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THE JOURNAL OF AGRICULTURE AND HORTICULTURE

VOL. 2. No. 21 — This Journal replaces the former "Journal of Agriculture," and is delivered free to all members of Farmers' Clubs. — MAY 1st, 1899

- THE -

Journal of Agriculture and Horticulture

THE JOURNAL OF AGRICULTURE AND HORTICULTURE is the official organ of the Council of Agriculture of the Province of Quebec. It is issued Bi-monthly and is designed to include not only in name, but in fact, anything concerned with Agriculture and Stock-Raising, Horticulture &c. All matters relating to the reading columns of the Journal must be addressed to Arthur R. Jenner Fust, Editor of the JOURNAL OF AGRICULTURE AND HORTICULTURE, 4 Lincoln Avenue, Montreal. For RATES of advertisements, etc., address the Publishers

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Notes by the Way.

Weeds.—Newly cleared land, after what the French-Canadians call *les abattis*, has no weeds to speak of. And, why not? Because, we suppose, there are no weed-seeds to start into life. Whence come, then, the innumerable weeds that we see on the same land a few years after clearing? Birds, of course, bring some; others the winds deposit; and the first ploughing doubtless brings up many seeds that had previously lain inert for want of the vivifying power of the air. Still, if land was originally clean, nothing but the neglect of fallowing or growing hoed-crops, at frequently recurring periods, can account for the terrible state of foulness in which we find so many farms in this province. Ah! yes, by the bye; there is another powerful cause for the foulness of our fields: the neglect of turning over our mixens to heat and thereby destroy the germinating force of the weed-seeds. Who ever thinks of turning up his dung to heat? One farmer in ten? No, not one in twenty!

A very marked proof of the injury done to land by the neglect of this simple process we observed, some years ago, on a farm not very far from Sorel. A small strip of land had been manured in two divisions: one division was treated with dung from the horse-stable, in which hay had been largely consumed; the other, with manure from the cow-house, in which only straw had been used as "roughage." When the crop (potatoes) was well up, the latter was comparatively free from weeds; the former; though thoroughly worked with horse and hand-hoe all through the summer; the moment the potatoes were dug and the wet weather came on, threw up a splendid crop of wild timothy (*mil sauvage*) and other

grasses—*mallows* by the thousand—all of which it is fair to suppose, were derived from seed grown in the hay-crop that was used in the horse-stables, and thence transported in the dung to the field in the full force of their reproductive power.

Had the dung that contained these seeds been turned over and allowed to ferment for a few days, a pretty long experience leads us to conclude that a great proportion of them would have been deprived of their germinative power; indeed, Professor Shutt admits as much in his pamphlet that we had the honour of reviewing in our last number.

Salads.—Although dwellers in cities like Montreal can luxuriate among salad-herbs pretty nearly all the year round; dwellers in the country, who like to go to the expense of making hotbeds, have to wait till the end of spring before they can raise any salading worth eating, and even then the common cabbage lettuce, almost the only kind one meets with away from towns, unless grown with great care on very rich soil, plentifully watered in droughts, and well thinned out, is too often thin and tough in the leaf.

We remember very well how astonished the late Mr. Ed. Barnard was when, in 1884, he paid us a visit at Sorel, at the appearance and flavour of a salad made of nothing but cos-lettuce. (Romaine) It was unknown country to him.

No one who knows what *cos*-lettuce really is, would ever grow the other kinds except for kitchen use. It is said to be very wholesome; and it may be, but it is emphatically the best salad plant we have, and so delicate is its flavour that it bears no admixture with any other herb; the man that would add onions to it would, like Menalcas' horror, "E'en harness wolves, and milk the rough he-goat."

To get cos-lettuce in perfection, where no hotbed subsists, the seed should be sown as early as possible, and the plants, after singling, should stand about 15x12 inches apart.

The land should be deeply dug, and manured with good rotten manure. Sulphate of ammonia may be added, and raked in at the rate of about 2 lbs. to the square rod.

When the plants are well grown, they *must* be tied-up to blanch, for, in this country, we have never met with a real self-blanching cos-lettuce, such as Sutton's "self-blanching." Tie-up with bass or other material, beginning the circumvolutions loosely from the bottom of the plant, tightening in towards the top. Ten days after this operation, you will have a mass of tender, delicate white leaves, with only two or three green ones outside: the very finest, most delicious salad in the world. (1)

Our salad sauce, the recipe for which we gave some years ago in this periodical, will, we think, bear repeating for the sake of new subscribers; it is compounded thus:

Materials.—Lucca oil; Crosse and Blackwell's malt vinegar, if you cannot get Bordeaux white-wine vinegar; Colman's mustard, two hard, very hard boiled eggs, and salt.

Bruise the yolks of the eggs till no lumps remain; to them add half a teaspoonful of salt, and mix thoroughly; two large spoonfuls of oil are then to be added by degrees, with continuous stirring, and when the mixture is as smooth as it can be made, add one large spoonful of vinegar.

If you do not like oil, it is probably because you have never tasted *Lucca* oil; Bordeaux and Marseilles oil is only fit to grease machinery. Strangely enough, the Italians, even of the upper classes, like oil to be a little rancid! (2)

Corn—You, who have land, will probably be soon thinking about sowing corn for the table. Take our advice, and sow, on the same day, Early Minnesota and Stowell's Evergreen. The latter will be just fit to eat when the former is finished.

Herbs:—Sow *sage* in hot beds and set out 12 x 8 inches apart. *Chervil* will grow anyhow. Marjoram, and the two savorys sow in rows 9 or 10 inches apart, and thin out to 4 inches in the row. Plenty of sun gives flavour to herbs; compleet shading preserves it when drying. Never mix the herbs when bottling; the flavour of no two soups or sauces should be a like, and if the herbs are mixed the distinction cannot be maintained.

Cauliflowers:—The finest and best flavoured cauliflowers we ever saw and tasted were grown for the Montreal market. Plenty of dung; and that not only the year of planting but in previous years as well; a light loam, and lots of water in a dry season, will grow cauliflowers. If the grub

(1) *Bass* is the outer bark of the birch-tree. Ed.

(2) So our dear old friend, the Cavaliere Gianelli, tells us. Ed.

attacks the roots, soak the land all round the plant with a pretty strong solution of Paris-green.

To cook a cauliflower properly, it should be steamed. If you have no steamer, set the cauliflower in a pot with the head well out of the water; put the cover on; it should be crispish and not sodden. Grate Parmesan cheese over the top, and just brown it with a red-hot shovel, if you have not a "salamander."

Beet-root thinned out too far apart is almost invariably poor in sugar. If the land is poor, so will the beet-root be, and stringy too. Earth-up while growing; the *sugar-beet* is always treated thus, so probably more sugar is produced by the operation.

Beans:—By beans, we mean *broad*-beans, not haricot-beans; not a nice vegetable when allowed to grow old and therefore mealy; but when young and tender, as delicious, in our opinion, as a good pea. When about half-grown in the pod, gather them, shell them at once, and boil them rapidly, furiously. Sow as early as possible, and repeat the sowing about the 10th May. Hoe thoroughly, deeply, and pinch off the tops as soon as there is a air show of blossom. The Windsor, is the best kind.

EXPERIMENT-FIELDS.

Special Competitions for Farmer's Clubs.

Official Circular.

QUEBEC, January, 1899.

SIR,

I have the honour to inform you that the Hon. E. Déchêne, the Commissioner of Agriculture, has granted, for the year 1899, a special sum, to be devoted to certain experiment-fields to be got up, this year, by the Farmer's Clubs, in accordance with the subjoined conditions.

Regulations.

1. The Club that shall organise one of these competitions, shall no longer be obliged, as a condition of profiting by the grant, to hold at the same time a competition of the same kind.

2. The prizes, or government grant; worth about $15.00; shall be paid partly in money ($7.00), and partly in the manure, *Thomas' basic slag* (4 bags of 220 lbs. each).

3. There will be only two prizes: 1st prize, $5.00 and 3 bags of Thomas' basic slag; 2nd prize, $2.00 and 1 bag of basic slag.

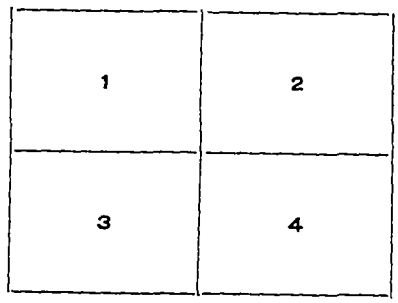
4. The two farmers who shall win the above prizes will have, next fall, to dress a piece of land with the Thomas' slag, and the Club will be bound to award, the next year, a prize of $3.00 to the one of the two competitors who shall show the best results from the application of the slag.

The Club shall send in to the Department of Agriculture an exact report of this supplementary competition.

Programme of the Competitions.

1st COMPETITION.—*Crops of wheat, barley, or other cereal.*—The competitors shall enter for the competition an arpent of land, of average quality, well prepared, cleaned, and water-furrowed.

The experiment-field shall be divided into 4 plots, of a quarter-arpent each, as in the annexed diagram.



The entire plots No 1 and No. 2 shall receive, this spring, as soon as possible after the winter, (it would be better done in the previous fall), a dressing of 200 lbs. of good wood-ashes (hard-wood for choice. ED.), to be worked well into the soil with the grubber.

A week or two before sowing, on the whole of the plots 1, 2 and 3, shall be spread 150 lbs. of plain superphosphate—50 lbs. to the plot—mixed with twice or thrice its bulk of dry mould, to be worked in and mixed with the harrows. After which, the whole arpent shall be sown with the grain selected.

Lastly, after seeding, a topdressing of 20 lbs. of nitrate of soda, finely powdered and mixed with dry mould, shall be given to plot 1; a good plan is to sow the nitrate of soda at twice, i. e, 10 lbs. before seeding and 10 lbs. a few days after the

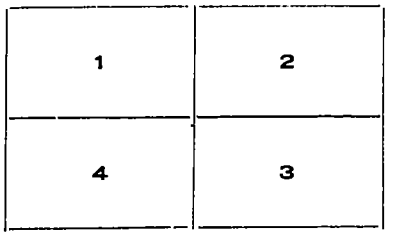
grain is above ground. (1) Be careful not to sow the nitrate the second time unless the leaves of the plant be dry ; otherwise, they may be sealded.

No. 4 plot, the comparison plot, is to receive no manure.

Briefly, No. 3 will show the effect of phosphoric acid alone ; No. 2, the effect of phosphoric acid and wood-ashes ; No. 1, the effect of phosphoric acid, nitrogen, and wood-ashes. (It must not be forgotten that wood-ashes contain a notable percentage of phosphoric acid. Ed. J. of Ag.)

Competitors are to note with care the difference between the various plots, both during their growth and at harvest time ; and the Judges appointed by the Club are to make their report with those points in view.

2nd Competition.—*Crops of mangels or field-carrots.*—Competitors shall enter in the competition an experiment field of one arpent, divided into 4 equal plots of half an arpent each, as shown in this diagram :



The field is either to have been manured in the previous fall, or this spring, with 12 tons of dung.

The whole of the 3 plots Nos. 1, 2 and 3 shall have received last fall, or shall receive as early as possible this spring, 600 lbs. of good wood-ashes, to be buried in, and mixed with the soil with plough or grubber.

A week at least before sowing, shall be spread on the plots 1 and 2, 200 lbs. of plain superphosphate, to be worked in with the harrows. (2)

After the seed is in, shall be spread, on plot No. 1, 50 lbs. of nitrate of soda, well pulverised and mixed with twice or thrice its bulk of dry mould. This shall be done at twice ; 25 lbs. immediately after seeding, and the rest a few days after the plant is above ground, the latter in dry weather.

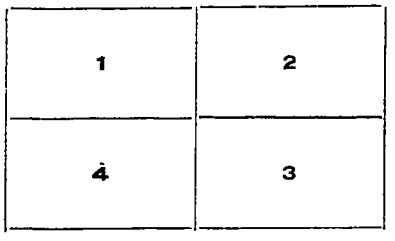
The comparison-plot, No. 4, is to have no other manure than the original dressing of dung common to all the plots.

To sum up, plot 3 will show the effect of wood-ashes. plot 2, the effect of wood-ashes and phosphoric acid, plot 1. the combined effect of wood-ashes, phosphoric acid, and nitrogen on mangels and carrots. (We should back the plot of mangels that receives the nitrate of soda together with the 3 tons of dung, even if it had neither wood-ashes, nor the phosphoric acid in the superphosphate. Ed. J. of Ag.).

The competitors will carefully observe the differences that manifest themselves during the growth of the plants and at harvest-time ; and the judges of the competition will make their report in terms of agreement with the facts stated.

3rd Competition.—*Tobacco.*—The experiment-field is to be an arpent of land fairly rich in humus and nitrogen from previous dressings ; for instance, a soil that had been manured one or two years before with dung or with a second crop of clover ploughed in, etc.

This arpent is to be divided into 4 plots, as below :



The whole 3 plots, 1, 2 and 3, i. e., $\frac{3}{4}$ of an arpent, are to receive, as early as possible in the spring, 600 lbs. of wood-ashes ; 200 lbs., that is to the $\frac{1}{4}$ arpent ; which are to be interred and well mixed with the soil with the grubber. If the ashes had been mixed with the soil in the previous fall, all the better.

A fortnight before the tobacco-plants are to be set out, plots 1 and 2 shall receive in addition, 150 lbs. of plain superphosphate, to be mixed with pulverised mould and harrowed in.

Then, after planting the tobacco, as soon as the plants have taken, on No. 1 plot 35 lbs. of nitrate of soda shall be spread in this way : mix the nitrate with 2 or 3 times its bulk of sand or dry mould, and scatter it ; in dry weather ; round each plant.

Plot 4, the comparison-plot, is to receive no manure.

(1) What our Scotch friends would call *brairded*. Ed.

(1) By "superphosphate simple," is meant mineral phosphate dissolved in sulphuric acid.

In judging the results, which can only be done after the crop is dried and prepared (fermented, etc.) for sale, the Judges are specially to consider the quality of the tobacco, provided the yield be reasonably large.

4th COMPETITION.—*Maize.*—The experiment-field is to be an arpent of land pretty rich in humus and nitrogen, or which has been manured the previous fall with farmyard dung. The arpent is to be divided into 4 plots of equal superficies, a quarter of an arpent each, No. 4, the comparison-plot, receiving no chemical manure of any sort.

1	2
4	3

In early spring, the plots 1 and 2 are to get 300 lbs. of wood-ashes between them, to be worked into the land with the grubber. It would be better had the ashes been spread in the previous fall.

A fortnight before sowing, the plots 2 and 3 are to receive between them a heavy dressing of 250 lbs. of plain superphosphate, mixed with two or three times its bulk of sand or dry mould, and to be harrowed in. The maize is then to be sown as usual.

The plot No. 1 will, at harvest, show the effect of ashes alone on maize; plot 2, the combined effect of ashes and superphosphate, and plot No. 3, the effect of superphosphate alone.

The differences observed in the 4 plots, at the brairding, the growth, during the formation and ripening of the ears, and at harvest, must be carefully noted; and the judges of the competition will report accordingly.

Important remarks.

1. In these competitions of experiment-fields, plain (i. e., mineral) superphosphate may be replaced by a quantity at least equal (but going as high as double) of Thomas' basic slag, that can now be had at Montreal; but to produce its best effect, the basic slag ought to be applied a long time before seedtime, preferably in the fall. This phosphate is slower in acting than ordinary superphosphate, but its effects are more lasting, being sometimes prolonged for 3 or 4 years after its application. It is especially suited to soils poor in lime, and to those rich in humus, with more or less of acidity, to meadows, etc.

2. Nitrate of soda, too, may be replaced by sulphate of ammonia, but the latter's action is not so immediate, and depends upon the season being rainy enough to ensure its dissolution in the soil.

3. In the absence of wood-ashes, muriate of potash may be used at the rate of 100 lbs. in place of 600 lbs. of hard-wood-ashes. For tobacco, however, sulphate of potash must be used instead of the muriate; but the wood-ashes are much more beneficial to the crop.

By order,

H. NAGANT,

Assistant-Editor of the
Journal d'Agriculture et d'Horticulture.

(*Trans. from the French by the Editor of the J. of A.*)

The Garden and Orchard. (1)

(1) Unfortunately, two of the following articles, that should have appeared in our last number, were mislaid in the office.—ED.

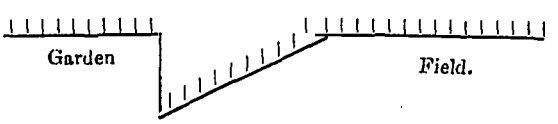
(CONDUCTED BY MR. GEO. MOORE.)

COTTAGE GARDENING.

A small piece of ground in places near the city where it is possible to secure it affords a man useful employment during leisure hours, enables him to add greatly to his domestic resources. and comforts, and indirectly, but powerfully, improves his moral character. But all this depends upon whether it is wisely managed and skilfully cultivated. If it is kept in a condition which indicates barbarous indifference, to all taste and beauty, or carelesness as to the true principles of cultivation on keeping it tidy and in order, the owner would be better without it, because, so far from benefiting him, it will injure himself and his neighbours by encouraging him in his miserable habits of neglect and inattention, incite him in a disregard for neatness, and exert an evil influence on the surrounding community.

Ill kept and badly cared for gardens sustain the same relation to the principles and arts of cultivation which filthy irregular and ill managed houses do to the principles of domestic economy. Every

one who cultivates a piece of land, whether it be a little garden plot around his suburban or village home, or a farm on the broad prairie, should ever bear in mind that Order is Heaven's first law, and disobedience to it must always be expiated by loss and disappointment. If the land of the cottage garden is too wet for successful cultivation it must be promptly and thoroughly drained. This may be usually done by digging a ditch along the outside and forming an outlet or a little dumb well or "swallow" at the lowest corner. When the garden adjoins a public road, or field where cattle are kept, of course a strong fence is requisite. A picket fence will answer the purpose until a good evergreen hedge of spruce or cedar can be reared, which, if kept neatly clipped will be ornamental and a good wind break on the side next the cold winds. If your garden is so situated as to enable you to get a view of it from the house and the fields adjoining, it would be better not to have any hedge to block the view, and in that case—what is called a sunk fence will best answer the purpose—it may be constructed thus :



Garden hedges should always be kept clear of weeds at the base, otherwise they will be a retreat for slugs and mischievous insects. Timber and large growing ornamental trees should have no place in or near to a small suburban garden ; their roots rob the soil of its fertility and the branches over shadow the land so that the amount of useful crop is curtailed.

When a garden is broken up first it should be trenched, perhaps not all at once, but piece by piece, until the whole is done. While trenching should not be too deep, it is indispensable for deep rooting plants, and serviceable to shallow-rooting ones ; if too much of the subsoil is not brought to the surface, trenching improves the soil by securing a better circulation of air and moisture, and heavy rains and droughts do not have injurious effects.

Frequent applications of manure, sometimes intermixed with the soil, sometimes as top dressing, must be used and if a cow, horse, poultry or pig are kept they will be a source of profit in the manure they make for the garden. In the garden, liquid manure can be applied, and a cesspool, if well covered or with some sand plaster frequently sprinkled in it, will be found handy and profitable. Crops should be regulated by the real wants or judicious tastes of the family.

As on a farm, a rotation of crops should be made in the garden to produce satisfactory returns and keep the land in prolonged fertility. These details will occupy the attention of the proprietor and practice will teach him year by year what to do and what to avoid, and success will make him the more anxious to learn and take an interest in the work. Two or three simple rules will be useful.

The soil in a garden ought always to be worked with a spade or hoe only when in a dry or nearly dry state and never when drenched with rain. Beans should be dibbled into the ground, and onion seed made firm by treading, because they form the most vigorous roots in firm soil. All other seeds should be sown in a loose friable soil, in which they can strike root freely. All sowings and transplanting should be made on freshly dug soil. It is needless to say that all weeds should be killed as soon as they appear. Beds of seedlings of cabbage and the like, should be kept for transplanting, and every yard of ground should be kept filled up with a crop.

Any attempt to cultivate large trees in a garden is a mistake because they would overshadow and destroy the vegetable crop, but some rows of gooseberry, currant or raspberry bushes, or a small bed of strawberries would not be out of place. Many a man who is confined to the office or workshop would find the advantage to his health, to his morals, and to his pocket-book, if he could secure a suburban lot with a convenient electric car track running near and where he could have a castle of his own surrounded by a *domain*, of only the size of a small garden.

GEO. MOORE.

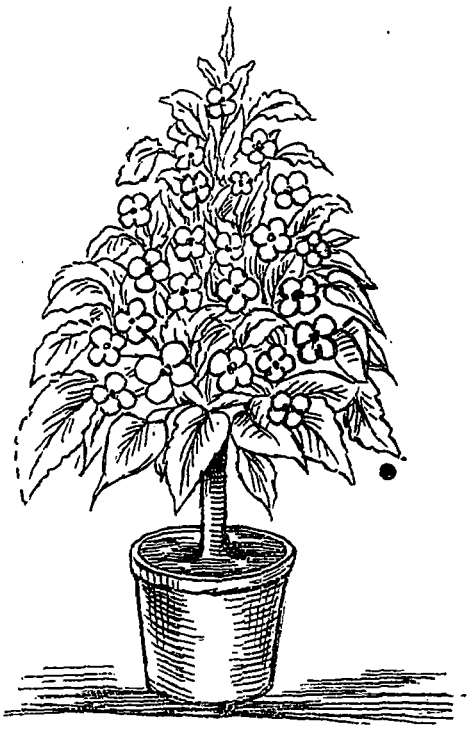
THE MAGUEY PLANT.

What is called the Maguey plant by the Mexicans, by botanists Agave Americana, and popularly the Century-plant, is put to many uses. A textile fabric and many other stuffs are made of its leaf fibre, a liquor called *mescal* is made from the juice and is used as a medicine, a drink called *pulque* which answers to the natives the same purpose as the light wines of the French or the

beer of the Germans, and a splendid quality of paper is made from the fibre. The popular idea that it only blossoms once in 100 years is a mistake; for it does so every 10 or 15 years.

NEW TREE TUBEROUS BEGONIA.

This new departure in tuberous-rooted Begonias is the very thing to be desired; the straggling habit of many varieties of the class detract from their merits as window plants, for which some other qua-



lities, as for instance their comparative immunity for insect attacks, render them most suitable. The variety under notice is described as having thick shiny green leaves, edged with red, and flowers deep rose color with yellow stamens; it will be a grand window plant.

PREPARATIONS FOR THE PARIS EXHIBITION.

Prof. Wm. Saunders, of the Experimental-farm, Ottawa, has issued a circular explaining the part assigned to him, as follows: group 8, class 39, vegetable food products, including carrots of all sorts in grain and in sheaf, leguminous plants, tubers and roots, forage plants, flax crops, etc.; group 8, class 45 : fruits, including all species and varieties of apples, pears, cherries, plums, grapes, and other fruits and nuts. It is quite evident by the circular that it is intended the display shall be worthy of the Dominion.

It is proposed to erect a handsome trophy built entirely of Canadian agricultural products and which will be surrounded by exhibits of marketable crops, and with these will be associated scenes illustrating farming in different parts of the country.

The space allotted to group 45 where the fruit will be displayed is in the Main Building and it will have the advantage of being shown along side of the fruit products of all other countries.

Dr. Saunders appeals for the co-operation of all agricultural and horticultural societies in the different Provinces, and it is to be hoped that he will receive a generous response, not only from them, but from individuals, who possess any specimens which may be of interest, or can by any means, forward the important work of assisting to afford the world an opportunity of judging of the capabilites of this great Dominion as regards agricultural and the production of fruit of superior beauty and quality.

G. M.

SEASONABLE NOTES ON PLANTING TREES. (1)

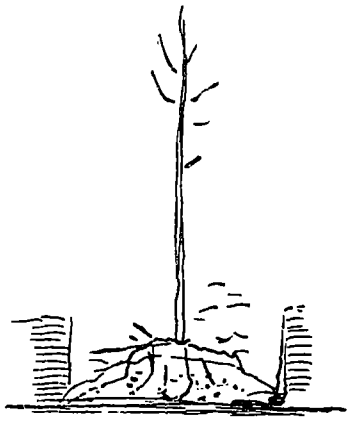
When this reaches our readers the season for planting, in most parts of the Province, will be upon us and although so much has been written on the subject, a few reminders may not be inopportune.

Presuming that the land has been duly prepared by draining, trenching, and manuring, we proceed at once to recall attention to the important operation of planting trees into their permanent places. If they are what they should be they will have been previously transplanted from the seed-bed in the nursery so as to have made a robust stocky growth, and with fibrous roots, and which should not have been damaged or cut off in the process of digging.

There is a new plan in vogue, to cut all off these and the branches, and reduce the tree to a mere stake before planting, by which it is claimed that

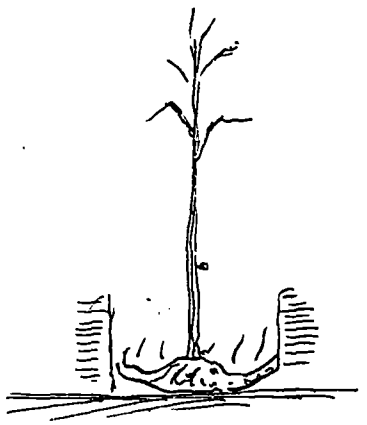
(1) This should have appeared in our last number. Ed.

it is more likely to take and eventually to form a good, symmetrical tree ; but I fail to see the philosophy of this, because there must be a loss of time while the new roots and branches are forming, while, if a properly grown nursery tree is used, and is properly handled in the planting, it



No 1.

need receive no check. But in this respect planters are apt to fail, they leave the trees lying about exposed to the air, and it must be borne in mind that it is not the sun only which will cause the delicate spongioles at the tips of the roots to perish, but exposure to the dryness of the atmosphere. I have seen roots dry up and wither on a dull day.



No 2.

I know it is recommended to prune the roots before planting, and if they have become at all dry this is necessary, but when they can be preserved intact, it stands to reason that they should be, because then they can perform their office, of imbibing, and imparting the nutriment required by the tree without any delay, and it will not be so likely to succumb in the interim. First then have your hole in proper shape to receive the tree so that there shall be no waiting. Keep the roots covered all the time until you are quite ready to plant. The plan of placing trees in or near the holes of a whole row with their roots exposed before you begin to plant is a mistake. because the last trees will suffer while the first one is being planted. If the work can be expedited by placing the tree near the holes, put a spade full or two of soil on their roots. I believe in expedition, but the planting is an operation which should never be performed with more haste than is compatible with thoroughness in every detail.

The trees should have the superfluous branches removed and the others cut back at the time of planting, because then the small quantity of sap received at first will be sufficient to nourish and forming the tissues of the remaining part until the foliage is formed, and then that will be more vigorous and suited to perform its allotted functions—of sap elaboration.

Some of the most careful nurserymen dip the roots of their trees in a puddle of clay, which prevents them coming in immediate contact with the air and thus the must delicate fibres are protected, from the time they are dug until they find their permanent positions in the orchard or plantation.

The digging and preparation of the hole should be completed before the tree is brought to it, and care in doing this must be observed. In the first place it must in any case be large enough to receive the roots, leaving space to spread them out in every direction, and enabling the planter to put some loose soil about them for the fibres to strike into, then the bottom of the hole should be made *convex* so that the roots will stand on a little hillock as in No 1, and not *concave*, which inexperienced planters are apt to make it, and in which the roots are doubled up as in No 2. It takes two persons to plant trees properly, one to hold the tree and the other to fill in the earth, gently dispersing it amongst the fine roots, and pressing it solidly amongst them. The care with which this part of the business is attended to will have a great deal to do with success of the work, because if holes are left to admit currents of air, the roots will be delayed in making a start even supposing they do not perish entirely.

To water the trees when planting is productive

of no good results, but on the contrary may kill them, because a copious supply of water, poured on at once, would, in all probability wash the soil away from the roots, and form the air passages we have been so careful to avoid by making the soil firm about them.

The soil placed in immediate contact with the roots should be so fresh and moist as to require no watering, if however it should not be, and it may seem desirable to apply water, it should be applied by means of a watering can or hose with a rose spreader, so that the water will find it way through the soil equally and not only in gutters as it would if poured on out of a pail, or hose without a spreader. However dry the weather may be do not water your newly planted tree before it comes into leaf, it does not require it seeing it has as yet nothing to support. You had far better moisten the stems and branches, and mulch, with stable litter, the surface to prevent evaporation during the critical period. I never saw any good result from watering newly planted trees at any time, but have seen hundreds destroyed by careless and too frequent watering.

After the leaves have expanded to their full size, the mulching will be no longer serviceable, except in cases of very severe and long continued drought, but will be better dug in or taken away so that the soil can be be properly aerated and the chemical changes in it necessary to the production of plant food may not be interupted.

Never by any means place green manure close to the roots of a tree: see that the ground is well manured before planting and what manures are used afterwards apply on the surface.

Finally, remember that planting is a vital operation, if you have made due preparation of your land and perform it carefully in every detail, carrying out the instructions which practical men have proved by reason and experience, to be absolutely necessary, you may reasonably reckon upon success, but if you neglect any of these simple rules with an idea that they are troublesome to obey, or useless, it will be your own fault if you fail. I know of no classs of tradesmen who are more liable to be blamed for supplying an inferior or useless article than nurseymen, and only because their goods are handled ignorantly, carelessly, or their directions as to the care they should receive slighted or ignored.

GEO. MOORE.

CURIOSITIES OF NATURE.

A vegetable caterpillar of New Zealand.

The grub is the larva of a large moth called the "night butterfly," it is about 2 to 3 inches long and is subject to the attack of a vegetable parasite or fungus called Sphœria Robertsii — the spores of which germinating in the body of the grub, absorb or assimilate all of the animal substance, and strange to say the fungus growth is the exact replacement of the living caterpillar. The fungi, having killed the grub and absorbed the animal substance, sends up a shoot or stem the length of which varies from 6 to about 11 inches, this seed stem always breaks through the grub at the back of the head. The ground caterpillar is found at a depth of 2 to 8 inches below the surface; above the ground, the stem of the fungus is straight and about 2 inches of the upper end is covered with spores, these stems stick up through the dead leaves and look like minature bullrushes.

Grubs which are not attacked by the fungi appear, in due time, as minged moths or butterflies of large size and beautifully marked. These facts go to prove that animal and vegetable life are not so inseparable as may be supposed.

THE NEW CARNATION.

Mrs. Lawson.

There has been quite a furore raised in floral circles in Boston over this new Carnation for which the sum of $30,000 was paid, for the stock. One of our leading florists, Mr. S. S. Bain, imported a few flowers at $1.00 each, just to show his customers what it was.

It is very large, 3 inches in diameter and of a deep pink color; form rather coarse and irregular. I cannot say that I was much impressed with its beauty.

It was too large for elegance, and the color was not decided enough, at least as I saw it.

There is no doubt about the enormous sum paid for it as that fact can be proved, nor is there any doubt that the speculation will be a good one, although I cannot feel certain that the high prices being paid for flowers at the present time is a healthy sign of public sentiment, as it savours too much of extravagance.

Government Aid.

IMPROVEMENT OF OUR ROADS.

(*Official circular addressed to the Agricultural Societies and the County Councils*).

Department of Agriculture,

Quebec, April, 1899.

Sir,

The improvement of the roads of this province has always been the object of the special attention of the government, which never loses an opportunity of offering to the farmers every possible facility of securing prompt reforms in this branch of rural economy hitherto so neglected.

During the last session of the legislature, the sphere of action of the agricultural societies was enlarged, so as to allow these associations to employ their funds, whether derived from subscriptions or from government grants, in aiding the purchase and working of stone-breakers and all other machines intended for improving the roads.

The Commissioner of Agriculture, in the case of Agricultural Societies being desirous of availing themselves of the privileges accorded to them by this law, may exempt them from holding exhibitions or competitions. They may also make arrangements with municipal councils to help them in buying machines, either for stoneing or levelling the roads, etc.

In addition to this, the Department of Agriculture will continue to leave at the disposal of the counties all the prizes offered by it for the last few years. In 1897, a first series of prizes of $125.00, $100.00, 75,00, was offered, and is still available in counties that did not lay claim to it. Last year, we added a fresh series of those prizes, of $75.00 each, offered to such counties as had already received the three previous prizes. The same favours are continued for the current year, and the aid thus granted will be payable on the same conditions as before, i.e., that resolutions be passed by the municipal councils as to the purchase of road-mending machines, a copy of which shall be delivered to the Department of Agriculture, and to the same department shall be forwarded the invoice of the purchase of the machine, with a certificate from the Secretary-treasurer, showing that at least two miles of road have been put into proper repair, before the prize shall be paid over.

We think too it would be useful to remind the different County-Councils of the province, that the to pay Government is prepared half of the cost of a stone-breaker, with its accessaries, for stoneing the roads (*Macadamizing ?*), to the extent of $1,200.00. The assistance granted by the Government towards the purchase of stone-breakers, will be payable on the following conditions : each Municipal Council that desires to benefit by this grant, shall previously pass a resolution, a copy of which shall be forwarded to the Department of Agriculture, and the premium offered shall not be payable until at least half a mile of road shall have been stoned.

Many counties have already purchased these machines, and it is very much to be desired that their example be followed by a much greater number.

I have the honour to be, Sir,

Your obedient servant,

S. SYLVESTRE,

Sec. Dept. of Agriculture.

(*Trans. from the French by the editor*).

CONSTRUCTION OR IMPROVEMENT OF CHEESERIES

Grant for the purpose from the Provincial Government

(*From the bulletin "Ripening-rooms in Cheeseries"*).

The experience of preceding years has shown an indisputable manner that one of the chief obstacles to the improvement of the cheese of the province of Quebec, and to the increase of its price, is the absence of good ripening-rooms and the placing of it on the market too green or badly ripened, the effect of the pains taken to secure careful making being thus partly lost.

Besides, the English buyers offer far better prices for properly ripened cheese, and are inclined to reject every cheese that is not soft in flavour and of a rich consistence.

Competition having become more lively on all the markets our cheese is sent to for sale, the bad results of its defects are more and more perceptible.

In order to apply a remedy to this trouble, the Hon. M. Déchène, the Commissioner of Agri-

ulture at Quebec, has decided to offer a grant to each firm or person possessing or desirous of building a cheesery, and who, having made a demand for it, shall bind himself to submit to the following conditions.

These conditions, explained at full length in the bulletin, are of four kinds :

1. Conditions relating to the construction of the factory, and of the ripening-room in particular.

2. Those relating to the ventilation of these rooms, to their cooling in summer and warming in winter.

3. Those which concern the general arrangement of the factory.

4. Those which relate to the mode of making, etc.

This subvention will be made payable in two parts. The first half of the grant shall be paid when the conditions of the two first divisions are fulfilled, and the second half when the two latter divisions are fulfilled.

The object of this grant is not a partial improvement of our factories, but the erection in various parts of the province of factories that may be considered as models in every possible respect, and able to supply to all those who are engaged in cheese-making, certain information on the cost management, and advantages of such an installation.

How to obtain the grant.

To obtain this grant, an application for it must be made, in writing, to the Department of Agriculture, at Quebec.

The Department of Agriculture will supply all the necessary forms, and these must be signed by the proprietor and maker, and by two of the principal patrons of the factory as witnesses, and returned to the Department.

By their signature thus made, the proprietor and maker will engage, each for himself, to fulfil, for the sake of obtaining the grant, all the conditions mentioned in the form, which are the same as those mentioned in this bulletin.

When the improvements are finished, an inspector will be sent to report thereon to the government. To his report, this inspector shall affix a sketch of the factory. A special form shall be supplied to him for this report, which shall be signed by him and by the tradesman who executes the work, and then by two of the leading patrons.

Grant by the government of the province of Quebec.

The grant offered by the Hon. the Commissioner of Agriculture will amount to the following sums :

For a ripening-room 400 to 700 square feet of flour-surface, $100.00.

This grant of $100.00 will only be made to factories already existing. No grant will be made to factories built after the publication of this bulletin, unless the ripening-room shall have a flour-surface of at least 700 square feet.

For a ripening-room of 700 to 1,000 square feet, $150.00.

For a ripening-room of 1,000 square feet and upwards, $200.00.—*From the French by the editor.*

Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

HOME DRESSMAKING HINTS.

However carefully a dress is made at home, it never comes up to a first rate make either in fit or style,

Now the reason for this lies partly in the home dressmaker, who will not take the trouble, or does not know how to press the work during her work, as well as after the garment is finished.

A few hints on this subject may be of use to those who wish to learn how this is done.

In pressing a bodice, the iron must not be too hot nor too heavy, or there will be marks of the pressing left on the outside.

Tailors use a long narrow iron, called "a goose," for pressing their seams, and if much dressmaking is done at home it will pay well to get one.

First, press each seam on both sides before opening it ; then, with a cool iron, press it well flattened out, taking great care not to stretch the seams.

Press the sleeves the same way, first closed then opened flat.

Anything round is best for using to do this pressing ; a broom-handle, or still better a rolling pin, well covered with a few thicknesses of cloth, will make a good pressing board for sleeves.

Thick material sometimes needs damping, but it must be done with great care as some goods will not stand wetting. Velvet must not be pressed in this way or the nap will be spoiled ; for this, the

iron must be held or fixed so as to pass the seam over the face of the iron.

Always try the heat of the iron on a bit of the stuff, as some colours, such as red, gray, and pale heliotrope charge colour by coming in contact with the hot iron. This is rather startling to the amateur, but after a time the colour generally speaking, will return ; though there are some that will not return ; so, to be on the safe side, use plenty and long pressure with a moderately hot iron. Silks scorch easily, so a cool iron is absolutely necessary in pressing them.

WASHING SILKS.

Washing silks make such pretty blouses, and when they are made of good silk will last a long time and always look nice and fresh every time after a washing, then they are so delightfully cool for a hot day in summer, no bother of starching them either and one feels so comfortable in them.

White, cream, or pink silk will make such pretty dresses for little girls and can be got ready on such short notice that they should never be allowed to dry after washing but rolled up tight in a dry towel and ironed at once with a moderately hot iron.

I can speak with certainty of white, cream, pink, and pale green that I have seen got up in this way with great success.

THE ART OF BROILING.

Broiling is a delicious but rather an expensive way of cooking meat, for to have it in perfection you require a clear, bright fire, the best cut of the meat, and unless the meat is to be eaten immediately it is cooked, it is seldom good. To grill a chop, rub the gridiron over with a small piece of suet, place the chop in the centre, keep turning it every few minutes. An ordinary sized chop will take about eight minutes. Serve on a very hot dish. Tomato or mushroom sauce is generally served with mutton chops.

COLD FISH COOKERY.

Many a tasty little dish can be made from the cold fish left over from want of knowledge as to how to prepare it than anything else. Salmon rissoles are greatly liked, and form a nice supper or breakfast dish. This rechauffé can be prepared beforehand, so that when wanted the rissoles have only to be fried. Mash finely half a pound of potatoes, and you will need rather more than this quantity of cold or tinned salmon. Take out all bones from the fish, now mix potatoes and fish together, adding a little butter and milk to make the mixture soft and smooth. Flavour with salt, cayenne, and a dash of lemon juice. Shape into small balls, egg and breadcrumb them, and fry a delicate brown in plenty of boiling fat, drain and serve garnished with parsley. Lobster ressoles of tinned lobster are made the same way and are excellent.

TOMATO SOUFFLE.

Take half a pint of tomato pulp that has been rubbed through a seive, an ounce of butter, two ounces of grated cheese, an ounce and a half of boiled macaroni, an ounce of stale bread crumbs, and a teaspoonful of made mustard. Mix all together in a saucepan, and stir over the fire until boiling ; take from the fire, let cool ; add first the yolks of two eggs, and then the whites of three with salt and pepper. Turn into a buttered dish, and set into the oven to bake quickly. Dust over with grated Parmesan.

ROCK CAKES.

Beat five ounces of butter to a cream and add five ounces of castor sugar, beat in an egg and a teaspoonful of caraways ; when the mixture is nice and light, add about eight ounces of flour. Then, with a silver fork, pull out little pieces of the dough and bake in rocky heaps on a floured tin ; or roll out and cut with a paste cutter into fingers.

FRENCH CREAM CAKE.

One cup of sugar, and three eggs beaton together until light. There tablespoonfuls of water, 1½ cups of flour, two teaspoonfuls of baking powder, flavor to taste and bake in three layers.

CREAM.

One cup of sweet milk. When it boils stir in two tablespoonfuls of corn starch dissolved in a little cold milk, two beaten eggs, one cup of sugar. Stir constanly until it thickens enough to drop from a spoon and until the raw taste is gone. Remove from the stove and add a small piece of butter, flavor with vanilla and spread between the layers of cake.

PEAS.

Buy canned peas. Pour off all or part of the water. Put them into boiling milk, season with salt, butter and pepper. Let them boil a few minutes. A level teaspoonful of sugar and a bit of *mint*, will improve them if they do not seem choice enough.

REMOVAL OF STAINS FROM CARPETS.

For cleaning the spots of grease on a carpet ox gall or ammonia and water are excellent. The proportion is one tablespoonful of ox gall to one quart of water. Personally I prefer the ox gall, as ammonia does not suit all colours. Apply with a sponge or flannel not too wet, and rub till nearly dry. Lime spots may be removed with vinegar. This must be used quickly and washed off immediately. For soot, cover with salt and sweep up. To remove ink, when accidentally spilled, pour on milk, and as it becomes coloured sop up with a soft cloth or with blotting or other soft absorbent paper. As soon as the ink is removed, wash with warm water and Castile soap—nothing stronger—to remove the grease of the milk. Then rub dry with a clean cloth. I have several times removed a pool of ink from a delicate carpet without leaving a stain behind. All the ink possible should be taken up with a spoon before using the milk.

If oilcloths are varnished once a year their term of service will be greatly prolonged. Plain window-shades that have become soiled with smoke and flies may be cleaned by wiping them off with a soft rag wet in cold water. Ink spots on a carpet may be drawn out if salt is applied immediately, and by renewing the application as often as the salt absorbs the ink.

Vinegar has many uses. A good housemaid will clean fire-place, steel, and fire-irons with it, giving it a good rub, then preventing all risk of rust by another rub with oil or turpentine. It is also excellent for keeping table glass bright, especially water bottles, which should be well rinsed out with it, and then with cold spring water.

A simple plan of disinfecting rooms consists in putting a saucerful of salt in the middle of the room, and pouring on it a dram or two of sulphuric acid. The fumes that arise do the work of disinfection.

THE BATH.

The most helpful and agreeable bath is that of tepid water. Few people can stand absolutely cold baths, and no matter how strong one may be such a bath should not be indulged in unless a thorough rubbing be taken afterward. To speak plainty, it must be remembered, that while a cold bath may be more or less invigorating, it is not cleansing. I can easily understand the desire of every woman to have a clear, beautiful skin, but I confess to being provoked when I think of the amount of money spent on lotions, creams and powders to be applied externally, and which have nothing like as good an effect upon the skin as a tepid bath with good soap taken at least once a week. The condition of the skin depends almost entirely upon the care given to the general healtp. The girl who is up late at night, gives no care to her diet, indulges in various stimulants, bathes but seldom, and exercises less, is certain to have either a dull, muddy-looking skin, or one covered with disagreeable-looking black and red spots. Find out exactly what suits you as to the kind and number of baths each week, the amount of exercise and the choice of food. Avoid many sweets and much pastry, and do not allow yourself to become a slave either to tea or coffee any more than you would to some vicious drug or strong stimulant, and remember that, unless you are in good condition internally, you will be anything but a pleasant object to look upon externally.

The Farm.

FARM PRACTICES OF OLDEN DAYS.

In these go-a-head days, one has to be very careful in speaking of the "good old days", especially in connection with farming, and more especially to that part which pertains to manuring; for fear of being pooh-poohed for an old Rip Van Winkle; but still the assertions made of late years, that the mineral and other manures, have superseded the necessity for lime, raises a question, which is of considerable importance in practice, and which is not so easily answered even by student farmers of the present day.

The question to be answered, is whether chemical analysis as at present possible—the most carefully conducted, and by the most competent professor—can really tell us exactly what any food will do for the animal that eats it; or what any manure (land-food) will do for the soil to which it may come to be applied. It is certain that no analysis can do this; and that the rations "scientifically equalised" (so-called), and dressings of land, which are affirmed to be equivalent may, and often do, produce results which are widely different.

As regards two rations of cattle foods, there have to be considered before it can be maintained that one is the same as the other two points, which it is doubtful if the chemical analysis can at all ascertain: 1. Is the mechanical agency of the ration in one form, which may be wholly absent in the supposed equivalent ration which is under different conditions; 2. The extent to which one food suits the constitutional propensities and palate of one animal, whereas a similar animal might take a distaste to the food in that form, and relish and thrive upon the same "feeding values" given in another shape. Everybody who has had to do with what is called "training" animals for show life knows that the great secret of success is a herdsman who studies (or knows instinctively without studying) individual peculiarities, and humours these. No really successful feeder treats the animals all exactly alike, either in the diet put before them and in the time for each "bait." Some take their food in one way and at one time, and some in another; and the ability to find out likes and dislikes, and the taking pains to humour these will make the difference of a good many pounds of meat at the month's end, even where the two rations have been exactly the same.

There is a story—and I believe a true one—of a man who exhibited successfully a very famous show ram. It was always in the finest fettle, and won everywhere. It was sold to an even more noted "trainer," who could do nothing with the animal, which entirely lost its bloom. The shepherd of the original vendor being asked what he gave the animal, in a moment of confidence, thus expressed himself: "I always hunted him up a "bait" of "sow-thistles" every day, and then he did famous. Would the chemist's analysis have discovered this?

And so with respect to the modern doses of manure, which are supposed to supersede the necessity of liming land. It is, in the highest degree, inexpedient to try to substitute these in a district in which it has been proved that the lime from a certain kiln, has always worked a beneficial change. The lime has an influence on the soil quite distinct from what its analysis will show. It "sweetens," when the equivalent will show nothing of the kind; or it acts mechanically when the top dressings, which are supposed to be the same, will have no such effect. There was a curious illustration how two manures, supposed to be all as one, acted differently on a farm some years since.

A plot, dressed habitually with farmyard dung, produced a yield of wheat unprecedented in forty years experience. A plot dressed regularly with the manures supposed to be of the same value, and which in many seasons have produced the same results, yielded a by no means unusual crop. There can be no question but that this was owing to the mechanical action of the remains of the dung, having kept open the soil for the roots of the wheat to work in during a midsummer fall of rain. This beat down flat the soil (not enjoying the mechanical advantage) and so, shortened the number of grains and the size of them, therefore altering the yield of wheat.

In most of the light land in the Eastern Counties of England, it used to be thought "good farming" to supply the chief ingredients of lime in doses of marl, or clay, at intervals of eight or twelve, or even a larger number of years. This was a traditional practice of some centuries growth. But the new philosophy, the advance of scientific farming of the Mechi period, altered all that, and the marl or olay-carting, always a heavy drag on the teams and unpopular with the horsemen, was abolished for phosphates, etc. The question is, Has the result justified the change? (I would ask the editor from his vast experience to give his opinion.) (1) Formy own part, I am inclined to doubt that it has The use of marl, on the rough herbage in permanent pasture, if slower in operation, did all that lime is capable of effecting. And in the improvement of the health of the turnip crop, upon arable land so treated, and upon the skin and colour of the barley grown after the turnips, the benefit worked by the marl was very real.

(1) We should say decidedly not. Ed.

It may fairly be asked if the lowered estimate of barley grown in the before mentioned country be not to a very considerable extent owing to the omissions of the marl and clay carting, which for years was regularly practised, to serve the very same purposes for which, in other districts and other soils liming has prevailed.

There is nothing easier than to raise a doubt as to the value of old agricultural practice, in any district by quoting the figures of Professor "This" or the learned Dr. "That" to the effect that "There isn't anything in it which cannot be done cheaper or better in some other way." But as a rule, pnblic opinion, in all such questions, has a tendency to gravitate back in support of the earlier practices.

It is quite within the bounds of possibility that chemical analysis may extend its range; and that it may improve so as to detect savours and medicinal effects as well as less ethereal constituents. But, until this has happened, it seems safest to try the most approved scientific rations by the best of what an old cow will make of them; and the most elaborately certificated patent manures by the returns made for them, by the soil, before we allow the man of science to talk us out of the conclusions arrived at by the men of practice W. R. GILBERT.

SOW ALFALFA. (*Lucerne*).

[Kansas Experiment Station Press Bulletin.]

Every Kansas farmer who has fed alfalfa recognizes it as a good feed, but a great many have not as yet begun to realize its full value, and do not know what they are losing by not having it as one of their main feeds. The results from giving alfalfa to dairy cows and fattening steers, as a part of the feed, compare very favorably with those from such expensive feeds as oil meals, cotton seed meal, and bran, and in fact takes the place of ehose feeds in the ration. The Kansas Experiment Station is demonstrating also alfalfa is an invaluable hog feed. A dound and a half of alfalfa a day per hog use with kafir corn produces gains very nearly equal to a feed of one fifth soy bean meal and four-fiths kafir corn. And now is the time to begin preparing to sow alfalfa. A deep, loose seed bed is not what you want; but it needs to be moist, and for this we may have the required rainfall and we may not. However, the ground is wet now, and if you can keep that moisture there until the plant gets the good of it, there is enough, even without another rain before the first of June, to give alfalfa the best kind of a start. The ground to be put in alfalfa does not need to be plowed deep, but the surface three or four inches must be kept in the best of tilth. Disc or cultivate as soon as possible, and then harrow every week or so; or at least after every rain, to keep up a good earth mulch until it is time to seed. If at that time the surface three or four inches of loose and moist, and there is a solid bed of moist soil underneath tdis loose surface, then it doesn't matter much, say many extensive alfalfa growers, how you proceed to get the seed under the ground. We have had the best results on the Agricultural College farm by using a press drill, and mixing the seed with an equal weight of wheat bran. But the principle thing is to sow alfalfa, and sow it until you get a field.

J. H. HANEY.

Kansas Agricultural College.

The Poultry-Yard.

THE INCUBATOR AND BROODER.

Before a hatch is started, it is very important that the machine be placed in an apartment which has a normal atmosphere, and is protected from rapid and extreme outer thermal changes. By a normal atmosphere, I refer to an atmosphere as ordinarily found out of doors. In other words, the air should be fairly pure, and contain a moderate amount of moisture. In a wet cellar, for instance, which contains rotten wood, decaying vegetables, etc., we should not call the air normal; for, upon examination, it would be found to contain a high degree of humidity, and too large a percentage of carbon dioxide and poisonous organic matter. While a chamber partially underground like a cellar is one of the best places to put a machine, it should be dry, clean, and sweet, with some ventilation. In cold weather, where there are two or three windows in the apartment, no direct openings will be needed, as more or less air will find its way in between the fittings, as ordinarily made. In moderate and warm weather, there will need to be direct ventilation.

The smell of the apartment is a good indication

as to whether it needs more light and air or not. The main advantage of an underground room is, that it does not quickly feel the extreme temperatures in the outside general atmospheres. The temperature of a well insulated cellar will never fall to the freezing point, and will seldom rise to 80 degrees, while the thermal changes are slow in taking place. Where the temperature of the hatching chambers will go up and down with the outer thermal changes, the temperature of the heating fluid remaining constant. If the outer thermal changes are rapid, it is impossible to maintain an even temperature in the chamber, however closely the machine is *watched*. Some incubator manufacturers have been slow in insisting upon their machine being placed where it would be insulated from the sudden thermal changes in the general atmosphere, as others advertise with much braggadocio, that an even temperature can be successfully maintained with their machine under all conditions For the same reasons, nearly all manufacturers advertise their respective machines to meet the various other requirements and to hatch, 100 per cent of the fertile eggs. With but one exception, the most successful machines now on the market are those regulated on the expansion of the heating fluid, and even that machine gives the best results when insulated against rapid and extreme thermal changes, as all incubators with direct ventilation must. All incubators have their limitations, and the beginner should be made acquainted with them and not left to spoil his eggs before he finds out their faults.

Our next consideration is to secure eggs that will hatch. There has been probably more carelessness and less thought given to this part of poultry raising than to any other. The general idea is that an egg is an egg, one being just as good for hatching purposes as another. Nothing can be further from the truth. Occasionally we have a poultry-man complaining about "watery eggs," but there are very few as yet who feed their breeding stock with any purpose in view other than to secure all the eggs possible. This, perhaps, is well enough, when the eggs are intended for market, and we do not intend to again breed from the hens that are overforced; as consumers do not as a rule appreciate the difference in quality of eggs, but only discriminate in favor of size and color.

When customers are willing to pay for quality as well as bulk, there will be no longer an excuse for this practice. If the eggs are intended for hatching, however, too great care cannot be taken that the breeding stock is not overforced, and that it is properly grown and well selected. This latter is a vital point, as without strong vigorous stock we cannot secure eggs that will exclude vigorous chicks when they do hatch, no matter how well the parent may have been nourished. Breeding from other than vigorous, well selected stock should not be thought of. Over forced, debilitated, or inferior stock should be discarded from the *breeding pens*. Unless the birds are well matured, the first batch of pullets' eggs will not hatch well, and the birds secured from such eggs will never flatter the breeder's vanity. Again, the hens cannot be expected to continue indefinitely, month after month, producing eggs that are well vitalized, while, after 4 or 5 months steady laying though the eggs may still be fertilized, the germs are not strong, the food yolk is defective, the germs die at all stages of incubation, and those chicks that are excluded are undersized, and show the debilitated state of the parent. In the case of the mammal, the fœtus draws on the mothers vitality during the whole period of gestation and it has the vital power to sustain life to maturity. But the case is different with the bird. Here, the transformation of the ovum into the body of the chick does not take place within the mother, but is excluded, to be developed externally, and is supplied with yolk-food for the development of the embryo. If the yolk-food is defective, either in the composition or arrangement of its constituent parts, or in the texture of its covering membranes, the germ suffers in consequence.

The normal egg contains all the elements necessary for the development of a perfect *chick* and in such an amount and arrangement as to insure its exclusion; but there is a limit to the amount of forcing a hen will stand and continue to *exclude normal eggs*.

Not only is there a limit to the number of normal eggs a hen can be forced to lay in a given time, but there is also a limit to the number she will lay before having a somewhat *protracted period of rest*. The number of normal eggs a hen will lay and the period in which she will exclude them, undoubtedly, varies with individual birds, as well as with differents breeds.

Without the data of a carefully conducted series

of experiments, no definite statements can be made. The indications are, however, that the majority of the breeding stock have been over forced during the laying season and that period too long protracted. Eggs that will not exclude 90 per cent of the fecundated germs when incubated by a faithful sitter not too long broody, are comparatively unprofitable to incubate either in point of view of cost or vigor of the stock secured. There is too great a mortality among the chicks when the percentage of hatch is low and their growth is too slow and uncertain.

S. J. ANDRES.

The Dairy.

SIZE OF DAIRY COWS.

The question of size in dairy cows has a bearing upon the economy of feeding, but the exact law practically governing the expenditure of food proportioned to the size of the animal in production does not seem to have been fully settled; yet experiments have been made which throw some light upon it.

Natural principles applied to it would appear to favour large cows, as they have less external surface for the radiation of animal heat than smaller ones, in proportion to weight. It may be stated as a general law, that the food of support decreases proportionally with the increase of size in animals. We find this to be the case nine time out of ten. I find this point illustrated in an article in a paper, without credit being given to the author, but I think it was written by Prof. Arnold. He sets out by stating this difference in the food of support according to size, but doubts its application, practically, to the production of milk; and he illustrates it by reference to three dairies: the first grade Shorthorns the second, natives, and the third Jerseys and their grades. He says:

"The dairy of Mr. A. H. Hatt, Wisconsin (about 100 cows), is a good one for setting the use of large cows in its best light. In the first place Mr. Hatt is widely known as one of the best dairy managers. He buys and milk a great many cows, and his experience and close observation have made him one of the best judges of milking qualities. He never select a poor cow. He buys large cows, and, feeding with a liberal hand, his herd is heavy. Reviewed in June, the year followfng their yield of 314½ lbs. of butter per cow, they were estimated to have an average live weight of 1,200 lbs. per head. They were in high order, and many of them could have been sent to the shambles at a good price. It would be very interesting to compare the products of his dairy with those of another having an equal number of Jerseys, or other small cows, which were treated as well as he treats his. But no such herd can be named. Good managers of less herds of smaller sized cows are often met with.

"Mr. Oliver Browning, of Delaware County, has a herd of twenty natives which, viewed in May last, were estimated to weigh 150 lbs. per head less than the herd of Mr. Hatt. They are kindly cared for, and produced last year 302 lbs. of butter per cow. Mr. Owen Smith, of the same county as Mr. Browning, has a herd of twenty-five Jerseys and their grades, all small cows. Viewed also in May, they were estimated to have an average live weight of 780 lbs. Though very skillfully managed and fed, their yield last year was 234½ lbs. of butter to a cow—a diminutive yield, compared with those of Messrs. Hatt and Browning, of 80 lbs. per cow less than one, and 67½ less than the other. Judged by the usual standard of product per cow, this dairy would by most dairymen be at once set down as the least desirable and the least profitable of the three. But, as a matter of fact, the reverse is true. Mr. Smith's dairy is the most profitable in the list, for he gets the most butter in proportion to the food consumed (that is the question at issue). As 234 is just three-tenths of 780, each of his cows (omitting the odd ½ lb of butter per cow) produces annually three-tenths of her live weight in butter."

The conclusion here is based upon, an assumption contradicting his statement, that the food of support decreases in proportion as the size increases. Had the food actually consumed by these herds been noted, the results, compared, would have been of great value. But, although I have not heard of any carefully-tried experiments in this country to determine the comparative economy in milk production of large and small cows, and the opinion of those who keep the different breeds is in accordance with the size kept, yet this question has received practical attention in Europe, where, by numerous experiments, the relation of food to product, in dairy cows of different weights,

has been very well settled, so far as to quantity in milk; but as to quantity of butter, I am not aware of any experiments actually settling it.

MILK THAT IS SLIGHTLY SOUR

It has often been observed that slightly sour milk was less healthful than that which was decidedly sour. This has been the experience of many farmers, but to my knowledge no explanation of it has so far been published. It is quite evident that the amount of lactic acid itself cannot directly be the cause of making slightly sour milk injurious, as this is contradicted by the fact that thick set milk which contains a large amount of acid is perfectly wholesome.

The following observations, which were made some years ago, in creaming milk in various stages of acidity, will throw some light on the subject:

There are a great variety of germs in fresh milk. Some of this these germs can be considered as wholesome, some as indifferent and some as injurious, according to the nature of the chemical action, which is incidental to their growth and multiplication. Speaking broadly, I may say, that the germs producing mainly lactic acid with but traces of other products, are always to be considered as wholesome, while amongst those which act mainly on the protein matter we must look for injurious kinds.

If fresh milk is exposed to average room temperature for sometime, all germs have at first an equal chance of growing. Some will act on the milk-sugar and cause an acid reaction; some germs will grow without affecting the reaction of the milk in any way, and certain protein germs will cause an alkaline reaction. The consequence is that the number of germs may have increased enormously, while the milk becomes only very slightly acid.

It may even happen, under abnormal conditions if a cow is sick or the stable very dirty, that the number of lactic acid bacteria is so small as compared to the protein germs, that the latter kind predominate entirely and the milk shows decomposition without becoming acid. Such milk is unfit for use.

After the maximum of acidity has been reached, the protein germs have generally disappeared, and sometimes it is found that one kind of lactic acid germs has crowded out all the rest. The reason is as follows: The germs have an equal chance to start with and will begin to multiply, but in a normal milk the lactic acid germs will by and by produce so much of this acid that other germs, and amongst these are the protein kind, will gradually succumb, because they cannot exist in a medium which contains much acid, and the ultimate order is a lactic acid germ which can endure the largest amount of acid.

From these observations we may infer that when the milk is just slightly acid, it contains a much larger number of protein germs, than is contained in the same milk when fresh, or when fully acid, and as we know that some of these protein germs are injurious, it becomes apparent why milk, which is harmless when fresh or entirely sour, may become injurious when just slightly sour.

H. WESTON PARRY.

April, 11th. 1899.

THE EFFECT OF THE FIRST IMPREGNATION ON FUTURE PROGENY

Not long since, we heard a very successful breeder of Holsteins declare that he deemed the first impregnation of his heifers the most important of any, and that he would subject himself to greater expense, to secure for them a valuable and potent sire than at any other time in their subsequent history. His claim was that he had notice that if the first calf was from a very superior sire, the cow would show the influence of that sire in all subsequent progeny.

This theory has been stoutly contended, for, and as stoutly opposed, for years. Yet, nearly all the leading naturalists of the world have believed it to be true. In *Hoard's Dairyman*, of May 2, 1890, Mr. Thos. M. Harvey, the noted Guernsey breeder, of Pennsylvania, gave a very interesting and extended article on the above named subject.

In this article, he cited various eminent authorities, in proof of the soundness of the theory. Of these he quoted Dr. Manley Miles as saying:

"The influence of the male in the process of procreation is not limited to his immediate offspring, but extends also through the female that he has impregnated, to her offspring by another male. Paradoxical as this statement may appear, there are many well authenticated cases on record, that cannot be satisfactorily explained on any other hypothesis."

The close observing Darwin remarks:

"Many well authenticated facts have been published, and others have been communicated to me,

plainly showing the influence of the first male on the progeny subsequently born by the mother to other males."

Prof. Agassiz and several eminent physicians contribute their experience in confirmation of the thoory.

Mr. Harvey gives a very interesting instance relating to the first importation of Guernseys, into the United States, by Nicholas Biddle. He says:

"When I first visited Judge Biddle's herd, at Andalusia, some sixteen years ago, I saw there a fine Guernsey cow, without horns, a muley. This excited my curiosity, as I had not heard of any muleys among Channel Island cattle before. Upon inquiring, I learned the history of her about thus: The Biddle's first importation consisted of three cows only, no bull; in this extemity, they were compelled to let one of them (Jennie Deans) be served by a neighbor's scrub bull. Not anything strange that the calf came to be a polled.

Bnt to illustrate our subject; the same cow in after years, when served by a throughbred Guernsey bull, having horns, produced some calves without horns, clearly showing how she had been affected by the muley scrub. See our Guernsey Herd Book, No 8. Muley was the dam of No 10 cow June, the muley I saw. In a letter from Judge Biddle, received last week, he says my statements that I had referred to him were about correct, and they are detailed above. He also informs us that Prof. Gibson on examining of this case, said he saw no muleys on the Island of Guernsey, and our neighbor, S. C. Kent, reports the same."

The obvious lesson from the above facts is, that every farmer, and particularly the dairy farmer, should pay particular attention to the *quality* of the bulls they place at the heads of their herds. A most foolish notion prevail with many that a cheap animal is as good as any other. Do they stop to think that the quality of all our dairy breeds can only be raised by breeding always from the best? We have seen lots of farmers scale down the quality of their herds in a few years by their indifference to the kind of bull they used. Then again, we have seen a wise one, here and there, scale the herd up by the opposite course.

There are any quantity of male calves that should never be permitted to serve. A certain Jersey breeder recently told us that he turned all his refuse males over to the farmers, who would not pay more than $25 to $50 for a bull. We asked him what would be the result of that policy on their fortunes. His reply was significant: "Well, I am not seeking their fortune. They had rather buy a failure for $25 than a success at $100, and I am willing to let them have their own way." When we consider the long time influence of the male on the heifer, is he a wise man who buys a poor cheap bull in preference to a good one, even though the price for the latter is greater?—HOARD.

INFLUENCE OF THE MALE

There are very few gray thoroughbred horses. We only recollect three or four in a longish experience of the turf. A thoroughbred brown mare was once, accidentally, served by a gray stallion of mongrel parentage. A brown foal was the issue; but though the mare was subsequently the dam of 9 foals, all got by brown, bay, or chesnut thoroughbred stallions, every one of the nine showed signs of the colour of the first conqueror of the mare's maiden-bed; there were more or less gray hairs on every one of them.—ED J. OF AG.

THE DAIRYMAN'S ANXIOUS TIME

Through winter dairying is now largely practised in many parts of Canada, dairymen as a rule have not adopted the practice of having the bulk of their cows drop their calves in the fall instead of the spring. Farmers who have tried this plan, and have had suitable winter conditions in the way of good stabling, feed, etc., claim that much more can be made out of the cows than by having them dropping their calves in the spring, as is the general rule. While we endorse this view in cases where the farmer has good cows, and has a warm, comfortable stable, with a liberal supply of good succulent food for his cows, we hardly think it wise for every farmer to do so. At any rate, it would be foolish to do so unless the proper conditions were provided for the care of the cow, as outlined above. However, as the large majority of our farmers have their cows calve in the spring of the year, a word of advice will be in season.

The dairyman's greatest anxiety is at calving time, and the better milkers he has the greater will be his anxiety. As a rule, a "scrub" cow that is good for almost nothing will come through the calving period without much difficulty. But a cow that gives a large flow of milk, and keeps up a good supply during most of the year, runs a far greater tisk than the poor milker. The greatest

danger will be from milk fever, a disease that once it takes root is hard to cure, but which can be prevented where rational methods are adopted. And here let us state that it would be wise to adopt preventive measures in all cases. When possible a cow should be dried off for a few weeks before the calving period. This can easily be done, except in cases where a cow is a very persistent milker, and gives a large flow of milk even up to near the time of calving. In such cases it might be injurious to check the flow of milk too suddenly, and a good cow might be spoiled. The average cow can be dried-off by reducing the grain feed, though not enough to cause any serious loss of flesh, and by gradually milking less thoroughly and less frequently.

After drying-off, the grain food should be resumed, in small quantities at first, and of the right kind of food, so as not to starve the calf or prevent the cow from making bag. Bran in slop, oats, a little oil meal, and such like, are the kind of foods to give. Corn and all heating foods calculated to produce feverishness should be avoided. The cows should be watched to see that there is no constipation, and that the bowels move freely without scouring. Where necessary, some Epsom salts can advantageously be given a week before the calf is due. When calving time comes make the cow comfortable, with plenty of good bedding. Every farmer should have a box stall in which a cow may be put when she is about due to calve. If the weather is cold, chilling should be guarded against, and the drinking water should be warmed for two or three days after the calf is born. If there should be any symptoms of fever give a little aconite. As we have already stated, preventive measures are wise and, if the cow has been properly prepared for the calving period, there is not likely to be any trouble.—*Farming.*

FODDER CHEESE.

To the Editor of the JOURNAL OF AGRICULTURE :

Dear Sir. The season of cheese making will soon be on again, and now is an opportune time to take a look at the situation, and make some suggestions.

At present, the outlook is rather bright and the prospects are in favor of fair prices, provided there is no fodder cheese made. It is just two years ago since present conditions prevailed : for the first 4 months of that season 1897, prices were exceedingly high, an enormous make of cheese was the result, and for more than 12 months we had a dull and dragging market. The increase in the output of butter, last year, has had something to do with the present healthy condition of the cheese market. From those who are well posted, we hear that the people in Great Britain are not using quite so much cheese as formerly, while the increase in the consumption of butter is gradually growing larger ; the average increase for the past 10 years, having been about one million a year, while during that time the cheese consumption has remained very nearly stationary. The present high price of butter ought to prevent many from starting to make cheese very early. So from every stand-point the outlook for cheese is very good : that is, if very little fodder cheese is made.

I would advise every one to make as little fodder cheese as possible. It is never a very desirable article at best, and if there is none made, the cheese market for the first 3 months of this year will be a good one. Factories that are equipped for both butter and cheese, will be in a position to make what ever will pay best. We are very near the danger limit in cheese making and should the output be very much increased, the price will certainly fall ; while on the other hand we can increase our output of butter tenfold without very much affecting the price of that article. Last year, about this time, I wrote an article in the JOURNAL advising farmers not to make any fodder cheese. I do not pretend to say that it was the reason there was not much made, but it was a fact nevertheless, but there were such enormous stocks in Great Britain and in Canada that the most of this last season passed without the effect being noticed, but it came at last, and during the past 4 months high prices have prevailed. If there is no cheese made in Ontario until the 20th or 25th May, the first 3 or 4 months' cheese will rule high. It is to be hoped that all who are prepared to make butter will do so until the grass comes, and that those who are not in a position to make butter will delay making cheese as long as possible : then the cheese market will be all right for 1899. The dairy industry has grown to wonderful proportions in the last 10 years, our future is now to capture the English market for our butter as we have for

the cheese and when we do, our farmers will be prosperous and healthy.

Yours very respectfully,

PETER MACFARLANE.

Chateauguay, 24th Feb. 1899.

THE PARIS UNIVERSAL EXHIBITION OF 1900

This exhibition is attracting world-wide attention and is expected to afford a most complete representation off all countries, products and manufactures of the world. The French authorities have invited all nations to participate, and nearly all have accepted the invitation.

The British Government has appointed a very strong Imperial Commission, with His Royal Highness the Prince of Wales as Chairman, and this Commission has invited the co-operation of the British colonies.

For the purpose of securing and organizing a proper representation of the Colonies, there has been named in the Imperial Commission a Colonial Committee. Canada was, about a year ago, invited to name a representative on this Committee, and the Government responded by nominating the High Commissioner in London, Lord Strathcona and Mount Royal. Lord Strathcona and Mount Royal was chosen by this Committee their Chairman, and was appointed the representative of the Colonies on the general Executive Committee of the Imperial Commission : so that Canada occupies a very honourable and advantageous position upon the Imperial Commission, the more so in consequence of the high standing in London of her representative.

The French Exhibition authorities deal exclusively with the British Imperial Commission in regard to all matters connected with the participation of each and every part of the British Empire in the exhibition. The Colonial Committee in London with the object of affording an abundant opportunity to the British Colonies for proper representation, abtained the privilege of a special building set apart for the occupation of these Colonies. Much correspondence and negotiation has taken place between the Imperial Commission and the French Authorities in regard to the concession of a separate building. &c. It was not until the 1st January, 1899, that this was finally granted nd the conditions fully determined.

In the course of this correspondence it became evident that the space thus accorded to the Colonies as a whole was such that the portion allotted to Canada would be quite incommensurate with the requirements of the Dominion. On representations made to this effect we have been able, however, to obtain a considerable additional allotment in the space accorded to the British Empire over and above that granted us in the special Colonial building.

The Colonial building finally decided upon, situated on the Trocadero grounds, overlooking the Champs de Mars not far from the great Eiffel Tower, covers 36,000 square feet, of which Canada has been allotted 27,100 square feet. In the Canadian portion of this building exhibits of all characters and classes can be placed, the space being entirely within the control of the Canadian authorities.

The general plan of the exhibition is to have the exhibits divided by classes in 18 general groups according to their nature, without respect to the country from which they come. Thus, the portion of the Imperial space which has been granted to Canada, apart from the Colonial building, is distributed through the different buildings according to the different classes, and in this space the exhibits must appear as exhibits of the British Empire, and cannot be grouped as coming especially from Canada, although each exhibit will be clearly marked with the name and full address of the exhibitor. There is, at the present time, 12,000 square feet of such space granted to Canada by the Imperial Commission.

It will be seen at once that the whole space at the disposal of the Canadian authorities is very limited in proportion to the capabilities of the country, and, therefore, it is evidently of importance that there shall be a careful selection of exhibits such as to ensure that only the best representative examples or specimens of each kind shall be sent, and the reputation of Canada's products be maintained or established. It thus becomes necessary that the exhibits shall be so arranged as to be of a national character, illustrative of the products, arts and manufactures of the entire Dominion, without respect to locality of origin.

The Government proposes to arrange for some exhibit in certain classes, but even in those must very largely depend on the various local organizations and on private individuals to supply specimens,—for instance, in mineral, agricultural,

fishery, or forestry exhibits,—which will ensure a fair representation of all parts of the country. In the classes of manufactured articles the chief dependence must be placed upon the enterprise of private companies and individuals.

It is decided that the Government will undertake, at the public expense, the transportation of all exhibits from certain seaports of the Dominion to Paris ; and that the unpacking. setting up and care of the exhibits at Paris, and the repacking and return to the shores of the Dominion of such exhibits as are not disposed of at Paris, will also be managed at the public expense.

The rules and regulations for exhibitors, as well as the full classification of the exhibition, are given in following pages. Further information, if required, can be obtained from the Secretary of the Canadian Board of commissioners, or from the respective members of the Board at their local addresses.

OTTAWA, 24th January, 1899.

GENERAL REGULATIONS FOR CANADIAN EXHIBITORS.

1. *Opening and Close of Exhibition.*—The Exhibition will open on the 15th April and close on the 5th November, 1900.

2. *Applications for Space.*—Forms of application for space must be returned to the Canadian Commission, Department of Agriculture, Ottawa, *as early as possible*, and in any case not later than *the 1st June, 1899.* All applications will be considered by the Commission, but owing to the limited amount of space at their disposal, the Commissioners cannot undertake to allot the whole or any part of the space applied for, their object being to secure the best possible exhibition of Canadian goods in each group. There will be no charge to exhibitors for space.

3. *Date of Reception of Exhibits and Transportation.*—Accepted exhibits from Quebec, Ontario and the West, packed in strong cases, must be delivered, at the exhibitors' expense, at the *Customs Warehouse, Montreal,* or *the Queen's Wharf, Quebec,* not later than *the 1st of November next, 1899 ;* and exhibits from the Maritime Provinces at Halifax, N.S., not later than the 15th November, 1899, to be shipped to Paris by the Canadian Commission free of charge. Exhibitors will be free to ship their goods by other routes not later than *the 1st January, 1900,* but at their own personal expense.

4. *Prohibition of Transfer of Space or Substitution of Exhibits.*—No exhibitor will be permitted to transfer his allotment, or to allow any other than his own duly accepted exhibits to be placed thereon. All goods must be exhibited in the name of the person or firm who signed the form of application.

5. *Forfeiture of allotted Space.*—Space not occupied thirty days previous to the opening of the Exhibition will be forfeited, and allotted at the discretion of the Commission.

EXHIBITS.

6. *Position of Exhibits.*—Exhibitors will be required to place their exhibits so as to contribute as much as possible to the general effect. The whole of the arrangements relating to show-cases, signs, notices and all similar matters, will be subject to instructions issued by the Commission.

7. *Maximum Height of Stands, &c.*—No stand, including sign-board, may exceed twelve feet in height, without special permission.

8. *Uniformity of Decoration.*—In order to ensure uniformity of decoration and general effect, no exhibitor will be allowed to put up flags, banners, or any other kind of decoration, without special permission from the Commission.

9. *Railing of Exhibits.*—Exhibitors may place railings round their stands, subject to approval. In every instance the railings must be within the space allotted.

10. *Partitions.*—No partitions may be erected between the stands without permission from the Commission, nor anything put up to interfere with the sight of adjoining stands, or to impede the general view in all directions throughout the building.

(*To be continued*).

Manures.

MANURES AND FERTILIZERS

When Green Manuring is Profitable.

PROF. WILLIAM P. BROOKS, MASSACHUSETTS.

In the majority of instances a crop which has been grown will be worth more to feed than it is for turning under. A crop standing in the field has a certain value as a means of soil improvement, a certain manurial value. It has also, in almost all cases, a certain value as food. It may be used

as a food either by pasturing it or cutting and feeding in the barn. In either case, under proper management the excreta of the animals consuming the crop will be worth as manure about three-fourths as much as the entire crop would be worth if incorporated in the soil. If we turn the crop under, then in the one case we get its full manurial value. If, on the other hand, we feed it and carefully save and apply the excreta, or if we pasture and so manage that the droppings are evenly distributed, we have the food value and about three-fourths of the manurial value. The sum of these two in the great majority of instances will be greater than the full manurial value. There are, of course, conditions under which the crop cannot be profitably fed, either because of the absence of stock necessary to consume it or because of the location of the field. In such cases, the turning under of the entire crop may be wisest.

There can be no doubt that the latter practice is much more often in place upon light and sandy soils than upon the better soils. Upon the light and poor soils, legumes, not finding nitrogen in the soil, are forced to take it from the air. Upon the richer soils they would take it from the soil itself and there would be no essential increase in this element as a result of green manuring. This has been very strikingly shown by Julius Kuhn. Kuhn's experiments were carried out in 1891 at Haile, Germany. The soil was a good medium loam. It had produced wheat in 1890. After the wheat was harvested a mixture of 194 lbs of peas, 44 lbs of vetch and 35 lbs of yellow lupine seed per acre was sown. The resulting crop was plowed under the last of October and rye was sown. The quantity of green material plowed in amounted to 8650 lbs per acre. This supplied about 50 lbs of nitrogen. In the spring of 1892 the field was sown to barley, and also an adjoining field not green manured. The crops were practically equal under the two methods of treatment. In this case, then, green manuring produced no appreciable benefit. Kuhn estimated that the crop plowed in would have been worth for feeding about $13 per acre. On the other hand, the same experimenter found that on a sandy loam, green manuring with field peas sown in the rye stubble after harvesting increased the crop of barley the following year to the same extent as an application of about 175 lbs of nitrate of soda. In the latter case, green manuring paid, while in the first it was attended with loss.

FERTILIZING INGREDIENTS IN ROOTS AND STUBBLE IN ONE ACRE.

Plant analyzed.	Depth of soil from which roots taken.	Roots & stubble (water free), lbs	Nitrogen, lbs.	Phos acid, lbs.	Potash, lbs.
Timothy and red top.....	3 ft	8223	90.1	25.2	55.8
Buckwheat.....	1 ft	483	4.4	1.3	3.8
Cowpea.....	28 in	1904	25.9	7.5	20.6
Clover.....	3 ft	2806	60.2	15.1	45 4
Vetch.....	22 in	1555	27.2	7.2	27.7
Yellow lupine.....	30 in	1429	15.7	4.9	23.4
Blue tupine.....	30 in	1256	10.7	2.9	12.5
White lupine.....	30 in	1034	11.0	1.9	10.7
Horse bean.....	22 in	1759	31.8	6.1	19.5
Soy bean.....	22 in	701	8.6	2.2	5.7

Numerous experiments in the United States establish beyond a doubt the possible benefits of green manuring upon the lighter and poorer soils. It is important to point out that even when the crop is fed the manurial value of its stubble and roots may be considerable. Especially is this true concerning the legumes (clover-like plants). A great deal of work to determine the manurial value of the stubble of different crops has been carried out at the Storrs school experiment station, Ct. Some of the leading results of Prof Wood's investigations are shown in the table.

It seems desirable to remark, in connection with this table, that while the work was no doubt accurately done it appears doubtful, in view of known facts and the results of others, whether the results of these investigations do justice to the plants of the clover family. Indeed, in his report the author quotes results of other investigators, showing several times more nitrogen in roots and stubble of clover than his own investigation discovers. Thus, for example. Dr Voelcker of England is quoted as reporting 100 lbs of nitrogen per acre in the roots only of clover, while Dr Weiske of Germany is quote as reporting 180 lbs in the roots and stubble. Dr. Weiske is also quoted as reporting in the roots and stubble of rye 62 lbs of nitrogen per acre, of barley 22 lbs. of oats 25 lbs. of buckwheat 45 lbs. of peas 53 lbs and of lupines 58 lbs. Though differing in detail, all these results demonstrate in a striking manner the fact that stubble and roots have a large manurial value. It would seem, therefore, in the great majority of instances that the feeding of the crop, the careful saving and application of the excreta of the animals consuming it, together with the manurial value of the stubble and roots, will give us the largest possible returns.—*Homestead.*

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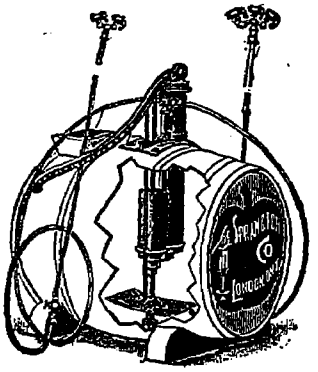

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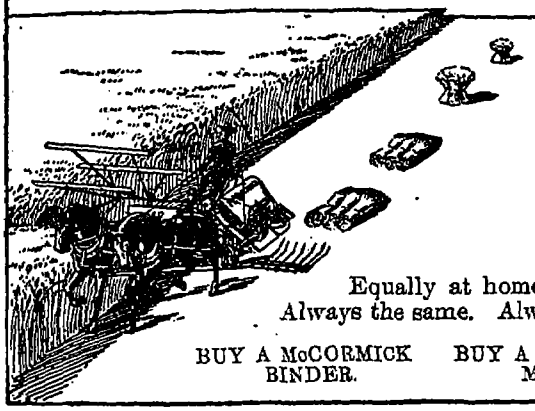

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