Technical and Bibliographic Notes / Notes techniques et bibliographiques

Canadiana.org has attempted to obtain the best copy available for scanning. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of scanning are checked below.

Canadiana.org a numérisé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de numérisation sont indiqués ci-dessous.

- ☐ Coloured covers / Couverture de couleur
- ☐ Covers damaged / Couverture endommagée
- ☐ Covers restored and/or laminated / Couverture restaurée et/ou pelliculée
- ☐ Cover title missing / Le titre de couverture manque
- ☐ Coloured maps / Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black) / Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations / Planches et/ou illustrations en couleur
- ☐ Bound with other material / Relié avec d'autres documents
- ☐ Only edition available / Seule édition disponible
- ☐ Tight binding may cause shadows or distortion along interior margin / La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure.

- ☐ Coloured pages / Pages de couleur
- ☐ Pages damaged / Pages endommagées
- ☐ Pages restored and/or laminated / Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached / Pages détachées
- ☑ Showthrough / Transparence
- ☑ Quality of print varies / Qualité inégale de l'impression
- ☐ Includes supplementary materials / Comprend du matériel supplémentaire
- ☐ Blank leaves added during restorations may appear within the text. Whenever possible, these have been omitted from scanning / Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été numérisées.

☑ Additional comments / Commentaires supplémentaires: Continuous pagination.

THE JOURNAL OF AGRICULTURE AND HORTICULTURE

VOL. 2. No. 8 — This Journal replaces the former "Journal of Agriculture," is delivered free to all members of Farmers' Clubs. — OCTOBER 15, 1898

..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

LA PATRIE PUBLISHING CO.,
77, 79 & 81 St. James St., Montreal.

Subscription: $1.00 per Annum payable in advance.

Table of Contents

Notes by the Way.

Wheat-supply of the future.—Whether or not Sir Wm. Crookes derives his information from spiritualistic sources, in which he, almost alone of our modern men of science, is a devout believer, we are not aware; but, at the Bristol meeting of the British Association, at which he presided, he gave vent to a most terrific warning as to the probability, nay, certainty, of the wheat-supply of the world falling short of the demand of hungry mouths within a generation of the present day, unless people grew wiser in the interim, and flew to cast themselves at the feet of the chemist, imploring, like a lot of feeble children, his aid against the impending famine.

But he did not leave his hearers comfortless; he mercifully assured them that the chemist would come to their rescue by converting the nitrogen of the air into nitrate. This, as they already knew, had been done already by the combustion of the air effected by electricity; coals, or other fuel, were not sufficiently cheap to effect this transmutation; water-power would have to be used, and Niagara alone was able to supply all that was needed. Thus, Sir William Crookes added, it was possible to raise the average wheat-yield of the world from 12¾ bushels to 30 bushels an acre!

Now this prophesy falls on incredulous ears to-day. It might have been all very impressive a few months ago, when the Leiter conspiracy had run up the price of wheat in the London market to all but sixty shillings a quarter—$14.40=$1.80 a bushel; — but now, when the price has fallen to just half that sum, and will, very likely, go still lower, we fancy very few people will "take much stock" in Sir William Crookes' vaticination.

It would seem as if the learned professor had

lost sight of the fact that the true incitement to wheat-growing is the hope that it may return a profit, and not the desire to benefit humanity. We remember well travelling on the Eastern Counties line up to Mark Lane market, in company with a number of Cambridgeshire farmers, just as the price of wheat was rising in anticipation of the Crimean war. "Ah! said one of them, bread will be dear to the poor man this year." "I don't know about that," remarked the then well-known Tom Webb; "what I do want to know is, have they got them stones out of the Danube yet?" The *stones* were the rocks that impeded the navigation of the great river, and their removal would lower the price of freight and therefore of wheat, which was already at 80s a quarter—$2.50 a bushel.

No, there is not much danger of starvation on a large scale. If the price of wheat rises, intensive cultivation will speedily re-inforce extensive cultivation, and when wheat is really worth growing, there is no fear but that it will be grown.

Heat in England.—It was hot enough here last month, and the hot wind of Sunday, September 4th — 94° in the shade,— is not to be forgotten; but fancy 80° in doors in England, and the poor soldiers, in their regimentals exposed to the full glare of the sun on the bare space of Salisbury Plain, the scene of the annual manœuvres! No wonder a good many stacks of hay, both meadow and clover, perished from spontaneous combustion. It may, and probably will, surprise many of our readers to hear that the temperature of the hay in a stack, if the contents are to turn out of the best quality, should rise to 130° F.; if that temperature is obtained, the hay will probably have a nice, rich smell, and a good colour, which in clover should be nut-brown.

Irish crops.—We are glad indeed to see that the crops in the Green Isle, this year, are very good. Out of 66 reports on wheat, 35 are given as over average, 28 as average, and only 3 as under average. Barley, 59 reports: 38 over average, 21 average, 0 under average. Oats, 120 reports: 49 over average, 68 average, 8 under average. Potatoes, 120 reports: 30 over average, 87 average, 3 under average. Hay and pasture equally satisfactory. We had too many County Galway friends in our younger days not to feel a deep interest in the prosperity of their beloved home.

Milk substitutes.—We have never tried any of the numerous advertised substitutes for milk in the rearing of calves, and therefore can give no opinion pro or con on that subject. We have always found skim milk and a little crushed linseed, properly prepared, brought calves forward fast enough, without too much or too little bone. But, we met with a statement the other day, in the *English Agricultural Gazette*, that seems worthy of attention:

ECONOMY IN PRODUCTION.

"The milk substitutes now manufactured are, however, so good that those graziers who are unable to keep even the small number of cows requisite to rear calves on this system can, although they may have to buy the calves at three days old, depend on their satisfactory rearing on soups from these milk substitutes. I write the more confidently on this point, as I recently had an opportunity of inspecting the large dairy herd of the Reading Sewage Farm, where there were over a hundred calves of different ages, the whole of which had been, or were being, reared on milk substitutes. I never saw healthier ones, not a single scourer being among them. They also seemed very thrifty, although, being reared for the dairy herd, they had received no extra feeding stuffs.

"Now, it must be very patent to the most superficial observer that a change of system of this kind made by our graziers would be attended with several highly beneficial results, and that if anything would enable them to make profits when beef sells for only 6d. per lb., its adoption would do it. Among the former must be reckoned the saving of calf life by raising so many calves for beeves, which but for the system would be slaughtered at an early age. In the next place Mr. Long's ideal of more general cattle improvement for grazing purposes would be carried out better than it could be in any other way, with the great result that butchers and consumers would have just the kind of meat they crave for, the small joints of young animals not made too fat. The highest classes of consumers have been perfectly willing for some years past to give 2d. per lb. more for joints of this kind, but even, if on the average the wholesale price were only a penny a pound more than the market rate for good ordinary meat, graziers would be able to compete with foreigners all the better. The system is therefore well worthy of trial, especially as feeding animals while in

a state of growth have long been admitted to be the most profitable kind of grazing." J. D.

Mr. Long, mentioned above, is the English Minister of Agriculture. At the luncheon given by the Duke of Portland to his Welbeck tenants, Mr. Long quoted certain figures showing how enormously the imports of dead meats had increased.

Basic-slag.—This phosphatic manure, which is becoming popular everywhere, will be largely used this autumn in England. We have no information as to its price here, but at Liverpool, the brokers quote it at the following rates:

Prime quality, guar't'd	30 to 35 o/o	phos	in bags,	$7.44	to $7.56
" " "	35 to 40 o/o	"	"	7.92	to 8.10
Finest " "	38 to 45 o/o	"	"	8.28	to 8.88

All at the depot, and per ton of 2240 lbs. As a fair dressing seems, from all accounts, to be about 600 to 700 lbs. an acre, it cannot be esteemed an extravagant manure. Like potash, it should be applied in the fall, as it takes some time to become assimilable by plants.

We wish some careful farmer would try the following experiment on land in preparation for swedes: Four hundred and fifty pounds of finest basic-slag spread *on the ploughed land*, now, or at any time before frost; 250 lbs. of best superphosphate (mineral) drilled in with the seed in the last ten days of May next. No dung. Perhaps Mr. Principal Le Moyne will try this.

Treacle, as the English call *molasses*, is once more looking up as a cattle-food. The price quoted, less than a cent a pound, seems reasonable enough, and when it is desired to get cattle to make away with a great bulk of straw, few things can compete with a dose of molasses and water sprinkled on a lot of straw-chaff, and the heap allowed to sweat for a few hours. Of course, it will help to fatten all sorts of stock.

Kerries and Shorthorns.—Lord Aylmer's letter, on page 175 of this number of the JOURNAL is worthy of attention. Our opinion of the Shorthorn dairy-cow is too well known to our readers of the last 20 years to need reiteration. Of the Kerries we have no practical knowledge, but Lord Aylmer's recent visit to Ireland doubtless enabled him to renew his acquaintance with the breed, and hence this recommendation of it.

We fear that the editor of *Hoard's Dairyman* will not be pleased with the statement that "This breed of cattle (Shorthorn) has ousted all other breeds in all the large dairy-counties, both in England and Ireland, through its remarkable combined qualities, as a milk and beef producer."

Mr. James Cochrane, of Hilchurst, who, as we mentioned some months ago, is importing a herd of pure-bred Shorthorns of the best milking tribes, will, doubtless before long, favour our readers with an account of his newest acquisitions.

THE ROMAINE AUTOMATIC AGRICULTURAL MACHINE

Last week, in company with Mr. Wm. Ewing and Mr. R. J. Latimer, of Montreal, I had the pleasure of inspecting the latest development of the Romaine Automatic Agricultural Machine in operation on a field in the rear of Mr. Trenholm's farm at Long Point, Montreal. The machine at present weighs about 6,000 pounds, and is driven and operated by gasoline engines. It is arranged to work the land in four foot widths, and, while it will work any depth required in ordinary lands, it was being run but five inches deep. Anyone acquainted with the Long Point clay (which might be fairly described as equal to hard pan) will readily understand that five inches was a good deal there. The action of the machine can scarcely be called plowing, in the ordinary sense, as it is rotary. Nevertheless, as the knives travel around at the rate of about 100 turns per minute, they really act like a lot of small plows working in a circle. They are not forced down into the ground, but get their depth and hold it by a draft similar to that of the plowshare. The present machine has two of these revolving discs, with four plough knives on each, and, as the discs are two feet in diameter, a four-foot land is worked. The machine moves steadily along at the rate of ten inches to each revolution of the knives, and, there being four knives on each disc, each one takes about two and a half inches' cut ahead. Travelling around in their circle, the knives again traverse or cut through the soil which has been loosened, and the result is a most complete pulverization of the soil, which is rarely attained, even in favorable soils, except by the spade. There is no doubt in the world as to the quality of work done by the machine, and as it can be done at a

remarkably low price, it looks as if the problem of the cheap cultivation of large tracks of land has been solved. The advantage of such a machine in backsetting new lands can scarcely be estimated. The present machine can handle about five acres a day, but another is to be built with a capacity of fifteen acres daily. Mr. A. A. Barnhart, to whom the evolution of this machine from a crude idea to the present stage is due, has shown wonderful perseverance and high mechanical ability, and is deserving of the highest praise. I understand Mr. Alliston McKay, of Chatham, contemplates having his land prepared by Mr. Barnhart, and no doubt there is lots of land awaiting the coming of this promising labor-saver.

Farming. BASIC.

The Dairy.

SEASONABLE NOTES FOR DAIRYMEN

October will soon be with us, with its constantly varying temperature and weather. Bright, warm, sunny days, coming hand in hand with cold frosty nights, suddenly lost sight of in a week of bleak, raw and rainy weather, with an occasional flurry of snow. This sort of weather, with its natural results, frozen grass, wet pasturage, etc., etc., is not best adapted to the profitable management of the dairy herd.

Newly calved cows or heifers, and big milkers, must be kept in the stable during night and during all inclement weather. A cow may be permanently or temporarily ruined by just half an hour's exposure. It is not wise, with an eye to the pocket, to tempt Providence, and leave valuable cows out to weather every storm, neither is it humane. It would be interesting to note the result of treating two cows, giving the same quantity of milk, in the two opposite manners. Leave one out to rough it, and treat the other as any one would wish to be treated oneself, if one could imagine oneself in the cow's place. This little experiment could be very easily carried out by any dairyman who needs convincing. He would find out then, for himself, just what others, who have tried already, could have told him ; first, that the poor cow having to rough it would shrink nearly one-third in her milk yield and considerably in its quality also, on account of the discomfort she must undergo, and the far greater proportion of her food which she must utilize in producing heat for her body, which would under more considerate treatment show itself in the milk pail. He would find himself with a far less valuable cow to winter than might with care have been the case, it being impossible, except perhaps with extravagant feeding, to raise the quantity of milk again to where it once was, and from where it need never have shrunk half so much. I am unable to discover records of any experiments in this line, with the exception of a clipping from the Indiana Experiment Station's " Bulletin No. 47, " in Gurler's " American Dairying." In this interesting treatise, on the " Effect of Exposure on Milk Cows," the following points of importance are brought out:

1. That cows exposed during the day to the inclemency of winter weather ate more food than those given the shelter of a comfortable cowhouse.

2. That cows thus exposed gave on an average less milk per day than those not so exposed, and much less milk as a total, during the experiment, which extended over forty-eight days in January, February and March.

3. That the cows which were exposed to the weather during this experiment lost in weight, while those given shelter gained in weight.

4. That there is a difference of $12.79 in favour of shelter for cows in winter.

Considering this experiment from the financial standpoint, including cost of food eaten, weight of milk secured, and animal weight lost or gained, we get the following results in favour of the sheltered lot :

Saving in cost of food eaten	$4.23
Value of difference in milk secured (161.1 lbs at 15 cents a gallon)	2.79
Value of 231 lbs. flesh gain at 2½ cts a pound	5.77
Amount saved by sheltering 3 cows 48 days	12.79
Amount saved by sheltering 1 cow 48 days	4.26

Prof. C. S. Plumb, Director of the Indiana Agricultural Experiment Station, who made this experiment, offers the following observations :

" A reasonable amount of exercise should be given farm animals, and pure air ought to be available at all times, but no animal should be exposed to weather conditions that involve suffering, neither ought farmers to expose stock in such a manner as to cause them financial loss. Beef cattle with thick mellow hides and heavy coats of fine hair may be exposed to outdoor conditions that would cause thin-skinned milch cows to suffer

and show the injurious effect in the pail and feed account. Dairy cows are more sensitive in temperament and require warmer winter quarters as a rule than do beef cattle."

Although this experiment apparently took place in mid-winter, nevertheless, the same principles will apply throughout the entire year. Perhaps with cows as with men, at no other time are we more susceptible to chills and damp than in the Fall. Up to a certain point fall pasturage and weather is as good as in any other part of the year. But after one or two hard frosts it is well to give extra care to the newly calved cows, and all those cows expected to milk well throughout the winter. To the rest it is well to offer some nice hay when they come in at night, and if they eat it with relish, one may be pretty certain the season has arrived to gradually change the herd from pasture to stable for the winter. They may be allowed in the field a few hours on all pleasant days until snow flies, but without expecting them to get much besides water and exercise. Before housing them for good, the feeding should be, by gradual steps, completely changed to the full stable diet. Meanwhile, or on leisure days earlier in the year, the cow house should be prepared for its occupancy by the herd throughout the winter. Boxes, stalls, and feeding troughs or floor should be thoroughly cleaned and disinfected, so that no animal can discover or be subjected to any unpleasant traces of another and previous occupant of the place. Then, assign every cow her particular place for the winter, and gently insist upon every one being always in its own place. Bedding, absorbents, etc., should be provided in ample time for all to be quite dry. Use no damp material under a cow, no rotten straw, and no moist earth or saw dust. In short, see that each cow comes into the house in the best of condition for the purpose she is kept, namely to produce milk, and see that the cow-house, food, and bedding provided are in the best of condition to aid the cow in her work.

H. Weston Parry,

Sept. 27th., 1898. *Compton.*

COMPETITION OF DAIRY-PRODUCTS

The second of the competitions of dairy-products organized this year by the Department of Agriculture, was held in Montreal on the 17th Sept. Many of the cheeses fell very far short of excellence. This was partly due to the terrible hot weather of the past summer, during which the patrons should have devoted more than ordinary care both to their cows and their milk; unfortunately this additional care was not always given; hence, a depreciation in the quality of the cheese.

Besides, most of the cheeseries are badly arranged, and having no proper ripening-chambers the cheese has not been matured under favourable conditions.

This is a very sad state of things, and likely to greatly injure our export-trade. If it is general, it is a year lost to the good reputation of our cheese, and our competitors, more careful than we to preserve the English trade, will largely profit by it, to our loss of position. This shows the importance of the advice that we never cease to pour into the ears of the patrons, namely, to take the greatest possible care of their milk, to provide all things necessary for that purpose in hot weather, and to take their milk to no factories except those in the reception of plenty of milk, that are well supplied with all necessary implements, etc., and are fitted up with proper ripening-chambers, in which the requisite temperature can be preserved even in the very hottest weather. For it stands to reason that, in factories that only receive two or three thousand pounds of milk a day, the bad milk of a single patron will injure the quality of the cheese of all the other patrons; whereas, in a factory that receives a large quantity of good milk, the same thing will not occur.

Moreover, makers must be very critical as to the milk they accept. If they take in bad milk, they will turn out bad cheese, and the profits of the more careful patrons will be thereby lowered: hence, a loss of reputation of the cheese of the Province when sent abroad, which, as we said just now, is a most momentous evil, to say nothing of the injury inflicted on the character of the maker himself.

In the two competitions, there were nine bronze medals and only one silver-medal assigned to competitors.

The names of the competitors who obtained the medals:

Competition of July 31st, 1898.

BUTTER

1st.—Joseph Beaudet, St-Damien de Buckland, Bellechasse, 99 points, prize of $14.00 in money, a silver-medal, and a first-class certificate.

2nd.—Elzéar Fortier, Ste-Anne de Beaupré,

Montmorency, 93½ points, prize of $2.00 in money, a bronze-medal, and a second-class certificate.

CHEESE

1st.—Louis Bibeau, St-Flavien, Lotbinière, 94½ points, $4.00 in money, a bronze-medal, and a second-class certificate.

2nd.—Eugène Boucher, St-Flavien, Rimouski, 93 points, $2.00 in money, a bronze-medal, and a second-class certificate.

Competition of September 17th, 1898.

BUTTER

1st.—Pierre Caron, St-Camille, Wolfe, 94 points, $3.00 in money, a bronze-medal, and a second-class certificate.

2nd.—Archez Allard, St-Paul l'Ermite, l'Assomption, 93 points, $1.00 in money, a bronze medal, and a second-class certificate.

CHEESE

1st.—Jules Fradet, Malbaie, Charlevoix, 96 points, $7,00 in money, a bronze-medal, and a second-class certificate.

2nd.—Joseph Véroneau, Valcourt Ely. Shefford, 94½ points, $4.00 in money, a bronze-medal, and a second-class certificate.

3rd.—Adelard Blais, Bic, Rimouski, 94 points, $3.00 in money, a bronze-medal, and a second-class certificate.

4th.—Paschal Angers, Jonquières, Chicoutimi, $1.00 in money, a bronze-medal, and a second-class certificate.

Many of the cheeses had a very bad smell, indicative of either the inferior quality of the milk from which they were made, or of the filthy state of the factory whence they came.

What was said above of the cheese, may be repeated of the butter; and considering the sluggish way in which the quality of the butter of the province is improving, the judges determined to be more severe in their decisions.

Many of the butter makers, who had been invited to send exhibits, were unable to do so on account either of the inferior installation of their factories, or of the trifling quantity of milk they had at command, or of the bad quality of that milk; or, to speak in general terms, because their goods were too bad to send.

These competitions, as was explained in a previous article, were instituted for the purpose of discovering and rewarding good quality in the products ordinarily made in the factories, and by no means in products made expressly with a view to such a competition. There organisation will be improved so as at last to thoroughly reach this end.

In this way, the makers that keep a constantly watchful eye over the process of manufacture have an opportunity of making themselves advantageously known; and factory proprietors, as well as patrons, can obtain useful information as to the capabilities of the makers who are employed by them.

(*From the French.*)

THE TORONTO SHOW

THE DAIRY BUILDING

In some respects the exhibits in the dairy building excelled those of other years. There was a fine display of dairy apparatus and machinery of all kinds; the best that has ever been seen at the Industrial Fair. But there was not as much cheese and butter on exhibition as last year. There were upwards of 100 cheeses less than last year, and the quantity of dairy farmers' butter was smaller. The exhibit of creamery butter was about the same as last year.

CHEESE

Not only was the quantity of cheese exhibited smaller than last year, but the quality was inferior as well. In fact, the judge, who is an exporter, in making his report stated that he believed, on the whole, the quality of the cheese made in factories during the present season was not equal to what it was three or four years ago, or, in other words, the cheesemakers instead of improving had been receding. Of course, there are sections and individual factories where great advancement has been made, but, taking the factories as a whole, they have not made the advancement they should have done along the line of improvement in the quality of the product. This is to be regretted, and we trust that everyone connected with the industry, from the patron to the maker, will take warning and not rest till the very highest point of excellence is reached. The trouble seems to be that our dairymen are too confident and are relying too much upon their reputation. Then, again, we do not believe that one-quarter of the patrons take the care of the milk they should. They ex-

pect a maker to make a first-class article out of an inferior quality of milk.

The chief fault with the cheese shown this year was in the flavor. In the whole exhibit of 300 cheeses it was the exception to find a cheese with anything near a perfect flavor. This may be due to the makers receiving poor milk on account of the hot weather prevalent when the exhibition cheese was made. The quality and texture were better than the flavor, but even these in many instances were very poor. The point in which the exhibit excelled was in finish. There has been a gradual improvement in this respect during recent years, and the cheeses on exhibition this year were the best we have ever seen.

Frequent Milkings.

Milking twice and four times a day.—Backhaus, in *The Milch Zeitung*, reports a short experiment conducted with eight cows, the result of which was as follows:

The cows were milked twice a day from June 21st to the 24th, and gave a total yield of milk 524.60, of fat 17.04, of solids not fat 45.47, the average composition of the milk being, fat 3.25 per cent, solids not fat 8.67 per cent. From June 28th to the 31st these cows were milked four times a day with the following result: Milk, 576.70, fat, 17.95, solids not fat, 49.57, the average composition of the milk being, fat, 3.11 per cent, solids not fat, 8.60 per cent. The percentage of increase from milking four times a day was thus: milk, 9.93, fat, 5.34, solids not fat, 9.01 per cent.

Milking four times a day thus gave a larger yield of both milk and fat than milking twice a day, but, contrary to the usual rule, the milk was poorer in quality. To test this further the experiment of milking four times a day was continued, the cows receiving a richer ration. On an average, the eight cows showed an increase of 5.36 per cent. in the yield of fat, but only 0.44 per cent. increase in the yield of milk, and 0.65 per cent. in the yield of solids not fat over milking twice a day. It was further found that, when the time between milking was divided equally, the milk did not have the same composition, the milk being poorer in fat after the cows had been at rest, as at night, while, after they had been in active motion, as feeding, the fat was higher. This is said to agree with the results obtained where cows are worked.

DAIRY CATTLE

It appears to me that it would be well for our farmers, to see if a change in their present system of cultivation could not be adopted advantageously to themselves. This year, there has been an unusual by large crop of hay, and other fodder, and apparently no remunerative maket, for so large a surplus as will be for sale the coming winter. The great number of small cheese factories, all over the country, makes it almost impossible to raise young stock fitted for fattening, or to take the place of those leaving the country. This is a subject our farmers should seriously take into consideration, and in place of so much cheese, would if not be better to encourage the creameries; good butter will pay better than cheese, as the farmer would get skimmed milk besides, and he could raise much better calves. The next important question is the improvement of our present breed of milk and beef cattle. I think it will be admitted that the present stock of cattle generally are not what may be called the most profitable for either milk or beef. For milking purposes alone, on poor lands, the little Kerry cow might be introduced with good results, but they are not suited to rich lands, as then they run immediately to beef and that of the best quality. On the inferior lands, in Kerry, no other breed is kept, and their large milking properties are admitted by every one. Private families prefer them to any other breed. On large, well cultivated lands, we must turn to the Shorthorns for beef and milk. This breed of cattle has ousted all other breeds in all the large dairy-counties, both in England and Ireland, through its remarkable combined qualities, as a milk and beef producer. There can be no doubt of the dairy capabilities of the pure bred shorthorns when carefully bred for that purpose, nor can there be any doubt among practical men of the desirability of cultivating and demonstrating the value of the shorthorn as a dairy cow. All know well how much more regularly such cattle breed than those of the non-milking breed. Granted, them, the desirability of maintaining and cultivating the milking properties of milking stock, what steps should we adopt to obtain this end. I contend, in the first place, that our modern show system requires a through reform, and that milk should be recognized as well as beef. I am not an advocate for mere milking machines, I would not overlook those

grand characteristics of symmetry and quality, which are the glory of the Shorthorn; but I would have our societies insist that no cow should be awarded a prize, unless she exhibited a well formed "bag" and showed good dairy capabilities.

It would be well too, if the Agricultural Societies could be induced to import some improved milking stock into the counties, in place of the encouragement given to trotting matches, ballooning, etc., etc., which seem to be the great attraction now, at our Agr. Exhibitions. Some years ago, the St. Francis District Agricultural Society imported some Shorthorns, bred by Mr. Vail, of Troy, much to the advantage of our milk and beef cattle.

AYLMER.

Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

AN AUTUMN GOWN.

This dress looks, and is very suitable for an elderly person, who might have some ancient costume that she would like to make up, so that it might have some trifling resemblance to the style of the present day. It is not too pronounced in any way, yet at the same time looks like a modern dress.

It has also the advantage, if found necessary, to be made in two colours. An old dress that has been put away for a time may in some parts become quite useless to the owner, who might have grown stouter; or parts of it in the making might be so cut up as to be quite useless. The present style gives such a large margin to work on, that, one need never despair of doing up, and making an old dress of good material into a modern useful one.

It would scarcely pay to give this kind of work into the hands of a dressmaker, as the cost of doing it would be more than one would like to spend, unless the old dress was of very rich material. At the same time, where there are willing young amateurs in the case, the time spent on doing over this dress would give them practice and bring forth their artistic talents, and thus enable them to have the courage to attack a new dress.

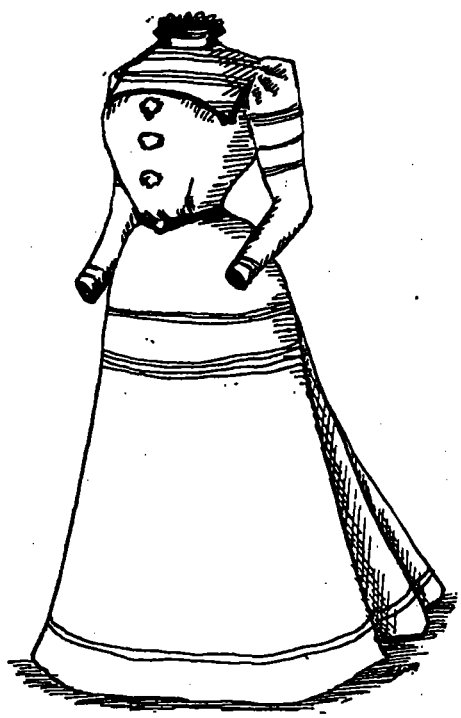
It would certainly be a pleasant and profitable way of spending a few spare hours, and still more so where it might be made the occasion of a pleasant surprise to a hard working mother who has no time to do it herself.

There can be no exact rule laid down for doing over this dress, but should there have to be joins, try and hide them as much as possible by the trimming.

The waist is open to be made out of many pieces, and as the modern sleeve is now worn very small indeed, it may be possible the old one might cut it.

The upper part of the sleeve down to the first row of braid, might be of the same colour as the yoke and neck, and might be made a little full or put on as a frill.

I saw a sleeve with a frill or shoulder piece of



An autumn gown.

red velvet trimmed with very narrow black velvet, and it brightened up and made the dark green dress look wonderfully well.

In picking to pieces an old dress, great care must be taken not to stretch the seams; nip the threads and let the seams separate without any pulling.

I hope I have conveyed my ideas clearly to those for whom they are meant, and that they will be the means of inducing some of the young people

to show what they can do; always remembering the old saying:

If at first you don't succeed,
Try again.
Time will bring you your reward
Try again.

Wash white lace curtains carefully as you would any other white clothes. Rinse them in several waters to make them clear. While still wet, stiffen with starch made into a paste, rubbed in well. Then lay a pair of clean sheets on the floor, and pin the curtains on to the sheets. Keep the edges very smooth. Put the pins in about two inches apart all round the edge, and as they dry pull out the spaces between the pins to prevent their drying in points. Leave open the doors and windows of the room in which the curtains are drying.

Before beginning to wash blankets be sure that you have a nice, fine, breezy day, when they will dry well out of doors. Cut up some good household soap, and boil it to a jelly. Mix it with warm, soft water and a tablespoonful of borax till it lathers well. Wash the blankets in two lathers of this kind, then rinse in a large tub of warm water, slightly blued. Wring the blankets as dry as possible, shake them well to raise the nap, and hang out to dry. The surface of the blankets will be much improved by being shaken twice more during the process of drying.

HOW TO ECONOMIZE IN LAMPS.

Save much trouble and get more light out of lamps by taking care of lamp wicks. The first object to be attained toward getting a well lighted lamp is to get a free flow of oil. The wick should be held by the fire and thoroughly dried before using. By this means it will quickly absorb the oil, and the flow is not impeded. Another way is to soak the wick in vinegar and then dry it thoroughly. This prevents smoking. Oil will not flow through a dirty wick, and without a good flow there is little light. Foul wicks should be washed or boiled in soft water and soap, then rinsed and well dried. The reservoir of the lamp should always be kept filled. If the oil is low, the flow is imperfect, and the wick becomes charred. The lamp will then give a poor light and emit a disagreable smell. A little attention to lamp wicks in the first instance will save a great deal of trouble and inconvenience.

PICKLED MUSHROOMS.

If you are a lover of this delicate fungus I am sure you will appreciate them pickled, and just now is the proper time for making this delicious pickle. For this, button mushrooms are the best. They need neither washing nor peeling, but should be wiped carefully with a bit of flannel moistened with vinegar. Place them in a saucepan, and add a little pepper and salt, a little pounded mace, two or three cloves, and as much vinegar as will half cover them. Let them stew until a good deal of liquid has been extracted from the mushrooms, when they must be removed from the fire and stand by till the mushrooms have again absorbed most of the liquor. Bottle, and pour over them cold boiled vinegar.

VIRGINIA MIXED PICKLES.

Take four dozen large cucumbers, half a peck of full-grown green tomatoes, a dozen white onions, two heads of cabbage, half a pint of grated horse-radish, a fourth of a pound of mustard-seed and ground pepper each, one ounce of cinnamon, one ounce of celery-seed, half a teacup of salad oil, and two ounces of turmeric. Quarter the cucumbers, cut the tomatoes in thick slices, chop the cabbage and onions, sprinkle with a pint of salt, let stand twenty-four hours and drain. Mix the spice and seasoning in a gallon of strong vinegar, scald, and pour boiling hot over the pickles. Let stand two days, reheat the vinegar, add a pound of brown sugar with the oil, and pour over the pickles.

CREOLE PICKLES.

Take two dozen large cucumbers, a peck of green tomatoes and half a peck of silver-skinned onion. Put the whole cucumbers and tomatoes in strong brine for three days. Cut the onions and sprinkle with salt. Put half a gallon of vinegar, with three ounces of white mustard-seed, one ounce of turmeric and celery-seed, one box of ground mustard and two pounds of brown sugar in a porcelain kettle, and set on the stove to simmer one hour. Pour over the pickles, seal and set in a cool place.

The Horse.

CLEVELAND BAYS

It is difficult to account for the ignorance which prevails respecting Cleveland Bays, beyond the district which is peculiarly their home. Even in some parts of Yorkshire itself the breed is virtually unknown, and I well remember some years since being asked by a well known jockey, himself a good all round judge of a horse, what a Cleveland Bay was like!

Now that the interest in the breeding of half bred horses is growing so rapidly, it may not be amiss to call attention to the merits of a breed, which is especially adapted for crossing with the thorough bred, and which has aptly been styled by a great authority as the foundation of half-bred breeding. It has been laid down as an axiom in cross breeding and practice has fully confirmed the truth of the saying, that the best cross is between two distinct breeds. It is the case with cattle, sheep and pigs, and perhaps in no case is it so marked as in the breeding of horses. How many beautiful mares, the very types of a perfect hunter, have proved failures at the stud? Nor is the reason far to seek? After the first cross or two, which is of course, thoroughbred and known, those mares descend from mongrel bred animals —half carting, half pony—that have neither character nor pedigree. The consequence is that atavism is frequent, and the handsome hunting mare too often throws an ugly monstrosity or a flashy "weed," even when mated with the best of sires. But if animals of distinct race are bred from, the bulk of evidence tends to show that the breeder can form some kind of idea what the produce will be like.

In connection with the claims of the Cleveland Bay to be called a distinct breed, there are the traditions in the home of the breed that Clevelands have been in existence for upwards of a century and a half, that they have existed for an unknown period of time untainted by any mixture of carting blood. The very nature, too, of many of the traditions is strong evidence of their truth. It seems to be a matter of course that the horses spoken of were Cleveland Bays, without going into that elaborate system of pedigree which is a creation of a later date and horses and different strains were known by the names of their owners rather than by their own. Even now, in certain of the Dales, it is not uncommon to hear the pedigree of a horse given merely by naming the sire and adding that the dam was one of So and So's sort. Breeding true to type and colour from one generation to another for a length of time, and in a manner, which hardly any other domestic animal can equal, the Cleveland Bay carries in itself, stronger evidence of purity of race, than any tradition can bestow. The Cleveland mare apart from the fact of purity of breed, possesses many points, which especially adapt her for crossing with the thoroughbred sire. Although dissimilar, there are many points of resemblance between the two breeds, just sufficient in fact to make them specially fitted to be mated. For example, there is the same liberty in the shoulder, and rather straight action in the knee; the same immense leverage from the hock, and the same clean, flat bone, like ivory for consistency, and the same elegance of carriage, though, of course, in a different degree.

With the origin of the Cleveland Bay, we have no concern. It is sufficient for my purpose, that it is entitled to be recognized as a distinct breed, and that its title to such recognition is as good as that of any, and superior to that of most of our breeds of domestic animals. But it may be remarked that, amongst the many conflicting theories that are rife respecting its origin, the chances are that the one which carries an air of the greatest probability is that which attributes it to the original breed of the country crossed with Eastern sires during the Roman occupation of Britain. Indeed, the habitat of the breed gives some sort of confirmation to this theory; for in north-east Yorkshire, Durham and parts of Lincolnshire, there was the largest importation of Eastern blood in early times. That much care was taken in the breeding of Cleveland Bays, and in preserving the purity of the breed, is evident from the oft quoted words of the eminent authority, Youatt: "Cleveland owes its superiority in the production of this beautiful horse to the possession of a definite breed, formed not by accidental admixture but by continued culture" —a high tribute to the care and intelligence of the breeders in the early part of the century, and especially valuable as coming from one so thoroughly competent to give an opinion.

A description of a true Cleveland Bay may be of interest to the readers of this JOURNAL. He is a big framed, powerful, and active horse standing

from 16 to 16.2. His head is plain, but well carried and his neck long and elegant, and well set on. His shoulders lie well, but they are scarcely what would be called "riding shoulders." His back is powerful, and his quarters long and level: indeed the elegance of his quarters is one of his principal characteristics, and their shape seems to indicate pretty clearly that the breed is a pure one, for no other breed of horses possesses quarters at all approaching those of the Cleveland in appearance. He has plenty of good flat bone of remarkable quality and in this respect he closely resembles the thorough bred as before pointed out. His action is very true, but there is none of the "knee and curb chain" about it.

Though not specially adapted for fast work, as fast work is understood in these progressive days, he has been known to do eight to ten miles an hour in harness, and there are cases on record where even more has been done.

Although not by any means a saddle horse, he was frequently ridden in days gone by, and even now is occasionally used as a hack. Instances are also on record of Cleveland Bays being sometimes used as hunters, and a hard-riding Yorkshire farmer relates with great glee how he once jumped on to a Cleveland Bay, bare-backed, as the hounds came by, and "brushed" the fox on him at the end of a long run, notwithstanding he was encumbered with the barfin and hames!

It would be foreign to the present purpose to dwell upon the ups and downs which this breed has experienced, and how it has been affected from time to time by popular caprice. My object has been to draw attention to an excellent and too long neglected breed of horses, from which have descended, and from which still continue to be bred, high class weight carriers and carriage horses. That there are some good judges who are prejudiced against Cleveland Bays as a foundation for breeding hunters must be admitted: but on the whole the balance of opinion on the part of those best qualified to judge is in their favour. In Australia, where big jumping is the order of the day, the show-yard champion is by the Cleveland Bay sire, Duke of Cleveland. This instance is quite sufficient to show the class of animal that is bred from Cleveland Bays, and a breed possessing so many good qualities should surely receive more general recognition.

W. R. GILBERT.

The Orchard and Garden.

(CONDUCTED BY MR. GEO. MOORE).

THE PLANTING OF FRUIT TREES AND BUSHES

BY THE REV. FATHER-TRAPPISTS.

(*From the French*)

(*Continued.*)

V.

The Pear

The pear-tree demands deeper and dryer land than the apple. It succeeds well around Montreal and in the southern counties. If planted on warm sites and sheltered from North and North-West winds which injure the blossoms in the spring, good crops may be obtained. At Montreal, pears yield well.

The culture of the pear may be advantageously pursued in the above situations; not so as to rival the fruit of Ontario, but for domestic use. The best varieties are the following:

Clapp's Favorite.—Fruit large, citron-yellow, flesh delicate, granulated, rich and melting, tree vigorous, but it needs a warm place.

Flemish Beauty.—Fruit large, brownish yellow, with red spots, rich, juicy and exquisite flavor, tree vigorous and much more hardy than the preceding.

The pear-tree is attacked by different insects and fungi, the characters of which are identical with those which attack the apple-tree and which may be treated with the same remedies.

The Cherry

The cherry fears moisture rather than drought. It likes light soil of medium consistency, sandy and mixed with a little chalk or lime, it does not thrive well on clay soils. The best varieties are the following:

Early Richmond.—A well known cherry, dark red, medium size, flesh juicy and acid; tree vigorous, and can be grown successfully anywhere.

Empress Eugénie.—Fruit large, deep red, flesh juicy and tender; a little acid, vigorous and hardy.

English Morella.—Fruit large, deep red, (1)

(1) Almost black, when really ripe.

tender and juicy, a little acid, very early, tree vigorous and very hardy.

Large Montmorency.—Tree intensely vigorous and very hardy, yields abundantly, fruit very large, flesh fine and delicate, ripens about a week after the Early Richmond.

Louis-Philippe—Fruit large, tender and juicy, slightly acid, comes about the end of July. The tree is vigorous and hardy.

The disease most injurious to the cherry is the gum, that is, the exudation of the sap, caused by clumsy pruning. When not too severely attacked, the tree can be restored by cutting off the diseased branch as far as a young shoot, which will probably send out healthy sprouts.

The pruning of the cherry tree is reduced to the thinning out of the centre so as to admit the air and light. Large cuts should not be made when the sap is in full flow, i.e., in April and May.

The Plum

The soils most favourable to the plum are heavy and cool. The trees not bring taprooted do not need a very deep fertile bed. It does not thrive in sandy soil.

The following are the varieties best adapted to our climate.

Bradshaw.—Fruit large, purplish red with stains of blue; tree vigorous and very productive.

De Soto.—Fruit medium, light red, flesh juicy, sweet, and of good quality, tree excessively vigorous, hardy, and prolific.

Lombard.—Fruit violet red, flesh yellow, juicy and pleasant to the palate; tree very vigorous, hardy and prolific.

Niagara.—Fruit very large, deep blue; tree very hardy and a good bearer.

Damsom.—Fruit light purple, tree vigorous and a good bearer. (*Damascene*).

Diseases of the plum.—The plum has two great enemies, which war desperately with it; namely the Black Knot and the Curculio. The first is a fungus, and the second an insect. With care and intelligent culture these two plagues may be subdued, or at least their ravages considerably restrained. As soon as it is seen that the fruit is affected, they must be destroyed. In the first place, shake the tree well; the fruit affected will drop into a cloth placed at the foot of the tree and then must be burnt.

As a remedy against the Black Knot, it is recommended to use a paste composed of coal oil and turpentine; but what is still better is to cut off the affected branches and burn them, nor should we hesitate to destroy the whole tree, if necessary.

The Vine

The vine does not like too rich soil; it yields better in soils which are poor, light, but perfectly mellow, well drained, and entirely free from moisture. A southern exposure is indispensable, especially for varieties which ripen late. To remedy the possible injury arising from too much sunshine in the spring, as well as from the extreme cold of winter, the stem, which is to be pruned as indicated, must be buried in the ground. Plant the vine in the following way: make a hole two feet every way, so that one of the sides of the hole in the direction of the row of vines is sloping, so as to allow the vine to be laid down for the winter.

At the bottom of the hole place some thoroughly rotted manure, and cover it with some good earth, in which the roots of the young plant are to grow. Bury the vines in the ordinary manner, so that the stem may lean upon the inclined part of the hole, with only one eye out of the ground. Tread it in lightly. Vines should be planted in lines running from East to West, so that the mid-day sun may exercise its free influence upon the grapes. To winter the vines, we must detach them from the stakes, to which they are fastened in the summer, and lay them down, covering them with a mound of earth of sufficient thickness; care must be taken that this is not taken from the foot of the vine so as to lay bare the roots. The pruning of the vine is thus done; the year of planting it pushes out several branches, every one of which must be kept. In the autumn, the branch which has grown most vigorously, and on which the eyes are the closest together, must be kept, the others are taken off, the one that is kept must be cut back to half its length. The second year, after unearthing the vine, we fix it, by means of osier bands, to a trellis inclined in the same direction as the vine.

The eyes of the long shoot now begin to develop; now, the eyes of the vine are double. The first that are developed give birth to premature buds, which will produce no fruit. These must be pinched to about 7 or 8 leaves. The shoot at the extremity is stopped for the purpose of favoring the development of a second eye, the only one capable of giving a long vigorous leading shoot with the eyes sufficiently close together. In the

autumn, the premature shoots are cut off, the leading shoot is shortened in to one-half its length and the vine buried. The next spring, care must be taken in taking up the vines, not to injure the eyes. Place the vines on the trellis as in the year preceding. From each eye a vigorous fruiting branch will be produced, the eyes of which are very near together, and bear a bunch of grapes near the four or five first leaves. The leading shoot is to be treated as in the preceding year. Each eye of the fruiting shoot brings a premature shoot which should be pinched to the 7th or 8th leaf.

When the berries are well formed, cut the fruiting shoot at the second leaf above the last bunch, to force the sap into the berry, and thus increase its growth and hasten its maturity. After the gathering of the grapes, the fruiting shoots should be pruned to two eyes from their connection with their parent stem and the leading shoot to three or four eyes. The vine stem will be found to be bristling with a series of spurs, each provided with two good eyes which will produce the year following two good fruiting branches; these branches are treated as above:

In the autumn, cut off the shoot on the branch the nearest to the base, and the branch above the two eyes. Every year we provide spurs even having two good eyes.

The best varieties of the grape are the following;

Bacchus.—Black, small and compact bunch, good for wine or for cooking (1).

Champion.—Black, very early, recommended on this account, good for wine and the table.

Concord.—Bunch large, black, yields abundantly, and ripens early enough to be gathered before frost; good for wine and the table.

Delaware.—Bunch small but compact, fruit red and of a delicious flavor; good for the table.

Duchess.—White, of excellent quality, yielding largely, bunch medium, a dessert-grape.

Moore's Early.—Black, vine vigorous, and hardy, fruit large and ripens earlier than the Concord. It resists the mildew well and is good for wine and for dessert.

Moyer.—Red, resembles the Delaware, but ripens earlier, the fruit is delicious; a choice grape for the table.

Niagara.—White, vine hardy and productive, larger than the Concord, ripens nearly at the same time.

Vergennes.—Bright red; fruit will keep part of the winter; flesh tender and delicate, excellent for the table.

Roger's No. 9.—Large red; produces abundantly; ripens early; excellent for wine or for dessert (1).

To preserve grapes, proceed in the following manner: Take a wooden box and line the inside with a sheet of zinc so that it will hold water, make a cover with holes in it large enough to allow a shoot of the vine to pass; instead of cutting the grapes by bunches, cut pieces of the branch containing two bunches. Fill the box with water, in which is put a little sulphate of iron to prevent putrefaction. The extremity of the rods on which are the bunches are placed in this. Grapes thus preserved will keep until spring, if placed in an appartment where there is very little light and no frost.

Diseases.—Good culture and the soil kept constantly clean and well worked, contribute largely to prevent diseases. Nevertheless, they will appear. The principal is the *mildew* which attacks fruit and leaves. For this, use Bordeaux mixture when the buds are expanding, afterwards use ammoniacal copper carbonate: dissolve 4 oz. of carbonate of copper in two quarts of liquid ammonia, and when required for use, dilute with 30 gallons of water. It may be reduced to any quantity, if these proportions are observed.

(*To be continued*)

(1) *Office* is the *kitchen; cuisine* is what is made in the *kitchen.*

MONTREAL HORTICULTURAL SOCIETY ANNUAL EXHIBITION

The annual exhibition of the Montreal Horticultural Society, and Fruit-Growers Association, was held from the 7th to 10th inclusive of September. The society has for the past few years, held their show in conjunction with the Montreal Exhibition Co., who, not holding their meeting this year, the Horticultural Society were thrown on their own resources; so, under the able management of their hard working Sec.-Treasurer, Mr. Ormiston Roy, the directors decided to hold their show in a large double marquee on St. Catherine St. The ground was laid out in irregularly shaped groups,

(1) It should be remembered that *dessert*, in England, is composed of ices, fruit, and cakes, alone.

bordered with turf, with the exhibits well arranged, and in the evenings, under the electric light, and the strains from a good orchestra, crowds were charmed with the effect, especially as the evening admission was the nominal sum of 10c, thereby drawing a large proportion of the ordinary public. Unfortunately, the weather was not very propitious, the exhibitors on the opening day staging their exhibits in pools of water, with here and there a shower-bath.

The opening ceremony was performed by the Mayor, accompanied by ex-Mayor Smith, both of whom complimented the management, and promised it future support.

A novel feature, "in Montreal at least" was the giving of special prizes to the exhibitor who gained the largest aggregate of points, counting 3 for 1st, 2 for 2nd, and 1 for 3rd; thus in plants, Mr. Wm Wilshire, gardener to R. B. Angus Esq., was 1st with 39 points; Mr. Pinoteau, city gardener being 2nd with 36. In fruit Mr. W. M. Pattison, Clarenceville, 1st.; in cut flowers, Mr. C. A. Smith, gardener to J. A. Dawes Esq., Lachine, 1st., in vegetables Frère Louis Marand, Notre Dame College 1st.; and the amateurs had Mr. I. Rubenstein at their head. This certainly encourages competition, by inducing exhibitors to enter in every section, if possible.

On the whole, the plants were good. Mount Royal Cemetry Co's exhibit, "not for competition" was a feature of the show, a large group of finely grown crotons in the centre of which was that remarkably leaved plant, Coholoba pubescens.

Fruits.—The entries were not so numerous as usual, but the quality on the whole was fine, especially in apples which were clear skinned and splendidly coloured: pears better than usual for this district, though in most case unripe; in plums we had the best show ever staged in Montreal. Vegetables were very fine, with the exception of celery, onions were certainly the largest ever grown on the Island, and reminded one of imported Spanish varieties. Cut-flowers competition was very keen, but the quality of bloom was below par, and the arrangement of the large groups, though composed of fine flowers, was flat and stiff.

One feature which attracted universal attention, was Mr. Hamilton's display of 50 varieties of Russian apples, for which he received a special diploma, the colouring of most of the varieties was remarkably fine, and in most cases the quality equally so, in others the beauty was "skin deep."

The judges in the open classes were: for plants, Mr. Geo. Coupland; cut flowers, Mr. Walter Wilshire; fruits, Mr. Robt. Hamilton; vegetables, Mr. Geo. Lamb. In the amateur classes, Mr. Jonathan Brown judged the plants, and, Mr. David Williamson the cut-flowers. The above gentlemen got through their unthankful duties in quick time, considering the rather packed state of the exhibits, which shows the advantage of having single judges for each section, and gave generally, satisfaction to the exhibitors, certainly to all *prize winners.*

A feature in connection with the society is the cottage gardening, in two sections, viz: city and suburban, the judge of which was Mr. Coupland, who awarded in the city 1rst prize to Mr. Alph. Leclair, and 2nd to Mr. John March, Amherst St. In the suburban class, Mr. E. K. Watson, West Mount, was 1st, and Mrs Jane Mayor, Lachine, 2nd. Mr. Roy says there is a distinct advance in quality of cultivation and in variety of plants grown in the above sections.

The exhibition, as an exhibition, was a success, financially it was a failure, since the provincial government reduced their annual donation from $1,000 to $500, and the loss of the support obtained from the Montreal Exhibition Co. The society, though retaining its usual number of subscribers, will have a struggle to carry out its object of encouraging and improving the cultivation of fruits, flowers and vegetables.

ALEX GIBB.

FRUIT GROWING.

To the Editor of the JOURNAL OF AGRICULTURE.

DEAR SIR;

Being at the present time here, attending to the shipments of fruit to Great Britain on the part of the Federal government, I am unable to send you my usual letter; but, instead, will give a little idea to the outside world of the extent of fruit growing in what is called the Niagara district. It is situated between Hamilton and Niagara Falls, a distance of some 40 miles long, by only a few in width. I am at Grimsby, a place half-way between Hamilton and Ste. Catherines or just about the centre of this division. It is bounded on the north by Lake Ontario, and on the south by a high mountain; so, as you see, it is rather

peculiarly situated, and well adapted for fruit growing. The soil is chiefly sandy-loam, with here and there a reddish clay. On the lighter soil, grapes, peaches, strawberries, raspberries and also pears are grown, while on the heavier soil, plums and pears are grown. Apples do not seem to do so well here as in some other parts, although there was a magnificent crop two years ago. One grower informed me he had some 1,400 barrels that year, and after paying all expenses of shipping them he had to pay some three hundred and odd dollars to clear expenses on them. Rather a doubtful way, of making money I should judge. The peach crop this year was a very light one. It paid well, choice fruit selling as high as a dollar for a 12 quart basket. Pears are only a fair crop, but grapes and plums are the great crop this year, and consequently are not selling very high. This year vineyards are bearing on an average between 3 and 4 tons per acre, the price of grapes at present for a ten-lb. basket is only 8 cents which after taking out the baskets and the picking leaves only 4 cents for 10 lbs. of grapes, it leaves only about $28 per acre for grapes. Plums, I should say, are paying better, and so are pears. For our own local market there are too many in grape culture. The Federal government has been shipping pears, peaches, tomatoes, grapes, plums and apples in order to put them before the people in Great Britain. Pears, usually about half of the whole lot. So far only one lot has been landed, and from word received about them, they sold fairly well. Canadian grapes have not been a great success over there, so far, people do not seem to like their flavor while Englishmen who reside here like them well, but say they are not like the hothouse grapes grown in England and France. If a market for grapes could be only established, we could supply them with cheap fruit, and at the same time the fruit growers here would get some recompense for their labor. If, say, 1½ cents a pound could be guaranteed for grapes, it would pay to grow them, but at less than half a cent, there is a certain loss to the grower. The best means of manuring vines is with bone meal, ordinary farmyard manure does not seem to give such good results, making too much wood to grow instead of fruit. Very few cattle are kept in this district, so that the manures, both farmyard and artificial fertilizers, cost a large sum yearly. Dung is brought by the railway from Toronto, Hamilton, and other large cities. Care and manure show in the size of the fruit, and also in the flavor. Spraying is fully carried out here, and could some of our Quebec people see the results between sprayed and non-sprayed, as at the Toronto Exhibition, they would not need further evidence of the great benefit derived from spraying fruit-trees, especially apples and Flemish Beauty* pears. No frost here to do any damage, glorious weather cool nights and sunshiny days.

Yours truly,

PETER MACFARLANE.

Grimsley, Ont., Sept. 28, '98.

* NOTE.—Is the "Flemish Beauty" the same pear as that known in Europe as the "Beauté de Gand."? ED.

THE PROVINCIAL EXHIBITION AT QUEBEC

The ancient capital can no longer be accused of lethargy and old fogyism. Turn which way you will, the march of modern improvement evidently is in progress. As regards the arrangements for the exhibition this fact is strikingly manifest. A plot of land which bore a very unpromising aspect for the purpose has been prepared with lawns, roads, racing tracks, suitable and comodious buildings, and to crown all, an electric car track has been laid in an incredibly short time, over which many thousands were conveyed to the show, without the slightest accident or inconvenience, from all parts of the city. The exhibition was in many respects perfectly successful. Cattle were not so numerous as was expected, but the quality was very superior in most classes. One heifer fed by Mr. Wilson of Compton and purchased, as indeed were most of the choice fat animals, by Messrs Delaney of Quebec, was said by that firm to surpass in points of excellence all out of the thousands they have handled.

Horses were scarce, especially farm horses, this seems a pity, because notwithstanding all the innovations on the horse trade, by electricity and bicycles, there must be a demand for good draught horses.

Of *hogs* there was about the usual display on such occasions, and the same may be said of sheep and poultry. There were over 50 exhibits of dairy-products, and good samples were shown. The bee-industry was remarkably well represented; there were ten competitors in honey, which was

excellent for its purity and clearness; the two first premiums being secured by local apiarians, Dr Gauvreau and M. Jacques Verret, of Charlesbourg. The latter being also awarded a medal for his exhibit of bee keeper's supplies which was very complete. There were some good examples of *grain in the sheaf*, and *field seeds*, but it was in *roots* that the district surrounding Quebec shone the most, not being excelled in quality by any other, and only in size by a display of enormous mangels from Montreal. Potatoes never were finer, the weather having been so favourable for the crop in this locality, and the prizes therefore went to local growers. *Home or domestic articles of Manufacture* were many, and much admired as bespeaking the skill, ingenuity; and industry of the good house-wife.

The horticultural part of the Exhibition was very attractive. There was a good display of stone and greenhouse plants and hardy cut flowers from the Sillery nurseries and others.

The cut flowers were numerous and of unusual excellence. M. Verret of Charlesbourg, took thirteen first prizes in this class and his collections comprised magnificent specimens of gladioli, asters, stocks and pansies such as the cool climate of Quebec alone can produce. Messrs Wilcox, Chollet and Stock, of Quebec, were also large contributors in this class. M. L'Ecuyer, of Lorette brought a very fine design "*Exposition Provinciale*" which was greatly admired. Mr. Wilcox's collection included some fine new and brilliant colius and begonia rex. In fruit, of course apples took the lead, and as regards quality have seldom been excelled. A collection of 100 named kinds shown by Revd John Hamilton, of Grenville P. Q., were full of interest to the student of our staple fruit, and were a feature of the Exhibition, highly appreciated by even the uninitiated.

All, or nearly all the classes of apples were filled up and for clearness of skin, perfection of form and brightness of color, were remarkably fine. All these were from our own Province, and to think that apples in proper localities and aspects, and with due care and attention, cannot be successfully cultivated there in, is entirely disproved by the present display.

The Rougemont orchardists sent some fine specimens, but the immediate vicinity of Quebec, as Charlesbourg, Lorette, and other parishes, on the north bank of the St. Lawrence, were not left far behind. Even from the southern bank, nearly a hundred miles east of Quebec, the nurseries of Mr. Dupuis, of L'Islet, furnished some beautiful specimens of plums. Grapes were few, as might have been expected, and of pears there were only three dishes. Garden vegetables were in abundance, and of excellent quality, and in these the prizes were secured by local growers. One onion grown in Charlesbourg was 6½ inches in diameter and weighed 1½ lb. The exhibit from the Lake St. John region occupied a large space and it was difficult to believe that such fine specimens of grain and roots grew in a part of the Province which, only a few years ago, was an unexplored and howling wilderness, and was supposed only to be calculated to furnish sport for the fisherman or hunter, or food for the woodman's axe, and not adapted for agriculture, as it now proves to be. One advantage of holding the Provincial show here was to give the farmers in this vicinity an opportunity of showing what they could do; and another was to give thousands the chance to see and be instructed and encouraged, who could not have afforded the time or money to go to a distance for that purpose.

Although, no doubt, thousands were attracted to the Exhibition by the races and other sports and amusements, without which it seems impossible to pay the necessary expenses incurred, there were others who went to take note of the products, and came away encouraged and incited to persevere by what they saw. Thus the public are benefited by such opportunities.

Manure for House Plants

In answer to a correspondent I wish to say that the manuring of plants grown in the house has been an unsolved problem by many of their votaries in consequence of the disagreeable circumstances connected with its use. I recently had the privilege of seeing some of the finest specimens of house plants, particularly Begonias and other succulent foliage-plants, and being intimately acquainted with one of the growers of the finest sorts, I ventured to ask him what was the secret of his success as regards the manuring of his plants. His reply was, that in the first instance he was careful to pot them in compost of light, well decayed vegetable matter, sod or leaf mould, with sand enough to keep the particles thoroughly disentegrated and about 2 per cent of wood ashes unleached; then a small sprinkling of

nitrate of soda and be sure that the whole is perfectly well mixed. Careful and particular attention must be paid to the drainage, which can be best effected by placing a number of potsherds in the bottom of the pot in such a manner that surperfluous water will drain off easily. A great deal of the healthy and vigorous growth depends upon the watering, which should be regulated so that while a sufficient degree of moisture is kept up, the soil should never be saturated sufficiently to cause it to become sodden. Whether this condition is correct or not can easily be ascertained by giving the pot a sharp blow with the knuckles ; if it gives only a dull sound the soil is sufficiently moist, but if on the other hand, the sound is hollow more water is required. Nitrate of soda is found to be one the best fertilizers for most plants, if used in moderation, and a weak solution of it, administered at intervals, has produced marvellous results.

We have not reduced the science of culture, with all our cleverness, to the same fine point of accuracy as I was informed by a gardener who had spent sometime in Japan had been arrived at by the Japanese florists. He told me that they had recipes for doseing the various plants with manures suitable to their kinds, stages of growth, and conditions, and that these were given of a stated strength, quality, and quantity which was accurately measured for each plant, at stated times with the utmost regularity like the dwarfing of trees, there were secrets of the profession that a Japanese would rather die than divulge, and my friend said that, in a Japanese Nursery, the men would immediately leave their work on the approach of a stranger.

Apple "La Reine d'Angleterre"

In visiting the orchard of a friend near Quebec, I was struck by the appearance of an apple tree having this name. The tree was laden with beautifully fair and every sized fruit, clear and waxy looking, pale greenish yellow and red next the sun ; perfection in form and general appearance. It was said to be of a delicious flavor in January, when it ripens. The tree is very robust in habit, vigorous, and has never suffered by frost in the slightest degree.

The name is not familiar in the catalogues, but the qualities of both tree and fruit should make it a popular variety.

Science.

CAUSES OF THE LODGING OF CEREALS

The work in Experimental Anatomy undertaken since 1883 by Mr. Gaston Bonnier and his followers, has fully established the fact that when plants are exposed to certain causes of a variable intensity, such as light, heat, etc., their structure is liable to great changes.

Thinking it would be interesting and useful to know whether the chemical composition of the soil which has a great influence upon the development of plants would not also create variations in this structure as well as the above mentioned causes, Mr. Dassonville has carried on a great number of experiments on the growing of plants in a watery solution ; the same experiments being also repeated in soil so as to find the practical application of the first.

The solution used by Mr. Dassonville is known as Knop's solution and is very favorable to the development of a great number of plants. It is composed of 1 litre of water, 1 gramme of calcium nitrate, and 0 gr. 250 of each one of the following salts : potassium nitrate, potassium phosphate, magnesium sulphate. Through different series of experiments, plants which were grown in Knop's solution complete were also grown in this solution deprived of one of its salts so as to find, from the difference observed in the vegetation, the particular action of each salt of Knop's solution.

While thus experimenting, Mr. Dassonville did not consider only the scientific side of the question, but he also made practical comparisons. Among the facts which he brought out to light, let us mention the one relating to the lodging of Cereals.

When oats or wheat are grown in Knop's solution, these plants make a great growth from the start. But about the 60th day of their vegetation, the stems bend at their base, the plants lodge, fade and die.

The experimenter tried to ascertain if a modification of Knop's solution would not prevent lodging. He then found out that by replacing the potassium nitrate and potassium phosphate with equal doses of sodium nitrate and sodium phosphate the plants stood perfectly erect until the grain was ripe. A fact which led him to draw this conclusion, potassium causes lodging, sodium

prevents it (which, in the form of common salt, we combined with nitrate of soda—for wheat—45 years ago. ED.)

An examination of the structure of the stem at its base showed fully the mechanical action exercised by the elements on the cereals. In presence of the potash the cell walls were extremely thin; where the sodium was substituted they were very thick and inside the stem was found a thick cylinder of fibres.

Furthermore, Mr. Dassonville's study shows us that sodium is not the only element which can counterbalance the effects of potassium; a strong dose of phosphoric acid also favors the support of plants by the same mechanism. As for Silicium, it has no preventive action against lodging. (As we have stated a dozen times in this publication. ED.)

The consequences to be drawn from these experiments have a great importance from an agricultural point of view. It is evident that the presence of potassium causing the lodging of cereals, these plants should not be grown in soils containing too great a quantity of this base. These soils should first be occupied by plants requiring a great amount of potassium such as beets, potatoes, peas, beans, etc. Sowing in drills is also a necessity, especially in such soils, as it has been proved that the lack of air and light at the base of the stems are two occasional causes of lodging. Drilling allows a free circulation of air and a better access to the light. At last, sodium and phosphoric acid can also be utilised as preventing agents.

Mr. Dassonville's experiments on the comparative properties of mineral salts are of a very high importance, as much for general physiology as for practical agriculture, and they open a boundless field for investigations.

Translated from "Agriculture Moderne" by C. W. T.

The Farm.

THE MANAGEMENT OF NEW PASTURES

SOWING GRASSES—WEEDS—SEED BED—AFTER MANAGEMENT—FAILURE OF PLANT—GOOD AND BAD SEED—HAY AND GRAZING.

A spring sowing of grasses is made at a time when the changes of atmosphere are sometimes sudden and severe, and grass seeds are not so well constituted for resisting these changes as grain and other heavy seeds.

Besides, the spring is never so dry and cold as to prevent the growth of weeds, nor is the May sun hot enough to scorch them to death; (1) but after sowing, a long spell of unfavourable weather will seriously retard the grasses. Meanwhile the ground may be covered with different weeds. As these grow, the chances of the grasses diminish, until at last it is possible that only a few spots will be found on which they show sufficiently to prove that there would have been a crop had circumstances been favourable.

In a backward spring the danger of the grasses being smothered by weeds increases in proportion to the early sowing of the seeds.

But if early sowing has its dangers, late sowing is not free from them. From the former arises the possibility that the young grasses will be smothered by weeds, and from the latter that before the grasses are sufficiently established to endure great heat, they may be scorched beyond recovery by fierce sunshine.

Or the soil may be so dry that the germination of the seed is dependent on rain, and if only a brief shower falls, the seeds will start. Then if there come a nipping, dry wind, or a hot spell and no rain, every seedling will probably be killed.

Laying down land to grass is a costly undertaking and therefore it is absolutely necessary to have the cleanest possible seed bed. Even when the farmer has done his utmost to clean the land, plenty of weeds are sure to spring up in the soil. It is then a question as to precedence. If the grasses come quickly, the annual weeds do little harm when promptly checked, but if they obtain a strong lead the injury to the grasses may prove serious.

It is in the immediate after-management of newly sown grass for pasture, that the advantages of dispensing with a grain crop are realised. Nothing can be done to help grasses sown in grain until the grain is cut and carried, but when grass is sown alone it is possible to top the plant as soon as it is a few inches high with a sharp scythe, and the benefit will soon be seen. After mowing, the roller should be put over the land again, which will help still further to consolidate it, and to give the young plants a firm grip in the soil.

The more frequently the pasture is mown and rolled during summer, the more rapidly will the

(1) Yet in 1896, the temperature in the shade, by our thermometer, on the 8th and 9th of May, was 84° F., and 90° F., respectively.—ED.

ground be covered with a fine coating of grass. (1) Although constant mowing will get rid of many weeds, there are some that can only be removed by a spud or narrow hand hoe.

If it is found as soon as possible that the plant has failed, not a moment should be lost in shallow ploughing or cultivating the land, breaking it down to a fine tilth and then resowing. Sometimes it will be found that the seed has taken over the main area, leaving some bare spots, these should have their crust broken and be resown, raked over and rolled down. For grasses and clovers sown with a grain crop only one thing can be done until the grain is cut, and that is to go over the ground to remove thistles, etc. If the plant is evidently all right after the grain crop has been taken off, it will pay well to give a top dressing of farm yard dung or some good artificial manure to help the young grasses into a vigorous growth. Bare spots caused by the lodging of the grain or from any other cause, should be lightly broken, sown, and rolled down again. It will be quite necessary to look over these patches in the following spring to see that they have passed safely through the winter, otherwise they must be sown once more.

After the grain crop the pasture will not be in the same condition for grazing as when grasses are sown alone. Cattle must not be put on to stubble containing young grass or they will injure it. (2)

The opinion is pretty general that the critical period of a pasture is the third or fourth year after it has been sown. But if a pasture begins to fail about that time, it is probably owing to mismanagement and starvation. (3) No farmer supposes that he can for several years in succession take much off arable land and put nothing on it. Yet this is a very common delusion concerning grass land, and the man who thinks it reasonable to treat a new or an old pasture on that principle deserves to find it deteriorate in quantity and quality too.

One cause of the early deterioration of some new pastures is no doubt due to grave faults in the prescription of the grasses sown. Too many farmers are content if they can only see "something green," without giving a thought as to whether that "something" is good or bad.

(1) As we see in the fine lawns in Sherbrooke street, Montreal.—Ed.

(2) By pulling it up by the roots, or how?—Ed.

(3) Or from the more tender plants dying out, before the grasses natural to the land are ready to take their place.Ed.

It has been proved by the Rothamsted Experiments that certain manures encourage the growth of certain grasses, and indirectly effect the destruction of those varieries which are not benefited, by enabling strong plants to choke them. (1) But manuring is not the only medium by which changes in the character of a plant of grass may be effected. Some varieties are specially adapted for grazing, others for making into hay. A fine old pasture which has been fed for many years will often yield a miserable crop of hay, and may be ruined by being mown for several consecutive seasons. Conversely, a meadow which has been mown for years and kept in condition by annual top dressings may prove altogether unsatisfactory as a pasture. Grazing gives all varieties of grasses, except a few which cannot stand trampling, a full chance of existence; while haying fosters the growth of those grasses which come to maturity at a particular period of the year.

It is therefore desirable as far as possible to reserve meadow land exclusively for mowing and pasture land for grazing. (2) Some of the most valuable pasture grasses are often entirely absent from good old meadow land.

WALTER S. G. BUNBURY,
Compton Model Farm.

(1) Nitrogen encourages the tall-growing *grasses* to the smothering of the low-growing *clovers*.—Ed.

(2) Particularly the latter.

DRAINING.

(*By the Editor.*)

In my last article on this subject I went over the theoretical points necessary to be understood by every one before the practice is attacked. We saw that the water entered at the bottom of the conduit; that gravity acted more efficiently in proportion to the height of the column of water already existing in the land; and that to get rid of the superfluous water by evaporation produced cold instead of heat: in other words, that, in undrained land, the first efforts of the sun in early spring were injurious instead of beneficial.

The practical questions that first meet us are the following: what depth shall we make the drains? what direction shall we give them? and how shall we cut them?

As a general rule, increased depth will allow of an increased distance between the drains. But

the question really sums itself up in this : I have so much money to spend in draining : how many cubic yards of soil can I dry for one dollar? For, if the water-level in the land be not lowered to a depth beyond the reach of capillary attraction, the full benefit of drainage will not be gained, evaporation will still exercise its malefic influence. This level we may assume to be reached at 4½ feet ; and, in England, the government Inspectors had strict orders not to sign certificates for the payment of drainage loans unless they found this depth rigidly adhered to. I know there is not much hope of such a depth being arrived at here, but I cannot help saying that at a less depth than 33 inches the work and materials will be as good as thrown away. Still, it is a matter for the farmer's own consideration whether he will put down a few deep drains or a great many shallow ones, the first will, in the majority of soils in this province, draw well at intervals of 50 feet ; but the latter will be probably next to useless at more than 20 feet apart. At any rate, when we have to deal with such expensive materials as pipe-tiles, I should think no sensible man would leave them within reach of the frost.

Depth of drains.	Distance apart.	Mass of soil drained in cubic yards.
2 feet.	24 feet.	3226¼
3 "	32¼ "	4840
4 "	50 "	6153

Generally, double the depth of drain has effect on about twice the cubical contents of earth, and about half more in extent of surface ; but as regards price, at the usual cost of digging drains, &c., three times as many cubic yard are dried for one cent by deep drains as are dried for the same amount by shallow ones. The exact figures are 2 cu. yds. at 2 feet deep and 24 feet apart ; 4 cu. yds. at 3 feet and 33½ feet ; and 12 cu. yds. at 4 feet and 50 feet, excluding fractions. I have taken the prices I have myself paid in England, about half what it would cost here.

The direction in which the drains should run. There is nothing so certain as the answer to this : up and down the greatest fall. And I think the following considerations will make this pretty plain. One law of hydraulics known to every one is that water always seeks the lowest level in all directions. In fig. 1, let *a b c d* be a field sloping from *a b* to *c d;* and let *e f* be a main drain into which the side drains *g h*, *i k*, *l m*, *n o*, *p q* and *r s* fall:

Now there is nothing more clear, in the case where drains cross the fall, than that the water that falls at *v* must have the whole distance to traval from *v*, just below the drain *i k*, in a diagonal line until it arrives at the drain *g h* (for it cannot run up hill into *j k*) that is, actually farther than the distance between the two drains : the same with the water that falls at *w*, below the drain *l m*. But take a glance at the other side of the plan, and look at the drains *n o*, *p q*, *r s*, and it will be evident that the water between each pair of drains has only a little farther to run than half the distance between the two drains, in fact where the fall is slight there is a mere trifle of extra journey for it.

Again, if we look at the plan No 2, where *a* and *b* are vertical sections of drains, and the dark line above *c* a foot of mould, (the plough furrow, in fact) the rain that falls on *c* will quickly absorbed, and, seeking the lowest level by gravity, will hasten at first perpendicularly towards the line *d e:* and, in doing so, the portions nearest the drains will find it easier to move towards the open conduits *d* and *e* than towards the firm ground at *h:* moving thus there will always be a higher level of water at *h*, and the accumulation there will cause a strong lateral pressure on each side towards *d* and *e ;* and the greater the accumulation the stronger will be the pressure. Some people imagine that water finds its way into the drains as it does from the ridge of a house into the *rones* or shoots ; but they are those who have never given themselves the trouble to think about the matter. Another reason why drains should run in the line of the greatest fall is, that almost invariably the substrata lie *horizontally*. Now looking

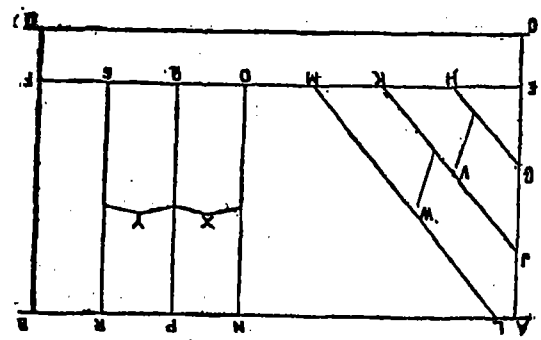


Fig. 1

at figure 3, in which *a b* is the plane of the surface soil, and *c d e f*, substrata concealed from view by the surface, it is evident that drains across the surface *a b* might very easily miss cutting any one

or more of the substrata, which, as spring almost always break out at the point of intersection, would be an awkward affair. So that, although oblique drains *might* cut through a vein of sand or gravel, and thereby carry off the water it contains, the drains along the greatest fall *must* cut it; and they are so preferable, as has been shown, in other respects, that they should always be adopted.

Main drains should of course occupy the lowest place in the field, or part of the field, to be drained, and where this is attended to as it ought to be, many a dollar may be saved. For example, many of our Kentish farms lie along a valley formed by a tiny brook, which acts as the receiver of the ditches which, in their turn, carry off the water which issues from the drains. The fields all run *N* and *S* from the brook. The bottom of the field is fine loam on gravel extending half way up the slope; the top of stiff (oh! very stiff) clay, full of springs and of a conglomerate of lime and shells. A grand opportunity of wasting money in

Fig. 2

draining the whole piece! Whereas, in each field one main drain running into the open side ditches about the middle of the field, and receiving short side drains 45 feet apart, and from 4 to 5 feet deep, cured the whole of the farms at a very moderate outlay. Such a state of land may be seen any day for many a mile along the road from Lennoxville to Coaticook. Springs, finding a week spot between the strata of rock, burst out, and spewing all over the lower ground, spoil every year twice as much at least as it would cost to drain it.

It may be as well to say here, once for all, that whether we are draining a town or a field, the small drain should always run into the main at right angles, with a curve for the last few feet, to allow its water to run with instead of against the current of the water it meets with in the main.

Whether the main should be lower than the small drains is a doubtful point. I prefer that they should be level, as the wash of a rush of water in sudden storms is a dangerous thing, if there is any fall at the junction. At all events, great care should be taken, whatever materials are used, to make the junction as secure as possible. When the main is being cut, the distance between the side drains having been determined upon, each side drain should be opened for a couple of yards as the main goes on: thus the main can be finished, materials placed, and the earth returned, from end to end without stopping. On springy ground, this will be found very important.

Where land is subject to more or less permanent bursts of water from springs, I advise all drainers to strike the outburst straight in the face. Cunning men, in backward districts in England, try to dodge, or circumvent, the "weeping spots", as they call them, and invariably cost their employer about four times as much as their work is worth. I knew three or four of these worthies. They always worked alone, whereas there never should be less than 3 men at a drain, and 4 are better still. All the drains I have seen made in this country are too wide atop. The great saving of expense lies in keeping down the quantity of earth moved, and if you start with two feet instead of 14 inches, it will amount to a great many pounds weight of unnecessary earth to be moved in a thousand rod of drains. Fourteen inches are plenty for the top spit, diminishing gradually till, with pipes, the conduit just fits the drain. And this bring us to another important point: the tools to be used in draining, and the materials that are to serve as the conduits, or ducts, for the water.

Now it will depend upon the latter, the ducts, what tools we want, especially for the bottom spit and the last crumbs of mud. At all events we shall need a line of some sort to mark out the lengths of drain; a spade of ordinary dimensions for the two or three first draws; a pick to dislodge stones, or to get through any *hard pan* we may meet with; a shovel to throw out the crumbs with, and a draw-scoop to finish off the bottom with.

If we are to use pipes, we shall need a narrow semi-cylindrical tool, sold at any of the seed warehouses, made on purpose to cut out a narrow bed closely fitting the pipe.

If, on the other hand, we use stone or bushes, the last spit must be removed by means of a very narrow spade of the ordinary shape. The pick had better be off the *tramp* sort, as in that case the men can all work with their faces towards the opened part of the drain, except the shoveller.

The draw scoop must be semi-cylindrical for pipes: but flat-backed and 4 inches broad, if for

other materials. In laying the pipes, the workman stands across the drain, and begins to lay from the mouth of the drain backwards, laying each pipe in its seat by means of a pole at the end of which is a short rod of iron at right angles on which the pipe is threaded, dropped carefully down, and adjusted to its place by the rod.

But this by the way, for fear I should forget it. I need hardly say that the tools should be kept sharp, and where there is a tenacious clay to be cut, the workman will be all the better for a bucket of water handy, to dip his spade into. Having drawn out our line of drain with accuracy, the question arises: shall we use a plough for the first 10 inches or not? It depends. If the subsoil is hard and not given to fall (cave) in, a plough may be used to advantage; but if the ground is wet and crumbly, rough and *tussocky*, and the drains are to be of decent depth, considering the risk of straining the horses, and of causing extra work in throwing out fallen-in sides of the drain caused by the tramping of the horses, I prefer taking the whole out by manual labour.

Whatever material we are to use, we may start by taking three draws of the common spade, each draw to be carefully shovelled out by the second man working with his face to the digger, who works backwards. This will give us about 3 x 9

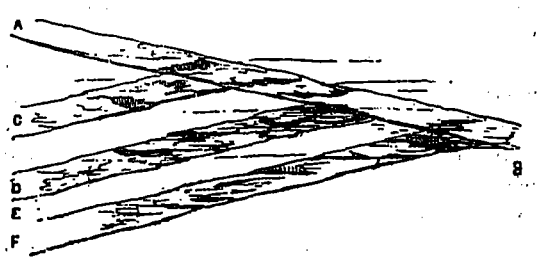


Fig. 3

27 inches in depth, and, at our proposed depth of 33 inches, as the shallowest admissible, it is time to think of the bottoming.

Suppose we are going to use bushes. The brush should have been prepared in winter, or at any rate when the leaf is off, and should consist of fresh, limber twigs about 3 feet long, as full of life as possible, and with nothing thicker than half an inche in diameter amongst them. If any of the boughs seem inclined to lie awkwardly, a slight tap with a sharp axe will correct the fault.

The drainer, still working backwards, should remove the remaining 6 inches with the narrowest spade, leaving the bottom 4 inches wide, and neatly finished, taking out the crumbs with the flat draw scoop. You may observe that there will in this case be a trough left at the bottom of the drain 6 inches deep, by 4 in width. This is the real conduit, the bushes are only meant to keep it open. In a few years they will perish, but the arch of the drain will remain for several years more if treated as I shall advise in the sequel.

The drain being now ready to receive its filling, let the workman take a sufficient quantity of the bushes in his hands, straightening them as much as possible, and lay them carefully at the bottom of the drain, trampling them firmly down. Then another man, a boy will do, should hand the drainer a fresh bundle to be laid further on, but with the top ends resting on the bottom end of the first bundle, and so on up the drain as far as it has been bottomed out. Care should be taken not to brush in earth from the sides.

Now the filling-in may begin. Remembering that the water is to enter the drain from the bottom, our main object should be to prevent any rush of water downwards into the top of the drain, bringing earth and sand with it, and thereby choking the duct: we take the stiffest, soapiest clay we can find, place it carefully on the bushes, and trample it down firmly. The firmest part of the original earth taken out of the drain is then returned on to the clay, and the rest thrown in anyhow.

If in bush drains the junctions with the main drain were made with pipes, it would be all the better, and the discharge of the main into the open ditch should be invariably piped for four or five yards upwards: wooden pipes, square or round, will do. The fall towards the mouth of the main where it joins the ditch should be as rapid as possible, to avoid a sudden stoppage from frost.

It may be necessary, in very level land, to use mechanical means to determine the fall of the ground. An ordinary *spirit-level*, mounted on a pole with a spike at the end, is quite sufficient for the purpose, and is used in this way.

Set the level in the middle of the ground to be drained, and placing the eye-sights in the proper direction, turn the screw until the air-bubble rests in the middle of the glass tube. An assistant should hold up a rod at the end of the ground in that direction, and mark a point indicated by the

observer on the rod. The same operation is gone through at the other end of the ground; and if the two marks agree, the whole piece is on a level. But if the mark at the first station is at 3 ft. 9 in. from the ground, and 4 ft. 8 in. at the second, there is a fall of 11 inches from the first to the second station. A very little practice with the level will make any one handy with it; but it is seldom necessary, except to intimidate the workmen by making them believe that the instrument will detect their tricks.

A very small descent is sufficent for the fall in pipe-drains. Çresy, the Civil Engineer, says that one foot in two hundred and twenty yards is enough: $\frac{1}{660}$! The deeper the water in the drain the less fall required: thus, deep rivers only want one foot in a mile. In very low lands I have found it necessary, sometimes to take the main a long way down into the ditch to gain a fall; and I have seen, at Longleat, the Marquis of Bath's place in Wiltshire, an iron pipe carried under a mill-stream to take away the water from the drainage of a meadow on higher ground. But in all cases of this sort, the services of a competent engineer should be secured at once; it will be found the cheapest plan in the long run.

The engravings of drainage tools, etc., will appear in the next number of the Journal.

LIME

The United States Department of Agriculture, in Bulletin No. 77, on the "Liming of Soils," gives the following summary on the methods of application and the conditions under which it should be applied:

The use of lime as a soil improver is very ancient, and its value for this purpose is generally recognized. Its action as a fertilizer is both direct and indirect.

There are many soils in which lime is deficient, notable in soils derived from granite, mica schist, and sandstone formations. On such soils lime is of direct value in supplying a necessary element of plant food.

The indirect value of lime is, perhaps, more important than its direct action, because, probably, the majority of cultivated soils contain sufficient lime to meet the direct demands of plants. Lime is of indirect value in unlocking the unavailable potash, phosphoric acid, and nitrogen in the soil.

Lime exerts a decided influence on the mechanical condition of soils, rendering heavy compact soils looser in texture and tending to bind particles of loose, leachy soils.

Lime is also beneficial in furnishing conditions in the soil favorable to the activity of the micro-organisms which convert the nitrogen of organic matter into nitrates, which are readily assimilated by plants, which decompose organic matter, and which assist leguminous plants to assimilate the free nitrogen of the air.

One form of lime, gypsum, has been shown to be a most effective corrective of black alkali, found in some of the soils of the arid portions of the United States.

The continued use of lime, unaccompanied by other fertilizers may prove injurious, especially on poor soils, since it converts the insoluble nitrogen, potash, and phosphoric acid compounds of the soil into forms which are rapidly taken up by plants or washed out in the drainage, and thus hastens the exhaustion of the supply of these substances in the soil. As the German adage states: "The use of lime without manure makes both farm and farmer poor." If the soil is not abundantly supplied with organic matter, its retentive power for water and fertilizers may be seriously reduced on account of the destruction of the organic matter by the action of too much lime. Soils are sometimes injured by the application of impure forms of lime, which harden like cement in the soil, or those which contain an excessive amount of magnesia.

It has been shown, that even many upland and naturally well drained soils, apparently in good condition otherwise, are so sour (acid) that most plants will not thrive on them. The application of caustic lime is the most economical and effective means of correcting this condition.

Lime may be applied in a variety of forms, among which are caustic, or burnt lime, or quicklime, which should contain at least 90 per cent of the actual lime (CaO) and is the most concentrated form of this material; gypsum, or land plaster, in which the lime is in the form of the mild sulphate; ground limestone and chalk, in which the lime is in the form of the mild carbonate; different kinds of marl, containing varying proportions of sand and clay, and from 5 to 95 per cent of carbonate of lime; wood ashes, which contain from 30 to 35 per cent of lime in the form of carbonate; limekiln ashes, containing about 40 per cent of lime; and waste lime from gas-houses, sugar beet factories,

etc., composition of which varies with the process of manufacture.

It is impossible to state definitely, for all locations and conditions, what form of lime is cheapest to use. Caustic, or quick lime, is the most concentrated form and consequently the most economical to handle. On account of its caustic properties, it is more vigorous in its action than the milder sulphate (gypsum), or carbonates (limestone, chalk, wood ashes, marl, etc.) There may be special reasons, however, why some of the latter forms may be preferable. For instance, gypsum, on account of its peculiar composition, has been found to be a specially valuable corrective of black alkali.

The frequency with which liming should be practiced, depends, among other things, upon the character of the soil and the rate of application, the number of years involved in the rotation practiced, the plants grown and their order of succession. As a general rule, it may be stated, that from ½ to 1½ tons of lime per acre every five or six years is sufficient. Applications of two or three tons may, however, be advisable in case of very acid soils, which are to be seeded down and remain in grass for several years. The practice of applying small amounts of lime at somewhat frequent intervals, is being generally accepted as preferable to the use of large amounts at rare intervals.

Lime in the form of carbonate of lime, as in marl, wood ashes, etc., can usually be applied with safety in the spring, or at any season of the year, but autumn is always the safest time to apply caustic or slacked lime. It is generally considered best to apply the lime to the soil immediately after ploughing, and harrow in thoroughly. Lime which is already slacked may be spread upon the soil directly from wagons or carts, or dumped into heaps and then spread with a shovel, although the most satisfactory plan, in such cases, is to use a lime spreader, or ordinary grain drill, with fertilizer attachment. Where a lime spreader, or similar implement, is not available, the burnt lime may be placed on the soil, in piles of from 40 to 50 pounds each, covered with moist earth, and allowed to slack before being spread with a shovel. Marls, frequently contain injurious compounds, and should, therefore, be allowed to weather for some time in the field, before being incorporated with the soil. The same is true of gas-house lime, which is impregnated with sulphur compounds, which are injurious to plants.

In conclusion, it may be said, ascertain first whether lime is needed, If it is, apply it judiciously, and never depend upon lime alone to maintain the fertility of the soil, for all of the ingredients which plants need must be present in the soil to insure the profitable production of crops.

MEAT AND BONE FOR EGG PRODUCTION

The best material for promoting egg production is nitrogen, which is best fed to poultry in the shape of lean meat. If meat could be supplied daily in the proportion of one pound to 12 hens, there would be such an increase in the production of eggs as to really lessen the cost of feeding. That is, there would be sufficient eggs secured, over and above the number that would be obtained without the use of meat, to not only pay for the meat consumed but to increase the profits. And this gain would easily come, two extra eggs a week from each hen paying the bill, as the cheapest kind of meat may be used. Animal food is necessary for fowls if they are expected to be producers at all seasons of the year.

It is a mistake to make grain the principal food for laying hens. Grain is well enough for food for market fowls, but the laying hen demands something more. The egg itself is animal food, and although it can be produced from grain, yet the hen is required in order to be profitable to produce an egg each day and her work must not be interrupted from lack of nutrients.

Meat fills a want that cannot be supplied from any other source, when the hen is laying regularly. Cut bone and meat are now staple articles of poultry food. Instead of buying so much grain, buy fresh bones of the butcher, cut them with an axe in small pieces, put them through a bone cutter and cut them into a delicious hash which the fowls will relish. Meat and bone at 3c per lb will be found far cheaper than any kind of grain. Bones supply the albumen, lime and grit, and also lessen the risk of hens becoming too fat. When our poultry raisers and farmers feed more meat and less grain they will have larger profits. The introduction of the green bone cutter also lessens the cost, as cheap bones and meat can be cut fine and fed without the necessity of cooking the meat. Do not consider any food expensive if it makes the hens lay. There are several styles of bone cutters on the market from the small $5 hand machine to the large power cutter. Illustrated circulars can be had for the asking.

S. J. ANDRES.