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THE ILLUSTRATED JOURNAL OF AGRICULTURE

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Vol. III.

MONTREAL, JULY 1881.

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Notice to Secretary-Treasurers of Agricultural Societies.

In May, 1880, we requested the secretaries to forward to us a list of their members who were entitled to the Journal of Agriculture for the then current year. The greatest number replied to the effect that they could not forward the required list until after the county exhibitions, as the subscribers put off their enrolment until that time. Hence, the management has been obliged to keep direction-lists open for six months, and to make corrections every month, which prevents any thing like a regular distribution.

To put an end to this inconvenience, we have determined to make only one set of corrections, and that in the autumn of each year after all the exhibitions are over. Thus, new subscribers for 1881 will not begin to receive the journal until the autumn; but, then, the receiving of it until the autumn of 1882 will balance the affair.

The secretaries will therefore be pleased to wait until they receive from us blank lists before they send us the changes to be made for the current year. We request them also to make the present notice public among their new subscribers.

(Translation)

Circular of the Department of Agriculture, P. Q.

How to use the Goëmon biphosphaté.

In order that the Goëmon biphosphaté" may produce the fullest effect, it must be applied in a finely pulverised condition; that is to say, if after being dried it becomes lumpy, the lumps must be crushed before sowing.

On ploughed lands the "Goëmon biphosphaté" should be sown in the morning or evening, immediately before or after the grain, and then well harrowed in.

On meadows and pastures take a showery time for applying this manure; unless this is attended to, the acid principles it contains may be, for a time, injurious.

Where the proposed crop consists of potatoes, beets, turnips, cabbages, or the like, the Goëmon should be spread as equally as possible over the surface of the land, and the plants or seeds should never be in immediate contact with the manure.

The seed must be sown first, and covered with a little earth, then the manure, to be in its turn spread over with a light coat of soil.

The quantities to be employed by the *arpent* are as follows.

Sugar-beets.....	900 to 1000 lbs.	to the <i>arpent</i> .
Potatoes, turnips, cabbages, &c.....	700 " 900 lbs.	" " "
Barley, oats, buckwheat, &c.....	400 " 500 lbs.	" " "
Meadows and pastures, sown like plaster.....	400 " 500 lbs.	" " "
Chemical analysis (dry) of the "Goëmon Biphosphaté."		
Organic matter containing nitrogen.....	25,00 to 20,00	
Equal to { ammoniacal and nitric nitrogen.....	0,50 " 0,25	
} organic	1,50 " 1,00	
Total nitrogen	2,00 " 1,00	
Equal to sulphate of ammonia.....	9,40 " 4,70	
Total phosphoric acid.....	10,00 " 8,00	
Equal to bone-earth (phos. of lime).....	21,80 " 17,44	
of which soluble { citrate of ammonia.....	10,00 " 8,00	
} oxalate of "	6,00 " 3,00	
Salts of potash	4,00 " 2,00	
Other salts, sulphate (?) and unimportant (non dosées) matters.....	49,00 " 60,00	

(In its normal state, the Goëmon contains from 20 to 25 0/0 of water).

Deliberations of the Council of Agriculture of the Province of Quebec.

Montreal, March 16, 1881.

Present: Messrs. Browning, Casavant, Casgrain, DeBlois, Gibb, Guilbault, Marsan, Massue, Pilote, Somerville and Tassé.

The president having taken the chair, the secretary read the proceedings of the last meeting, which were approved.

A letter was read from the principal of the St. Francis' Agricultural school, informing the council that he was unable to send in his financial statement for the year expired because he was waiting for the details from Mr. Tanner, his predecessor.

Mr. Browning, seconded by Mr. DeBlois, moved: That the principal of the St. Francis' Agricultural school, be informed that the whole subsidy will be retained from this school until he has completed his report by furnishing a financial statement for the past year, and that if the school does not conform to the regulations of the Council, it will be entirely deprived of the government grant. (Carried).

The annual address of the president of the council was then read.

Mr. Ouimet, seconded by Mr. Pilote, moved: That the address be received, and that the council expresses its gratitude to the president for so complete an expression of his sentiments and opinion. (Carried).

Mr. Browning, seconded by Mr. Gibb, moved: That considering the importance of butter making to the province, the permanent Exhibition committee be invited, if the thing be practicable, to have a creamery in full operation at the

(1) One seventh more per acre.—A. R. J. F.

next provincial exhibition, and that, on account of the considerable expenses incurred by the exhibitors in the agricultural department, the amount of the prizes offered be increased (Carried).

And the council adjourned until 2 p. m.

Session at 2 p. m.

The same members being present: the secretary read a petition from the farmers of a certain part of the county of Beauce, asking leave to form a second Agricultural Society in that county, to be known as "The Society No. 2 of the county of Beauce," and comprising within its limits the county of Aymer, Gayhurst, Ditchfield, Lambton, Forsyth, and Whitton. The petition, moreover, prayed that the new society be recognised as dating from this day. The council having heard the explanations of Mr. L. Paradis, a special delegate to that end, decided to grant the prayer of the petitioners.

The council having discussed several suggestions contained in the president's address, Mr. Tassé, seconded by Mr. Browning, moved. That a committee be named to prepare certain amendments to the act of agriculture, to confer about them with the Hon. Commissioner of Agriculture, and to make a report on the projected amendments, and on the disposition evinced by the ministry as to their adoption.

This motion, having been put to the vote, was lost on the following division.

For: Messrs. Browning, Gibb, Guilbault, Somerville and Tassé (5).

Against: Messrs. Casgrain, Casavant, DeBlois, Marsan, Oumet and Pilote (6).

Resolved: That the secretary receive instructions to inform the directors and officers of the agricultural societies, that the 70/10 allowed the secretaries of these societies on moneys expended, as mentioned in the 64th clause of the act of agriculture, must not be understood to extend to sums paid for the purchase of stock, on which there will be no per centage allowed.

This motion having been put to the vote, was carried on the following division.

For: Messrs. Browning, DeBlois, Gibb, Guilbault, Pilote and Tassé, (6).

Against: Messrs. Casavant and Marsan, (2).

The Assomption Agricultural Society prays to be exempted from the competition for the best cultivated farms, in order to buy breeding stock, and for the purpose of holding an agricultural exhibition.

Resolved That the Agricultural Society of the county of Assomption be excused from the competition for the best cultivated farms, on condition of expending at least \$400.00 in the purchase of pure-bred animals, and on condition of making a report of its purchases to the council.

The Beauharnois society prays for leave to buy a stallion, and to be exempted from all other competition this year (?)

Resolved: that the prayer be granted.

The society No 1 of the county of Compton prays to be exempted from the competition for the best cultivated farms, because the farms in this county are more suited to grazing than to the cultivation of grain.

Resolved: That the petition be granted.

The society of Three Rivers asks leave to buy a boar and a Leicester ram, and to hold an agricultural exhibition.

Resolved: That the petition be granted, on the express condition that the society also hold a competition for the best cultivated farms.

A petition was read from the present directors of the Agricultural Society of Berthier, complaining, generally, of the irregularities committed by the former directors of the

society, and, more particularly, in their expenditure of the society's money in the purchase of animals.

Resolved: That the council is of opinion that the difficulties existing between the present and the former directors of the Berthier Society of Agriculture is rather within the province of the Hon. Commissioner of Agriculture than of the council.

The programme of the operations of the Agricultural Society of the county of Brome offering to give prizes for standing crops, for parish competitions, and to hold an exhibition, was approved by the council.

The Agricultural Society of Temiscouata asks leave to spend \$180 in the purchase of animals, and to hold an agricultural exhibition.

Resolved. That leave be given to the Society of Agriculture of the county of Temiscouata to spend \$180 in the purchase of animals, and to hold an agricultural exhibition, on condition that the two bulls, and seven rams, mentioned in their programme, be of pure race. The programme of the Agricultural Society of the county of Kamouraska, proposing to hold an exhibition, and a competition for the best cultivated farms, and to employ half of the amount of the members' subscriptions in buying seeds, is approved by the council.

A petition was read from certain members of the Society of Agricultural of the county of Dorchester, praying that the exhibition of the society be held at St. Isidore, rather than at St. Anselme.

Resolved. That the directorate of the said society having decided that the exhibition should be held at St. Anselme, the council cannot interfere in the matter.

The society No. 1 of the county of Pontiac asks leave to hold an exhibition of stallions, a ploughing match, and an agricultural exhibition.

Resolved. That the said society may hold an exhibition of stallions, a ploughing match, and an agricultural exhibition, provided that, in accordance with the regulations of the council, it also holds this year a competition for the best cultivated farms.

The Society of Agriculture of the county of St. Maurice prays to be exempted from the competition for the best cultivated farms, and to be allowed to expend their funds in the purchase of breeding stock.

The council grants the prayer of the said society.

The agricultural society of the county of Rouville asks leave to grant 90 cents worth of seed to the subscribers, instead of only to the value of half of their subscriptions (?)

Resolved. That the county of Rouville society must conform to the regulations of the council, which prescribes to the societies the distribution of only the half of the subscriptions to the members in seed, the other half to be reserved for the purchase of thoroughbred breeding stock.

The society No. 2 of Charlevoix, asks leave to buy stock, and to distribute seed to the amount of \$3 00.

Resolved. That the society No. 2 of the county of Charlevoix be obliged to conform to the regulations of the council for the purchase and distribution of seed, that is, to employ not more than half the subscriptions of its members in this way, it may buy animals of improved breeds, provided that it spend at least \$3.00 in the purchase of thoroughbred stock, and reports its purchases to the council. Should it fail to comply with these conditions, it will be compelled to hold a competition for the best managed farms.

The society No. 1 of the county of Ottawa begs permission to hold an exhibition of stock, and of domestic manufactures.

Resolved: That the council grants this permission to the society No. 1 of the county of Ottawa, on condition that it also hold, this year, a competition for the best managed farms, in accordance with the council's rules,

The Agricultural Society of the county of Terrebonne asks leave to subdivide the prizes for the competition for the best managed farms, and to hold an agricultural exhibition.

Resolved: That the Agricultural Society of the county of Terrebonne be obliged to observe the regulations of the council as regards the number and amount of the prizes for the competition for the best managed farms, and that it cannot hold any other exhibitions before it has conformed to the above condition.

The Agricultural Society of Quebec asks permission to hold only one exhibition of stock this year, and only one ploughing match.

Resolved: That the Agricultural Society of the county of Quebec be allowed this year to hold only one ploughing-match, and one exhibition of stock; but on condition that it conform to the regulations of the council, which oblige it to hold, first of all, a competition for the best cultivated farms.

The Agricultural Society of Argenteuil asks leave to hold an agricultural exhibition, and a ploughing match.

Resolved: That the Agricultural Society of the county of Argenteuil may hold an agricultural exhibition and a ploughing match, but only on condition that, in conformity with the rules of the council, it first hold a competition for the best managed farms.

The Agricultural society of Dorchester asks permission to hold an exhibition and a competition for the best managed farms; but, for the latter, it offers prizes varying from \$25 to \$9, for the first class, and from \$18 to \$5, for the second class.

Resolved: That the council permit the Agricultural Society of the county of Dorchester to hold an exhibition of stock, and a competition for the best managed farms; but that it cannot allow of the division of the \$150.00, as the society wishes; that the society must obey the rules of the society which fix the amount of the five prizes, but they being once decided, the society may give as many additional prizes as it chooses.

The council approves of the programme of the Agricultural Society of the county of St John, proposing to hold a competition for the best managed farms, for standing crops, together with an agricultural exhibition, and a ploughing match.

The society No 2 of Chicoutimi asks leave to employ its funds for the purchase of breeding stock and 9 rams.

Resolved: That the society No. 2 of the county of Chicoutimi be allowed to employ its funds in the purchase of choice breeding stock, on condition that it spend at least \$200 in buying thoroughbred horned stock, and that the half only of the members' subscriptions shall be distributed in seed.

The council gives leave to the Agricultural Society of the county of Chateauguy to hold an exhibition next autumn, seeing that it has already bought a stallion, leave is also granted to the said society to charge 15c. instead of 10c. for entrance to the exhibition ground.

The council approves of the programme of the Society of Agriculture of the county of Napierville, proposing to hold a competition for the best managed farms, an exhibition of stock, and a ploughing-match.

The Beauce Agricultural society begs leave to distribute, gratuitously, one dollar's worth of seeds to its subscribers, and to hold a competition, county and parochial, for the best managed farms.

Resolved: That the agricultural society of the county of Beauce must be compelled to conform, this year, to the regulations of the council forbidding the distribution of more than half the amount of the subscription of its members in seed;

this strict condition complied with, the council approves of the rest of the programme of operations submitted by the said society.

The society No. 1 of Chicoutimi requests permission to employ its funds, partly in the purchase of animals, partly in buying seed.

Resolved: That the Agricultural Society No. 1 of the county of Chicoutimi be authorised, this year, to employ part of its funds in the purchase of thoroughbred breeding stock, provided that it devote at least \$200 00 to that purpose, report upon it to the council, and do not distribute in seed more than half the members' subscriptions.

The council approves the programme of operations submitted by the Agricultural Society of Montcalm for the present year.

The Agricultural Society of Bagot asks permission to employ its funds in the purchase of 10 thoroughbred bulls, at \$150 each, and to distribute seed to the amount of half of its members' subscriptions.

The council approves this programme, and grants the request.

The Agricultural Society of Drummond begs to be allowed to employ its funds in the purchase of 25 boars, for the use of its members, and to distribute seed to the full amount of the subscriptions in certain parts of the county.

Resolved: That the agricultural Society of the county of Drummond be authorised to buy 25 boars for the use of its members, but as to the distribution of seed, it must conform to the rules of the council, which forbid the societies of agriculture to distribute in seed more than half the subscriptions of their members.

The Agricultural Society of Portneuf asks leave to buy seed to the amount of the subscriptions of its members, to subscribe for the general benefit to the Gazette des Campagnes, and to buy 20 Cotswold rams, costing \$250.

Resolved: That the Agricultural Society of the county of Portneuf be authorised, this year, to buy 20 Cotswold rams, costing \$250; but as regards the purchase of seed, the society must conform to the rules of the council, which forbid the societies to buy seed to the amount of more than half the members' subscriptions.

The Richlieu Agricultural Society asks to be exempted from holding a competition for the best managed farms, and to be allowed to hold an agricultural exhibition.

Resolved: That the Agricultural Society of the county of Richelieu be allowed to hold an exhibition of stock this year, only on condition that the society conform to the rules of the council, which obliges the society to hold a competition for the best cultivated farms.

The Yamaska Agricultural Society offers as prizes for the best cultivated farms. \$25, \$20, \$15, \$10, \$5.

Resolved: That the Agricultural Society of the county of Yamaska be obliged to conform to the rules of the council, which fix the number and value of the prizes to be offered for the competition for the best managed farms.

The Agricultural Society of St. Hyacinth requests leave to distribute 90 cents' worth of seed to each of its members.

Resolved: That the Agricultural Society of the county of St. Hyacinth must conform to the rules of the council with strictness; which rules forbid the distribution of seed to an amount exceeding half the members' subscriptions.

The Nicolet Agricultural Society desires leave to employ its funds in the purchase of stock, and to distribute seed to its members to the full amount of their subscriptions.

Resolved: That the Agricultural Society of the county of Nicolet be authorised, this year, to employ its funds in the purchase of thoroughbred breeding stock, provided it spends

at least \$580 for that purpose, and reports upon its purchases to the council.

The Agricultural Society of Champlain desires to employ half the members' subscriptions for the purchase of phosphate of lime, the other half for the purchase of seed, and the government grant for the purchase of thoroughbred breeding stock.

Resolved: That the Agricultural Society of the county of Champlain be authorised, this year, to employ its funds in the purchase of thoroughbred stock, on condition that this society devote at least \$500 to this purpose, and report upon it to council. This condition fulfilled, the council approves the rest of the programme of this society.

The council approves the programme submitted by the Agricultural Society No. 1 of the county of Gaspé, offering to hold an exhibition of stock, and a competition for the best cultivated farms.

The Agricultural Society No. 1 of the county of Lotbinière desires to apply its funds to the purchase of a stallion, and the whole of its members' subscriptions to the purchase of seed.

Resolved: That the Agricultural Society No. 1 of the county of Lotbinière be permitted to buy a stallion, provided he be of pure breed, but it must conform literally to the rules of the council, which forbid the distribution of seed to the amount of more than half the members' subscriptions; the other half being intended to form a fund for the purchase of thoroughbred breeding stock.

The council then adjourned till the next day, March 17th at 10 a. m.

Session of March 17th, 10 a. m.

The same being present, except Messrs. Casgrain and Massie; Mr. Browning, seconded by Mr. Casavant, moved: That the societies for the cultivation of fruit of the counties of Islet, Brome and Shefford, be recognized, and that the grant for the past year be paid them, and \$50 to the Shefford Society; that leave be given to the counties of Rouville and Shefford to combine for the exhibition of fruits for the year 1881. (Carried).

Resolved: That the Agricultural Society of the county of Berthier be compelled to hold a competition for the best managed farms this year, on penalty of losing the government grant.

The council approves the programme of the operations for this year submitted by the Agricultural Society of the county of Chambly.

The council gives permission to the Agricultural Society No. 1 of the county of Wolf to give only \$75 in prizes for the competition for the best cultivated farms.

Mr. Browning asked, if the council had received any information from the government as to the manufacture of superphosphate of lime in this province, as to its distribution, or as to the means of obtaining it.

The secretary stated that the council had received no information on the subject since the conference between the ministers and some members of the council called together specially for that purpose, last September, about the time of the Exhibition, when the importation into this country of the "Goémon biphosphaté" was talked about, as well as the establishment of a factory for its preparation in this province.

Resolved: That the secretary be ordered to prepare a financial statement of the affairs of the council, and that the president be requested to present the statement to the government, requesting them to make up the deficiency, if there be one.

Resolved. That the secretary prepare, for the council, an extract from the minutes, showing the rules in force at the present time, pointing out those that refer to the schools, to

the agricultural societies, to the council, and so on, chapter by chapter.

Resolved. That the money derived from the "Prince of Wales' fund" be placed at the disposal of the five members of the council who form part of the permanent committee of the Exhibition, to be offered in prizes at the next provincial exhibition.

The council then adjourned

Approved this 4th of May, 1881,

L. H. MASSIE,
President.

[Certified copy],

GEORGES LECERC, Secretary.

Approved by the Lieutenant-Governor in council, May, 28th, 1881.

ERNEST GAGNON.

AGRICULTURE.

To the Illustrated Journal of Agriculture.

Paris, April, 20.

Mr. Pasteur is closely occupied with his experiments on the causes of contagion. He has already shown, that in the case of hen cholera, the malady was due to the animalcules, called microbes, a kind of life, recalling fungus, and belonging to the same class of infusoria as those under the designation of bacteria and vibrios. Science does not exactly know the complete history of these organisms, but which play an important rôle in fermentation, contagion, and decomposition. They appear as spores, in the form of minute particles, or as delicate threads, reproducing themselves with an extraordinary fecundity, and subsisting in their medium till they have exhausted all the elements necessary for their existence. The Oxygen of the air is the principal moderating agent on the action of these animalcules, which may, as a general term, be viewed as virus. How then can oxygen be made to diminish the terrible effects of virus in the cases of contagion, cattle plagues, for example? The germs have the power of propagating themselves by scission, independent of the presence of the parent spore or seed, similar as in the case of beer leaven, where the cellulæ of fermentation multiply themselves indefinitely without the presence of the parent seed, not unsimilar to those plants raised from slips or cuttings. In the case of the animalcule *bacteria*, ascertained to be the virus in the cattle pest known as *charbon*, its thread-like form is hardly multiplied during twenty-four or forty-eight hours, then they become transformed into egg-like particles, or seed germs. M. Pasteur demonstrates their wonderful vitality, he has preserved some of these bacteria since March 1877, in a glass tube, and when he places some of the germs in conditions favorable to be hatched or developed, they germinate with the same facility and rapidity, the same virulence, as the original seed which produced them four years ago. He prepared, artificially, a liquid, and exposed it to pure air during a month, and at a temperature between 108 and 109 degrees. Up to the last day the liquid was capable of reproducing germs, that is to say, after the month it completely lost the power of production. Still more singular, if bacteria be placed in this liquid, it loses after a residence therein of ten days, all its virulence at least in the sense that it is incapable of communicating the mortal effects of the plague to sheep and rabbits, animals the most liable to contract the disease. Since the virus can be thus rendered inoffensive, nothing, following M. Pasteur, is more simple than to inoculate sheep, cows and horses, and so prevent them from falling victims to the terrible disease? He has done so with marked success in the case of sheep, and, during the summer, intends practising inoculation on an extensive scale on flocks in the Beauce. As in the virus of hen-cholera, so in that of the *charbon* malady of cattle and

sheep, it can be obtained in several degrees of virulence. Now since the air, that is to say its oxygen, can lessen the effects of virus, the latter can refine its virulence when it encounters the conditions favorable for development hence, why plague appar so suddenly as to be called spontaneous, the fact being, that the germs of the disease were only sleeping. These remarks are applicable to pestilences in general. Some countries have their special virulent plagues; moderated by oxygen, their virus only assumes the active form, when the conditions of climate, famine, and misery, reappear. There are maladies again which break out spontaneously in all countries, such for example as *camp typhus*. The microbes or germs—the authors of typhus, are everywhere; man has them in his intestinal canal, which do not injure him, but are not the less ready to become dangerous by the over-population of a place, or their successive development on the surface of wounds or in weakened constitutions, enabling them to regain their virulence. What then is a microscopic animal, inoffensive to man? An organism which cannot develop itself in his body. But nothing proves that that organism cannot penetrate and become developed in another animal, no matter how small, increasing in virulence proportionate to the size of the animal, and augmenting in intensity, till it can affect man and live stock.

The reports of spring work are excellent, and the winter-sown crops present a very satisfactory appearance: the middle of January being very cold, has affected, but only slightly, the agricultural situation in the South and South-Western regions. Clay soils are not thoroughly dried yet after the recent heavy rains. Here are the points of progress French farmers have yet to attain—the use of sowing machines, and the judicious choice of complementary manures. All other modern implements for good husbandry are sufficiently widespread in France. But broadcast sowings predominate, with all their disadvantages for weeding, &c.

The Senate has definitely voted the general tariff, and thus the provisional state in which agricultural interests have been existing since years, has come to an end. Henceforth, the government is free either to make, within six months, a treaty of commerce with any nation or apply the general tariff. For the future, the following are the rates that imported stock will have to pay, per head: oxen, fr. 15; cows and bulls, 8; heifers, &c. 5. calves, 1½; Sheep, 2; lambs, goats, &c. ½; pigs, 3. For fresh slaughtered meat, the tax is 3 fr. per 2 cwts; salt meat, 4½, and preserved or canned, do. 8 fr. per 2 cwts. Will these duties exercise a favorable influence on the future of French agriculture? The protectionists and free-traders seem both to think, they will not; the former, because the taxes are not sufficiently heavy, and the latter, because deemed excessive. In any case, many departments will be inconvenienced which do a large business in the importation of lean stock for fattening. Respecting fluctuations in the price of stock, these being largely dependant on meteorological and economical causes, over which the legislature can exercise no control, the subject may be passed over. Now it is these oscillations from which the breeders of cattle suffer. In general, the price of meat will tend upwards; and the foreigner will, as heretofore, enter into competition when the price is be sufficiently tempting. Many impartial authorities would prefer the abolition of all duties, and instead, the striking of a tax of 2 to 3 per cent, uniformly on all importations.

The condition of beet sowings is good, and where the seed has been judiciously selected, the most favorable results may be anticipated. Varieties of beet rich in sugar are what the manufacturers seek, and farmers lean towards quantity, at the expense of quality. While interests are thus in antagonism, progress must march under difficulties. The sugar

harvest last year has been bad in France, which is chiefly due to inferior seed. In reference to the general question of sugar industry, the prospect is not so clear: this is to be attributed to legislative causes, and the difficulty of reconciling England to accept as free trade, sugar that receives a bounty from a government, because being exported.

An important discovery has been made by M. Lichtenstein respecting the phylloxera: he has at last obtained the winter eggs, the only real ones, on vines (the American Clinton) two years old. But he has discovered them, not on the stem of the growing vine, but invariably on the prunings of the vine which are tied up in bundles ordinarily for fire-wood. Hitherto, the eggs were sought for on the stems exclusively. The galls are formed on the vine leaves, by the phylloxera, on the surface opposite to that in which the insect has picked; thus in the leaf of the elm, the insect peculiar to that tree makes its puncture on the under surface of the leaf, and the gall becomes developed only on that side: the phylloxera, on the contrary, pricks the upper surface of the vine leaf, and the gall is developed on the opposite side, that is, underneath. To destroy slugs: place a morsel of rancid butter on portions of wood, 8 inches square, or on cabbage leaves—8 yards distant from each other. In the morning they will be covered with small snails, that petroleum will destroy.

CORRESPONDENCE.

My dear Sir.—I have read with pleasure the very interesting letter from the pen of Mr. C. A. Deming, in which he says that *theory* is all very well in its way, but *practice* tells the story (1). Well, sir, I have had thorough practice, for 35 years, on the well known farms of the Duke of Bedford, at Woburn Abbey, where feeding cattle for beef and for milk is the farmers' daily occupation. I quite agree with Mr. McEachran in feeding three times a day. If for beef, I feed five times a day, thus, turnips at 6 a. m.; hay at 8 a. m.; oil-cake, or provender, at 11 a. m.—turnips at 4 p. m., hay at 8 p. m. I give only a small quantity at a time, so that it is all eaten up, and then the cattle are ready for the next feed. If I am feeding cows for dairy purposes, I feed 3 times every day, as follows: at 6 a. m., at 12 noon and at 8 p. m. By feeding thus, the animal is not restless for the want of food, they will rest quiet all night. Mr. Deming says he only feeds twice a day, he does not say what time he feeds in the morning, but he says that he feeds at 4 p. m. If he feeds at 7 a. m. and at 4 p. m., there are 15 hours before the animals get food again. This is decidedly too long for any animal to fast. Again Mr. Deming says that he only feeds twice a day, this is only two feeds in 24 hours—for my part, I think that there are too many farmers that have the same rule of feeding, perhaps that is what accounts for the many poor-looking animals we see in the spring in the greater part of our farmers' yards, and I must say that I fail to see how any animal can put on beef on two feeds a day.

Mr. Deming says that he could not get calves to take milk more than twice a day! Now, Sir, I have fed calves, and I have found them ready to take milk three times a day and perhaps they would have taken it oftener if they could have got it—but when they are six months old, I feed them five times a day, the same as the older animals, that is, a few turnips cut fine at six a. m.; a little hay at 8 a. m., pease meal at 11 a. m., turnips again at 4 p. m., and a little hay at 8 p. m., and I always find them ready to eat as soon as they see the food. If Mr. Deming doubts whether his animals will eat oftener than twice a day, let him feed his animals at six a. m., and then give them a little again at noon, and then a little at four, as he says that is the time he feeds for the night—this will be the best proof that he can get.

Perhaps some other practical cattle feeder might give you his opinion about cattle feeding.

(1) So we have Mr. McEachran, Mr. John McClary, and Mr. Bowden, together with the whole practice of England, against the solitary authority of Mr. Deming! I like firmness, but obstinacy is not a commendable quality. Mr. Bowden has the misfortune to have been born in England, and, what is worse, to have learned farming in that benighted country, and, on that account, I fear his opinion will not have much weight here. I remark that, as it is the custom in Canada to call every one who has studied the *principles* of trade, a *Doctrinaire*, so it is the custom to call every one who understands the principles of agriculture, a *Theorist*.

I would have written more on the subject, but I am afraid I have already taken up too much space in your valuable paper. But as Mr C. A. Deming is anxious to see an article on making hay, and as I have had considerable experience in making and stacking hay, if you do not think me too much bother, I will write an article on making and stacking hay for your next number.

I am, Dear Sir,
Your obt. servant,
RICH. BOWDEN.

Wright, 18th April, 1881.

Sir,—I send you an article on cutting and making hay. As the time will soon come, it may be of interest to some. I have had considerable practice in England and Canada, in making stacks of hay. I have had a thorough practical knowledge of cutting and curing hay both for putting in the barn, also for stacking. It must be understood that every farmer should know when his hay is in a fit state to cut, also when it is in a fit state to be put in the stack, or when it is in a fit state to be put in the barn, as there is a considerable difference, as I will explain in this letter.

I will first explain when the hay is fit to cut. To make this plain, I will first take the trees of the forest. Any person can notice that while the sap is rising, the tree looks fresh and green; but as soon as the sap ceases to rise, and begins to return to the root, then the leaves begin to look dry. So it is with hay; as soon as the sap in it ceases to rise, the hay begins to look brown, and, if not soon cut, it is very little better than straw, if hay is cut while the sugar is in it, it has a sweet smell when it is dry; but if it is not cut then it will have lost that sweet smell, and have only a musty smell; it is the sap dried in the hay that causes the hay to have the sweet smell, and when a horse is eating it, you can see the moisture on the horse's mouth. To make the matter plainer, I will explain how every farmer can know when his hay is in a fit state to cut. About the 8th of July, to the 15th, the hay will begin to put out its bloom, and as soon as it begins to drop its bloom, it should be cut as fast as possible, as the sap will in a few days begin to return to the root. Every farmer should get all the help he can afford, so as to cut and cure the hay while the sap is up in it.

Drying, or curing hay, is another very important point in making hay. Every farmer should understand when his hay is in a fit state to put in the stack, or barn. I will commence with stacking.

Hay that is intended for a stack does not require to be so dry as it does for the barn. It can be put in a stack greener than it can in a barn. There is a very good reason why it should be put in the stack greener: during the time the stack is making, the sun and wind have a chance to dry the hay, which they have not in the barn. That is one reason why hay should be carried to the stack greener.

Another reason is that there is a free circulation of air all round a stack to carry off all vapour. There is none goes back on the hay. Hay should be *green enough to heat so as to settle down about one third*, so as to exclude all air from the middle, and then the hay will come out of the stack as green as it was put in it, and there will not be the least signs of mustiness. If hay were put in a stack as dry as it is required to be for the barn, it would not settle down and the air would pass through it, and then it would not weigh so heavy nor will it be as profitable for feeding. So much for stacking.

Now, I will make a few remarks on curing hay for the barn. To know when the hay is fit to be carried into the barn, take a small bunch, and wring it as tight as you can, and if it is wet, it is not fit to go to the barn; but if it is tough, and not damp, you can carry as fast as you like, and there is no danger of heating. Hay should never be allowed to dry enough to break when you wring it, if it does break, the nourishment is all gone, and it is no better than straw. The reason that hay does require to be drier for the barn, is that there is no circulation of air in a barn to carry off the vapour all around the mow; and then the sweat, or vapour, gets condensed in the middle of the mow, and the hay will be musty (1).

(1) Hear! hear! A. R. J. F.

Now a little about the management of hay after it is cut. All hay that is cut in the morning should be shaken out of the swath as soon as the dew is gone; it should be spread as evenly as possible, so as to dry it regularly. Then, before the dew falls, the hay should be put up into what are called grass cocks; this will sweat it a little; then, as soon as the dew is gone, the next morning, the cocks should be shaken out to dry, and left to dry, or wind, two hours, then it should be turned over. Great care should be taken so as to turn it *all over*, or one half will be too dry, while the other will be quite green. The reason that hay should be put up into grass cocks is this: the hay may be half dry, and if it is left on the ground spread out all night, the heavy dew, and then the sun after, will change its colour to a little browner, and it will not have the rich green that it would have if it has been in the grass cocks over night. There are a great many that have hay which they think when cut is all right, they do not give it the proper working after, and they never have good hay.

The yield of hay, on this farm, is 200 tons per annum; and the twelve years that I have superintended it I have not spoiled 200 lbs. It is acknowledged that I have the best hay in this part of the country every year.

Now, my dear Sir, I have not written this with the intention of raising a dispute, because there may be a plenty of farmers that can write you an article on making hay better than I; but at all events, I hope this will be the means of bringing out some of our practical farmers to write you an article on making hay, that will enlighten a large number of farmers on the subject. A few years ago, a farmer came to me to ask my opinion if his hay was fit to put in a stack. After I had examined his hay, I assured him that it was; after it had been in the stack about one week, he came to me, and asked me to go and examine it; he said that he was afraid it would spoil, as it was heating, but I assured him that it was all right, and that it would come out of the stack as green as it went in. When he began to use the hay, he came to me to tell me that his hay was just as I assured him it would be, and that it was the best hay he had ever had. When I came here to farm, the farmers thought that I was cutting my hay too early. They said that the hay was still growing; but nearly every one of them has taken to my plan, they say that they can see that I was right; that I had better hay than they had; besides I had good after-grass, whereas they had none; they say that they lost in quality more than they gained in bulk.

I hope you will excuse me for writing such a long letter on the subject of making hay. If you think my letter of interest, I shall be happy to write you one on the cultivation of turnips; also one on harvesting grain.

RICH. BOWDEN.

A. R. JENNER FUST, Esq.

American Hereford Record. — *Beecher, Ill., 1880.* — I have no room to embark in the quarrel of the Herefords vs. Shorthorns. Both of the breeds are good in their places, but it seems absurd to lay claim to all the bovine virtues for the one, and to neglect the other as unworthy of notice, when all the world, uninterested in the question, knows that in their home, in England, the Shorthorn is to be seen all over the country, while the Hereford is confined to a few counties on the borders of the Severn and its tributaries. There cannot be found a better grazer's bullock than the Hereford, and that is what they are kept for. Devons for plough, Herefords for grass, Shorthorns for beef and dairy—there are the animals, you can take your choice.

The Record is well got up, as regards printing and binding, but the engravings are, I suspect, from fancy portraits, rather than from photographs, which is a pity, as they give no idea of the real animal. If any one will compare the engraving of the "Great Hereford Cow," p. 1, vol. 2, of this Journal with that of the "Devon Heifer," p. 56, same volume, he will see what I mean: one is the beast itself, the other, the beast idealised by a butcher.

A. R. J. F.

Roads, and Road-making.

If it be a truism to say that in every country good roads are of the greatest advantage, it may appear, at first sight, an extraordinary thing that bad roads are so frequently met with. But, lamentable as this fact is, there are many reasons for it: ignorance of the best plans of making roads; want of unity of purpose among the inhabitants of the district; and the absence of proper implements.

Road-making, in Britain, one hundred years ago, was in its infancy. The great MacAdam had only just begun to teach the world, for the first time since the departure of the Romans from the island, how roads ought to be made. Before his reign, the pace of all carriages was tiresomely slow. Pack

each, 7½ feet wide, with a gradual slope from the edge of the road bed to the outside of the ditch, and should be about one foot deep at the farther lip. The level of the ditch must be looked to, so as to deepen through the higher spots (fig. 1).

From the engravings of the different parts of the road, it will seen that the expenditure in labour, where the soil is free from large roots, &c., cannot be very great. The only implements necessary are the plough and the scraper. A new and improved style of the latter implement is at present greatly in vogue in the Western states. From its simplicity and handiness, it is greatly superior to the one in common use. If the directions given below are strictly followed out, it will be found easy to manage, and much less severe on the muscles of the driver than might be expected. Acting as a proeder, it obviates those unsightly lumps of earth so often met with by the side of ditches cut by hand and spade.

Two engravings are given, showing the form and mode of action of the scraper. The price is \$10—free on the cars at Chicago.

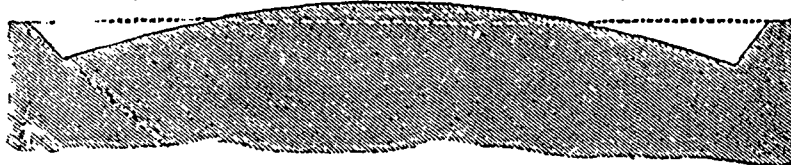


Fig. 1.

horses were still in use, as, even now, pack-mules are in the mining districts of Wales. Abraham Adams easily outran the stage-coach on Salisbury Plain; as well he might, for it only covered 4½ miles an hour; and the journey from London to York took two days to accomplish. Heavy goods were conveyed by broad-wheeled waggons with 6 or 8 horses, the driver riding on a rough but hardy pony, at the rate of 3 miles an hour. Within 80 years of that time, that is, in 1830, the Devonport Mail was timed by contract at 11 miles and hour, including stoppages, and galloped the 4 miles from Ilminster to Ilchester in 16 minutes!

HOW TO MAKE A ROAD FORTY FEET WIDE.

First.—Stake off the road bed twenty-five feet wide, setting stakes so a man can plow a straight furrow.

Second.—Then plow the sod on each side the width of the ditches, seven and one-half feet.

Third.—Scrape all the turf or sod upon the centre of the road bed, striking the furrows endwise with the scraper, and having the team pass around in a circle.

Fourth.—When the sod, the whole width of the ditches, is removed to the road bed, plow again, with the furrows growing deeper, to the outside of the ditches, and scrape this mellow earth upon the road bed, rounding up the centre and filling all inequalities caused by the sod.

Fifth.—When the second plowing has been scraped in, then plow again three or four furrows wide upon the outside of the ditches, scrape in the dirt and round up the road, leaving it highest in the centre, and curving gradually to the outside of the ditches, like the cut below. Such a road as this can be made at less than twenty-five cents per rod.



Fig. 2.

Railroads have of course altered all this, but they have by no means altered the fact that good country roads are a necessary constituent of a prosperous country; on the contrary, they have made them a greater necessity than ever. They are, in reality, the affluents of the main stream.

We may lay down, as a general rule, that a good road should possess four qualities: dryness, smoothness, hardness, and sufficient width. To these might be added, elasticity, a great preservative of horses' feet and legs.

COST AND CUBIC YARDS.

The ditches are seven and one-half feet wide, one foot deep on the outside, and sloping up to the edge of the road bed, hence it has cost the labor of removing less than five and one-half cubic yards of earth to make a rod of road.

HEIGHT OF ROAD AND DRAINAGE.

The ditches have been lowered one foot on each side, the road bed in the centre has been raised six inches by the dirt hauled on from the ditches, hence the drainage is eighteen inches in twenty feet from the centre of road to the outside of ditches, which is ample.

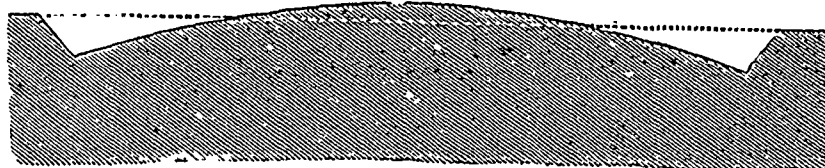


Fig. 3.

Drainage is the first requisite; and this must be secured by the ditches on each side of the road. Smoothness and hardness are obtained by choice of materials, and carefulness of treatment, elasticity depends upon a proper selection of the route, so that the bottom, or subsoil, may be firm and at the same time springy; and a proper width will prevent traffic from always following in a single rut, or rather pair of ruts, as it inevitably will in a narrow road.

Width of road. — The road should be 40 feet wide from outside to outside of the ditches. The road-bed should occupy 25 feet in width, and the ditches should therefore be,

hence the drainage is eighteen inches in twenty feet from the centre of road to the outside of ditches, which is ample.

TRAVEL ON THE ROAD.

Now with such a road the original road bed is solid and firm, as the earth has not been plowed or disturbed, the sods and mellow soil scraped atop of them soon pack and become hard, and the ditches themselves are hard from having all the loose earth scraped off, hence you have a road forty feet wide that can be used, and the travel will never follow in a single rut, as it must in a narrow road.

HINTS ABOUT REPAIRING ROADS.

The tendency is to make the road bed too narrow in the first place, and then too encroach upon it every time it is repaired. The side ditches are usually deepened most close to the road, hence the travel is kept in one place—it is difficult to turn out—the road soon becomes rough and rutted, and the result is a narrow, flat, rough road, with abrupt banks each side like diagram No. 2.

The road should be the highest in the centre, and gradually sloping to the outside of the ditches, so the travel can be over a wider surface without danger of tipping over, like diagram No. 3.

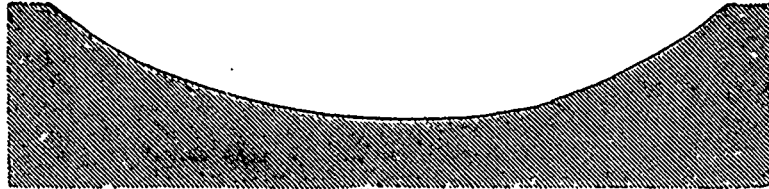


Fig. 4.

In making repairs, the better way is, to plough on the outside of the ditch *always* throwing the furrows towards the road. Then begin to scrape from the outside of the new plowing and you have plenty of fresh earth to broaden and round up the road, and room to set the scraper square into the outside furrow. This will give an oval road bed so the travel can, if required in turning out, go clear to the bottom of the ditches without tipping over. The outside of the ditches can be cut to an angle of forty five degrees, as shown in diagram No. 3, by driving lengthwise of the ditch with the scraper, one horse on the bank and one in the furrow. The scraper will cut the bank smooth and leave it at an angle, so it will stand better. The cheapest way to make a dry road is to make ditches that will take off the water. Any

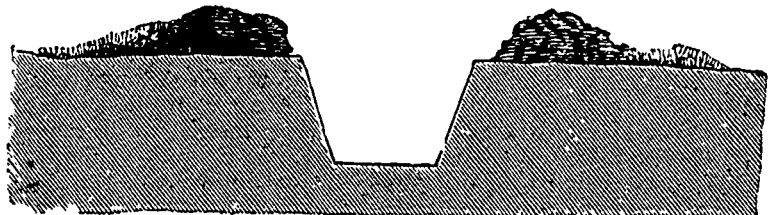


Fig. 5.

road will become dry that has good ditches, and nothing short of that will make a dry road. To fill up mud holes without draining them, is simply putting in *more earth* to make *more mud*.

DITCHING AND DRAINING LANDS.

There is hardly a farm that would not be improved by making broad open ditches to drain off the surplus water in the early spring, like this diagram: (No. 4).

They make no waste land, like a straight hand-cut ditch, (fig. 5), but can be plowed to the bottom, can be driven over without bridges, and, more than all other considerations, do not fill up, hence cost nothing for repairs. The cost of these ditches, made with our Scraper, is trifling. The land is plowed and the dirt is wasted to fill up any low or uneven places within a few rods on either side.

The Massachusetts Horticultural Society having invited the American Pomological Society to hold its next meeting at Boston, notice is hereby given that the Eighteenth Session of this National Association will be held in that city, commencing *Wednesday, September Fourteenth, 1881, at 10 o'clock, a. m., and continuing for three days.*

This Session will take place at the time of the Annual Exhibition of the Massachusetts Horticultural Society, which is expected to be of unusual excellence, and will give additional interest to the occasion.

All Horticultural, Pomological, Agricultural, and other kindred Associations in the United States and British Provinces, are invited to send delegations as large as they may deem expedient; and all persons interested in the cultivation of fruits are invited to be present, and take seats in the Convention.

Reviews.

Journal of the American Agricultural Association, New-York, 1881.

A publication containing articles on Agriculture, and its kindred topics, contributed by all orders of men in the United-States, by Englishmen, and by one resident of Canada (spare my blushes). Many of the writers are well known to fame; particularly, Messrs. Law, Willard, Sheldon, Lawes, and Loring. Practice is evidently the aim of the society, and, with the improvement which is sure to come with time, the Journal may fairly look forward to occupy in the States the place occupied in England by the Royal Agricultural Society's Journal. Mr. Atkinson, of Boston, furnishes the *pièce de résistance*; a long and learned dissertation on "The Railroad and The Farmer." One paragraph I must find room for; "Any attempt to control the rates that may be charged upon a railroad by statute is but an indirect attempt to regulate prices by law. Such undertakings have always failed. Every sumptuary law has failed, and scarcity has ensued from every attempt to regulate prices by law in all lands, and at all times." True enough, and the same thing may be said of all attempts to regulate the price of money, i. e. the rate of interest.

Mill's "System of Eosilage," by Francis Moulton, is interesting though, perhaps, a thought extravagant. In it we learn how to secure the pit from premature decomposition by keeping it in sections I do not think, however, that we shall arrive at feeding 300 cows on 20 acres of land. The difference in cost between the maintenance of an animal under the system ordinarily adopted by farmers, and that adopted by Mr. Mills, he claims is the difference between \$80 and \$12 per annum.

Professor C. V. Riley is rather rash in his statements, e. g. "There are three schools of Agriculture under the patronage of the English Government—one in England, one in Scotland, and one in Ireland. Each of these schools stands on one hundred or more acres, and is divided into three farms: 1st, a spade-labour farm, &c." This is absurd. There is no such thing in England, or Scotland. In Ireland, I believe something of the sort does exist, at Glasnevin; but the Agricultural Colleges at Cirencester (where there is no farm), and Salisbury, are entirely free from any connection with the Government. In Scotland, there is no Agricultural College of any sort.

An appendix on *Trichinosis* admits the existence of *trichina* in the United-States to a limited extent, and is written with commendable frankness. But the testimony of a hundred pork-packers to their own carelessness in the selection of hogs, and to the cleanliness with which their operations are conducted, has little to do with the question. If people will eat raw or half-cooked pork, they are in danger of suffering from the disease, but as a moist temperature of 150° F. destroys the life of the parasite, those who die from its attacks have only their own carelessness to thank.

A. R. J. F.

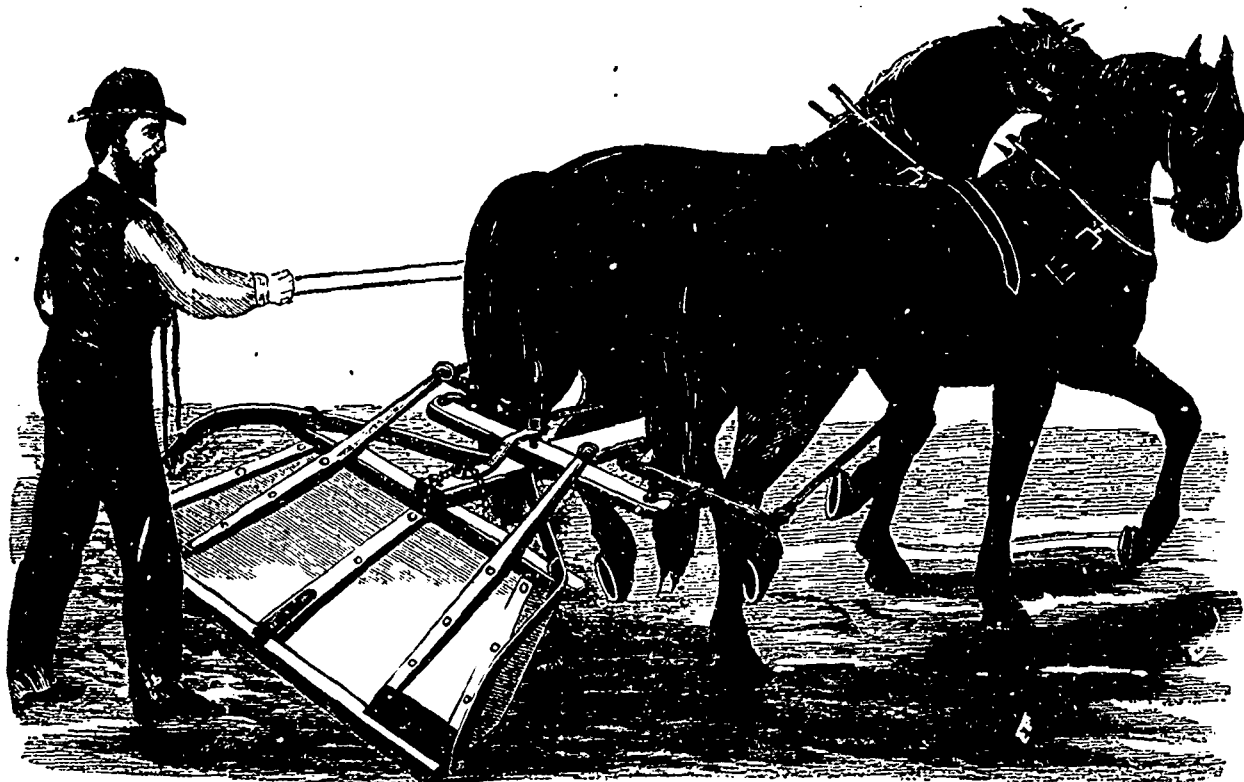
HORTICULTURE.

THE CULTIVATION OF THE VINE.

The attention of the horticulturists of our country must have been attracted to the excellent articles, written by Mr. Chas. Gibb and published in this Journal, on the various sorts of grapes grown in different parts of the province. The descriptions by this gentleman of the best and finest kinds, are enough to make any one's mouth water, and must tempt every person with however small a patch of land to make a fair trial at the growth of at least one of them.

The systems of vine-culture have been already described in this publication; but in general terms; terms from which an amateur with a moderate experience might gather much information; but insufficient, in point of detail, to guide the novice.

SITUATION AND EXPOSURE OF VINEYARDS.—Vines should be planted in a spot, which, though raised above the general level, is not exposed to winds from the North and East—the cold quarters. There are who recommend that vines should be planted close to a wall or to a board-fence, on which the plant should be trained; but I disagree with them. In England, I am informed by Mr. Jenner Fust, this is the method almost invariably practised, and he is convinced that the constant mildew of the grapes in that country, particularly in the Western counties, is chiefly owing to the want of circulation of air caused by this mode of training. If, however, a trellis be erected within about six inches of the wall or fence, the objection vanishes: all the benefit of the heat-rays reflected from the wall is retained; a free circulation of the air is gained, and the advantage of a protection from winds is afforded. In fact, provided vines are sufficiently



Scraper—empty.

Last autumn, at the time most favourable for pruning, I wrote a short article on that subject. The following thoughts are intended to be the completion of that article, in which I only treated of the pruning of the vine, and not at all of its cultivation. Now, I hope to be able to give full details of such a character as shall enable the husbandman, the gardener, or the amateur, to carry out the work successfully from planting to fruiting.

PRELIMINARIES.—I recommend every one to buy the vines he may want for planting in the autumn, and after having taken them from the package, they may be *heeled in*, out of doors, in this way: open a furrow a foot deep; place in it the vines obliquely, with the roots at the bottom, and the stems lying across the furrow and resting against the edge. The vines, root and stem, must then be covered with earth, at least six inches in depth, and over the earth, a foot or so of straw or brushwood. In the spring, when the time arrives for the vegetation of the vine to commence, the plants in the ditch will be found in full health and vigour.

sheltered, receive the full morning sun, and are tied to a proper trellis running East and West, almost any position is suitable to the grapes generally grown in this province.

SOIL.—Does the vine require an especial soil? The true grape-soil is composed of clay and sand, in equal parts, well drained, naturally or artificially, and rich in *phosphoric acid*. Land which is too light is inferior for the purpose of vine-culture to that of heavier quality; but the latter must be thoroughly dry; for low, damp situations invariably produce mildew.

PREPARATION OF THE SOIL.—Dig a hole eighteen inches deep and wide, taking care to separate the soil from the sub-soil. Lay down near the hole a good lot of rich mould (like the earth prepared for no-beds—*terreau*) well pulverised mixed with plenty of bone dust, and proportioned in its richness to the quality of the land you are to plant your vines in—for the more productive the land the less manure will be required; too much wood and too little fruit, will be the effect of over-doing it.

PLANTS.—These are of two sorts: *cuttings* and *layers*. For the former take a last year's branch, cut it into three inch length; with a bud, or eye, in the middle of each length; cut away half the wood of each slip on the side opposite the eye, and keep them, during the winter, in damp sand in a cellar. When spring arrives, plant the cuttings out in the garden, or pre-



Fig. 1—Cutting.



Fig. 2—Layering.

ferably, in a hotbed, and cover them with three inches of earth (fig. 1).

If you choose the system of *layering*, take a lower branch, and without detaching it from the vine, make a shallow trench for it in the ground and cover it with four or five inches of earth. This must be done in spring, and shortly afterwards you will see as many young shoots rising from the ground as there were eyes in the branch. If you wish for strong plants, do not leave too many shoots on the same branch. Cut the layers apart, and extract them carefully from the earth—you will find them well rooted, and they have the advantage of bearing the third year; whereas, cuttings are seldom worth much before the fourth year. The only

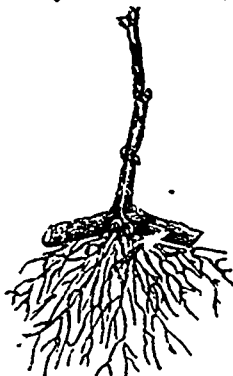


Fig. 3—Layer.

reason for growing plants from cuttings, at all, is that, where there is not much room, plenty can be produced in very small plot of ground, and they can be set in any convenient spot.

SPACE FOR EACH VINE.—Many errors are committed on this head. Thus, under the pretext that vines should be very closely pruned to obtain as much new wood as possible, people plant, in places where space is limited, as closely as from four to five feet only, between the vines; and keep them within bounds by an unmerciful use of the knife. The strongest vine will suffer from such treatment. Only two good crops can be expected from vines managed thus before they fall

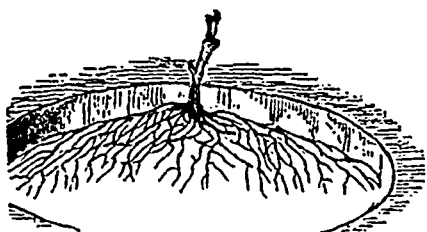


Fig. 4—How to arrange the roots.



Fig. 5—Side-shoots a & b

away into a miserable decadence. The best authorities among practical men recommend at least ten feet between each plant on all sides. A vine called the *Beaconsfield*, which is really only the old *Champion*, an importation from the States, is said to answer very well at distances of five feet. But this is a mistake. It is the hardest of all the American vines, and as early as most of them; but it requires, to do well, the same amount of room as the rest, and the same sort of cultivation.

SETTING OUT.—About the time when vines begin to vegetate, prepare the holes as above. Cut off all broken roots

from your plants, and having made a small round elevation in middle of the hole, set your young vine upon it, spreading out the roots and rootlets with the greatest care, sprinkling in the finest mould by degrees, and leaving not the smallest interstice unfilled. Then, fill up the hole with the mixture of bones and earth; tread all down firmly; place a stake, well driven in, at each plant's side, and the job is done.



Fig. 6a—Vine of the 1st year.

FIRST YEAR'S CULTIVATION.—As soon as the buds begin to expand, choosing the strongest of the lowest ones, let it grow and pluck off the others. As this *eye* becomes a stem, tie it to the stake, but only loosely, so that its development may not be hindered. All the lateral shoots between the *axils* (fig. 5 a and b) must be pinched off, so that the stem may look exactly like the figure 6 a. This, as in tobacco or in tomato growing, must be looked after carefully, at least every fourth day—as these side-shoots grow with vast rapidity.

Your vines, if grown from strong and healthy layers, ought, in the autumn, to be as thick as one's finger. If they are from cuttings, they will be much slighter, and in consequence will require a *second year* of the same treatment; they must be cut down in the autumn to two eyes each; one stem only must be allowed to grow the second summer, at the end of which they may be treated exactly as the layered plants are at the end of their first year; thus a clear gain of twelve months is made by using layers in

preference to cuttings.

In the autumn of the first year, the young vine will be like fig. 6b. Cut it down to within three eyes of the ground, and cover it with at least six inches of earth. Never use, for this purpose, straw, or half-rotted dung. Many do, and thereby unnecessarily expose themselves to loss; for it affords a safe retreat to that pest of orchards, the *field-mouse* (1).

Vines should not be covered up for the winter before the ground has begun to freeze; and the pruning should be deferred, too, until the circulation of the sap has ceased for the season.

SECOND YEAR'S CULTIVATION.—Two of the three eyes left in the autumn should be allowed grow in the spring of the second year, and the third must be obliterated. Tie the two shoots, as they progress, to the stake, pinching off the laterals, and especially the flowers, if any show themselves; and in autumn your vine will resemble fig 8. If you intend to follow out the *first* of the two plans I intend to lay before you, you must cut down the two branches to within



Fig. 6b—Vine of the 1st year.

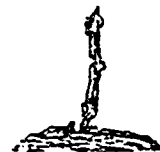


Fig. 7—Pruning, 1st year.

five feet of the grounds; if the second plan, to within four feet, lay them down and cover up as

(1) *Mulot*—twice as big here as in England.

THIRD YEAR'S CULTIVATION — First method. — In the spring of the third year, a trellis should be placed near each vine.



Fig. 8—Vine two years old, before pruning.

There are two sorts of trellises: horizontal and perpendicular. In both cases, two posts (cedar, if you wish them to last) must be driven into the ground, at a distance of five feet on each side of your vine; in a perfectly straight line, running, if possible, due East and West. At six inches from the bottom of the posts must be fastened a cross-bar, about two inches square, and another at the top. Then, at distances of a foot, galvanized iron wire, a line in thickness, must be fastened, vertically, from the lower to the upper cross bars, and well stretched. The whole should be about six feet high (f. 9). Another way of making the trellis may be seen in fig. 10; where the wire is placed horizontally between the two posts, with only one cross-bar, and that, on the top. The horizontal wires should be only eight inches apart. I confess I prefer the former method, as by it the vine can be tied to the wires at any height; whereas by the second method, it is necessary to allow it to pass the wires a little before the tying can be done. Both ways, though, are good.

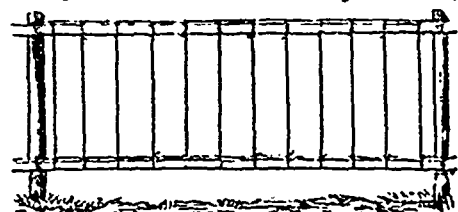


Fig. 9—Trellis with vertical wire.

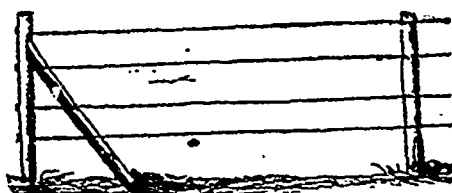


Fig. 10—Trellis with horizontal wire.

The trellis finished, the two branches of the former year (fig. 11) are to be raised from the ground, and tied, in a horizontal position, to the lower cross bar, or to the bottom wire. Numerous shoots will make their appearance; but all those that point downwards must be pinched off, and only four of those on each of the branches retained, at as nearly as possible fifteen inches apart. If we practise the *renewal system*, we must proceed as follows: each vertical stem, to make my meaning clearer, I will designate by a number, as 1, 2, 3 &c.; each of these must be allowed to grow equally, and be tied to each wire as they mount; but only numbers 1, 3, 6, 8, should be permitted to bear grapes; the flowers, branches, and side-shoots of numbers 2, 4, 5 and 7, must be pinched off, the moment they form (fig. 12).

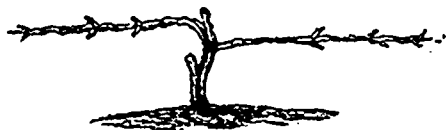


Fig. 11—2nd year's pruning.

When, on 1, 3, 5, 7, the flowers are sufficiently developed, leaving three bunches on each, pinch off the top of each ver-

tical branch three leaves above the topmost of these three

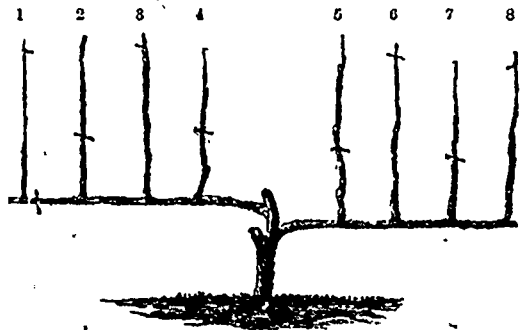


Fig. 12—3rd year (first method).

bunches, and obliterate all side-shoots that start afterwards. Some recommend the removal of most of the leaves from the fruit-bearing branches, that the bunches may get an addition

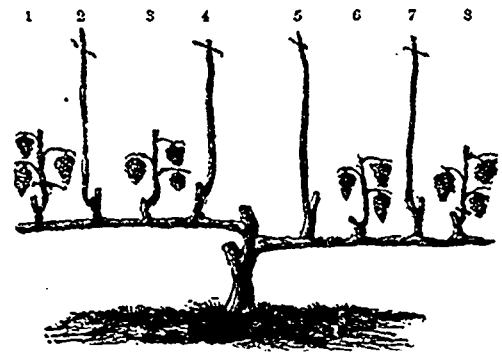


Fig. 13—Vine, 3rd autumn (first method).

of light. Doubtless, if the vines grows too vigorously, it is a good plan to remove some of the leaves, lest they shade the fruit too much. But caution should be used; for the leaves are the means by which the plant absorbs much of its food, and too great nakedness would tend to starve it. Fig. 13 shows what the state of your vine should be in the autumn of this third year. Prune number 1, 3, 6, 8, which have

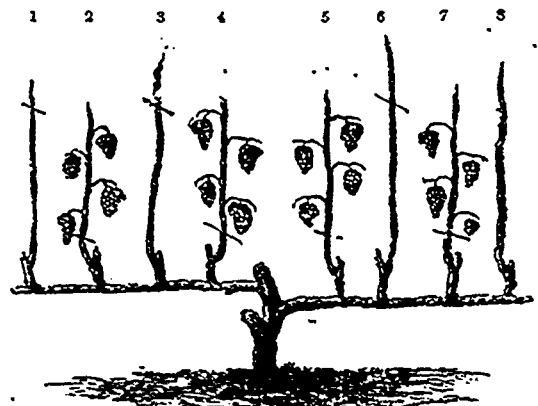


Fig. 14—Vine of fourth year (first method).

borne fruit, to within two eyes of the horizontal branch, and the others, which have lain idle, to six eyes, and cover for the winter as before.

FOURTH YEAR'S CULTIVATION—First method. — In the spring of the fourth year, after you have disinterred your vines, the branches 1, 3, 6, which have borne fruit, and

which have been pruned down to within two eyes of the horizontal branches, will put forth two shoots. Two eyes were left, for fear one of them should fail; so, now, pinch off one, and tie the other, as it grows, to the trellis, obliterating the side-shoots as usual. The numbers 2, 4, 5, 7, pruned to six eyes in the previous autumn, will send out side-shoots at each eye, which are to be allowed to grow. When each of these has flowered, and produced a bunch of fair appearance, pinch off the shoot two leaves above the bunch, and leave on each of the branches 2, 4, 5, 7, four of the new fruit-bearing shoots, and stop them at two leaves from the last fruiting branch. In autumn you will have a vine like the one pictured in fig. 14. Prune, then, the branches which have borne fruit this year like those of last year; and the new ones, which have not fruited, prune in the same manner as you pruned the new ones last year. The after-cultivation consists in leaving two bunches instead of one on the fruit-bearing side-shoots; and as the vine increases in size and strength, even six of these shoots may be left, if the plant is of a prolific sort and of robust habit.

THIRD YEAR'S CULTIVATION — Second method. — I have already stated, that for grapes grown in this fashion, each of the branches should be pruned to within four feet of the ground. In spring, tie them to the lowest bar of the trellis, as before. Pinch all shoots tending earthwards, and retain ten of those growing on the upper part of the branches, preserving, as much as possible a distance of a foot between them, and tie them to the trellis as before. As soon as bunches have formed, leaving only one on each branch, stop the branch two leaves above the bunch. Stop all side-shoots and the buds that form where you pinched. Fig. 15 shows the appearance your vine will present in the following autumn. Prune, by cutting all the branches, except those of the two ends, down to two eyes each from the horizontal branch. The end branches you may shorten to within a foot of the main, and cover for the winter as usual.

FOURTH YEAR'S CULTIVATION — Second method. — In the spring of this year, the branches pruned to two eyes will send out two shoots each. Off with one of them, as it was only kept lest the other should meet with an accident. Tie the two end branches, which you left a foot long, horizontally to the lowest bar of the trellis to form an elongation of the two chief branches. Your vine has now arrived at its proper length, viz. ten feet; and on each of these elongations, one vertical cane must be allowed to grow, thus, you will now have ten new vertical canes, on each of which two or, if the vine is very strong, three bunches may be left. The remaining treatment should be exactly the same as that pursued the year before. In fruit-time your vine will, or should, resemble the engraving No. 16. Prune to within two eyes of the main-branch (f. 17), and continue the same method in subsequent years.

Another system of vine-growing is that practised by Mr. Driscoll, of Aylmer. The stump of the vine is allowed to grow about five inches above the surface of the ground; then, from the top of this stump, two canes are allowed to grow



Fig. 17—3rd year pruning (2nd method).

each year: that is, the two canes which grow one year, at full liberty, are tied to a stake and fruit the next year. This is, like the "first method" described above, a sort of very simple *renewal* (fig. 18). I am not very well acquainted with this system, but I am inclined to think that it would, in our climate, be found rather exhausting to the vine.

Mr. Gibb, in the two articles from his pen, has sufficiently described the different sorts of vines cultivated in this country. To these I refer my readers. They will find there vines to suit all tastes, every soil, and every situation.

ENEMIES AND DISEASES OF THE VINE — THEIR TREATMENT. — Two great plagues attack the vine: *Mildew* and the insect called *Thrip*. European grapes, imported into this country, are especially subject to the mildew, as are American grapes planted in low, damp places; therefore don't plant vines in such situations. As for those

afflicted by this pest which sometimes attack them even on an eminence, sulphur is the only remedy. It must be applied, in the full heat of noon, over the whole plant, above and below the leaves, and a pair of bellows is the most suitable agent for its distribution. The operation must be repeated two or three times in the season, as soon as the attacks of the enemy are perceived.

Thrip is very fatal to the vine; the more so, because it develops itself between the cracks of the bark, at the intersection of the branches, where no eye can detect it; and its ravages are only perceptible by the languishing and dying away of the vine, whose life-blood it is slowly but surely draining away. See p. 182, vol. 3, 1881. A good syringing with a solution of whale-oil soap is about the only cure.

If an early or a late frost should affect your vineyard, water the leaves which are touched with *cold water before sunrise*. The same treatment will serve for like cases in tobacco, tomato-plants, &c.

I have consulted, for the purpose of this article, many American works on grape-culture. I have trusted, however more particularly to our Canadian horticulturists, as being better acquainted with the character of our climate and soil. Having myself taken much interest in this pursuit, I am convinced that if the methods followed by our best grape-growers are strictly followed out, they will conduct the novice to a certain and successful end.

J. C. CHAPAIS.

Duke of Connaught.

This fine Shorthorn bull, for which Lord Fitzhardinge gave the mad price of £4,500, has already returned to its possessor £7,500. His charge for service is fifty guineas a cow. I forgot to mention that, though there is no College or School of Agriculture in Scotland, there is a *Chair of Agriculture* in the University of Edinburgh.



Fig. 16—4th year plant (2nd method).



Fig. 18—Driscoll's method. *a a*, fruit-branches, *b b*, this year's branches.

REVIEW.

The art of grafting trees, shrubs, fruit-bushes, &c. by Chs. Baltet, Horticulturist, Troyes, France. Second edition, revised, and accompanied by an appendix on the re-habilitation of the vine by means of grafting.—127 engravings.—Paris, G. Masson, Publisher, 120, Boulevard St. Germain, 1880.

I have, lately, had the pleasure of reading this book, which for thorough knowledge of its subject, and fulness of detail, is so unusually valuable, that I think I cannot do better than give a précis of its contents, for the instruction of the readers of the *Journal of Agriculture* in the useful art of which it treats. It is not only the work of a well known orchardist, whose operations are carried out on the largest scale, but it has been viewed with approbation by the best judges of France; and the author's establishment has received the highest honour in the gift of the great French Society of Horticulture, the Emperor's Gold Medal. (1)



Fig. 1.—Clayed graft. by Mr. Baltet in the art of *grafting*, or as the English called it four hundred years ago, *imping*, (2) may be reckoned the following: *fruit bud grafting*; in which the fruit-buds of the pear are added to branches of a pear-tree, where, from accident or otherwise, its own buds, have failed. *Bulltress*, or *grafting by approximation*, to supply the place of boughs stripped of their twigs and foliage. This plan has been very successful with peach-trees, and with vines.

The principal divisions of this essay are these: 1st Meaning and end of grafting; the tools, grafting wax, &c., to be used in the operation. 2nd How to graft; the three methods principally used, from which all the others springs; the care of trees after grafting; and the destruction of insects. 3rd What trees, &c., will admit of grafting 4th Revival of trees, previously worn out, by the graft. 5th Rehabilitation of the vine by grafting.

In the first part, the author defines the art of grafting as: "An operation which consists in welding (*souder*) one, or a part of one, vegetable to another which shall furnish it part of the food necessary to its existence, and become its support when severed from its parent stock.

(1) This was in 1855, when there was an Emperor in France.
(2) *Imp*, in old English, signified a child: "Oh! royal imp of fame": Shakespear.

The end to be aimed at is: 1st By modifying the wood, the foliage, the flowering, the fruit, to change the nature of any given vegetable; (1)



Fig. 3.—Graft by approximation. English manner.

2. To excite the grafted tree to put forth branches, flowers, and fruit, where these are wanting;

3. To revive a defective or worn out tree, by the transfusion of the new sap of a more vigorous stock;

4. To bring together on the same root the two sexes of *monœcious* vegetables, to ensure greater fecundity. (2)

5 To preserve and propagate a great variety of plants, ligneous and herbaceous, useful or agreeable, which cannot be produced by any other means of multiplication.

"Without grafting," says our author, "our orchards could never have boasted of such a rich collection of fruits suited to each season as they as now possess; our forests would have been deprived of many an important member; and we should never have been gratified with the view which our parks afford us of innumerable species of indigenous or exotic shrubs." He then points out what conditions are necessary to the success of the graft. affinity of species, reciprocal vigour of the two stocks, and the choice of proper seasons for the work. Again, he describes the tools used by the grafter. Numerous engravings make this part of the

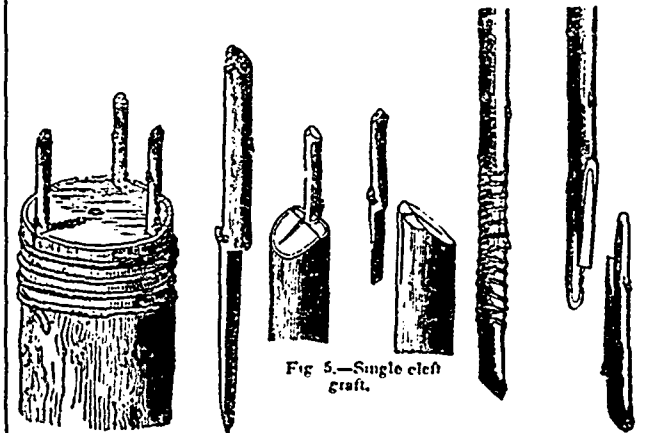


Fig. 4.—Crown graft.

Fig. 5.—Single cleft graft.

Fig. 6.—English graft—complicated.

work very useful to the amateur, by giving him a true idea of the implement described; and this division of the book concludes with a short treatise on the *ties* and *claying* (engluement) which serve to protect the graft, and which ought

(1) The author, of course, by "*végétal*" means, not turnips or carrots, but trees, bushes, &c., but the word is otherwise untranslatable, except by a long periphrasis.
(2) *Cucumbers*, *melons*, &c., are *diœcious*, i. e. bear male and female flowers on the same plant. *Hops* are *monœcious*, i. e. there are male and female plants.

to be used liberally, and without false economy. Fig. 1 shows a well clayed graft.

The second part, the most important of the whole work, points out the proper care to be taken of the graft and its

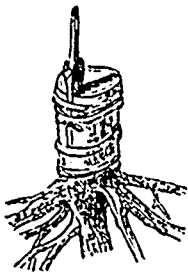


Fig. 7.—Root-graft.

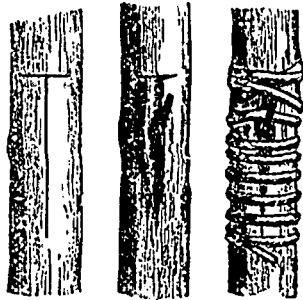


Fig. 8.—Escutcheon-graft.

step-mother before the operation; and the preparation to be made before the actual work begins. In this description is shown how to produce grafts from trees worthy of propagation by layering, either from the stump (*cépée*) or *en butte*

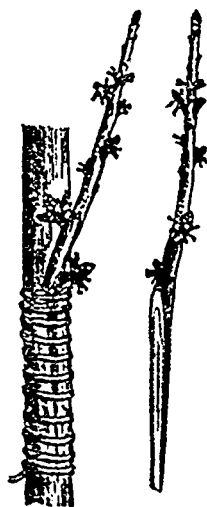


Fig. 9.—Double escutcheon graft.

Fig. 10.—Naked branch grafted.

(fig. 2). This plan, I believe, is very little known among gardeners; I, therefore, transcribe in full what the author says on the subject.

“Layering is practised on the quince, apple, plum, fig, nut, &c. The plant is cut down level with the ground; it is earthed up with fine mould, and the extremities of the twigs are pinched off in their tender state so that they are made fluffy (*chevelues*). In autumn, the stump is uncovered, and the young twigs, now well rooted, are taken up. If the plant is weak or badly rooted, it may be pruned, and covered up again till the next season. Stumps can be layered every year, or every two years.”



There is a full description given of the three principal modes of grafting: by *approximation*, by *detached boughs*, and by *eyes* or *buds*. It would occupy too much space in this review to enlarge upon them all. Let it suffice to say that the graft by *approximation* may be per-

formed in two different ways, of which ways there are numerous variations. The engravings which accompany the descriptions are so well done, that it is only

necessary to see them to understand the operations. Of the different ways of accomplishing the graft by *approximation*, the engraving, No. 3, represents the English way. Grafting by *detached boughs* may be performed in eight different

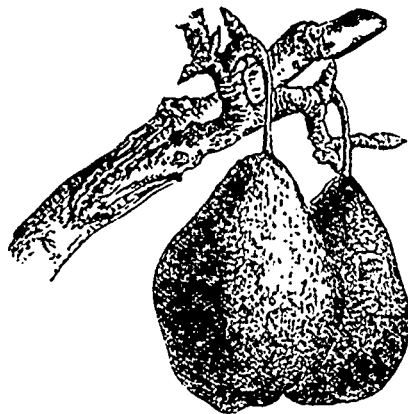


Fig. 12.—Result of fruit-bud graft.

manners, with endless variations. Figs 4 and 5 show, *crown* grafting; *single cleft* grafting; 6 and 7 a more complicated form of English work, and root-grafting. Very clear indeed is the description of grafting by *eye* or *bud*.

This fashion, together with the cleft-grafting described above, are the two which are most suitable to our climate, although the others may often be found useful. Budding may be practised by the *escutcheon* method (see fig. 8), or by that *en flûte* (1).

Mr. Baltet points out, apropos to the *escutcheon* plan, a way of doing it which appears to me both simple and rational. It consists in doubling the *escutcheon*. If in the single way, the graft does not take, the whole season is lost, but double (fig 9), there is less chance of failure. If both take, one must, of course, be pinched.

The details of all these operations are very fully given, and the experience of 30 years, which Mr. Baltet possesses, are placed at the service of the amateur in a most pleasing and satisfactory way.

That division of the book which treats of the restoration of trees by grafting may, at first sight, appear of less general utility. And, still, it can be of great service, when it concerns the appearance of a tree deprived of its branches. Figure 10

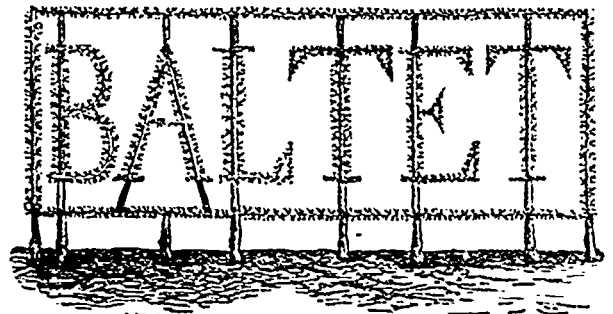


Fig. 13.—Grafted espalier pear-trees.

shows how by this means, a fine tree which has been injured, and rendered mean-looking by some accident, may be restored to its pristine beauty. Again, it often happens that trees bear no fruit although they are strong and healthy. If they are of a hardy sort, their sterility may be arrested by cutting away freely their limbs and roots. But for such tender trees as pears, &c., this would be but dangerous work, so, Mr. Baltet shows how, in such cases, it is perfectly practicable to graft fruit-buds on the sterile tree. And thus a profitable exchange may be made; for buds can be taken from a tree too weak to perfect its fruit, and transferred to one so

(1) To graft *en flûte* means paring down the graft and the limb to be grafted till they resemble the mouth-piece of a flageolet or pipe.

luxuriant in its growth as to bring forth nothing but branches and leaves. This is shown clearly, in figs. 11 and 12.

The engraving, No. 13. gives a good idea of the marvels to be effected by this art. It represents several espalier-grown pear-trees, each of which forms one of the letters of the name "Baltet!" The whole is united and forms one piece, made so, entirely, by the use of the various system of grafting described in Mr. Baltet's book.

The chapter on the rehabilitation of the vine by means of grafting has no interest for us. Our climate would not admit of the practice; and besides, thank goodness, we have no phylloxera to contend with.

J. C. CHAPUIS.

sometimes for several weeks before discharging, being surrounded by a membrane full of creamy pus, in which the microscopic organism exists in infinite numbers, side by side with the globules of pus. It is the life of the inoculated organism which causes the abscess, which is as a closed vessel, from which we may obtain the organism without endangering the life of the animal. The microscopic organism remains, mixed with pus, in a great state of purity without losing its vitality. This may be proved by inoculating on chickens a small portion of the contents of the abscess. From the effect of these inoculations, the chickens very soon die, while the guinea pig, which has furnished the virus, is entirely cured after a short time. This is an instance of the localised evolution of a microscopic organism, which causes the formation of pus and



Scraper—at work.

On virulent diseases, and especially on the disease commonly called Chicken Cholera.

By M. Pasteur

In my former researches, one of the liquids which I used with the greatest success, was a decoction of beer-yeast in water, after filtering it to obtain it perfectly limpid, and after rendering it sterile by a temperature superior to 100° C. The most various microscopic organisms thrive on the food presented by this liquid, particularly after being neutralised. For instance, the *bacteridia* of carbuncular disease multiplies surprisingly in a few hours. It is a strange thing that this liquid is entirely unsuited to the life of the organism of chicken cholera, which dies in it in less than forty-eight hours. Is not this entirely analogous to what happens when a microscopic organism is entirely innocuous towards an animal on which it has been inoculated? It remains inoffensive because it does not develop in the body of the animal, and it does not reach the organs essential to life.

The sterility of the decoction of yeast, with respect to the microscopic organism of chicken cholera, affords us an excellent criterion for the purity of the cultivation of this organism in chicken broth. If the cultivation be pure, upon transferring it to a decoction of yeast, no development takes place, and the yeast solution remains limpid. If, however, other organisms are present, they are developed, and the solution becomes turbid. I will, in the next place, call your attention to a still more extraordinary peculiarity of the cultivation of the germ of chicken cholera. The inoculation of this organism on guinea pigs is not so surely fatal as in the case of chickens. In guinea pigs, particularly in the older animals, the only thing that can be observed is a local lesion, at the point of inoculation, which ends in an abscess, of greater or less volume. This abscess opens spontaneously and heals, and meanwhile the guinea pig eats his food as usual, and seems to possess all the characteristics of health. These abscesses last

of a closed abscess, without, at the same time, causing intern disturbance of the death of the animal on which it exists. It is, however always able to cause the death of other species on which it may be inoculated, and even the death of the animal on which it exists in a closed abscess, if through some fortuitous circumstances, it should pass into the blood or into the viscera. Chickens and rabbits, living in company with guinea pigs, affected with abscesses of this kind, might, all at once, sicken and die with ut any great change being observable in the health of the guinea pigs. This could easily happen if the abscesses of the guinea pigs discharged a small portion of their contents on the food of the chickens and rabbits.

An observer who witnessed these facts, and was ignorant of all the points, might well be astonished to see chickens and rabbits die in great numbers, without any apparent cause, and he would be apt to believe in some spontaneous disease. Certainly, he would not suppose that the guinea pigs were the cause of all the trouble, when he saw them all in good health, and particularly if he knew that the guinea pigs themselves often suffer from the same disease. Many of the mysteries in the history of contagions will some day be solved in easier ways than the one I have just mentioned. We may reject theories which are in contradiction with known facts, but we must not reject them solely because some of their applications elude our grasp. The combinations of nature are both simpler and more varied than those of human imagination.

I may easily convince you of the truth of these statements, if I add that, if a few drops from a cultivation of our microscopic organism, be placed on bread or meat given to chickens, they are sufficient to propagate the evil to their intestines, in which the little organism propagates with such remarkable rapidity, that the excrements of chickens so poisoned cause the death of those on whom they are inoculated. These facts enable us to understand the manner in which this fearful disease develops in poultry yards,

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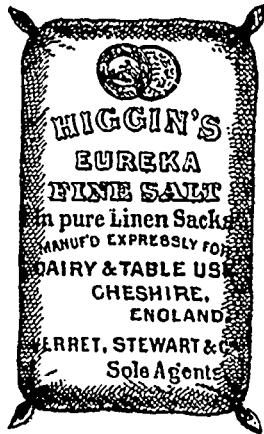


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NOTICE — THE HON M H COCHRANE begs to inform the Agricultural Societies that, about the last of June he will receive 10 or 12 Young Hereford Bulls, from 10 to 13 months old, which he will be disposed to sell at \$200 each, a price which barely covers the cost of purchase and importation. Also two valuable Clydesdale stallions, just arrived, a bay, 3 years old, and a black, 7 years old, each weighing about 1900 lbs. They will be sold at reasonable prices to Agricultural Societies. For particulars apply to **JAMES A COCHRANE, Compton,** or **D. McEACHRAN, Montreal.**

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It is made by the only known process which ensures the removal of panscale and other impurities in large pieces, and prevents them from being broken up and becoming mixed with the salt, and that process is patented, preventing it being used by other manufacturers.

The maker of Higgin's "Eureka" challenges searching examinations of the salt, and is satisfied that years hence the truth of the statements now made respecting it will be verified by every maker of the finest dairy products.

The importance of good salt to Dairy men cannot be over estimated, and since the introduction of Higgin's Eureka, a want has been supplied, so that those making choice butter and cheese, can always rely upon getting a thoroughly pure and perfectly uniform article.

The Eureka is used in the best creameries and cheese factories in Canada and the United States, and gives the utmost satisfaction, also at Her Majesty the Queen's Model Dairy Farm, Windsor, and by makers of the finest dairy products in Great Britain. It is also used extensively in Scandinavia, where butter-making has long been studied scientifically.

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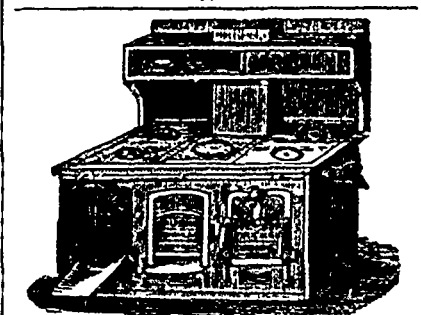
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