple matter. Have a hive at hand of the same size and pattern as your others. Then from four hives take each two frames and place them in the new hive, supplying their place in the old with empty frames. Then move a hive which you have not disturbed, a rod or more away to a new place, and place the new hive where that one stood. This should be done in the middle of a fine day, when many bees are absent in the fields. These will come in loaded to their old place, and find it strange; but as it contains stores and young bees hatching, and eggs from which to rear another queen, they will at once proceed to rear one and remain and work as contented as ever. This process may be repeated every two weeks until you have secured sufficient increase. The hives from which you take the combs, and the ones which you move to a new place, will lose so many bees that they will not think of swarming, but will energetically make up their loss and be better than if nothing had been taken from them. This is the safest of all ways to divide bees, and can be safely practised by beginners.

As the bee-keeper acquires practice and confidence other ways will suggest themselves. The trouble generally is, that the novice, finding that he can multiply his stocks so easily, does it to excess, and by so doing cripples the strength of all. However many eggs a queen may be able to deposit, her laying is always found to be in proportion to the strength of her colony, and thus the number of bees may be increasing faster from one queen in a good strong colony than from two or three in those that are weak in stores. A bee-keeper is rich not in proportion to the number but the strength of his hives.

How to Change Bees without Loss from Common to Movable Frame Hives.

The best time to do this is about the season of swarming, which season varies with the latitude and climate. In the Northern States, June is the month of swarms, in the Middle and Southern States they come with early and abundant bloom.

About the time when swarms are expected naturally, take the hive which you wish to transfer, and blowing a little smoke into the entrance, remove it a rod or more from its stand, leaving an empty box or hive in its place, into which the bees that are out in the fields may gather. Invert the hive which you have moved, and put over it an empty box or hive, as near the same size and shape as possible, and stop all holes or cracks between the two with grass or weeds that may be at hand, leaving no hole large enough for a bee to escape. Then with sticks keep up a sharp drumming on the bottom hive, at which the bees, alarmed, will fill their sacs with honey and and mount up into the upper hive. In from twenty to thirty minutes most of the bees with their queen will be in the empty box on top. The beginner need not fear driving too many; let all go that will. Then carefully set the box containing the bees in a shady place, and take the old hive back to the place where it stood. While you have been driving, many bees will have come back to their home, and finding it gone, will be roaming in and out of the empty hive in distress. These will at once rush into the old hive when it returns, and gladly adhere to it; then remove it to a location some yards off, when as it contains many hatching bees and eggs, the bees will at once rear a new queen to replace the one just driven out, and in a short time be as prosperous as ever. Now place your new movable comb-hive with its entrances all open, on the old stand, and spread a sheet before it; on this sheet empty the bees you have driven into the box and they will at once take up a line of march for the entrance of the new hive; if they gather there, brush a few in with a wing or twig and they will call the others who enter in a body and accept the new hive as their home.

You have now a nice swarm in your new hive, which will work as well as any natural swarm and quickly stock their hive. You have besides your old hive, in which the bees are rapidly hatching, and in three weeks they will have a young queen and a goodly number of bees, *but no brood* in the combs. Therefore in three weeks repeat the process of driving out the bees; and after this is done, split open the old hive, or carefully take off the side, and fasten all straight nice pieces of the comb into the frames of a moveable comb-hive;—a little melted resin will help to hold them in place, or they may be kept in place with thorns. Comb need not be rejected because it is old or black, as, if it is straight and free from mould, it is quite as good to rear bees in, or to store honey for their use—indeed, it is proved that old comb is better than new for these purposes. No drone-comb should be put in the frames. This may be known by the larger size of its cells.

Arrange the frames containing comb in the hive, set it in its place, and empty the bees on a sheet in front, as before described. They will soon securely fasten the combs, and work on all the better for this necessary disturbance. To the novice it may seem incredible that the bees should be thus driven from hive to hive and directed as you please, but it is now done every day through the summer, by hundreds of bee-keepers, who find not only that it may be done without loss but to great profit. After bees are once in movable comb-hives, little change need be made when all is well with them; their great advantage consists in the power they give their owner to discover when anything is wrong, and apply the remedy, as also the facility they afford for taking surplus honey from the bees in nice shape without trouble.

Rape as a Honey Plant.

I see in nearly every JOURNAL and bee paper, a report of some new honey plant; but what is the use of experimenting with new plants when we are neglecting the old and well tried plants, one on which we can figure the dollars and cents just as well as on wheat, corn, or any other crop. As it is not only a honey producer, nor a noxious weed, as most advertised honey plants are, but is a regular farm crop, it is for several reasons the best crop to raise when a return in honey and seed is desired.

1st. As a honey producing plant, the rape is scarcely second to linden, producing a beautiful golden honey of good flavor, and is in blossom when nearly everything else is out of blossom commencing about the middle of August and continuing a couple of weeks.

2d. As a farm crop, it is as good, if not better, than wheat. The time for sowing it is from the middle to the end of June. This gives time to prepare the soil after the other crops are in; or if wheat or corn should fail in coming up, rape can be sown in their places. It is harvested from the middle to the last of September, after all other grain is harvested. It does not impoverish the soil, but benefits it. From five to eight bushels more per acre of wheat are raised on ground which had rape the previous year. It allows no weeds to grow after it is fairly started, growing very dense, and its leaves completely shade the ground, therefore it does not suffer from drought like other grains.

The seed has a good cash market, oil is extracted from it. From ten to eighteen bushels is generally produced per acre, but is oftener over than under this estimate. Two quarts is sufficient to sow an acre. Thousands of bushels are annually raised, and it is just as staple a crop as wheat. H. O. KRUSCHKE in *American Bee Journal*.

How Plants Purify the Air.

Plants gain their nourishment by the absorption through their roots of certain substances from the soil, and by the decomposition, through their green portions, of a particular gas contained in the atmosphere—carbonic acid gas. They decompose this gas into carbon, which they assimilate, and oxygen, which they reject. Now, this phenomenon, which is the vegetable's mode of respiration, can only be accomplished with the assistance of solar light.

Charles Bonnet, of Geneva, who began his career by experimenting on plants, and left this attractive subject to devote himself to philosophy, only in consequence of a serious affection of his sight, was the first to detect this joint work, about the middle of the eighteenth century. He remarked that vegetables grow vertically, and tend toward the sun, in whatever position the seed may have been planted in the earth. He proved the generality of the fact that, in dark places, plants always turn toward the point whence light comes. He discovered, too, that plants immersed in water release bubbles of gas under the influence of sunlight. In 1771 Priestly, in England, tried another experiment. He let a candle burn in a confined space till the light went out, that is, until the contained air grew unfit for combustion. Then he placed the green parts of a fresh plant in the inclosure, and at the end of ten days the air had become sufficiently purified to permit the relighting of the candle. Thus he proved that plants replace gas made impure by combustion with a combustible gas; but he also observed that at certain times the reverse phenomenon seems to result. Ten years later, the Dutch physician, Ingenhousz, succeeded in explaining this apparent contradiction. "I had but just begun these experiments," says that skilful naturalist, "when a most interesting scene revealed itself to my eyes: I observed that not only do plants have the power of clearing impure air in six days or longer, as Priestly's experiments seem to point out, but that they discharge this important duty in a few hours, and in the most thorough way; that this singular operation is not due at all to vegetation, but to the effect of sunlight; that it does not begin until the sun has been some time above the horizon; that it ceases entirely during the darkness of night; that plants shaded by high buildings, or by other plants, do not complete this function, that is, they do not purify the air, but that, on the contrary, they exhale an injurious atmosphere, and really shed poison into the air about us; that the production of pure air begins to diminish with the decline of day, and ceases completely at sunset; that all plants corrupt the surrounding air during the night, and that not all portions of the plant take part in the purification of the air, but only the leaves and green branches."—*Popular Science Monthly.*

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The Canada Farmer.

TORONTO, CANADA, JUNE 16, 1873.

The American Pomological Society.

A quarter of a century having passed away since the formation of this society, it is proposed to celebrate the event by an unusually attractive meeting and display of the fruit productions of the United States and British Provinces. We have been favored with an advanced sheet of the circular calling attention to this grand gathering of fruits and of fruit-growers; and we hasten to lay the substance of it before our readers, that they may prepare in time to enter the lists with fruits that shall do credit to themselve and to Canada

This will be an occasion of more than common interest. It will bring together the prominent men in pomology, and the choice fruits of the United States. Such an opportunity is not often to be enjoyed. To see gathered together in one place the fruits of the North and the South, from Nova Scotia to the Gulf of Mexico, and from the Atlantic sea-board to the Pacific Coast, will be a sight never to be forgotten.

But besides all this, the Massachusetts Horticultural Society will grace the occasion with a grand exhibition of Plants and Flowers. Thus Flora and Pomona will unite to celebrate this Quarter Centennial and make it a marked day in the life time of those who may share in the festivities.

It is the special desire of the American Pomological Society that Canada shall be fully represented at this meeting, both by her men who take an interest in fruit culture, and by a full display of her fruits. Canada owes it to herself to be thus represented at this great gathering. Her skilled men in pomology —and she has men who are worthy to stand side by side with the ablest across the border—should know and be known to their fellow-laborers across the lines. Her fruits too—and she need not be ashamed to show her fruits anywhere—ought to be placed side by side with the best America can produce, and the world be made to know that the fruits of Canada can hold an honorable place even there.

This grand celebration will be held in the City of Boston commencing on Wednesday the 10th of September next, and continue for three days. Arrangements will be made with hotels and railway companies terminating in Boston, for a reduction of rates, of which notice will be duly given. Membership in the American Pomological Society is open to all who remit four dollars to the Treasurer, Thos. P. James, Esq., Cambridge, Mass.

Waste Products.

In the volume of transactions of the *Highland and Agricultural Society of Scotland* for 1872, which has just come to hand, there is a premium essay on the above subject, by A. H. Church, M. A., Professor of Chemistry, Royal Agricultural College, Cirencester, and we think that we shall be doing our readers a service by condensing some portions of this useful production.

The circulation of matter constantly going on between the three kingdoms of nature, is often attended by the production of waste products, which when properly prepared possess great manurial value. Soils are formed and improved by the commingling of rocks with decayed matter of an animal and vegetable origin "The analysis of farm plants and of soils, and the study of the forms of vegetable nutriment, as well as of the manner in which it is assimilated, lead us at once to limit our investigation to some dozen or fourteen elements, which, out of the sixty-three known to chemistry, are common to plants and animals Further than this, we find that the atmosphere and the soil contain such rich stores of the majority of these necessary organic elements, that we may generally rest content with the study of the artificial supply of no more than three of them. The search for waste products of manurial value resolves itself then into search for refuse substances containing in notable quantity one or more of the three elements.

Nitrogen, phosphorus, potassium " These elements in their ordinary combinations often possess great manurial power, and their money value in the older countries is constantly advancing. In Britain, all waste material, rich in organic and inorganic matter, capable of promoting the growth of plants, is eagerly sought after by the manufacturers of artificial manures; a branch of commerce that of late years has assumed gigantic proportions. In all our Canadian towns and cities there is a vast accumulation of waste materials, which science could work up into valuable manures, instead of being, as they are now, sources of discomfort, disease and death. Indeed there is scarcely a homestead where waste products are not allowed to be lost, that with a little care and pecuniary outlay, might considerably increase the fertility of the soil.

Waste Products of Animal Origin.

1. *Blood.*—This material is too often allowed to be totally wasted, and owing to the large percentage of water which it contains,—about 80 per cent,—it is difficult to manage running so rapidly into fermentation. When the cost of transport is small and the distances inconsiderable, dried peat or dried earth may be saturated with fresh blood, and the mixture exposed to the air and turned until its physical condition has sufficiently improved for it to be applied to the soil. Where a weak manure, such as that just described, would not pay the cost of preparation, of carriage, and of distribution, a more concentrated and useful drying agent must be used. Such a material offers itself in bone-black, and the spent animal charcoal of the sugar refineries. Steamed bones ground to meal may likewise be employed, but then the quantity of blood absorbed is much less. The addition of a small quantity of sulphuric acid, of green vitriol, or of super-phosphate of lime, to the mixture before the process of drying (by exposure to the air or by waste-heat) has been commenced, tends to prevent any loss of ammonia.

"Blood can be coagulated with quicklime, but it must be in quite a fresh state, or a serious loss of ammonia will ensue, the proper proportion is 100lbs. of blood intimately mixed with 3lbs. of quicklime in a state of fine powder. The mass should then be broken up and exposed to the air, if it should exhibit a tendency to ferment, apply some bone-black and super-phosphate, and a valuable fertilizer will be obtained. Large quantities of blood subject to putrefaction will contaminate the air, and may be corrected by the application of carbolic acid or calcium sulphite. The following is the average composition of fresh blood of the ox and horse:

	Ox blood	Horse blood.
Water	80 0	78.0
Combust. & Volatile matters	19·3	21.2
Mineral Matters or Ash	00 7	00.8

"It may be stated in round numbers that 100 parts of the fresh blood available for agricultural purposes contain 3 parts of potential ammonia, 1 part of phosphorus pentoxide, and 5 parts of potash. Perfectly dry blood is five times as rich. When blood is simply coagulated by heat or steam, then the separated clot retains the greater part of the nitrogen and of the phosphates, leaving in the serum or liquid residue a great part of the potash. When the coagulum is completely dry, it constitutes a valuable manure easy to preserve and transport."

Flesh. The means of converting flesh, unfit for other use, into valuable manure have for a long time been understood and practised in France, by simply heating the material with steam in close vessels under considerable pressure. In this way, the fleshy matter may be dried and pulverized, the fatty portion, possessing little manurial value, separated. A sample of flesh manure, thus prepared, gave by analysis :—

Phosphorus pentoxide	2·35 per cent.
Potential Ammonia	5·60 "
Potash	·60 "

Perfectly dry flesh, free from all foreign matters, would exhibit a much larger amount of nitrogen; and the substances mentioned as useful in mixing with blood, are in great degree applicable to the preparation of muscular flesh for manure.

Bones, Horns, Hair, &c.—Bones are well known to be an excellent manure, both for roots and grains. The boiling of bones, when not carried too far, quickens their action as manure, and does not impair their power; but if steamed under pressure they lose the greater part of their nitrogenous substance, and leave phosphate of lime as their chief manurial ingredient. It is surprising how long bones will sometimes continue buried in the ground without suffering material change. Our author observes :— "I have examined bone ornaments of Roman origin, dating from the second and third centuries of our era, which had not lost their form and sculptured details, and though often brittle, still retained some osseine, and most of their phosphates, although they had remained in a moist calcareous soil for fifteen or sixteen hundred years. Generally, when a bone has lost part of its nitrogenous constituents, the remaining phosphate becomes less apt to dissolve; and thus our endeavors to devise a plan for developing the action of bones as manure will have this end in view, to make the phosphatic matter they contain as rapidly available for plant nutrition as the nitrogenous constituent is. Oil of vitriol, we know, accomplishes this result: pulverisation tends to produce the same effect; while the mere admixture of putrescent matters, such as a proper compost heap contains, will afford another mode of attaining the same end." When animal refuse, containing some bony fragments, is steamed and subjected to considerable pressure, the product has great manurial virtue, as the subjoined analysis will show.

Phosphorus pentoxide	2·1 per cent.
Potential Ammonia	8·0 "
Potash	1·9 "

Horns, hoofs, hair, wool, &c., are all, more or less, related in composition to the osseine of bones; and by gentle roasting or steaming may be made to yield valuable food to plants. Glue has high manurial

qualities, and the refuse of glue manufactories, though very much inferior to glue itself, may, by judicious management, be made profitable for this purpose. The following analysis of *glue-refuse* will afford a practical illustration:

Water	53·7 per cent.
Combustible and volatile matters, containing 1·75 of nitrogen.	21·2
Calcium compounds, silica, &c. containing ·61 of bone earth.	25·1
	100·0

The skin and hair from tanneries, known as *trotter scutch*, though variable in composition, contains considerable manurial richness; and the offensive smell which it yields may be neutralized by sprinkling spent animal charcoal from sugar refineries, or of dry peat earth. A somewhat inferior sample gave the following results:

Water .	29·0	
Combustible and Volatile matters.	35·5	Containing 2·95 of Nitrogen, corresponding to 3·58 of Ammonia.
Ash.....	35·5	Containing ·4 Phosphorus pentoxide, ·87 of bone earth.
	100.0	

Fish Refuse.—"Fish have long been used as manure; and there is indeed a peculiar appropriateness in returning to the land every kind of valuable matter which can be recovered from the sea. For the sea holds the soluble waste of the world, and is continually receiving vast accessions of valuable substances carried down by rain and rivers through the action of natural forces, or by the carelessness of man. Loss of soluble matter is in great measure inevitable, but we need not increase it by neglecting to utilize the sewage of towns for the enrichment of the soil, and to retain those manurial matters which can be thus absorbed. Whatever we get back again from the sea, is an almost unexpected gain; and this restoration of the elements of fertility, through the agency of sea-weed, of potassium compounds derived from sea-water, of guano, and of sea-fish, and their debris is a most important link in the circulation of matter."

A serious loss of manurial wastes occurs on the fishing coasts of most countries; a subject that has received increased attention of late years in Europe. All surplus takes of fish, all stale fish and the refuse of the curing stations should be carefully preserved and utilized. There is a sort of artificial fish-guano, of great concentration, that of late years has been successfully manufactured in Europe, and chiefly prepared from the liver, heads, and refuse matters of the Newfoundland and Norwegian cod-fisheries; a portion, however is manufactured from the waste of herrings and sardines. The following analysis will give a general idea of the value of the *Norweggan cod-guano*.

Potential Ammonia...	9·4 per cent
Phosphorus pentoxide..... ...17 1	"
Potash . . . 4·7	"

The extent of the fisheries of the St. Lawrence and other parts of our Canadian Dominion, with the rapid extension of our agriculture, and the consequent increasing necessity for extra manures, should awaken the earnest attention of scientific and practical men to the discovery and application of means for utilizing in the most economical and effective manner these almost exhaustless materials, which are at present, in too many instances, allowed to run entirely to waste.—The consideration of the waste products of *vegetable* origin, forming the grand part of the essay, must be left to a future paper.

MARL.—R. McD writes us: "Would you please examine the enclosed sample of marl, and inform me as to its value and uses." REPLY.—The sample before us is rich in carbonate of lime, with traces of phosphate and approximates, both in quality and appearance to specimens of the same substance we have often seen in this country and various parts of Britain. Though much inferior to lime as a fertilizer, it is, nevertheless, admirably adapted to stiff clayey soils, rendering them open and friable to an extent difficult to accomplish by most other means. In combination with swamp muck and barn-yard manure, it forms a quality of compost that tells powerfully on almost every kind of soil.

Plagiarism.

Our attention has been drawn to a charge of plagiarism made by the Albany *Country Gentleman* against the Editor of our Poultry Department, for having adopted, in an article on Pigeons, the thought and expression used by our Albany cotemporary in a similar article last year. We think our cotemporary carries his ideas on this subject too far. When an article is copied by one journal from another, or when considerable extracts are made, credit should of course be fully and frankly given and the writers in THE CANADA FARMER are most scrupulous in this respect. But when an exhaustive article on any topic is being prepared, and the writer reads up his subject and consults various authorities, it would be absurd to insist that every thought or expression, however trifling the point in it, should be duly noted as the emanation of a particular person's brain. We always recognize the ability and sound practical sense of our Albany cotemporary, and would never think of charging him with plagiarism because for convenience or otherwise he adopted in any article the words of others. But to show the unreasonableness of his complaint against us in this matter, we call our cotemporary's attention to the fact that he himself, *in the very article from which he says our collaborateur copied* and in the next succeeding paragraph to it but one did precisely what he charges us with having done. Here is a sample, and the whole series of articles on pigeons, published in the *Country Gentleman* in 1872, is full of such curious similarities of thought and expression.

(From Country Gentleman, January 11th, 1872.)	*(From Tegetmeier's Pigeon Book, p. 26, pub. 1868.)*
"Pigeons are a very thirsty bird, and must be supplied with an abundance of fresh water." This is especially the case when young birds are being fed, as the parent's crops cannot be disgorged into the throats of their young without taking a copious draught of water before hand."	"Pigeons are very thirsty birds, drinking a much greater amount of water than most persons would suppose possible, therefore a good supply is requisite. This is especially the case when the young are being fed, as, after picking up a cropful of corn or pulse, the old bird has to take a copious draught of water before it can disgorge into the throat of the young."

Saving Rain-Water for Stock.

Dry weather is already upon us and a consequent deficiency of water for stock. To meet this difficulty in many places the only resort is to wells, or the collection of rain-water in properly constructed cisterns. The quantity of water that can be obtained from the rain that falls on a barn 70x40 feet, is very great. We may safely calculate that during the months of July and August and part of September, there will be an average fall of rain of three inches in depth. From observatory records we find this is the minimum quantity and often it is far more.

During the months in which water for stock is generally scarce, the rain that falls on one barn roof the size we have previously named (70x40), would furnish five gallons a day each for twenty head of stock, for a period varying from seven to ten weeks, according as heavy thunder showers prevail or not. If a very heavy thunder storm accompanied with much rain occurs, the quantity obtained would be much increased. These heavy rains, however, do not greatly assist a permanent supply of water for stock as it is ordinarily caught and collected; ponds and drains are filled for a few hours only, the moment the rain touches the thirsty earth it is all absorbed and goes to nourish vegetation and partially assists springs, but the great mass is lost so far as furnishing an immediate supply for stock is concerned. The benefit derived from saving this supply by means of cisterns and cave troughs, cannot be too highly estimated, and those who have seen the cattle parched with thirst, without the power of remedying the evil, can alone appreciate it. Depending, however, somewhat on the price of lumber and the carpenter's wages.

In appreciating the advantages to be derived from such an expenditure, we must not lose sight of the facts, that water is often as scarce in winter as in summer, and the labor of driving stock some distance once a day is great, and some mischief, more or less, is sure to arise amongst a herd, from having to do so, and the cost of building such a cistern would probably be repaid the first year from this cause alone ceasing to produce accidents. Two such cisterns would furnish a supply for twenty head of stock for upwards of four months, even supposing that little rain fell during that period, and often we get one or two very heavy rains about January in every year. Placing the advantages, therefore, against the cost, it is doubtful if any money could be more profitably expended on the farm, than providing cisterns to catch the rain that falls on our barns and sheds.

Ravages of the Turnip Fly.

It is stated that spirits of turpentine, if applied to the turnip seed, a few hours before sowing, will effectually prevent the destruction of the young seedlings by the fly.

The best way to use it is to wet the seed with turpentine and allow it to remain wet about half an hour, then dry it with plaster or ashes, and sow as usual. We are assured by parties who have tried it that this is an excellent preservative. The cost is nothing, and we believe no evil can result. In some cases the seed has remained wet with turpentine several days before being sown, and no perceptible evil arose from the delay. One gentleman assures us that he has used this application for ten years and has never lost any plants by the fly. On questioning him closely as to the *modus operandi* he states, his belief is that the turpentine passes into circulation with the sap of the plant, as it can be distinctly detected by the peculiar taste it possesses when testing its presence by choosing some of the young plants.

Fertilizers for Strawberries.

MR. EDITOR. I have used a mixture composed one-third of plaster (gypsum), one-sixth fine ground bones, one-sixth marl, one-sixth salt, added to one-sixth of hot lime, and when the lime is well slaked, thoroughly mixed together and daily turned for five or six days. I have applied this as a top dressing over my strawberry beds with most wonderful results. THOS. H. GRAYDON.

St. Catharines, May, 1873.

Grape Vines Winter-Killed.

MR. EDITOR. The past winter has been very severe on some of my grape vines. Iona, Adirondac and Salem are badly winter-killed. The top branches of some of my peach trees are showing a good amount of bloom, while the lower and middle branches of the same trees are dead!! What say you to that?

T. H. GRAYDON.

St. Catharines, May, 1873.

CONSTANT READER, YORK.—The title of the book is: "The Manufacture of Beet-root Sugar in England and Ireland, by Wm. Crooks, F. R. S., Editor of the *Chemical News*. Published by Longman, Green & Co., London." Any bookseller will get it for you.

SKUNKS. "C. G." says "this locality is at present infested with skunks. Would you kindly suggest a means of destroying them." ANSWER:—The discovery of one of these animals upon the premises usually furnishes occasion for the display of a vast deal of noise and excitement. But it is far better to take the affair quietly. Call off and chain up all the dogs, and remove every obstacle to the free egress of the animal from the premises. Station one or two good marksmen armed with rifles in a position to cover the retreat, and let them blaze away when the enemy is at proper distance—which means the farther the better—from the premises.

A Western farmer says: "My remedy for scratches on horses or cows is an ointment made of equal parts of tar, sulphur and lard, applied every day. I have never failed of effecting a speedy cure."

[illegible] It is stated that 12 sheep shearers in Australia sheared 7,567 ewes and lambs, between Monday morning and Saturday afternoon. Although this was 105 per man each day it is said the work was well done.

Experiments made by an English chemist some years ago [illegible] how much food of different kinds it takes to produce a pound of flesh. According to his conclusions, it [illegible] of milk, 27 pounds; turnips, 190; potatoes, [illegible], oatmeal, 9, [illegible] meal, 7½, peas, 3½; beans, [illegible]

[illegible] W. Heighton [illegible]

Oats [illegible] either wheat or [illegible] to beat when [illegible] farmers prefer [illegible] for they [illegible] there is less waste [illegible] they are cut, and then [illegible] in the stock.

[illegible]

The [illegible] 12,099 head of horned stock [illegible] which is about one to every two [illegible] of the [illegible] the cattle [illegible] in winter [illegible] Europe or America.

[illegible] bees, laden, some with [illegible], and some with honey. Fear not to approach! There are no wasps, there are no hornets [illegible] thou canst [illegible] and hold thy hand [illegible] strike not [illegible] that [illegible]

[illegible] *Nature* says: "I have found a very effective remedy for the annoyance of ants [illegible] the garden paths and border [illegible] water [illegible] touches, and the [illegible] immediately take themselves off [illegible] destroys animal and vegetable as well as [illegible] life.

THE average yield of wheat in different countries varies remarkably. In Austria it is 14 bushels per acre, in France and Prussia, 17; in Spain, 23; while in Britain the average yield is from 28 to 30. The yield of barley in France is 21 bushels per acre; in Prussia, 25; and in England from 35 to 40 bushels per acre; in Manitoba from 50 to 60 bushels per acre [illegible] ploughing without any artificial manuring.

In [illegible] any description [illegible] the first importance to get the best. [illegible] does it pay so [illegible] "The best," says [illegible] "are cheap at the highest price—the [illegible] a gift." [illegible] he remarked that he would be unable to pay his hired help, were it not for his orchards.

The [illegible] say that Mr Hueghe [illegible] in changing the common cowslip from [illegible] yellow [illegible] purple by merely transplanting it into richer earth. The color of plants can [illegible] varied by mixing certain substances with the soil. Wood charcoal will darken the hue of dahlias, petunias, and hyacinths. Carbonate of soda turns the last-mentioned flowers red, and phosphate of soda alters greatly the shades of many plants.

At a recent Dairymen's Convention in Michigan, the question of running cheese factories on Sunday was discussed at length. The [illegible] sentiment was decidedly in favor of suspending Sunday operations, which was embodied in a resolution and adopted. The owners of milk are to retain that of Saturday night and Sunday morning and use it for butter. The position taken was that Sunday labor in the factory is a violation of the law of God and a detriment to public morality.

ABOUT EGGS.—Massachusetts has decreed that a dozen of eggs cannot be a legal dozen unless it weighs a pound and a half. The heads of the Bay State legislators are level upon this subject at least. Very few persons have any idea of the difference in the weight of eggs. A few years since we purchased several dozens from different farmers. Each dozen was carefully weighed at a drug store, the result proving that there was a discrepancy between the heaviest and the lightest dozen of a full half pound, and yet we paid the same price for each.

LATE PLOWING OF CLOVER FIELDS.—A correspondent of the Cincinnati *Gazette* details several experiments which show that when clover sod is turned in May, after the clover is up some inches, corn planted thereon is far less liable to be troubled with the cut worm, than if the land were plowed the fall before or early in spring. The worms feed on the clover instead of the corn. Besides, if the clover is in rank, [illegible] condition when turned under, and the roots [illegible] it will be more rotten at August than if plowed earlier, when the roots are not full of sap.

HIPPOPHAGY IN PARIS.—There are forty stores in Paris devoted to the sale of horse-meat as an article of food. During 1872, 9,725 horses, 866 asses, and 51 mules were consumed by the inhabitants. *Les Mondes* says that the animals are prepared for the market in the ordinary way, and that the meat sells for about half the price of beef. The horses are inspected at the slaughter house with the greatest care. It may be noted as an interesting fact that hippophagy is decidedly on the increase, as 2,408,076 pounds of equine meat were eaten in 1872 as against 1,113,024 in 1869.

THE CORN CROP.—The prospects of the corn crop have seldom been so unfavourable as they are this spring. The long continued wet weather is almost without precedent. Only on the higher lands in the great corn regions have been prepared for the crop, and it will be far into June before the lower lands can be planted. Thus the acreage will be very largely reduced and the yield per acre will be much lighter. Intelligent farmers inform us that they do not look for more than two-thirds the product of last year in this State, and in Iowa and Missouri there will be a very material falling off. Should early frosts prevail in the fall, even this estimate will be seriously reduced.—*Chicago Farmer, May 31.*

A society calling itself the National Columbarian Society has been organized at New York, having for its objects the encouragement of the systematic breeding, improvement and training of pigeons; the promotion of free intercourse among fanciers, and the interchange of views and the results of experience. A constitution and by-laws were adopted on the 15th of May. The next regular meeting of the Society will take place at 14 Murray Street, New York, on the 9th day of July next, at 2 o'clock p. m., on which occasion we hope to see fanciers there from all sections of the country, who are hereby cordially invited to be present. The Constitution and By-Laws will be forwarded to any address, on application to the Secretary, A. B. Estes, at 14 Murray Street, New York.

CATTLE IN EUROPE.—In a paper read by Herr J. Ruegg, at Seebezirk, in Switzerland, the aggregate number of cattle in all Europe is estimated at 94,700,000 head. Of this number, 13,000,000 are found in Germany, 12,000,000 in Austria, 12,000,000 in France, 10,000,000 in England, 9,000,000 in Turkey, 4,500,000 in Spain and Portugal, 4,000,000 in Denmark, 3,500,000, in Italy, 2,500,000 in Norway and Sweden, 2,000,000 in Holland and Belgium, 1,000,000 in Greece, and 1,000,000 in Switzerland. In proportion to superficial area, and number of the population, Switzerland stands at the head of the list, having 268 head of cattle to every 1,000 acres, and 557 head to every 1000 inhabitants. In Spain, on the other hand, there are only 39 head of cattle to every 1,000 acres.

A NEW WAY OF OBTAINING FLOUR.—A revolution is likely soon to take place in the process of flour-making. It has just been started in England. The grain is crushed by numerous little trip-hammers, attached to the proper machinery to produce the result desired. The new machinery is very cheap, and does up its work in a thorough manner. The flour produced is said to be far superior to that obtained by grinding. A pounding-mill, costing $1000, will produce as much flour every day as an old-fashioned mill costing $5000. The new mill is very simple. When a hammer is out of order, it can be replaced for a few cents. For four thousand years, millers have produced flour by grinding the grain with stones. The new idea gives a new departure. What results it will produce in this country remain to be seen.—*German Town Telegraph.*

SURPLUS WHEAT IN 1872. The *Michigan Farmer*, is an able article on the wheat of the world, thus estimates the surplus wheat in the several countries named:

	Bushels.
France	20,000,000
Holland and Belgium	None.
Switzerland	None.
Germany	12,000,000
Scandinavia	800,000
Russia	21,000,000
Austria, Hungary and Turkey	8,000,000
The Mediterranean countries	None.
Egypt	2,000,000
United States	24,000,000
Total surplus wheat	99,800,000

UNDER THE HOUSE. One great fault in building houses in both city and country is to make them too low on the ground. There should be distance enough to allow a free circulation of air, say three feet between the floor and the earth. All rubbish, shavings, etc., should be cleaned away before siding up, and a good ventilation should be kept open to insure dry, sweet air under the floors. Much sickness is caused in many families from low underpinning and close, damp stagnant air, carrying miasma into the lower rooms through the floors of dwellings. Many houses are built upon flat ground, and the earth thrown around the outside, making a sink under the house to hold water. This is wrong. It is much better to raise the ground under the house, and even gravel and cement before building. At any rate, ventilation under the house should be always attended to.—*Ex.*

STEAM PLOWS IN EUROPE. In a report to a Farmer's Club in England the manufacturers of the Fowler plow say: We are making about 100 plows a year for the English market, and about 50 or 60 for foreign countries. They are principally of the double-engine class. About two-thirds of those sold in England are let out on hire, and one-third for private firms. Steam cultivation is very much retarded in this country, because little or nothing is done to assist it in the shape of roads, enlargement of fields, &c., so as to make the farms more suitable for the use of steam power. About 50 of our steam plows are working in the district of Magdeburg, Germany, in the cultivation of beetroot for sugar. The best grown on steam plowed land shows a gain of about 2 per cent. of sugar, and about 20 per ct. gain in the weight per acre. This has induced all the sugar cultivators to employ steam. They usually work to a depth of from 12 to 15 inches, but never less than 12 inches.

A WONDERFUL EXHIBITION. An exhibition more wonderful and interesting than that at Vienna will be held in Russia about the middle of August. The scene of its operation is the historic city of Nijni-Novgorod, which is situated at the confluence of the Volga and the Oka, in Central Russia. The ordinary population of the city is about 32,000 inhabitants, but during the fair that number will be augmented by an addition of 300,000 or 400,000 visitors from all parts of Europe and Asia. The fair is held in an immense stone building capable of containing 3,000 people, in which the sales are made. One hundred and forty-five million dollars' worth of wares and goods were brought to last year's fair, and out of that immense quantity only $20,000 worth remained unsold. All kinds of goods and manufactures are sold at this mammoth fair, and an opportunity will be afforded for seeing collected together the people of all countries, and the modes of traffic of every race in Europe.—*Guelph Mercury.*

CLOVER BEFORE WHEAT.—We quote from Dr. Voelcker: "All who are practically acquainted with the subject must have seen that the best crops of wheat are produced by being preceded by some crops of clover grown for seed. I have come to the conclusion that the very best preparation, the very best manure, is a good crop of clover. * * * A vast amount of mineral manure is brought within reach of of the corn crop, which otherwise would remain in a lock-up condition in the soil. The clover plants take nitrogen from the atmosphere, and manufacture it into their own substance, which, on decomposition of the clover roots and leaves, produces abundance of ammonia. In reality the growing of clover is equivalent to a great extent to manuring with Peruvian guano; and in this paper of mine I show that you obtain a larger quantity of manure than in the largest dose of Peruvian guano which a farmer would ever think of applying.—*Ex.*

VENTILATING STACKS.—A new invention has been adopted this year at the Prince Consort's farm and at the Norfolk farm at Windsor, England, for the preservation of hay ricks from the heating occasioned by confined air and moisture. A long perforated tube, fixed in short lengths which fit into each other, is built into the body of the rick as it is carried up, and surmounted by a cowl, which turns with the wind and provides a constant down current; an upward current is also arranged for in an [illegible], which [illegible] opens at the bottom, and so completes the circulation. This invention is also adapted to granaries and ships in transit, but in these cases several arms are provided, running out from the central shaft at right angles, so as to distribute the air through the body of the grain.—*[illegible]*.

FERTILITY OF WATER.—The following is an extract from the speech of the Hon. Robert B. Roosevelt, in the House of Representatives, May 13, 1872, comparing fish culture with agriculture:—

The relative fertility of the water and the land is altogether in favor of the water. An acre of land will produce corn enough to support a human being, but an acre of water will support several persons, and could be readily made, with proper aid, to sustain the lives of many more. The former requires manuring, working, planting, harvesting; the latter merely requires harvesting; and that, where the fish are sufficiently abundant, is hardly [illegible]. While the yield from the land is reasonably large, the profit is exceedingly small. The field must be plowed and harrowed and fertilized; the corn must be planted; it must be plowed again; and still again, must be hoed; and at last the ears must be cropped, husked and ground. What is the net result of this compared with the natural fish growth in a [illegible], almost without effort, finding their own food, and finally taken in some net which does its fishing while its owner is sleeping.—*Utica Herald*.

CHEAP VINEGAR.—A correspondent of the Cincinnati *Gazette* relates his experience as follows:—I will give you my method of making vinegar. I consider that it is decidedly the most economical way to make this useful article, needed by every housewife. I take a quantity of common Irish potatoes and wash them until they are thoroughly clean, and then place them in a large vessel and boil them until done. I now drain off carefully the water that I cooked them in, straining it if necessary, in order to remove every particle of the potato. Then I put the potato water into a jug or keg, which I place near the stove, or in some place where it will be kept warm, and add one pound of sugar to about two and one-half gallons of the water, some hop yeast, or a small portion of whiskey. Prepared in this way, and letting it stand three or four weeks, you will have most excellent vinegar. Indeed, it is the only vinegar that will preserve cucumbers cut fresh from the vines without the aid of salt. If I have not plenty of potatoes, when I am boiling them for family use I put on more water than is necessary to cook them, and drain off the water and treat it as above described, diminishing the ingredients to suit the amount of potato water. The whole cost of really superior vinegar made in this way [illegible] cents per gallon.

THE CHAMPAGNE VINES.—The *New York* [illegible] correspondent writes under date Champagne, May 7:—"The frost which scourged all the vineyards in France during the nights of the 24th, 25th, and 26th of April [illegible] fatal in Champagne [illegible] obtained [illegible] information as possible respecting [illegible] than on the left bank of the Marne. Thus, on the right bank, Dizy [illegible] Champillon, Ay, [illegible] the loss in these rich vineyards [illegible] about four-fifths of the crop, is now considered to be about two-thirds. [illegible] has caused less destruction [illegible] one-third, while [illegible] have lost only one-fifth. The severity of the damage, however, is resumed at Rilly, which it is calculated has lost two-thirds; but Chigny and Ludes, more favored, lose only one half. But the rich slopes of [illegible] and Verzenay are damaged to the extent of [illegible] of the crop, the vineyards of Verzenay being, moreover, infested with the *pyrale*, which, before the frost, had already destroyed the young buds to a considerable extent. I have no reliable estimate respecting Verzy, which has, however, been severely visited. As to the vineyards on the left bank of the Marne—Epernay, Pierry, Moussey, Vinay, St. Martin, have lost about two-thirds of their crop."

Paris Green and other Remedies for Leaf-eating Insects.

Many of the most common and most destructive of our noxious insects, do their damage by devouring the foliage of plants. The leaves of plants are analogous to the lungs of animals, and like them are vital organs; and, in proportion to the extent to which they are destroyed, the decrepitude and death of the plant slowly but inevitably follow. We see this illustrated in the serious injury and sometimes death of apple trees by the destruction of their foliage by the tent caterpillar and the canker worm. Smaller plants, and especially young seedlings, are often devoured bodily by leaf-eating insects, as illustrated by the damage to cabbage plants by flea beetles and cut worms, and the destruction of cucumber plants by the striped beetle, and, still more strikingly, the wholesale destruction of potato vines by the Colorado beetle. The obvious suggestion, in the way of counteracting such injuries as these, is the application to the leaves of some substance, either in the form of liquid or powder, which will deter or destroy the insects without injuring the plants. Such substances may operate either by poisoning the insects, or by simply making the foliage distasteful to them. Among the applications of the latter class most generally used, are lime, ashes, road dust, and suds made from the whale oil soap; and the two principal substances of the former class are hellebore and Paris green. The substance first named have been long and extensively known as the cheapest and most convenient applications to small or seedling plants, such as young cabbage and cucumber and melon plants, and they are chiefly relied upon at the present day, where these vegetables are cultivated upon a somewhat extensive scale. The whale oil soap is the popular remedy for the rose slug, and it might undoubtedly be used, with more or less success, against many other foliage insects. The powdered white hellebore is the specific remedy for the imported currant sawfly, which has for a number of years past been so destructive to currant bushes in the Eastern States. But the most deadly poison that has ever been used for destroying insects is the compound of arsenic and copper, commonly known as Paris green.

When Paris green first came into use, and before its remarkable efficiency was known, experimenters fell into the natural mistake of using it too strong. It was first used with only three or four parts of flour or lime. The consequence was that young and tender plants were killed or seriously injured by it and cautions against its use were published. It was then used diluted with ten parts of inert powder, but it was found that it was almost equally effective when mixed with twenty times its bulk of flour, and some have asserted that it may be reduced to nearly double this extent without destroying its efficacy. The plan of using Paris green in a liquid form, by dissolving it in water, has been recently practised with success, and as the liquid has several very important advantages over the powder, it seems probable that it will come to be used most commonly in this form. Mr. J. B. Root, of Rockford, who is an extensive cultivator of vegetables for market, used the liquid exclusively, last year, upon his potatoes, with entirely satisfactory results. In a recent correspondence with Mr. Root, for the purpose of learning how strong a solution he used, he informed us that if the Paris green be a pure article, three quarters of a tablespoonful to a ten quart pail full of water, will make it sufficiently strong. The pure article is completely dissolved and gives to the solution a deep green color, whilst the adulterated article leaves a sediment, and the color is less intense, and of course a larger proportion of it must be used. The advantages of using this poison in liquid form are the following: First, it goes farther, and is therefore less expensive; secondly, it can be used in all kinds of weather and at all times of day, whereas, the powder can be used advantageously only when the vines are wet with rain or dew; but thirdly, the most important advantage of using this poisonous substance in the liquid form, is that in this way it is rendered non-volatile, and therefore all danger of inhaling it is removed. Though we believe no case of death from the use of this substance for the purpose of killing insects is known to have occurred, yet we have known persons to be made sick by its use; and a case is related in the author's first annual report, in which the death of a child was attributed to it with considerable probability. Many people are yet afraid of it, and will not use it where children are liable to get access to it, and every one feels the necessity of taking special precautions in using it. The only practical danger in using Paris green lies in the risk of inhaling the fine powder as it floats in the air. The mixing of the powder with water entirely obviates this danger, and this safe mode of using it may open the way to a more extensive experimenting with it for the purpose of destroying other leaf-eating insects besides the Colorado potato beetle and its larvae. It can be applied to trees with a syringe, and to potatoes and other low plants, either with a syringe or watering pot; or it can be sprinkled upon them by means of a handful of brush, or a broom with the handle conveniently shortened.—*Prairie Farmer*.

How the Spider Spins his Web.

Most people have too great an antipathy to spiders to spend even a few minutes in watching them. But we must confess that we rather cultivate their acquaintance, as they catch and devour our enemies, the flies. The spinning apparatus of a spider is very curious. On the under part of the body are several small prominences covered with many hundreds of small holes, through which exudes a gummy substance which hardens on exposure to the air. Thus each little hole produces a thread of inconceivable fineness; and when these many threads are joined together, they form what we see as a single thread.

When a spider wishes to form a web, if he belongs to the race of geometrical spiders, which build a wheel shaped web, he selects some convenient place, and proceeds to lay the foundation by attaching the spokes of this wheel to proper objects; he then commences at the centre formed by the crossing of these lines and travels round and round, spinning his web, employing his feelers for guides as to distance. He always uses the outer web as a pathway, and every time he crosses one of the spokes he attaches his line to it. When he has finished, he takes his position at the centre, head downward, and waits for the unlucky insect which he is sure will soon happen along. As soon as he perceives that some awkward fly has run against his delicate framework, then he bounces out on him and quickly ties him fast, hand and feet, so that he may devour him at leisure.

But it is not alone for laying traps and tying fast his unlucky victims that the spider uses his web. If he wants to cross from one tree to another, or from one side of a stream to the opposite, he uses the web for a bridge. Thus he constructs by taking a favorable position and then spinning a web, which he lets float out on the wind. As soon as it strikes some object to which it adheres, he pulls it to see that it is secure, and then he crosses on this single line. This is an achievement in engineering that far surpasses the suspension bridges built by human skill. Here is a bridge oftentimes from fifty to one hundred feet long, spun by so insignificant an insect, that we may have some trouble to find him, yet strong enough to bear his weight. When a spider wishes to descend from an elevation, he attaches the end of his web to some object and then boldly launches off, spinning as he goes. When he gets down, he cuts the line and leaves it, unless he wishes to return immediately, in which case he coils it up and takes it along as he ascends.—*Ex.*

To Pickle Eggs.

Through the kindness of Messrs. De La Vergne & Hare, of this city, we are furnished the following recipe, which they use in their business, said to be the largest in this city.

To make a good pickle, get one bushel of clean lump lime, free from dirt and all foreign matter, four quarts of fine salt, and sixteen ten-quart pails of pure water, hard or soft, and as free from vegetable matter as possible.

Slake the lime with two or three pails of the water, and dissolve the salt in a pail of it; then add the salt and the balance of the water. Stir the preparation well; let it stand a short time, and stir it again three or four times. Finally, let it settle and dip the clear pickle into the cistern or cask you are to preserve in, filling it about half full. After this has been done, dip the eggs into the pickle with a dipper or basket made for the purpose. When the cistern or cask is nearly full of eggs and they are well covered with pickle, spread a cotton cloth over them, and spread on that a layer of two or three inches of the thick lime that is left after the clear pickle has been dipped off. Be sure that the eggs are well covered with pickle while they remain in it, and the lower the temperature of the pickle is kept the better the eggs will come out.

The best arrangement for preserving eggs is to build a vat or cistern below the cellar-bottom, being careful to get it well made, tight, and from six to seven feet long, five feet wide, and four or five feet deep.

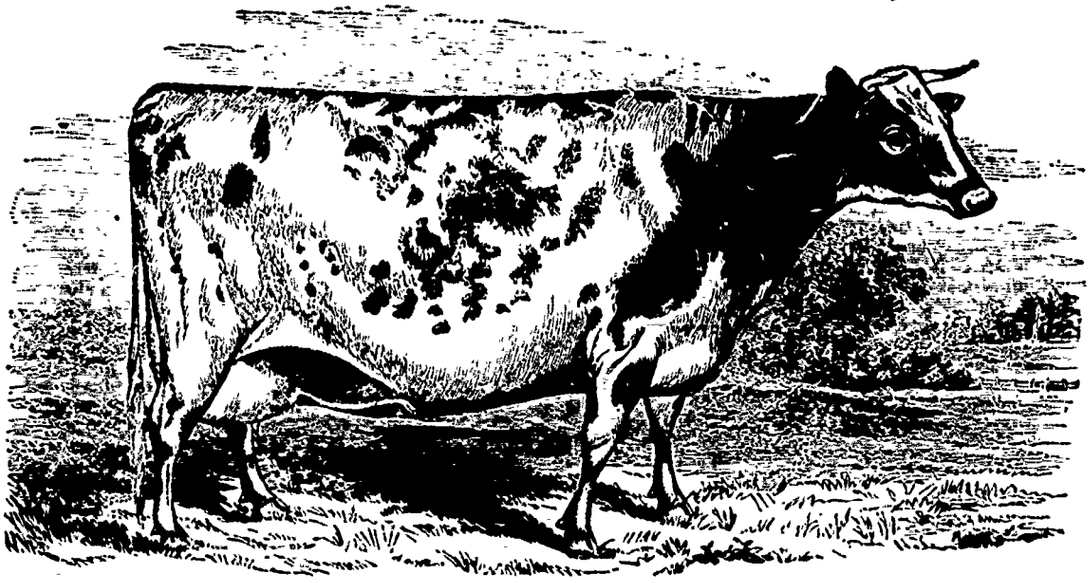
Eggs pickled according to the recipe given have been known to keep well for two years.—*N. Y. Weekly Times*.

The Dairy.

EDITOR—L. B. ARNOLD, OF ROCHESTER, N. Y., SECRETARY OF THE AMERICAN DAIRYMEN'S ASSOCIATION.

Filling Vacancies in the Dairy.

There is no one thing on which the success of a dairyman depends more than on the selection of the cows which are to compose his herd. There is no profit in keeping poor ones. The steadily increasing price of land brings the cost of keeping so high that poor milkers often fail to pay for the provender they consume. The money made by dairying is all made from good cows, and skill in selecting is therefore a matter of great consequence.



To illustrate the difference in profit between a good cow and a poor one, let us suppose a case. Take a cow of any given weight, say 1000 lbs., and suppose it costs in hay, grain and pasture $30 a year to support her body, and five dollar's worth of extra feed to produce milk for making 300 lbs of cheese, the net value of which is ten cents a pound.

Take another cow of the same weight and it will cost the same to support her a year. But suppose she can convert $10 worth of extra feed into milk that will make 600 lbs of cheese.

Though the first cow has manufactured each dollar's worth of extra food into 6 dollars worth of cheese, the profits on the small quantity she has manufactured will not pay for her keeping. While the second cow, by converting a larger quantity of food into cheese, has paid her keeping and left a handsome margin.

A comparison of results will stand thus:

Cow No. 1—Dr. to support 1 year,	$30
" to extra feed for producing milk,	5
	$35
Cr. by 300 lbs. cheese at $10,	30
Loss,	$5
Cow No. 2—Dr. to support 1 year,	$30
" to extra feed for milk,	10
	$40
Cr. by 600 lbs. cheese at $10,	60
Profit,	$20

These supposed figures are close approximations to actual facts which exist in thousands of dairies. In fact there are few large herds that do not contain cows differing about as much. A dairyman in Herkimer having a dairy of 40 cows, which as a herd was accounted a good one, selected five of his best cows and five of his poorest, and measured their milk through the season. The five best averaged 554 gallons each, and the five poorest 245 each. The milk of the whole herd averaged 11½ cts. per gallon, making the income of each of the better cows $63.71, and of the poorer ones $27.95—a sum less than the cost of keeping, which he estimated at $30.50. This case was not deemed an exceptional one. Its parallel could have been found in almost any dairy of equal size. To avoid similar defects, a wise selection of stock is evidently essential to prosperity, and every one should study how to do it. It is believed that the best and surest way to secure good cows is to raise them from good milking stock. But a large proportion of dairymen, for one reason or another, prefer to fill up vacancies, which are ever occurring, by purchasing.

It requires frequent additions to a dairy to keep its numbers good. The milking period of dairy cows averages only ten years, from which it follows that ten per cent must be renewed annually, and when allowance is also made for losses by accident and disease, and the rejection of such animals as prove inferior, it will require eleven per cent. or more to sustain the yearly diminution. In the aggregate, this makes a large traffic, and it demands a ready appreciation of the merits of the animals with which it is proposed to supply the deficiency.

How much such a knowledge may avail, an instance within our personal knowledge will show. A. L. Fish, of Winfield, N. Y., by a skilful selection of superior milkers, averaged for a series of years over 300 lbs. of cheese to the cow in a season. His cows

averaged, when feed was the best, 32 quarts of milk each per day, and in one season he made over 900 lbs. to the cow.

What is the Best Breed to Select From?

The merits of different breeds have of late been pretty well discussed in the current agricultural periodicals, and it will suffice here to say that there is no single breed which will answer all the requirements of every dairyman, nor one in which the milking qualities are so well established that one can, by resorting to it, rely on getting a desirable animal without being a judge of milking qualities.

The Ayrshires are more uniformly large milkers, probably, than any other breed, but defective specimens occur among them, making selections necessary to ensure excellence. They are a good resort for cheese dairymen.

The Alderneys excel as generally in richness and color as the Ayrshires do in quantity, but they are not infallible, and their yield is too small for cheese-makers. They should form a part at least of every butter dairy.

It would be difficult to find a larger flow than is sometimes obtained from the Short-horns, but as a breed they are unequal. Some strains of the Short horn blood are remarkable for their large flow, fully equalling the Ayrshires, while the animals surpass the Ayrshires in size and hardiness. There are other strains that are inferior. The rich milk of the Devons is also uneven and small at best. The Dutch cow, or Holstein, more recently introduced, promises well both for quantity and quality, but like all the rest, needs to be carefully selected to secure a first-class milker. No larger yield or richer milk is found anywhere than has been obtained from the native cows, but they, like the Short-horns, are uneven. The famous Oaks cow, one of the most extraordinary cows of her time, having made 467½ lbs. of butter in a year, was a native. The cow Kaatskill, that made about as much, and the Vermont cow, that made 504 lbs. of butter in a year, were natives. We have had in our own dairy natives that have made a pound of butter from 12½ lbs. of milk, and on the other hand, some that have required 44 lbs. of milk to one of butter. The extremes in quantity are as great, sometimes running down to an amount more befitting a sheep than a cow. We have, as a rule, found grades to be better milkers than either side of the ancestors from which they have descended.

Where cows are to be raised it is the surest and cheapest way to cross the best cows of the herd with a good bull of the breed best suited to the purposes of the dairy kept. Crosses between thorough-breds are also frequently improvements upon the original stock. The extraordinary dairy of Mr. Fish, mentioned above, was made up of grades and crosses, most of them crosses between Ayrshires and a milking strain of Short-horns.

The large annual demand for dairy cattle must be supplied from any and all sources that are available. There is no single breed sufficiently numerous to furnish the supply, nor would all the thorough-breds together be sufficient. Besides, thorough-breds are usually held at fancy prices which farmers cannot afford to pay for the use of the dairy. The selections must therefore come mostly from the native stock. Culling from different sources, and from animals of such unequal merit calls for the readiest skill in judging of the external signs of milking qualities.

There are certain external indications of the capacity for producing milk which are as apparent from an inspection of the cow as are the signs of strength and speed in the horse. In old dairy districts where the owners are in the habit of filling up their herds annually by purchase, they soon become so expert as seldom to be deceived.

To write out all the marks that are relied upon as showing merit and demerit, would be both tedious and difficult. They are best learned by practice and close observation. But some of the leading points may be stated that will be of some service in determining some of the wider differences.

A great deal has been said and written in regard to the appearance of good milkers, and a multitude of irrevelant and nonsensical signs have been laid before the public which have tended rather to confuse and mislead than to guide and enlighten the inexperienced. A sign which has no connection with the thing it claims to signify is always worse than useless, as it is just as likely to lead wrong as right, and detracts from more intelligent indications. What important connection is there between a large flow of milk and a "Roman nose' or "a hollow head, a long head or a short one; a crumpled horn or a straight one; or one that tapers evenly or unevenly, or a straight leg or a slim tail; or a peculiarly shaped ear or dewlap; or whether the eye-lids are well divided, or much or little wrinkled? Yet these and a score of other signs equally irrelevant are ever and anon circulating through the press to guide, or rather mislead, the inexperienced purchaser.

The reader will see for himself how the following points are connected with milk production, and by attentive observation will soon learn to make them of practical utility.

Milk is a female product, and its production may reasonably be expected to be more or less affected, if the organization varies much from the characteristics peculiar to the sex First of all see that the animal has a feminine appearance—a cowy look. The next thing to be looked after, is the digestive apparatus, particularly the stomach and bowels. A large and strong boiler is not more essential to the power of an engine, than a large and vigorous stomach is to the production of milk. A cow cannot make milk out of nothing. If she gives a large flow, she must eat and digest a large amount of food to make it from, and she must have a stomach equal to the task; one that has capacity to hold and power to digest enough to manufacture the milk out of.

When the digestive organs are relatively larger than the other viscera, they give depth and breadth to the abdomen, and a somewhat wedge-shaped form—the body tapering forward A little inclination to this structure may be seen in figure 1, which illustrates a well formed cow.

The large stomach and bowels here indicated mark a diathesis in which the fluids abound, a condition, as will readily be understood, very essential to a large flow of milk; and the broad hips, and the depth and breadth of the lumbar region, indicate a large development and flow of blood, and vital influence to all the parts surrounding and connected with the milk-producing vessels. Gaunt cows are small milkers. A good constitution is important. This may be judged of by the lustre of the hair and the brilliancy of the eyes and horns. Constitution depends mostly upon the heart and lungs, the size of which may be determined by the depth and breadth of the thorax. They should have a good development, enough to secure health and vigor, but the lungs, in particular, should not be excessively large. When very large they burn up, by increased respiration, the fat-forming material. By the extraordinary energy they create, they induce unusual exercise and motion, which make a rapid waste of tissue and a rapid assimilation to repair it, and thus divert nutriment from producing milk. If too small, the animal may be an excellent milker while she lives, but will be feeble and short-lived.

The capacity of the lungs corresponds with the size of the apertures through which they are filled. Large open nostrils indicate large lungs, and *vice versa*. In the same way the indications of the mouth correspond with the size of the stomach.

The udder should be large and capacious. It need not be fleshy. It should be broad and reach well forward. A large development of the fore part of the bag is a more certain indication of quantity than the back part. The teats should be set wide apart, and be of good size for handling. Teats which are small next to the udder, denote small tubes inside the bag, which of course is unfavorable to quantity.

The flow of blood to and from the udder helps to determine the inclination to secrete milk. The arteries which supply the milk vessels with blood reach the bag inside, and are not seen externally, but having supplied those organs with blood, they pass through the udder, and ramify on the surface above and outside of the bag, turning the hair in the direction in which they run, upwards and outwards, forming the escutcheon of Guenen. See Figure 2.

The size of the escutcheon is regarded as the measure of the quantity of blood supplied to the milk-producing vessels, and are evidence of their capability of elaborating milk. In the same way the veins take up the blood and carry it back in the milk veins, which pass through the bag and along the belly, and enter the body through one or more holes on their way to the heart. The size of these milk veins and the holes where they enter the body vary with the escutcheon, and like it give evidence of the quantity of venous blood passing away from and through the udder, and they have the same significance with reference to quantity, as the supply of arterial blood, and the size of the escutcheon.

But none of these indications taken singly, is an infallible evidence of large yield. They must be considered together A large escutcheon and milk veins coupled with a small stomach, would be marked down at least one-half of what they might otherwise signify. And a large digestive apparatus coupled with small milk veins and escutcheon, should be marked down in the same way. Keeping the leading indications in view, observation will soon enable one to make close estimates.

Richness

Soft fine hair is by many regarded as an evidence of richness, and oftener than otherwise it proves true But some cows that give the very richest milk have hair that is quite coarse and harsh. The appearance of the skin is another guide. A clear white, or pale skin, is an evidence, either that yellow fat is not formed, or if formed, the peculiarities of the animal are such that it is used up in supporting respiration. When it is so abundant as to lodge in the pores of the skin and give it a yellow color, it may be expected to appear also in the milk and give it the same color. High color and richness seldom fail to go together, hence a yellow skin becomes an evidence of rich milk. But it sometimes happens that the skin is of such a hue that the yellow fat does not affect its color. The appearance of the skin then has no significance.

The fat of animals is stored in a net work of cells, called cellular tissue, and an abundance of these cells is coupled with a tendency to form fat wherewith to fill them. When a cow is in milk, the fat formed is carried away in the milk, making it rich. Hence where this tissue abounds, rich milk may be expected. When dry, the cow having it fattens rapidly. The supply of cellular tissue may be known by feeling the skin. When it is plentiful, it forms a sort of cushion under the skin, giving it a soft and mellow feeling. When it is wanting, the skin feels hard, and the hand when resting on the animal, feels very much as if resting on the bare bones.

There are many other points that it might be interesting to notice in this connection, but the length of our article prohibits following them further.

Square Cheeses.

Certain parties in New York, who have manufactured the rectangular cheese for two or three years past, have been eminently successful, and the cheese has sold for a better price than that received for the usual round shape That a radical change in the shape of cheese, from round to square, should meet with opposition and prejudice, was to be expected, but we see no good reason why the square or rectangular shape should not be as well received by consumers as the others. Indeed, in cutting, it has decided advantages, and there is less waste and the pieces are in a more comely shape for the table. Again, in putting up for market, square packages are much less expensive than round, while they take up less space in storing or in being carried to market. Some factories, however, have entered upon the manufacture of square cheeses and have failed; or at least, have had much trouble in pressing, bandaging and in the care of the cheese, and have, therefore, pronounced against it in strong terms.

So far as we can learn, these troubles have come from imperfect molds used in pressing, and from not understanding all the processes and manipulations which belong to the treatment of this kind of cheese. No one should attempt to make square cheese unless fully provided with suitable apparatus and specially instructed in the management of the cheese.—X. A. WILLARD in *Rural New Yorker*.

Butter and Cheese Merchants' Exchange, N. Y.

A Butter and Cheese Merchants' Exchange has been organized at New York. Mr. R. S. Doty was elected temporary Chairman, and H. N. Morgan, Secretary, and a large representation of those interested was present. The objects of the association were explained to be a mutual exchange of business interests, and to afford means for a daily intercourse between those persons interested in the butter and cheese trade.

The Secretary read a statement, showing that there are received annually on the piers of the Hudson over 1,000,000 packages of butter and 1,800,000 packages of cheese. The traffic in butter is nearly double the amount of that in cheese; in this respect butter is one of the leading articles of produce received in this market in quantity and aggregate value, and by far the most important of that class of produce not sold by sample, but by actual inspection. Of the same nature are cheese and provisions mainly, and it is this fact that confines the commerce in these products to any locality most convenient to the general carrying trade It will surprise all on comparing the estimated value of the receipts of this produce market, to find butter the chief, and dairy products, with kindred articles to that commerce, immensely in excess of bread-stuff The estimates are: Butter, above $30,000,000; cheese, over $15,000,000, or nearly $50,000,000 of dairy products; cut meats, $12,000,000; lard, $3,500,000; wheat, $24,000,000; corn, $26,000,000; flour, $20,000,000; petroleum, $10,000,000. The butter and cheese produce merchants receive, in dairy produce, and other smaller produce, it is estimated, $100,000,000; provisions of the same class as respects carrying, distribution, and exchanges are confined to the same channels. Bread-stuffs and other sample produce aggregate $70,000,000.

Value of Old Cows.

Old animals in general are not profitable. We know this is the case of poultry, hens in particular; also with sheep and quite old horses. It is different with old milch cows. A cow at two years, if well treated, will in general do as well the first year as one dropping her first calf at three years, and after that do better. This improvement will continue for several years. A cow, if well kept, will be at her best in her seventh or eighth year. I have noted some variation in different animals, but generally after the eighth year there will be little or no improvement. If the animal has not been well kept, the improvement may continue for several years longer. I have known a change for the better at twelve years where a cow has been taken from bad hands into good treatment.—Good treatment is of the highest importance, including feed and all that relates to the well being of the animal, it may be put before blood or any other condition, as it is indeed this which makes the excellence of a breed. The best qualities in vain are gathered by breeding, if the treatment or condition of the animal is overlooked. Neglect a Short-horn, and it fails at once. So with other breeds particularly with respect to milk. It takes only a few years to bring up a neglected cow so far as the lacteal element is concerned. There are exceptions; some cows are worthless for butter, and some can never be made to yield largely of milk.

Bring in your cow early, at two years. This will get up the early habit for milk, and it will grow as the animal grows, and continue—this is its nature—till the animal is quite old. There will seldom be a falling off before the fifteenth year. If then the food is suited to the age, several years can be added of undiminished yield of milk. Tender grass in summer, and well comminuted and cooked food in winter, will continue the cow almost unimpaired as a milker. But the attention must be given, or the animal will go down at once. No abuse must be permitted by the herd or by the keeper; there must be warm, but well ventilated stables, and kindness towards these old mothers, who will appreciate it and be benefited by it, for the cow is eminently domestic in her nature and habits. Not enough stress is put upon this point. Treat the old cows well, and they will richly repay it. Now is the time more than any other during the spring, when they need it. It is all-important that they go into pasture strong and encouraged. It is more profitable to keep cows as long as they are of benefit, to a quite old age, approaching twenty years, than to dispose of them several years earlier, say four or five, as is usually the case; in the course of a few generations the raising or value of a cow may be saved. Select a good dairy, and then keep it, and keep it good. So long as the cow remains strong and healthy, there will be little or no falling off in the milk, however old she may be.—*Iowa Homestead*.

Breeder and Grazier.

Sheep-Shearing.

Aside from the importance of this event as the wool-growers' harvest, no good shepherd will underestimate it for the opportunity it affords to review his work in the management of the flock. It is the only time in all the year when every animal must come under his hands, or those of his assistants. As the golden fleece rolls off, the skeleton too often, but always the carcass, is laid bare to his view. The slightest appearance of disease or want of condition is observed, and the application of the remedy determined. No other occasion affords so favorable an opportunity to study the form of the carcass or quality of the fleeces or to make note of what it may be necessary to remember at next coupling time; and, as a practical suggestion, it may be stated that uniformity in grade is an element of considerable value in any flock. An even clip, in which every fleece will grade in fineness of fibre and length of staple with every other, is much more easily sold to a manufacturer at full figures, than a mixed lot in which are found several grades and qualities, and breeding notes made at shearing time should keep these facts in view.

It is not the intention to describe the operation of shearing, but there are two or three points which our experience in a wool loft impels us to call attention to as deserving some attention.

1. If there are burs in the wool it will pay to remove them unless the quantity is very great indeed. The average difference in price between burry wool and wool free from burs, other things being equal, is not less than five cents per lb.; if very burry, more; if slightly so, less. In any market not very active, the presence of many burs renders a clip hard to sell at all, and always limits the competition to the comparatively few mills which are provided with burring machines. Combing wool is ruined for that purpose by burs.

2. Heavy tags and dirt balls cannot be sold for wool as formerly they were, except to very green buyers, and these latter have retired from the market of late years too generally to be counted on as customers. When prices went up "sky high" last year a few of these speculating gentlemen made their appearance, but the frosts of the past winter used up the entire fraternity, so that the present season is not likely to find them operating. Hence it will be better not to tie up tags and dung balls with the fleeces this year.

3. Fleeces should not be tied up too compactly. If a box is used, it should be so large as to contain the fleece easily, and the strings should not be drawn too tightly. A hard fleece seems heavy for its size, and if much string is used there is often a suspicion of stuffing.

4. If washed at all, wool should be well washed in clean water. It is very difficult indeed to sell a clip on its merits which is "neither one thing nor the other." The gentlemen who paid washed prices "*for* partly washed or dingy fleeces," were the same who bought tags and dirt for wool, and most of them have turned their attention to more promising fields of operation.

5. On the whole, the present outlook is for a rather close market and discriminating purchases this season, and we think it will pay to send the clip to market in good shape.—*Prairie Farmer.*

In-and-in Breeding.

There is not the slightest foundation for the strong prejudice which exists in the public mind against in-and-in breeding. On the contrary, within certain limits, this plan is highly advantageous. Many of the best horses, as well as the best short-horned cattle, we have ever had, were very much and closely in-bred. To a certain extent this was unavoidable when the studs and herds were first formed; but it makes little difference whether it was the result of necessity or of choice. It has fully established the immense advantages of breeding in-and-in, when the stock is the right sort; indeed, we can see no other possible way of retaining the perfections of any particular strain than that of returning frequently to the same blood. When the out-and-out crossing is strictly pursued, the tenth generation contains only the one-thousand-and-twenty-fourth part of the original stock, which is a mere nominal affair. The practical result may not always correspond precisely with the arithmetical ratio, because the sire may stamp his form so completely on his offspring, that it will not be easily got rid of; but still it will unquestionably run out in the course of time; and the more complete and violent the cross, the sooner will the peculiarities disappear. They can be retained only by frequent returns to the same blood; and by this plan we can reap all the advantages of good stock, without running in-and-in so very constantly and closely as to run any hazard of ever deteriorating the constitution of the animal. We must be careful, however, to observe that the individuals we select to breed from are as near perfection as possible, both in themselves and their ancestors. We shall thus secure the transmission of the good qualities.—*Prairie Farmer.*

Nutritive Value of Feed.

The proportionate values of the following materials used for feeding farm-stock, are gathered from published analyses by the most eminent agricultural chemists, and have been corroborated by the results of the practice of many eminent English feeders. They include the relative flesh-forming, fattening, and total feeding values of the different articles mentioned, and are probably the most trustworthy information that can be gathered from all sources at the present time. They are as follows, equal weights of each being considered.

	Flesh producing.	*Fat producing.*	*Total Value.*
Turnips	1	6	7
Rutabagas	1	7	8
Carrots	1	9	10
Mangels and Kohl Rabi	2	8	12
Straw	1	10	22
Potatoes	3	17	23
Brewer's grains	6½	18	25
Rice Meal	6½	27	33
Locust Beans	7	32	39
Hay (early cut)	8	50	64
Millet (seed)	8	26	35
Buckwheat	9	60	69
Malt	9	26	31
Rye	11	32	39
Oats	12	63	79
Corn	12	68	80
Wheat and Barley	12	67	80
Dried Brewer's grain	16	70	77
Palm-nut meal	16	98	72
Earth-nut cake	20	40	54
Beans (English field)	22	56	71
Peas	22	60	79
Linseed	27	112	32
Cotton-seed cake	34	46½	61
Malt sprouts	26	69	17
Tares (seed)	27½	57	70
Linseed cake	28	58	77
Bran and coarse Millstuff	31	54	70
Rape cake	31	73	78
Decorticated Earth-nut cake	39	45	72
Decorticated Cotton-seed cake	41	57	82

In these estimates the flesh-forming value is in proportion to the nitrogenous elements contained in the food. The fat-formers consist of starch, oil and fat; and as oil and ready-formed fat is estimated as double the value of starch in feeding, the total feeding values of different articles varies in somewhat different ratios to those of the fat-forming elements. For instance, while bran contains more carbonaceous matter, viz.: starch and oil together, than rape-cake, and exactly the same flesh-forming material, yet its total feeding value is less than that of rape-cake, because the 53 parts of starch and oil in the rape-cake have more oil and less starch and oil in the bran, and the oil being, as we have said, more valuable than the starch, therefore the rape cake is worth more than the bran as feed.—*American Agriculturist.*

Meal for Stock.

One of my neighbors, whom I reported in my last as having injured a fine cow by feeding her too much meal, has recently given me a little more of his experience. He had been feeding two cows good hay and dry meal, but they did not do so well as he thought they ought to on that feed. A few days ago he commenced giving the meal wet instead of dry and the quantity of milk was increased almost immediately. One cow is now giving two quarts more of milk a day than she did when fed dry meal and the other has increased nearly as much. I have been experimenting a little with rye bran or "shorts," as the dealers call it. A cow to which I was feeding two quarts of wet meal a day did not give as much milk as I thought she ought to, and, with the hope of increasing the quantity, I commenced sometime ago giving her two quarts of rye feed in addition to and mixed with the two quarts of meal. I do not see as she gives any more milk than she did before I gave her the extra feed. If I had roots I think it would pay to feed them if they did not command an extraordinary price. But I have neither turnips nor beets and do not know where they can be bought.—*Cor. Working Farmer.*

Herefords.

Mr. T. Duckham, publisher of the *Hereford Herd Book* in England, said, in a lecture in 1869:

The Herefords have been severely tried in competition with all other breeds of this kingdom for several generations past, and although in the main they have during that lengthened period been principally in the hands of tenant farmers on this side of the kingdom, by whom they have been regarded as their best rent payers, yet they have maintained a position of which their breeders may well be proud when placed beside animals of other breeds in competition for show-card honors. This was particularly the case during the past month at the great national fat show; and the result of that best of tests, the weighing machine, which was first brought into use at the Agricultural Hall, by the Smithfield club, has set those who claimed earlier maturity and greater weight, to seriously think how they could account for the fact revealed by the scales, viz.: that the average weight of the Hereford steers and oxen exceeds that of any other breed exhibited or shown, by the following statement of average weights of Devons, Short-horns and Herefords:—

Under 2 yrs & 6 Mo.	*Under 3 yrs & 3 Mo.*	*Under 3 yrs & 3 Mo.*
LBS.	LBS.	LBS.
6 Devons.....1294	11 Devons .. 1485	17 Devons 1616
3 Herefords 1791	8 Herefords....1936	9 Herefords . 2224
4 Short-horns.. 1648	12 Short-horns...1976	14 Short-horns.. 2260

In England, from 1800 down to the present time, they have divided the honors with Short-horns, when shown as fat cattle or for breeding purposes.

Strange Cattle Disease.

A correspondent states that at Rockland, in the parish of Kingston, Mr. J. R. Macfarland has lost two fine cows, from a disease like *cerebro-spinal meningitis*. Five others have been attacked, but are recovering. Several of his brother's cows have also suffered. The herd of the late J. S. Wetmore, of Clifton, has also been attacked, and three have died. In the midland section we hear of several deaths among the cows and sheep. In the lower part of the parish of Kingston, several cows have been reported as sick, but particulars have not been received. At Rockland, in the herd of Mr. Macfarland, the cattle were seized suddenly. Thus the first one attacked lay down in the barn-yard and never stood on her feet again, although she lived for several weeks. Before death, the muscles of the neck became rigid and contracted, drawing them backwards or to one side. In one case the jaws were locked. There is also a considerable amount of catarrhal trouble, as cough and discharge of pus from the nostrils. These symptoms, namely, loss of muscular power, the retraction of the head, lock-jaw, the cough and discharge from the nostrils, correspond to the symptoms of this disease, when members of the human family have been attacked. After death the cavity of the skull was found partly filled with pus.—*St. John's N. B. Telegraph.*

Feeding Roots.

Mr. E. R. Towle has recently visited the farm of N. S. Whitney, on the Canada side of the line, near East Franklin, Vt., and gives, in the *Vermont Farmer*, the following account of the manner of feeding roots adopted by Mr. Whitney:—He cuts his hay, straw, etc., with horse power, and pulps his turnips on a machine that will tear them into minute fragments as fast as a man can throw them into the hopper. A sufficient quantity of this material is prepared for three days, thoroughly mixed, no water being used, and allowed to stand three days before feeding, when it becomes warm and a slight fermentation ensues. Two bins are necessary, one to feed them while the other is "warming up." Meal can be added to the mixture if desirable. The stock eat this with avidity and thrive remarkably well upon it. Where roots are raised to a considerable extent, and the arrangements are such that this mode of feeding can be practised, it must possess advantages apparent to every farmer over the common mode practised of feeding hay, straw and roots separate.

The Crazy Disease of Horses.

In this section of the county it is admitted that the disease is brought on by horses eating rattle weed, hence, a horse affected is called rattleweeded. Some horses affected partially recover, but never fully; others wander off and eventually die. In some cases the horse recovers sufficiently to perform his usual labor; others becoming insane to such an extent as to be unfit for service, but still live and thrive for a number of years. People generally let the disease run its own course; but my remedy

was to pour cold water on the head, taking good care of the horse, feeding scalded barley with chopped hay and bran all wet up together with plenty of salt, keeping the bowels loose with castor oil, and giving occasionally a slice of fat pork. The result was, I cured my horse of rattleweed, and he got as sensible as ever, and became hearty and in a thriving condition, and to all appearance was well; but in a short time he took the lung fever and died in spite of all I could do, the disease culminating in hemorrhage of the lungs. The remedy is worthy of a trial.—*Rural Press.*

Indigestion in Calves.

Calves when carelessly fed or managed are very subject to indigestion. They become dull and pot bellied, and thriftless in appearance, their appetite capricious, their bowels irregular, and their fæces pale-colored, sour, and badly smelling. When such cases are neglected, troublesome diarrhœa is apt to follow. The ailment usually depends upon the accumulation of sour curdled milk in the fourth stomach, which is the only one used while the young animal is fed on milk and does not ruminate. Laxative medicine must therefore at once be given. For a three months' old calf, the dose may consist of two ounces of castor or of linseed oil, to which may be added half an ounce each of carbonate of soda and ginger. If the animal is weakly and scouring, ten or fifteen drops of laudanum may be added. For a few days until indeed recovery is established, an ounce each of common salt, carbonate of soda, and ginger may be given night and morning in a little milk; or where the calf is flatulent, dull and weak, an ounce of salt and half an ounce each of carbonate and sulphite of soda may be administered twice daily. The diet, as in all such cases, must be carefully attended to. If unweaned, the calf should have its milk fresh and sound, and thrice daily. A daily allowance of linseed gruel or bruised linseed cake will further be serviceable; comfortable shelter, a dry bed, and plenty of room are also essential. When protracted indigestion appears to result from weakness, and the mucous membrane has become irritable and relaxed, advantage frequently follows the use of eight or ten drops each of muriatic acid and creosote, given night and morning in a few ounces of water.—*North British Agriculturist.*

Grooming a Horse.

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

Whoa!

In breaking a colt, it is necessary to teach him to stop at the word *whoa*. Not only should one and the same word be used, but one and the same tone. The colt that has been broken to stop at the firm, low tone of command, is not likely to stop at the word uttered in a high key.

When a man halloos "who-o-o-oo-o" in a wild tone of affright that would make the hair rise on the head of a marble statue, and that sends the women of the neighborhood to their doors shrieking "what's the matter?" a colt is very apt to feel nervous.

When a man snarls "whoa-sir-r-r-r-sir," through his teeth, as if he would say, "stand still, you brute, or I'll tear your heart out!" the cry counteracts, not only the effects of early training, but of those powerful opiates, old age and starvation, and even the poorest old crow-bait, is ready to repeat the runaway scrapes of his early youth. The imploring tone "who-oh, who-oh, ending with a note of despair. "Do stand still. I know you won't. Oh, I shall be killed!" might as well be addressed to a railroad corporation as a horse. The loving tone "who-ee, who-ee, sweet 'ittle bonny horsee; doee stand still, that's a darling," is wasted, unless one has oats, salt or sugar, which are never at hand in a pinch, when wanted. The shrill feminine cry, "whaw, whaw," like the squawk of a hen caught by the leg, invariably screamed by the inexperienced female, when a a driving-rein or hold-back breaks, is alarming in the extreme to a high-tempered animal.

A tone of fear or rage imparts fear to the horse. To govern one well a man must have mastery over himself. No matter what the emergency, nor how much there is to excite fear or anger, the tone employed must be that of one fully master of the situation, not only free from passion himself, but at liberty to soothe the fears of his trembling dependant. The tone, in short, must be that of a king, firm, as of one who does not contemplate disobedience—gentle, but conveying a sense of absolute power.—*Iowa Homestead.*

Veterinary Department.

Navicular Diseases.

This is a very common disease of the horse's foot, involving the navicular bone, its *synovial capsule*, and tendon in immediate connection with it. On this continent it is generally designated the coffin joint lameness, and from the situation and importance of the parts affected it very often proves an inveterate and troublesome disorder. During the progress of the disease, various changes occur in the parts mentioned, and when inflammation is set up from whatever cause, it may end in partial destruction of the tissues and therefore the navicular bone often becomes ulcerated, the synovial membrane destroyed and the tendinous fibres severely diseased and these changes gradually interfere with the proper nutrition of the various structures which leads to a general atrophy and contraction of the foot.

Many years ago contraction of the foot was thought to be the common cause of chronic lameness, and the treatment was generally directed to the removal of the contraction; but even when to external appearances, all signs of contraction had disappeared, the lameness still remained. Again, in many cases the foot appeared contracted, and in numerous instances the contraction was so great as to bear scarcely any resemblance to the circle of the natural form of the foot, and yet horses so affected would go perfectly sound. It was also found that in other cases the foot was not contracted in the least, but square and open at the heels, and yet the animal was a confirmed cripple from navicular disease. Such circumstances, as a matter of course, led to a more thorough investigation of the horse's foot in a diseased state, when the true seat of the inveterate lameness was discovered.

The causes of this disease are somewhat varied, hard and fast work being the usual exciting cause, but in many animals there exists a certain hereditary or predisposing tendency to contract the disease, in so far as there are certain conformations especially subject to it. This is often well marked in horses with narrow chests, and stubby upright pasterns, and from their imperfect action, concussion is set up within the bone and burser, aggravated of course by the continual battering to which horses' feet are subjected upon hard macadamised roads and streets. It may also be the result of a severe injury to the foot, as a puncture from a nail, &c., and it may proceed from a sprain or rupture of the fibres of the *tendo perforans* as it passes over the bone, and, therefore, it may occur suddenly. A horse may make a stumble or a bound, and immediately afterwards go lame, which in all probability is due to a rupture of the fibres of the tendon within the foot, as upon making an examination the leg appears perfectly sound, no heat nor swelling being visible. We have occasionally met with cases where the horse became suddenly lame, and to such a degree that he was scarcely able to move, the severe pain being due to injury of the parts mentioned.

The first noticeable symptom is tenderness or lameness to a greater or less degree, which may either come on suddenly and be very severe, or appear gradually, and be very slight. Occasionally this lameness is somewhat transient for a time, but it cannot fail to become constant and severe if the animal is kept constantly at work, and as the disease advances, the symptoms are very well marked indeed. The horse when standing favers or points the affected foot, and if he is affected in both feet, he keeps continually shifting and pointing his feet, first the one then the other, and rarely stands even for a few minutes firmly upon his fore feet. This position, in cases of long standing, causes a wasting of the muscles of the breast and limb, and the animal is frequently, though erroneously, supposed to be chest foundered. When brought out of the stable in the morning, or after standing a few hours, he walks with a tender tripping action which disappears to a great extent when he is excited or warmed up to his work; therefore, in some instances where the disease is suspected, it is necessary to allow the horse to stand quietly for an hour or two before giving a decided opinion on the case. A prominent symptom is generally atrophy or wasting of the foot, which is very plainly noticed, when the disease is confined to one foot, by standing in front of the horse—the difference in the appearance of the sound and healthy foot is very evident.

In many cases, the heels are somewhat contracted and the frog small and shrivelled, the inside quarter of the wall is straighter than natural, and very often the horn of the sole is increased in quantity. The general temperature of the foot is slightly increased, which may be easily detected by the hands applied to the heels, and pressure upon the tendon behind the frog causes the patient to evince pain. In cases of long standing, all the muscles of the limb and shoulder are affected, and this condition of the muscles of the shoulder is often mistaken for the cause of the horse's lameness instead of the effect. A horse may be slightly lame for years from Navicular Disease without being entirely incapacitated for slow and moderate work.

Shoeing is said by some writers to be a great cause of this trouble but our experience does not agree with this view, for the disease has been known to exist in horses that had never been shod.

The cure of this disease is more easily spoken of than performed, for though we may apply measures that tend to abrogate the symptoms for a time, the disease often remains. However, there are cases in which when remedial measures are used in due time, a perfect cure may be effected. In all cases, it is necessary to give the patient perfect rest. Remove the shoe for a time, shorten the toe, and thin the sole moderately; then poultice the foot, or stand the the patient for several hours daily with his fore feet in a cold water bath. This mode of treatment has an excellent effect during the hot months of summer. After a time a cantharidim blister may be applied around the coronet, or a seton inserted through the frog; and when the animal is in a gross condition, the local] treatment is greatly benefited by giving a good dose of purgative medicine. The after treatment consists in careful shoeing; and at certain seasons, if the horn is used much upon hard roads, it is found beneficial to use a leather sole with a stuffing of tar and tow. A run at pasture on moist lands is also useful. In horses that are exceedingly lame, and when the disease is of long standing, it may be deemed advisable to perform the operation of neurotomy, or the excision of a portion of the nerves going to the foot, with the view of removing pain by the destruction of feeling, and many a poor suffering animal may be made serviceable for ordinary work by the successful performance of this operation.

The operation of neurotomy or tennerving for the relief of foot lameness was first performed by eminent veterinary surgeons of London, upwards of fifty years ago, and since that time it has been practiced with varying degrees of success. It is an operation which should be resorted to only when an animal is deemed incurably lame, and when the disease has existed for a lengthened period.

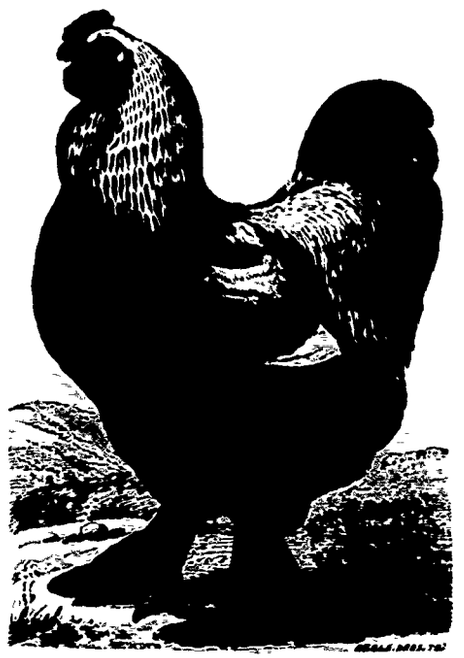
The operation of neurotomy, although greatly to be recommended in some cases of coffin joint lameness is sometimes very much abused, as horses are frequently operated on which are not at all fit subjects. The foot most suitable for the operation is a strong, deep foot.

Poultry Yard.

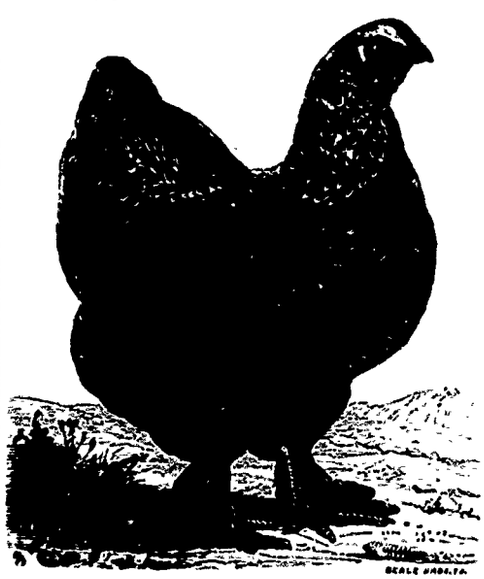
Dark Brahmas.

In breeding Dark Brahmas, the constant tendency to breed lighter must be especially allowed for; and, therefore to maintain the character of any strain, it is very necessary, to provide depth of color on one side or the other; in fact, either the cock or the hens should, if possible, be a shade darker than the color desired. In the selection of hens or pullets, the fancier should consider what color and character of pencilling he prefers out of all those to be seen either at exhibitions or in the breeding yard, and then procure birds as near to it as possible. If they be a shade darker than the fancied color, it will be all the better, provided the character of the pencilling is the same. It is necessary however to distinguish between pullets and hens, in the case of silver grey birds especially, which as hens often look so brown and dingy, that it seems almost impossible to believe that they were ever of that exquisite color, so admired by many in the young pullets. Such brown birds will often breed good stock, nevertheless as the dingy color is the great draw back and blemish of the silver grey school, if hens can be obtained free from it so much the better. In any case the birds should be well pencilled over the breast, or it will be long and tedious work getting exhibition pullets from such stock. In Brahma pullets, the great point as regards color and marking is, that whatever the color be, it should be uniform over the body, not patches of the clear grey in one place and brown in another, and that the breast up to the throat be closely pencilled, so as to be as nearly dark as the sides or back, and whatever the color be, the neck hackle should be silvery-white, heavily striped with rich black, and the shank feathers be pencilled the same as the body. We will now consider the specific markings of the cock and hen.

The head and neck of a Dark Brahma cock are very similar to the Light, the head being white and the hackle striped, but somewhat more so than in the Light breed. The back is nearly white, a little black appearing here and there while between the shoulders the black ought to predominate, but is nearly hidden by the hackle flowing over it. The saddle feathers are like the hackle, silvery white, striped with black. Many breeders prefer only a little stripe in the hackle and saddle feathers, and such are the most showy birds for exhibition, while they will often breed good pullets if other points are correct; but on the whole a good distinct dark stripe in every feather is preferable. As the feathers approach the tail, the stripe get broader, till they merge into the tail-coverts, which are rich glossy green-black, with a margin or fring of white. The effect of this is very beautiful, while a mossy appearance of the coverts is not only unpleasant to the eye, but is inferior for breeding pullets. The tail itself is pure rich black with a green gloss, any white being a great blemish. This fault is hereditary in some otherwise good strains, and is, it is believed, often caused by a remote cross with the Dorking. The objection to white in the tail does not, however, apply to a silver margin or edge to the top sickles, which we have already described as proper to the cock in the Light breed, and is frequently found also in the best specimens of the Dark. When perfect this is a very great beauty, and very frequently accompanied by a fair black cock type of tail, sometimes, instead of a green lustre to the black of the cock's wings and tail, the feathers show purple reflections. As a rule such birds breed beautiful dark pullets, and the purple shade is not to be considered a fault. The wing-coverts are black, forming a distinct black bar across the middle of the wing, while the ends of the secondaries, or the feathers which appear when the wing is closed, have a large black spot on the end, making the top edge of the wing also appear black. The remainder of the secondaries are white on the lower half and black on the upper, but the black of course is not seen. The flights are all black except a narrow fringe of white



on the lower edge. There is often a little brown or bronze towards the top of the "bar," and at the end of the secondaries. There is often also a portion of brown on the shoulders and back, in such positions the color should be condemned being both unsightly and objectionable for breeding. The breast may be either black, or black very slightly and evenly mottled with white; the thighs and fluff either black or very slightly ticked or laced, with white. The shank feathering should correspond with the breast, being black if the latter is, and slightly mottled with white if not. The proper color for the shanks is deep yellow, inclined to orange; but this can rarely be obtained except on a grass run; and many Brahmas being reared in confinement, if the leg be moderately yellow it is sufficient.



The color of the hen somewhat varies according to the taste of each individual fancier; one, and a very successful exhibitor too, describes it as a "dingy white ground, very much and closely pencilled with dark steel grey." The effect of this is very beautiful, giving the appearance of a frosted or silver grey; but there should be no appearance of pure white in the plumage except in the margins of the neck hackles. Pullets of this color are in perfection at about six to eight months old, but next season often acquire a very dingy tone, much disliked. The hens are also of a dingy color except for a month or two after moulting. A more serious fault is that this color is very apt to breed pullets with necks almost white for some distance down; and even below that very thin and uncertain in color. These light-necked birds generally breed worse and worse, but the evil can easily be checked by choosing birds for breeding whose heads are distinctly marked. Another extensive breeder preferred a decided brown color for the hens, a tint which breeds true with much less trouble than the clear. This tint although occasionally shown at English exhibitions is considered by most fanciers as much inferior in beauty to the clear color, and has nearly gone quite out of fashion, and it has lately become an accepted axiom that a clear ground-color, is the proper one for a Brahma. Still another color, and one that is generally much admired when seen in perfection is as follows: The ground color is itself a still grey, and the pencilling or markings a rich black, so intense as to show green reflections like the tails of the cocks. Sometimes there is a slight cast of chestnut in the ground, but the intense color of the pencilling prevents this from looking the least dingy, even when the birds moult out as hens. The ground then often shows the chestnut tone, with a slight purple cast, but the birds look wonderfully rich even then. Other shades of marking also occur; and on the whole perhaps the most preferable is a variety of the first, a silver grey color, in which the grey of the ground is of a perceptible blush cast, and the pencilling itself so dark as to be nearly black. This color which may be denominated the blue grey, usually moults out tolerably clear, the bright blue only giving place to a slightly duller slaty cast, which makes the hens of this color show better than any, unless the very dark pencilling may be an exception. The shape and character of the marking in Dark Brahma pullets also varies. In some birds the pattern is very thick and large, in others so small as to be barely distinguishable; of the two, a medium size is preferable, so that the pencilling can be clearly discernable at a short distance, say twelve feet. The shape of marking, likewise, is found to differ, sometimes being nearly straight across the feather, as in pencilled Hamburghs, and in other cases being curved like a series of lacings. In this, also, a medium character looks best. Amongst our American fanciers there are a few who seem to greatly admire a feather for Dark Brahma pullets, which besides the regular pencilling, has a defined edge of dull white, considerably lighter than the rest of the ground color, as already stated, whatever the color be, it should be uniform over the body, and not in patches of different color in different places. Hens or pullets with very large coarse heads of a "sour" expression should in nearly every case be refused for breeding stock. In breeding silver-grey or blue-grey pullets, the cock ought if possible, to be entirely free from brown, even in the wing bar. Purple reflections in the tail are also improper, the right color being a very bright greenish black, while the bar on the wing should appear positively green. The more black there is towards the front part of the back the better, and the hackle and saddle feathers ought to be solidly and very distinctly striped. Supposing the bird perfect in these respects, almost all will depend on the color of the under parts on the breast, thighs, and fluff being pure black. It is a singular fact that by continually selecting cocks with wings, perfectly clear from brown, a tendency was for a long time always developed to increase the brown, thus producing the very thing so carefully shunned.

PERIODS OF INCUBATION.—Hens sit 21 days, turkeys 26, geese 29, pea fowls 28, guinea hens 25, pigeons 18, and swans 40 to 60.

Fattening Fowls.

The French method of fattening fowls by cramming is to provide sparred coops in which each fowl has its own compartment. The coop is a long narrow box in white wood, set on legs one foot and a half high; the outer walls and partitions are close boarded, and the bottom only is made with rounded spars one inch and a half in diameter, running lengthways of the coop, on which the fowls perch, their dung falling between the bars. The top consists of a sliding door, nearly as wide as the compartment, by which the chickens are taken in and out. The partitions are eight inches apart, so that the fowl cannot turn itself round. The length of each box may be regulated by circumstances, care being taken that the attendant has room to pass along and to sit down; and furthermore, that cocks, capons, and pullets, or the lean and the fat lots, be not mixed up indiscriminately. If fowls of different sexes are in close proximity, though nothing beyond vocal relations be established between them, the fattening process will be delayed, or again, fowls of different degrees of fatness should not inhabit the same box, because their rations will differ, and the new comers will disturb the old settlers by their noise. Young cocks will fatten, though not so readily as capons; their flesh is somewhat inferior in delicacy to that of capons, and yet more so to that of pullets. The floor below the boxes is covered with ashes or dry earth to catch the droppings, which are removed every two days with a scraper. The dung is equal in value to guano, and should be preserved from waste and moisture in old casks. The best food for fattening fowls is buckwheat meal "bolted" quite fine. This is kneaded up with sweet milk till it gets the consistency of bakers' dough; it is then cut up into rations about the size of two eggs, which are made up into "rolls" about the thickness of a woman's finger, but varying with the sizes of the fowls; these are subdivided by a sloping cut into "patons" (pellets) two and a half inches long. A board is used for mixing the flour with the milk, which in winter should be lukewarm. It is poured into a hole made in the heap of flour, and mixed up little by little with a wooden spoon so long as it is taken up; the dough is then kneaded by the hands till it no longer adheres to them. Some say that barley or even oatmeal is a good substitute for buckwheat meal, but I take leave to differ entirely from that opinion. Indian corn, the white variety, may do, but it makes "short paste, unless mixed with buckwheat, when it answers well and is cheap enough. The food is thus administered: The attendant puts on an apron which will stand being soiled or torn, and takes the pellets on a board with a bowl of clear water. She takes the first fowl from its cage gently and carefully, not by the wings or the legs, but by both hands under the breast. She then seats herself with the fowl upon her knees, putting its rump under her left arm, by which she supports it, the left hand then opens its mouth, (a little practice make this very easy) and the right hand takes up a pellet, soaks well in the water (this is essential), shakes it on its way to the open mouth, puts it straight down, and carefully trams it with the forefinger well into the gullet. When it is so far settled down that the fowl cannot eject it, she presses it down gently with thumb and forefinger into the crop, taking care not to fracture the pellet, for if some scraps of it remained in the gullet they might cause inflammation. Other pellets follow the first, till the feeding is finished in less time than one would imagine. It sometimes happens, particularly in the early stage of fatting, that the tracheal artery is compressed together with the pellet; this makes the creature cough, but is not of any serious consequence, and with a little experience this mishap is easily avoided. The fowl when fed is again held with both hands under its breast, and replaced in its cage without fluttering it, and so on with each fowl. The chicken should have two meals in twenty-four hours, twelve hours apart, provided with the utmost punctuality; if it has to wait, it becomes uneasy, if fed too soon it has an indigestion, and in either cases, loses weight. On the first day of cramming only two or three pellets are given at each meal, the allowance is daily increased by one at a time till it reaches twelve to fifteen pellets. The stomach may be filled, but at each meal you must make sure that the last is duly digested, which is easily ascertained by gently handling the crop. If there be any dough in it, digestion has not gone on properly; the fowl must miss a meal, and have rather a smaller allowance next time, if too much food be forced upon the animal at first it will get out of health and have to be set at liberty. The fatting process ought to be complete in two or three weeks, but for extra fat poultry twenty five or twenty-six days are required; with good management you may go on for thirty days, after which the creature becomes choked with accumulated fat, wastes away and dies.

When a fowl is to be killed, it should first be fasted for twelve or fifteen hours, and then held carefully (not hung up by the heels, which would suffocate it), the mouth opened and either the under side of the tongue cut with sharp scissors, or the pointed blade of a knife thrust into the palate till it pierces the brain; or thirdly, a few feathers may be plucked from the left side of the head near the ear, and a good incision made at the spot. In any case it must be fastened up by the heels immediately afterwards, that it may bleed freely, for on this the whiteness of the flesh depends, but during the death struggle let it be held by the head. The chicken is then bandaged till cold to mould its form; and if the weather is warm it is plunged for a moment into very cold water. The fat of fowls so managed is of a delicate white color; their flesh is as it were seen transparent beneath a delicate skin. An average fowl takes about one and one-tenth of a peck of buckwheat to fatten it.

The King of Oude's Flying Pigeons.

A correspondent in the *Journal of Horticulture*, writes: "It will be known to most of your readers, that after the Indian Mutiny of 1857, the King of Oude was removed by the Government to Calcutta, where he still remains a state prisoner. He is allowed a liberal pension which he spends on a well kept menagerie and a host of human parasites from his former dominions. In one part of the grounds is a small mosque-shaped building, surmounted by a gilded dome, the apartments of which are floored with marble in inlaid designs, and hung round with pretty cages containing beautiful colored birds. In the centre room of the building the floor was hollowed out to contain water, in which there were a small number of small gold, silver and other fish, all so tame as to eat from the hand. In front of the building is an oblong marble tank, measuring, as far as I can remember, about forty by a hundred feet, containing a great assortment of aquatic birds, many of them of great rarity, and brought from great distances. Not far from the tank is a place devoted to the larger feline animals—a lion, tigers, leopards (spotted and black), hyenas, &c. I noticed three jackals, one of the usual color, a second pure white with red eyes, and a third a melanoid jet black. For any freak of nature of this kind the king will pay a good price. A cat fancier would have been delighted with the assortment of Persian and Affghan cats. The usual color of those brought down by the Cabul fruit-sellers, every cold weather, is pure white, but I saw pure black and tortoiseshell, one of great size and length of hair. Among the parrots, of which there is a splendid collection, especially of Australian, Bornean, and Sumatrian kinds. I saw two Albinos of the common ring-necked Bengal Parroquet. They were of the most lovely canary yellow, with red eyes.

I must now come to the pigeons. His Majesty's fancy pigeons are kept in some of his best houses, the lofty verandahs of which are enclosed by wire netting. They were not on view, so I cannot describe them. He has recently acquired a good many European varieties, and his taste for them lies chiefly in Punts and Jacobins, both kinds being entirely different from anything to be found in India. He had some very fair Jacobins, which were shown in cages on tables laid along some of the garden walks. They came from France; and besides having birds of the colors and markings known here, I saw very good Blue and Black self-colored ones. Bald-pated ones with feathered legs, and one pair of Reds with feathered legs and a Trumpeters moustache of rose above the beak. This pair was very good in hood and chain. I must now come to the flyers, of which, I dare say, the king has four of the largest trained flocks in the world. Each flock contains about a thousand birds, and is kept in a separate house, at a distance of 200 to 300 yards from each other. I have no doubt these birds, which I shall endeavor to describe, have been bred for generations for flying. The first thing which strikes a fancier about them is the wonderful hardness and close lying appearance of their feathers, and the bold upstanding look of the birds. In this respect there is a great deal of the character of the highly-bred carrier about them; but they differ in the head and beak, which is something like that of an Archangel, being long and thin. And with reference to the Archangel, as I have seen it stated somewhere, that it originated in Germany, where it is still called the Bullfinch, I may correct this opinion by saying that it is well known in India, having been bred there for generations, and I believe many more of the German toys originated in the same country, where a great many wonderfully feathered birds are bred. But to return to the flyer. In color it is invariably pied, and almost always the head and neck as far down as a Nun are colored, the other pieces of color being dispersed without regularity over the body. The color is never in mottles, but in splashes, and the eye is orange. Of these birds, the king has, as I said, four great flights, one each of Blue, Black, Red and Yellow Pieds. For beauty of color—a deep metallic shining black, clear blue, rich mahogany red, and bright yellow—they are worth going far to see. Attached to each flight there is a keeper, whose duty it is to feed and fly them; and for the latter purpose he keeps beside him a jar of some small seeds, of which the birds are extremely fond, and a long bamboo with a small red flag attached to it. Throwing a small quantity of the seed on the ground, and at the same time uttering a peculiar call, the keeper of the flight, I watched, brought his birds out of the house in a heap, and in a few seconds the seed was gone, when he began to drive them on a large wooden rack, shaped like a green-house rack for flower pots standing on, which stood near the house. They evidently understood him, for in a short time they all rose from the ground and settled the rack, which, though by no means small, was so crowded with birds, that there seemed no room for one more. All of a sudden, placing his first and second fingers in his mouth, the keeper gave a shrill whistle, and at the same time waving his flag, the great flight rose in the air. They neither flew very high, nor very far away, but they kept together in a compact mass with scarcely a straggler, so that each time they passed over the house they cast a great shadow on the ground, and the noise of their many wings was like music to my pigeon-fancier's ears. At the time I saw them flying, the other three flocks were going through the same performance, to the amusement, I dare say, of some of the other visitors, and more than once the flock I was watching mingled with another in their flight, and separated again, They were evidently lazy, being well fed and ready to come down when wanted; but the keeper had them well under command, and by the motions of his flag kept them going as long as he liked. At length I asked him to bring them down, which he did by lowering his flag and throwing a small quantity of the small seed on the ground, uttering his peculiar call as he did so. They seemed to stop instantaneously in their flight, and with a rush "like doves to their windows," the whole mass settled at my feet, moving the air with the fluttering of their many wings. As soon as they were on the ground, I noticed the man dart at and soon catch up one, which he shook and tossed up. It was a Yellow one which had got into the Blue flock as they mingled in their flight, and I dare say, a young one not yet educated."

Black Russian Fowls.

This rare breed has a rather obscure history. Their first introduction into America seems to have been at two periods, that of earliest date being into New Orleans, whence they spread northward as far as Iowa, and the latter importation being into Connecticut about 1850, by Capt. Kellogg, of Mystic. Lately another lot has been imported into Ledyard. Mr. Kellogg's importation is still represented by a few individuals in the vicinity of Mystic; and Mr. W. H. Brackett of Boston, showed specimens from the same at the Massachusetts Poultry Assoc ation Fair last February, and took a prize.

They are black, with a vivid glossy green, although the cocks were originally red on the neck-hackle, but this appears to have been bred out. The bottom of the feet is yellow, and sometimes the dark legs are nearly of the same color. They have rose combs, less acceptably single, and both sexes are heavily muffled. The flesh is yellow. They are round and compact in form, and not badly shaped, Cocks will, late in the fall, reach seven pounds; ten pounds has been reported; pullets about five. They appear to have useful economical qualities, prodigious reports having been made of their laying qualities, cases being reported where 200 eggs per year were produced. Probably such a high rate, if correct, was the result of recent importation, which seems to often act as a stimulus.

The egg is rather small. Their flesh is excellent. They make good sitters and mothers, and the chickens are hardy, and mature early.

It is reported that a cross between a cock of this species and a light Brahama hen produced pullets laying at four and a half months of age.

There can be no doubt that this race will prove to be a very valuable addition to existing ones, especially if other importations are made to infuse fresh blood.—*Poultry World.*

Estimating Net Weights.

It is a very difficult thing to ascertain with any degree of certainty, the probable net dressed weight of an animal when alive, the gross weight of which can be found on the scales. So much depends upon the breed, size and degree of fatness, in other words, the thickness of the flesh upon the frame. In cattle and sheep the usual allowance for shrinkage is one-third, which is generally pretty fair to the seller when the animal is only medium to small in size, and is but in fair condition. A cow or ox well fatted, weighing 1,200 lbs. alive, will give close to 800 pounds of dressed beef when slaughtered. But one in the same condition weighing 2,000 pounds will give a larger proportion of dressed meat. A sheep of 100 pounds live weight rarely gives more than 60 lbs. dressed mutton, while one of 200 lbs. live weight will often dress 140 pounds or more On hogs the shrinkage is much less, usually in well-bred, well-fatted animals over 200 lbs. gross, not exceeding one-seventh. The following rule for estimating the dressed weight of live hogs we find in a late number of the *National Live Stock Journal:* "From the first 100 lbs. deduct 25 lbs. from gross; from the second 100 lbs. deduct 12½ lbs.; from the third 100 lbs. deduct 6¼ lbs.; all over the third 100 is net Thus a hog of 300 lbs. live weight will give 256¼ net weight, and as a general rule 43¾ lbs. only should be allowed for shrinkage on every hog of 300 lbs. or over. A hog of 100 lbs. will net 75 lbs., one of 150 lbs. 118¾; one of 200 lbs., 162½; one of 250 lbs., 209¼." This, of course, is only as close an approximation as can be given for the general average of hogs as brought to market. If they are thin there is more shrinkage: if large and well-fatted, and especially if pure bred, they will often shrink even less. We have known instances where the shrinkage amounted to only one-sixteenth of the live weigh.

LAZY FARMERS.—Laziness prevents a man from getting off his horse to put up the first rail that gets knocked off the fence and through this lazy neglect a whole field of corn is seriously damaged.

Laziness keeps a man from driving one nail when one would do, and finally costs a carpenter's bill for extensive repairs.

Laziness allows a gate to get off the hinges and lie in the mud, or stand propped by rails—or a stable or barn to leak and damage hundreds of dollars worth of provender.

Laziness, in short, is the right and proper name for nine-tenths of the excuses given for bad farming. But by the most prolific of the many wastes that are due to laziness is the waste of ignorance. But this waste is in itself so great, and has so many ramifications, that we shall have to defer its discussion for another time.—*Dixie (Tenn.) Farmer.*

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