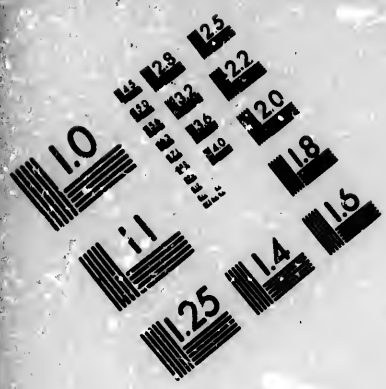

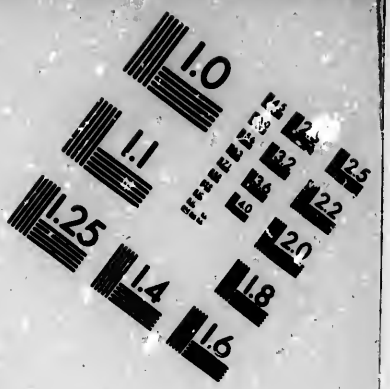

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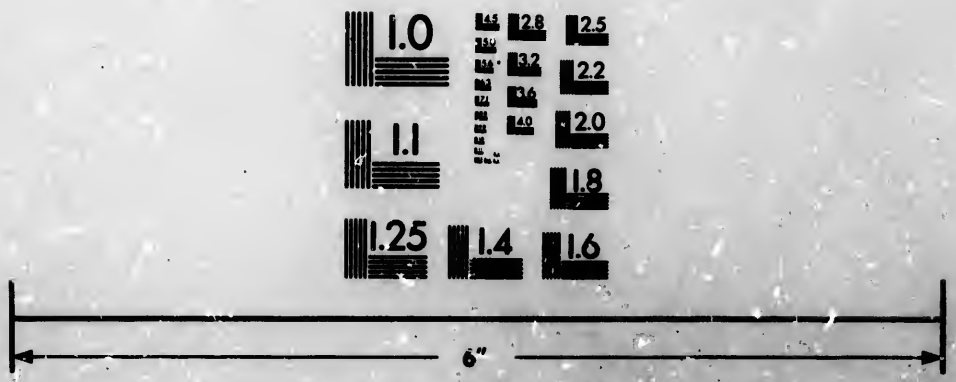

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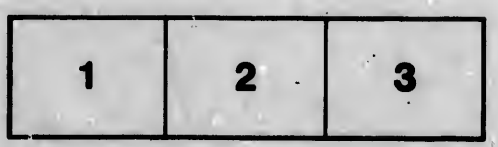

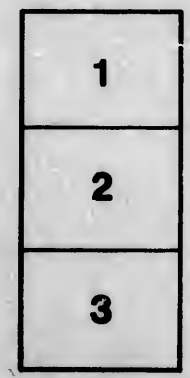

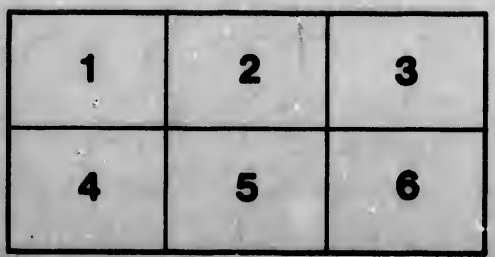

THE CANADA

VINE GROWER:

HOW EVERY FARMER IN CANADA MAY PLANT A VINEYARD AND MAKE HIS OWN WINE.

BY

J. M. DE COURTENAY.

Ps. thy fruit of their corn, their wine and oil they are multiplied.—*Ps.* iv. 8

TORONTO:
JAMES CAMPBELL & SON,
1866.

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PRINTED AT THE
GLOBE STEAM PRESS, 26 AND 28 KING STREET EAST,
TORONTO.

PREFACE.

THE success of my efforts in producing a vigorous, healthy and fruitful vineyard of over thirty acres in extent—induces me to comply with the numerous requests continually received from every part of North America, desiring a compact statement of my views upon the relative capabilities of our own climate and those of "The Vine Regions" of Europe—and a *Practical* Course of Instructions upon the Cultivation of the Vine and the Manufacture of Wine, with directions for the formation of vineyards so as to enable every Farmer and Householder to enter into such cultivation with a certainty of success.

In the Vine Regions of Europe, lands suitable for such purposes in the vicinity of cities are laid out in small vineyards, for the use of citizens, who, by this means, are enabled to obtain at a very trifling expense, a healthy and nutritious beverage—which is considered as indispensable as the bread and meat they consume, or as the coffee, tea and sugar that inadequately replace this beverage amongst more northern and less favoured communities.

Indeed, any ten householders who will purchase *each* of them *one* acre of land, and employ *in common* one labourer to cultivate the ten acres and manufacture the produce may, by following my instructions both recover their outlay, supply their wants, and obtain a genial and healthy recreation; and I am encouraged by the hope that these instructions may succeed in rendering *practically* possible the realization of theories for which I have so long struggled, and which after many years of scornful incredulity are finally accepted as probable, and examined with attention and respect.

J. M. DE COURTENAY.

CLAIR HOUSE, November, 1866.

CULTURE OF THE VINE

AND

MANUFACTURE OF WINE.

In the sessional papers of 1860, No. 22, may be found a correspondence of mine, laid before Parliament, and printed by their order, soliciting assistance for the introduction of Wine and Silk culture into Canada. The Bureau of Agriculture then promised that every assistance should be given, when I could demonstrate, in a practical manner, the correctness of my views. In soliciting assistance from Government, I never stipulated for personal advantages; yet, since then, I have been taxed with "exorbitant pertensions" and "chimerical views," by men who were unable to confute my theories, to deny the facts I had practically established, or to comprehend the motives that actuated, or the sentiments that animated, me. I based my application upon the principle that the *first* production of good wine in a country must be obtained by *Agricultural Experience alone*—and that private enterprise could not be expected to undertake the expenses of an undertaking which could not, by any means, remain a privilege. In corroboration of which, I quoted the Count de Gasparin, Vol. 4, pp. 616 to 618, as an authority.—"If the variety of wine to be produced already exists in the country, we can accept it, and it will be sufficient to consult the best producers and conform to their practice; but chemical analysis has not been able to indicate qualities in advance, and it is therefore to Agricultural Experience alone that we must address ourselves, for the knowledge required."

A parliamentary committee has since then recommended assistance, but no action of any kind has yet been taken, and

in the meantime, myself and my friends have solved the problem, unassisted.

Wine is the antidote of Dyspepsia and Delirium Tremens—has even at the same time *banished the use of spirituous liquors*, and "made the heart of man glad." It seems to be a necessity of the human organization. It awakens the forces of the stomach, and exercises an action of radiation upon the entire nervous system, and the complicated vital functions, and appears to be a beverage indispensable to man—being that which is the most easily obtained, the most agreeable, and the most generally appreciated, which is proved by the *fact* of the exclusion of all others within the climates where it can be produced. But in order that wine should be within the reach of all classes it must be produced of every quality and of every price. Good, ordinary wines are the *only* real basis upon which such cultivation can be established: for it must be remembered that, as for every other description of merchandise, poor consumers are the most numerous. Unlike most other productions, it is by no means a *defined* substance, presenting everywhere the same composition.

For some, it is a delicate beverage, the merit of which consists in the odour or "Bouquet," in the unctuous and agreeable savour to the palate, much more than in the greater or less quantity of alcohol it contains.

For others, it is only a spirit, more or less diluted; and between these extremes, all tastes and necessities may be discovered.

But, in the wine-growing countries, the mass of consumers are poor; so are the ordinary wines the most numerous, and their value more easily appreciated. With regard to fine wines, you can discover no other criterion than the palate of the connoisseur, whose opinion will only be guided by an acquired taste, or by the fashions of the day.

A great number of questions present themselves to the wine-grower, in a new country, where no agricultural experience can guide him, and the problems he must solve are so complicated and so numerous, that I cannot at present discuss

the Agricultural, Economical, and Commercial considerations necessary for—relating to, or dependant upon—the success of so arduous an undertaking.

CONDITIONS OF SUCCESSFUL CULTURE.

The great art of vine culture consists in *planting* and *pruning*—which can only be acquired by considerable practical experience. Pruning of any description, and there are five hundred different methods, is by no means arbitrary. Both that, and the distance to be preserved in the rows (and the former is always regulated by the latter) must depend altogether upon the nature of your climate, the inclination of your land, and the vigour of the vine you propose to cultivate. As you approach the southern portion of the region, you must allow your vines to *rise*, and also extend the distance between the plants, which practice is based upon the vigour of the vine, which diminishes as you approach the North; for although in the South, it furnished the staircase of Diana's temple of Ephesus, in the North it would not produce the wand of a centurion.*

Independent also, of latitude, altitude, or the inclination of the land, the nature of the vine itself must be taken under the most careful consideration. Certain varieties have a propensity to *rise* before bearing abundant fruit, and are generally to be found amongst the wild grapes of all countries, as the "Vignes de Treilles," of France, and the "Pergulanes," of Italy; and it is only from their horizontal branches, "Guirlandes," that you can hope to obtain an abundant fructification.

The vigour of their vegetation, if allowed to run wild, will expend itself in wood, branches and leaves, and if kept low and short, the same effect will be produced.

Monsieur De Gasparin, in his "Cours d'Agriculture," vol. 4, page 667, exemplifies this doctrine in an interesting manner: "We made an experiment upon a vine from Corinth, brought home from the expedition of Morea, in 1828. Kept *low* for fourteen years, it produced a very small quantity of fruit, used only as samples. Having then been allowed to climb upon a neighbouring tree, it covered itself with fruit, and gave that

*Pliny, Book 14, chap. 5.

year a quantity sufficient to furnish a 'hectolitre' (25 gallons) of wine."

I presume many persons in this country have remarked amongst the wild vines, that some prefer to climb to the summits of the highest trees, whilst others content themselves with spreading over brushwood. The same thing exists in Europe, and in a greater degree with the cultivated vines (*vitis vinefera*), whose natural propensities have become fixed habits, from many centuries of judicious pruning; and those varieties that have long been preserved *low*, would wear themselves out immediately if allowed to rise, or if the mode of pruning was materially altered. At the same time *all varieties*, if abandoned to themselves, produce an innumerable quantity of branches, and either perish or become wild within three years.

As the vigour of the vine varies according to the climate, and increases as it approaches the south, so (in the same proportion) does the distance between the plants extend itself—and the increasing evaporation of the vine makes it absolutely necessary to allow a greater cube of earth, so that the roots may extend themselves, and absorb the degree of moisture requisite for vegetation.

In our climate (including that of Lower Canada) I have planted in squares of four yards distance, and pruned accordingly, and I find I have by no means over estimated the nature of the climate, or the vigour of the plants. In Cincinnati they have estimated their climate and their vines according to the *feeble* vigour of an extreme northern limit (Germany), and plant at distances of two or three feet, pruning of course accordingly. By my estimate of their climate, I should judge *at least eight yards* as the distance to be preserved. Had they obtained the assistance of able and scientific wine growers from Europe, they would not have been groping for thirty-five years after (in my opinion) unsatisfactory results. But the ordinary labourers they have employed, and by whose advice they have been guided, however useful they might have been in their *own climate*, are hardly to be depended upon *elsewhere*, unless under a reasoned direction, and an experience newly acquired.

After deciding upon the distance to be preserved between the plants, and consequently upon the manner of pruning them, the next and the most important consideration for the vine-grower, in a new country, where he cannot be guided by agricultural experience, is undoubtedly the choice of plants. Before entering into many necessary details upon this very difficult question, I must first endeavour to explain the principles upon which are carried on the manufacture of *pure wines*,—which, as a general rule, are difficult (if not impossible), to be obtained outside the limit of the region of the vine. It is an undoubted fact that the best French wines are sold in France, and bring *there* the highest prices. The value of those exported are more easily calculated, by the amount of alcohol they contain. I believe that Chateau Laffitte, or Chateau Margeaux have *never* fetched less than ten francs a bottle ($2,) and therefore all may judge how much of such wine may be obtained in this country.

The following analysis of some of these valuable wines, by one of the most able French chemists, Monsieur Faurè, will show that such value cannot be attributed to the amount of alcohol they contain :

BORDEAUX WINES.

Alcohol	9.488
Tannin	0.112
Bitartrate of Potass	0.160
do of Iron	0.089
Inorganic Salts	0.025
Colouring Matter Blue	0.019
do Yellow	0.022
Water	90.085
	100.000

I find that Chatean Laffitte, the most celebrated of those wines, contains only 8.70 of alcohol, and Chateau Martillac only 8.75. Their *value*, therefore, evidently consists in the organic salts of potassi, and of iron, and above all in the quantity of tannin they contain. It is necessary to endeavour to obtain an association of plants in a vineyard, that *united*, will furnish the kind of wine you desire to produce.

De Gasparin says : "If your wines are too sweet, and want ferment, correct them by planting vines that possess contrary qualities. If abundant in sediment, or likely to turn into vinegar, supply the deficit by planting vines possessing a great deal of tannin ; and it is not only necessary to calculate the taste required, but also the degree of colour preferable to consumers."

But I must, before going any further, say that in this country, the question of the *greatest* importance must be to use *no vines whatever* having (what has become almost a slang expression) a *foxy* flavour. That very disagreeable flavour belongs to almost *all* the grapes hitherto used in America, for the manufacture of wine. The Catawba, Isabella, and Hartford Prolific are examples. The Clinton, the Delaware, and most of the wild vines of Canada, are altogether exempt from it, and with the Golden Chasselas, and other varieties which I shall afterwards examine, will ultimately, I doubt not, form the great basis of the future vineyards, of this country,—I might say of North America. However, before entering further into details or minute calculations on this matter, I must endeavour to explain the great principles upon which the amalgamation of different varieties of grapes, and their metamorphosis into wine, consist.

1st. Almost all out-door grapes contain within themselves the *material* necessary for the production of wine, which are sugar, water, and free acids.

2nd. *Only* perfectly sound and ripe grapes, in the centre of the vine region, can furnish them in proper proportions ; and even then only by a judicious mixture of several varieties.

3rd. The extreme southern portion of the wine region, furnishes an *excess* of sugar, with a *deficiency* of *water* and of *acids*.

4th. The extreme northern limit (being the portion where Indian corn ceases to ripen), holds an excess of *acids*, being at the same time deficient in both *water* and sugar.

In the northern portion of the wine region, more than thirty per cent. of sugar is rarely produced, by the most sugar producing varieties of the grape, inferior varieties in the same

region often producing only eleven per cent. In the southern portions of the region, fifty per cent. is no uncommon production, and the Island of Cyprus furnishes grapes producing eighty-four per cent. Indeed, it is this propensity of the southern grape to produce sugar at the expense of its acids and organic salts, that prevents wine of any value being made to the south of the forty-fifth (45th) degree of north latitude. And very often it can not be made at all from these grapes, for the reason that they do not contain sufficient ferment to effect any change in their juices, preserved from fermentation by the saccharine matter with which they are over-charged.

5th. Water and sugar alone may be supplied artificially, but the other and more important ingredients can never be furnished in any other manner than by the grape itself. These ingredients contained in the grape, and of so much value, are, in part, free acids, and partly acids combined with earths and alkalies, forming bitter as well as neutral salts. Only free acids and bitter salts can be detected by the taste, and proved in their total quantity in the wine. The acid parts, present in proper proportions, besides deciding the value and palatable taste of the wine, determine the existence of many different combinations, and by these the formation of the "aroma" or "bouquet" of the wine, and, for this reason, Southern wines deficient in acids are without bouquet, and therefore comparatively of little value except for the production of spirits; and it should be understood that all wines of value must contain at least four per thousand of free acids, and not more than six, and all musts containing more than six per thousand of free acids are considered as not having sufficient water in proportion to their acids; and those containing less than four per thousand as incapable of making wine—that is of producing wine ether, for which alcohol is indeed but a poor substitute.

Some centuries ago, an excess of acids was removed by the addition of potash, or some other alkali, which was really an adulteration of the wine. However, the reduction of acids by the addition of water, and afterwards supplying the additional saccharine matter required, by a proper proportion of

honey, was largely practiced by the Romans, whose celebrated "Falernian" was in that manner produced; and in France, it has been shown by long experience that an addition of water and saccharine matter has been the means of producing, in favourable seasons, as good wine as can be obtained in the same situation under the most favourable circumstances.

Whilst upon the question of acids, I must remark that acetic acid is never contained in the grape, and therefore not in the must. It is, in substance, only oxidized alcohol, and therefore can only be formed after this spirit has been previously produced by fermentation.

All combinations of acids with a "basis" are called salts, which really do not at all belong to wine, of which they are by no means a necessary ingredient. On the contrary, salts of grapes produced from soils abounding in nitrates of potash, lime, magnesia, and ammoniacal salts, are injurious to the wines, unless the larger part of such salts are excluded by increasing the alcoholic contents of such wines by the addition, if required, of a sugar per centage, rendering it equal at least to thirty per cent. The gummy or slimy parts, and the gelatine acid, are fortunately removed, partly by fermentation and partly by indissoluable combinations with alkaline earths and superfluous potassi, and although found in the grape, do not belong to the wine. The colours of red wines are altogether influenced and effected by the quantity and quality of free acids that have the effect (well known to chemists) of changing blue or reddish blue into red.

6th. Next to the free soils and organic salts, saccharine matter and water are the most important constituent parts of the grape; and two pounds of saccharine matter will transform itself into one pound of alcohol, which at the same time, and during the period of wild fermentation, mingling with the acids, creates "wine ether," that most penetrating substance in which also the boquet is contained.

Where (as in the South), little acid is produced, *no* "Bouquet" can be found, and only "Liqueur Wines" are produced —strong or sweet in proportion to the quantity of water con-

tained in the must. The more *water* (of course within the proportion), the stronger, for sugar ceases to generate alcohol when the liquid, saturated with both ingredients, ceases to ferment. In the extreme North, where the must contains less than 17 per cent. of sugar, it cannot furnish 7 per cent. of alcohol, which is requisite (even with the addition of tannin) for the preservation of wine. Less than that amount will "oxide" with facilty, and the wine will *sour*, not from an excess of original acids, but from the transformation of the alcohol, by oxidation, into acetic acid, which, as I said before, did not exist in the must. It must also be remarked that very excellent wines, verging on the alcoholic limit (from 7 to 8 per cent., or even more), often *oxide* from want of care—from sea voyages—rapid changes of temperature and other causes—and will generate acetic acid at the expense of their alcohol.

In order to explain more distinctly the difference that may exist between the musts obtained from the same vintage and vineyard, I copy a report of a Burgundy must of the best quality, and one of inferior, with the formula, amelioration, &c., by the addition of sugar and water—given, amongst other official documents, by the Imperial Government of France to a very able United States Commissioner, who was officially despatched to Europe, in order to obtain reliable information upon these important, and I may say (for an agricultural country), vital questions :—

A good must.....	262 lbs. sugar,	5—9 acids, and	733 lbs. water.
The inferior must.....	110 " "	9—0 "	881 " "
And required the addition of.	290 " "	0—0 "	236 " "
To make it.....	400 lbs. sugar,	9—0 acids, and	1117 lbs. water.

Being the *exact* proportions of the good must, with an increase of five hundred and twenty pounds, or more than fifty-two per cent.

In France, Germany, and other parts of Europe, sugar for the manufacture of wine is now produced at wonderfully low prices from potato starch, and although unfit for ordinary domestic purposes, is superior to the best refined cane sugar for

the improvement and production of wine. Indeed, in every respect, chemically and otherwise, this "glucose" is *identic* with that produced from the grape itself, and is termed grape sugar in the numerous manufactories established in Europe for its production. The artificial as well as the natural grape sugar, is in its dry state a combination of six atoms of oxygen, six of carbon, and five of hydrogen, whilst the common sugar contains five atoms of oxygen, six of carbon, and five of hydrogen. From the cane sugar it differs by chrystallizing (as upon dry raisins), in an irregular shape. Its taste is less sweet than the common sugar, and two and a half ounces of grape sugar will in sweetening, be only equivalent to one of cane sugar. In water the grape sugar dissolves less freely, as one ounce of water will only receive two-thirds of an ounce, although it will readily dissolve three ounces of cane sugar. Both kinds, however, furnish the same quantity of alcohol. Many other plants and fruits contain the same kind of sugar, which was formerly designated "fruit sugar." I have obtained it with facility from the apple,—but it can be always obtained at a cheaper rate from the potato, and I yet hope to see large manufactories upon the borders of the St. Lawrence, many miles below Quebec—where potatoes can be grown at six cents a bushel, and in any quantity, for we have there an energetic and intelligent population, ever seeking in vain for occupation—and there is to be found a never failing supply of the best manure, in the sea weed, driven at regular intervals on shore, by a patient and ever bountiful Providence, in order that it may rot there, perhaps for ages, so that people may discover its value. In our day, certainly the hardy "habitant" recognizes this value, and would make liberal use of it if a market was assured for the potato crop, even at less than six cents a bushel.

I hope the "agricultural limit" will there also in time be removed, and that Lower Canada will furnish "glucose" or grape sugar to Europe and America. The lands, hands, climate and manure are there; the machine is there, but the machinist has not yet been granted. In the meantime, we have people

deploring as a public misfortune, the impossibility of reaching the Lower Canadian population by indirect taxation, and the hopelessness of being ever able to establish there a direct tax. Had they anything of value to sell, they would soon become consumers—and if taxed before they are placed in a different position, they may use their own old proverb, and exclaim—

"Quand il n'y a rien
"Le Roy perd ses droits."

A Royal commission at Coblentz, in 1844, declared that "Cane sugar added to the must changes into grape sugar, during the fermentation, and leaves no difference whatever, and that a genuine improvement of wine can by no means be termed adulteration, so long as the ingredients employed remain confined to those which are homogeneous to the constituent parts of the grape, and the natural production of which in larger quantities, only depends upon the accidental state of the temperature,—but as in wine, a certain relation of ingredients must necessarily prevail. It becomes the duty of the wine-maker to regulate the addition of sugar and water, according to the proportion of other parts."

Doctor Hubeck, in his very remarkable essay upon "Grape Culture," remarks: "We have three ways in Germany of improving the sugar contents of the grape. 1st. By keeping them on layers to mature. 2nd. By boiling must to syrup. 3rd. By the addition of sugar. And we have three kinds of sugar—cane sugar, grape or potato sugar, and slime sugar, (Saccharum Muscosam.) According to the results of the French, who have obtained such a high degree of perfection in the art of wine-making, the potato sugar is the best adapted for the purpose, and we have the conviction that potatoes are one of the principal means of improving the wines of a country, and procuring for them an extended market. Numerous grape sugar manufactories are established in France, Prussia, Rhenish Hesse, Baden, Wurtemburg, Bohemia, and Styria, and are monuments of advancing science in its onward march through the vine regions of Europe."

The writings of such men in Germany, and the incessant

labour in France of Messrs. Dubinfault and Doctor Gall has tended in a very extraordinary manner to the improvement of the manufacture of wine; but the greatest honour is attributed to Mr. Abel Peliot, of Chamirey, one of the largest wine growers of Burgundy, whose essay, published by the French Imperial Bureau of Agriculture, has popularized this improvement in the manufacture of wine throughout Europe.

It has always been known to the principal wine-growers, and for fear of creating their enmity, the French Government, previous to the Empire, feared to instruct the populations, which accounts for the careless manufacture of ordinary wines. The water, it is true, has always been furnished, and with a liberal hand, but it was used in diluting instead of manufacturing, and was an adulteration instead of an improvement. The wines of Canada, however, will, in my opinion, never be of that class that in Europe have become celebrated for their weakness.

I have been always of opinion that Canada would one day be called to supply a great gap in the wine markets of Europe. I mean the want of Essence of Wine, which can only be produced by congelation.

Small quantities of wine, indeed, are frozen in Europe, for although the winters in the wine regions are more severe a good deal than in England, yet the African winds cause so many violent thaws during winter, that the congelation of wine has been found altogether too uncertain. In this climate, on the contrary, where the thaws are only partial, large quantities can be congealed without any risk of loss, and I have succeeded in congealing this winter considerable quantities of both red and white wines without any difficulty whatsoever.

I consider, and my friends know, I have always considered the exportation of congealed wines to Europe as the great future of both Upper and Lower Canada. The demand in Great Britain alone will, I have no doubt, for centuries, be greater than can be possibly supplied. It is a well known fact that the moist climate of Great Britain and Ireland require wines of more body than can be produced without the addition of distilled spirits; and the evil effects alcohol has on the fibres of the

brain, has within the last few years become generally understood. Whilst a necessity has long been felt for the production of an *essence* of wine that may be either used alone or applied to the purpose of strengthening other wines, and obviating the the necessity of adulteration by spirits, this essence of wine can be produced in the Canadas without difficulty, and, I have no doubt, will, before many years, become a source of great national prosperity and individual wealth.

Little is known of congealed wines in Europe, except the difficulty of producing them, for the addition of brandy necessary to preserve wines when exported to colder regions, would also prevent the process of congelation from being carried out —at least so far as the production of Essence of Wine is concerned.

I give, however, an extract from the very careful work of Messrs. Joigneaux & Moreau on that subject, and must previously remark, that in order to test the capability of our climate in that matter in the most positive manner, I commenced congealing wine in December, and continued the operation until the 15th of February, without (as I have previously stated) encountering any difficulty whatever.

"It is very difficult to discover a wine-grower (in France) who has succeeded in obtaining congealed wines. Commerce alone has succeeded in obtaining this preparation, and with the object of improving valuable wines by the mixture. Wines exposed to cold at first become troubled, and then force a sediment; afterwards, when the temperature falls to six below zero (centigrade), ice is formed on the staves, at nine below zero, it extends itself to the liquid, and if this low temperature continues for five or six nights, the operation is terminated. At fifteen below zero, one or two nights will be sufficient. The wine obtained by this operation is very rich in alcohol. It is deprived of a great part of its salts (inorganic), and of matter subject to ferment or corrupt. It will scarcely deposit (sediment) again, and ought to keep for an eternity."

Properly made wine is an ether,—and frozen wine divides itself into two parts, one part (about half) being a concentrated

wine ether, and the other solid ice, composed of water of valueless acids, and inorganic salts, injurious to wine. When wine is *properly made*, it is a *compound*, and not a mixture. Water, saccharine matter, acids, and salts combine and form "wine ether," each element having ceased to retain its own distinct character—in the same manner as common salt is no longer either chlorine or sodium, or plaster Paris, sulphur or lime. Every compound is a combination of fixed proportions, in obedience to the *law of definite proportions*, and it is this very distinction that constitutes the difference between pure wine, which is a compound; and impure wine, which is a mixture, and which might as well be termed punch, or coblers, or any other term selected from the beautiful nomenclature of our waggish neighbours. Pure wine is often adulterated with sugar, water, spirits, log-wood, essences of all kinds, and alkalies of every description. A thing is called pure wine, being a mixture of all the above mentioned materials, with the juice of some grape. Another thing is called pure wine, or pure juice of the grape, made honestly, but ignorantly, by pressing some imperfect grape and mixing a little brandy with the juice, without allowing it the time to make its own combinations with either skin or pulp, and which could never, therefore, become wine ether. In short, we receive from abroad all sorts of *spurious mixtures, re-mixed* here, and everybody *pretends* on this continent to make wine with grapes or gooseberries, or currants, and call their mixtures wine. Yet, strange to say, no man establishing a brewery will think of making his own beer, but will immediately obtain a practical brewer. Can it be possible that people think it less difficult to make wine? I see continually letters in the agricultural and other papers, speaking of the wines of *one* grape being superior to that of *another*, yet there is no wine made in Europe from the produce of one variety of grape, and no one variety can furnish the proper proportions absolutely necessary to the combination requisite for the production of the wine ether. The great difficulty in a new country is to succeed in obtaining in a vineyard the proper combination of different varieties suitable to the climate, and

capable of furnishing that combination required for the manufacture of wine ether, and at the same time obtaining an aroma and flavour so judiciously mingled as not to permit that of any *particular* grape to be distinguishable.

In my opinion a combination may be formed of the following varieties :—

1st. Clinton, which will furnish saccharine matter, tannin, and tartaric acid, and organic salts, with abundance of colouring matter ; indeed all in excess except water, of which it is deficient. It furnishes a very fine "bouquet," but not equal to the

2nd. Delaware, which is also deficient in water and in tannin and colour.

3rd. The Golden Chasselas and Musk Chasselas will furnish saccharine matter and aroma, with organic salts, and ferment ; and lastly—

4th. The Ontario, which, without any *foxy* or disagreeable flavour, will furnish some saccharine matter, and the *water* of which others are deficient, and which it holds in excess ; and although it may be supposed that water may be easily supplied artificially, I would advise in preference, and for economy as well as for the security of supplies, obtaining it from a harmless watery grape.

Mr. Frederic Schouro, the Danish botanist, has published a very remarkable essay upon the plants of Pompeii, which has been translated into German, French and English. I have gathered the substance of it from Blackwood, and think it most applicable to this country, where the metamorphosis of vegetation must already have become apparant to every one. We seem naturally to expect that the same class of trees and plants will grow for age after age on the same spot, but an inspection of the pictures preserved in Pompeii, and an examination of Virgil and other classics of that day, show that the character of plants and trees has been changed in Italy within the last 1800 years, and that they bore a far more northern aspect than at present.

The early settlers in Italy found a forest region of common

deciduous trees. The beach forest, which Schouro calls the symbol of Danish character, and the maple, which is that of Canadian, flourished formerly throughout Italy, although now driven back to the Alps and Appenines. Some trees of which Virgil celebrates the grandeur, are now impossible to discover, and the region he celebrated was not the land of the Cypress and the Myrtle, but of the Oak, the Ash, the Linden, Elm, and Beech. Trees like our own formed the forests of which he sang, and if the malpe is yet discovered on the plains of Italy, it is because its affinity for the vine allows it to be used with advantage as a live prop for that plant. In the course of centuries southern vegetation seems to have crept upwards, and the characteristic plants of Italy have therefore now a far more southern appearance than they had when Virgil sang and Cicero declaimed; whilst in Greece, also, the Linden, the Yew, the Beech, the Alder, the Cornel, and the Ash have almost entirely disappeared. The productions for which Italy has since become famous, were known only to Pliny as "foreign plants." The citron was only cultivated the third year after Christ. Lemons came with the Saracens, and Oranges were brought by the Portuguese from the east; while the Aloe and Indian Fig came from America. The white or silk worm Mulberry was unknown to the Pompeiians, and only commenced to be cultivated in the sixth century, and silks were imported by the Romans from the East. Barley was cultivated for the common people, and now Rice and Indian Corn (then unknown) are the staple commodities. The same change going on there has everywhere been developed by civilized man. At first by great care and pains, southern plants have, by protection, been raised; they have by degrees become hardy, then indigenous and thus the fruits of the South are everywhere creeping towards the North. The acclimatization of plants is becoming a science of itself, and its progress may well be illustrated by the introduction of the Olive into the Crimea. Before, however, endeavouring to introduce the more valuable southern plants, let us succeed in developing our indigenous ones, such as the Vine, the Mulberry, the Walnut, and the Chesnut; and

we require only to understand the manner of cultivating each in order to abound in the production of wine, oil, and silks, and obtain the "ready-made bread" of the Chesnut.

The difficulties to be overcome are, above all, our own prejudices, and of obtaining skilled labour, in order to set the machine in motion. Prejudice is the child of ignorance, but *no government* of civilized men is permitted in this century of advancement to plead ignorance; and the responsibility of a poor system of agriculture, far beneath the qualities of our climate attach itself to them; for private enterprize dare not calculate beyond that which will give immediate returns; and as I have previously mentioned on more than one occasion, we have "an agricultural limit" to overcome.

PART II.

THE PRACTICAL WINE GROWER.

GLASS HOUSES.

I have always considered that glass-houses, and the many able works in the English language adapted to the *artificial* cultivation of the grape, in what is termed *vineries*, has been one of the principal causes why the *natural* cultivation of the vine, in *vineyards*, has hitherto been so neglected, and so unsuccessful in this province.

Yet, it is but natural to expect that persons desirous of *cultivating* the vine shall seek instruction in works of their own language and will by this means unwillingly become imbued with the plans of *artificial* growers—plans that are no doubt very *ingenious* and very well adapted to the unfruitful climate of Great Britain (where excessive moisture and want of heat renders the production of *vineyards* impossible) but that are here not only *useless* but are as *unnatural* as if employed *against nature* in any other portion of the vine regions of *the* world.

Pinching, pearing, cutting and hacking, pruning in summer and in autumn, burying in straw and mould, soaping, sulphuring, washing, picking and scissoring—will certainly destroy any of our *native* luxuriant wild vines that might have the misfortune to fall under such treatment, and can only be applicable to the production of that *artificial composition* of *manure* and *steam*, called hot house grapes—that from the bud have been subjected to such treatment and accustomed to such torture.

In the vine region of Europe hot-houses are rarely employed in the production of grapes, but are used for the cultivation of rare flowers and tropical fruits and plants.

The exception to this rule has been a *vinery* upon the English principle, imported to France by M. De Rothschild, and to

which is attributed the introduction of the "Odium," that most destructive disease of the vine, which has within the last twenty years desolated the vineyards of Europe.

In an agricultural or horticultural point of view, I am therefore at a loss to discover the reason why premiums are given at Agricultural Exhibitions for "best three varieties of hothouse grapes, three bunches each," and think it extraordinary that encouragement should be given to a system of culture which, when applied to grapes, has proved itself in different ways, both in Europe and America, injurious to public welfare, and obstructive to agricultural progress; and whilst upon that subject I must say that the *multiplicity* of *small worthless premiums* granted at the Agricultural Exhibitions, are *in themselves impediments* to real progress—and are in my opinion upon a par with our entire system of agricultural management which has not produced satisfactory results.

A striking instance of the absurdity of the present system has lately been pointed out to me by a worthy Divine, Rector of an important parish west of Hamilton, who had done me the honour to examine our vineyards and establishment, and was attracted particularly by the large quantity of flourishing white mulberry trees grown upon this estate.

It appears that seven years since, some ladies in the neighbourhood of St. Catharines, not only cultivated the mulberry with success but produced samples of very superior silk, which they forwarded to the "Agricultural Show" and were *laughed at*, and no more silk exhibitors have very naturally presented themselves.

If an earnest, honest and *practical* minister of agriculture had been the judge upon such an occasion, he would have granted a premium of so much value to these ladies, that the question of making this Province a *wealthy silk-producing* country, would already have become an accomplished fact, and one hundred pounds would not, at the time I write, have been sufficient payment for the poorest acre of land in that district, where these intelligent and patriotic ladies were *laughed at* and where the best lands can *now* not always fetch one-tenth of the amount mentioned.

NURSERY-MEN

are unfortunately for themselves and for this country opponents *by education* to a healthy system of vine culture ; I mean to the *only* system admissible for a climate such as ours which is *essentially* that of the "region of the vine."

I do not attempt to attribute improper motives or intentions to men of so high a character as Mr. Beadle of St. Catharines, Mr. Arnold of Paris, or Mr. Leslie of Toronto, or to so respectable and inteligent a class of citizens as the nursery-men of this continent are admitted to be ; but they are perhaps unwittingly the propagators of a system that is *obstructive* in so much as their horticulture is *not* that of the "region of the vine" *to which we belong*, but on the contrary is purely *artificial* or English, and is the fruit of a colder light and of a more northern sun.

It is undoubtedly true that we must owe the future agricultural progress of this continent to the intelligent and patriotic efforts of our wealthy nursery proprietors, who in the more favoured agricultural regions are the means of intelligent progress, and of national and individual wealth ; but on their part they are bound to examine without prejudice the climatic influences by which they are governed, and must cultivate the vine in our "vine region" with a view to *vineyards* and *not vineries*, with regard to *nature* and *not* according to the pinching, pettyfogging principle of a forced and unnatural vegetation.

The vines they produce would be classed amongst the wine producing vines—natives of the country they are to be cultivated in, or of a *more northern* part of that country.

They must be hardy and free from certain diseases from which even our own wild vines are not always exempt, for I have discovered from experience that the majority of the wild vines in both Upper and Lower Canada are subject to what the French call "coule" or "blast" and are subject to be fruitless, or nearly so, when the flowering season happens to be unpropitious.

They must be accustomed from the *bud* to bear the rigours

of our winters (as necessary for their excellence as the heat of our summers), and they must be habituated to **weep in the spring*—under the vigorous action of the pruner's steel. They must finally be propagated in vineyards from *cuttings* obtained from vigorous and productive vines, which as in Europe should be furnished to the vine-growers at the maximum price of ten dollars a thousand. I propose to furnish Clintons at that price, and there is not a vine-grower in America that should either expect or receive more.

Of course, exception should be made for choice plants of rare and hardy qualities, and I am persuaded our nursery-men under the encouragement they are likely to receive, will succeed in supplying the wants of the country in this respect; but I must repeat my conviction that they should study the *vine* for the purposes of the *vineyard* and leave *vineries* to those climates less favoured than our own.

There is another *large* field of progress and improvement open before them.

In the first instance, the propagation of the white mulberry (which will endow the Province with the production of silk and with the *incalculable wealth* attendant upon such industry) is in their power and within their reach. I can show them five hundred mulberry trees that, without *any care*, have withstood successfully the supposed rigour of this climate, and I can point them out trees of the same description upon the property of my neighbour Mr. Silverthorn, which, for more than *thirty years* have flourished under the same *disadvantages* that ignorant "*savans*" pronounce us to possess. The Count de Gasparin, in his "Cours d' Agriculture," page 697 and 98, declares that "The mulberry accompanies the vine to its last limit—and it is in my opinion one of the most important privileges of the region of the vine."

In the same able work of Monsieur De Gasparin, pages 753 and 754 we find that the same region obtains its *bread all prepared* from the chesnut, and receives its *oil* from another

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* I translate weep literally, both from French and Italian—instead of the ordinary term "Bleed."

tree the walnut, which furnishes nearly half the oil that is consumed in France.

There can certainly be little difficulty in grafting French common walnuts upon our own magnificent trees, or in obtaining large chesnuts by means of the same operation from the splendid wild chesnut of this country.

The Fig flourishes in northern Italy upon the slopes of the Alps, and in *more* rigorous climates than our own, and the olive itself flourishes in the Crimea, and *from thence* it is more than possible might be transplanted to Upper Canada.

The wealth of such productions which constitutes the riches of the finest agricultural regions of Europe, may, through the enlightened exertions of our horticulturists, at no distant period belong to ourselves, and certainly it must be admitted that the prize is worthy of the exertion required for its acquisition.

No doubt it is unreasonable to expect that private enterprize shall cope with the difficulties to be encountered upon the rough and thorny path of progress; but the time may not be far distant when the immense sums squandered upon *agricultural politics* may be turned towards another direction and to a more profitable account.

Since the above has been written I had the pleasure of attending the Grimsby meeting of the Horticultural Society held on the 3rd of October, under the intelligent direction of their President, Judge Logie—and I am persuaded that the efforts of Mr. Beadle of St. Catharines, and Mr. Arnold of Paris, tend already towards a proper direction.

Mr. Arnold produced several remarkable varieties of hybridized Clintons, all of which may be considered as valuable additions to our wine producing grapes, and have the great advantage over the Rogers' hybrids that the original stock has been obtained from the Clinton, the St. Peters, the Black Hamburg, and Golden Chasselas,—in short from excellent foreign and native varieties instead of from the foxy-flavoured family that give origin to other hybrids claiming advantages as table grapes but altogether unfit for the manufacture of wine.

Mr. Kilburn's "Creveling," which appears to be a new variety under that name, is certainly one of the most promising vineyard grapes I have seen in America; and amongst the Rogers' hybrids, No. 15 is the least foxy and may furnish the muscated flavour we require.

I cannot conclude without mentioning the French walnuts produced in the neighbourhood of Grimsby, where grafts may be obtained to metamorphise the unproductive varieties, so common throughout the province,—a hundred and fifty bushels from one tree is not an extraordinary crop, and may soon be obtained by graft.

HOW TO PLANT A VINEYARD.

In the preceding chapters I have endeavoured to demonstrate that glass-houses, improper instruction, ignorance, prejudice and the exorbitant price of plants combine to prevent the farmer or house-holder from enjoying the advantages of his climate, and extending the cultivation of the vine throughout the Province.

In the United States they are *groping* after a better system than the German one, which, unfortunately, they adopted, having been imported by German labourers from the Rhine, who planted and pruned as they were accustomed to practice in their own *northern climate*, where the total amount of heat during the season of vegetation *never* surpasses two thousand seven hundred degrees centigrade, whilst that of Quebec according to Lieut. Ash, amounts to 4200, and that of Cincinnati must arrive at 7000 degrees.

The Count De Gasparin who, in all matters pertaining to agriculture is the best authority Europe can afford, declares in his "Cours d' Agriculture," vol. 4, page 666, "the distance to be preserved between the plants must depend altogether upon the nature of your climate, the inclination of your land, and the *vigour* of the vine you propose to cultivate," and as a general rule you *must* keep your vines *low* in the north, and plant at about two feet apart; as you approach the south you *must* allow your vines to *rise* and *extend the distance* to about *eight yards.*

This practice is based upon the increasing vigour of the plant as you proceed south, at least to the extent of the southern limit of the vine region, which, by the best authorities has been traced upon the 35th paralell.

In our climate, which I have *proved* to belong to the *centre* of the vine region, I allow sixteen square yards to each plant and prune, of course, accordingly.

In Cincinnati they plant and prune, as in Germany (which belongs to the extreme northern part of the vine region), although they form themselves the southern limit.

Independant of latitude, altitude, or the inclination of the land, the nature of the vine itself must be taken into consideration, and the native vines of North America must be treated as the "Pergulanes" of Italy or the "Vignes de Treilles" of France, as they *all* have a propensity to *rise before* bearing abundant fruit—and it is *only* from their horizontal branches or "guirlandes" that you can hope to obtain an abundant fructification. The vigour of their vegetation, if allowed to run wild, will expend itself in branches and leaves, and if kept low and short the same effect will be produced.

Three hundred and fifty plants to the acre, will, therefore, be found sufficient for the climate of this portion of the American continent, as far north and east as Quebec, and south and west as Ohio; but the *manner* of the plantation must be left to the planter himself, and it may be varied according to the formation of the soil. Sometimes, for instance, in square fields, the plants may be placed at four yards apart, in every direction, whilst through the centre or along the borders, avenues of eight yards wide may be formed, and the plants in this case should be about two yards distance along the lines.

After numerous experiments, I consider seven feet should be the height preserved, which will allow the vines to be cultivated and weeded by horse-power, and a hop cultivator; that also is the height best adapted to provide against the injury of winter and spring frosts, and excess of moisture which causes the *blast* at the flowering period. Monsieur Guyot, who is a good authority says:—"It is upon the high branch that the

finest vines produce the best bud, and far from the soil and *above* the *moisture* and *snow* they are *preserved throughout the winter.*

At Clair House, I have formed a meadow along the avenues, allowing only three feet of cultivated space for the vines, and I find the produce of hay per acre superior to that of any other meadow upon the estate; but the best soil for the vines being rocky or barren clear gravel, it would be useless to calculate upon the hay to be obtained in such positions.

The season for plantation is in May, *after* the fermentation of the soil has commenced, and the cuttings should have been previously bound up in bundles with willow twigs and left for at least eight days half covered with moist earths or stagnant water.

The planting may then commence by making holes with a short iron crow bar, such as is used for making the hole for hop poles, only leaving two or three eyes over ground.

Some small crushed bones may with advantage be placed into each hole, and a handful of old manure, rich mould or old plaster added; some cow and pig manure mixed with plaster of Paris (sulphate of lime) is very effective, and has a tendency to retain the moisture and prevent the plant from drying up; however, it would be well to plant two cuttings so as to be insured against failure, and if both succeed they will ultimately form one root with two branches or stems.

The land may be cultivated with potatoes, carrots, or a green crop, but about a foot around each cutting must be kept free from roots and weeds.

Many cuttings will put forth leaves and then *appear* to fail, but may afterwards send forth underground shoots; five or six hundred cuttings to the acre will ultimately insure the possession of the 350 plants required.

On the following year the ground should be hoed around each plant in spring, and early in August, and each should in spring (April), be pruned so as to leave only two or three eyes; after the second pruning of this kind they should be staked, and allowed to rise, and the third year will commence the production, and at the same time the difficulties of

TRAINING AND PRUNING.

I have heard it said that during the Regency or shortly before it, a Royal Duke endeavoured to obtain at a ball some gratuitous advice from blunt Doctor Abernethy, and having button-holed him in a corner, stated a case, and asked what he could advise under the circumstances. The Doctor replied abruptly, at the same time starting off at the risk of his button, "Call a Doctor, call a Doctor"—Sir.

When I am often asked "How shall I prune my vines?" I am always obliged to say "obtain a vigneron"—for the art of pruning *can not be taught by theory.*

There is no vigneron from the Old Countries that has not pruned his own, or his father's vine *in Trellise,* either around the rustic porch, or over the window of his cottage, and with the example of Clair House vineyards before his eyes he cannot fail to understand that our vines *require* to be treated, *not like the feeble* and crowded plants of Germany, or some parts of France, but according to the principles of Italy, and of climates of hot summers, and hard winters like our own.

I have explained the way to do *without* a vigneron *until* the vineyard shall *commence bearing* when, of course, it will (even the first year) largely bear its own expenses, which, under any circumstances, will be less than is requisite under other systems of Agriculture.

I can supply vignerons to all that require them at the ordinary price of farm labour; and one good vigneron should cultivate, at least, ten acres of vineyards, and be able to turn the produce of the same into wine; of course, he must have help at the vintage, and when forming the skeletons of Trellises—but he can also render other important services in attending to the mulberry and walnut trees, which should (as M. De Gasparin declares) always accompany the vine to the last limit.

The Canada Vine Growers' Association will also receive apprentices, and I am in hopes that County Councils will enable some intelligent and well-conducted young men from each township, to attend to our instructions and assist our operations without salary for three years; after which, they should

be capable of undertaking the production of silk and wine in their own neighbourhood.

I must not conclude without warning vine-growers to be careful *from* the commencement, to accustom their vines to spring pruning, which should not be carried on in Upper Canada later than the 15th of April, or earlier than March. I attribute the failures on this continent as much to autumn and summer pruning as to close planting; summer pruning not only prevents the wood from ripening, but in removing the leaves distroys the lungs of the plant.

CHOICE OF PLANTS.

The choice of plants is, in a new country where agricultural experience is not yet acquired, one of the most important considerations for the vine-grower, and one of the most difficult problems for the country to solve.

The Count De Gasparin, vol. 4, page 616, remarks that: "The nature and the quality of the wine that is desired to be "produced, must above all be arranged by a *choice of plants.* "Chemical analysis failing to indicate qualities, we must "depend upon agricultural experience *alone* in order to obtain "the knowledge required.

"If the variety of wine required exists near us, we can "accept it, and it will be sufficient in that case to consult the "best producers, and conform to their practice, in proportion- "ing the different varieties of vines that, *united* in one vineyard, "produce the commercial article in question, and if you plant "a vineyard with the intention of producing table wines, you "must associate an abundant vine to others of a higher quality, "and in the association of plants, it is not only necessary to "calculate the *taste* required, but also the degree of colour "preferable to consumers."

The great object, therefore, in the choice of plants is to produce,

1st. A *must* that may become a wine without any artificial mixture whatsoever.

2nd. To produce a wine that will be what is called a *round*

wine, without any angular predominance of any peculiar flavour. This can, I fancy, be obtained by the mixture or the combination in a vineyard of several varieties of different qualities and flavour, and of those that require the *same heat* to arrive at maturity.

The French have classed all their varieties into seven *divisions of heat.*

CLASSIFICATION OF FRENCH VINES.

DIVISION.	HEAT. DEGREES.	RIPENS SOUTH OF FRANCE.	RIPENS AT PARIS.
1st Total Heat....	2264	15th July.....	20th August.
2nd " "	3400	25th August.....	7th October.
3rd " "	3565	1st September.....	20th October.
4th " "	4133	27th September ...	Does not ripen.
5th " "	4238	2nd October.....	" "
6th " "	4392	10th October.....	" "
7th " "	5000	31st October.....	" "

The First Division are eating grapes *alone*, and unfit for the manufacture of wine. De Gasparin, vol. 4th, page 606, of the celebrated pinot, of Burgundy, belongs to the Second Division; the plant Pascal, of the Rhone, to the Third, and the Aramon to the Fifth.

The total heat of the climate of Quebec, as furnished to me by Lieut. Ash, R. N., F.R.S., and published on a former occasion, amount to 4392 degrees, so that if the Sixth Division of French Vines could be in other respects adapted to our climate they might be cultivated at Quebec.

When our own varieties shall have been classed, according to the heat required by each, there will be little difficulty in adapting them to their proper positions. In the meantime, I would suggest the adoption of the Clinton as the standard, and only accept in a vineyard those grapes that may ripen at about the same period.

Equal proportions of Clinton and Delaware may be united to Arnold's Hybrids—one of which is a large watery grape that with the Ontario might occupy at least one-half of the

entire vineyard. To this last Division, Mr. Kilburn's Crevelling, which is a most promising grape, might also belong. Mr. Kitchen's Oporto Grape appears to me to be likely to improve the colour and furnish Tannin, and Mr. Beadle of St. Catharines, can furnish some excellent varieties of native grapes.

For white wines, I would recommend an association of Delaware, Golden Chasselas, Arnold's white Hybrid, and some hardy wild vines, and sweet-waters. The first run of red grapes also produces white wines.

The No 15 Roger's Hybrid, may furnish a muscatel flavour, but it must be used very cautiously, and all other *foxy grapes excluded altogether*—each variety to be planted separately; the Delaware in the warmest situation of the vineyard.

However, it cannot be expected that during the first few years of our apprenticeship in vine growing, we can arrive at the perfection in the choice of plants that M De Gasparin declares with reason can be *alone* expected from agricultural experience; many new varieties have yet to be chosen from *our wild vines as numerous here as Virgil* formerly proclaimed them in Europe. *Queme qui scire velit libyce velit œquoris idem*—Geo. II.

COMPOSITION OF THE VINE AND ITS NUTRIMENT.

Chasso, in his "*Annaler der chimie uud Pharmacie*—S. L. V. P. 67, gives the following analysis of branches of the vine after the fall of the leaf.

Water and Gas	97151
Carbonic Acid	241
Sulphuric Acid	248
Phosphoric Acid	660
Chlore	67
Lime	300
Magnesia	72
Potash	257
Soda	17
Oxyde of Iron	45
Silice	50
Manganese, Traces	00
Loss	892
3	100,000

The best combined succession of moisture and heat cannot, however, produce wine, if the earth and atmosphere are unable to furnish the plant with organic and inorganic matters requisite for its composition, and which must be furnished to old vineyards (at least) artificially, by means of farm manure or other substances, such as bones for its supply of phosphate, salt for its chlore and soda, gypsum for the sulphur, and lime and ashes and iron filing for its potash and oxide of iron.

For new vineyards, I may say, that, with a fair start of manure to enable their roots to penetrate deeply in the soil, they may for a long time subsist upon the accumulated wealth of a favourable sub-soil; for lands possessing Argile, oxyed of iron and carbon, absorb every year ammonical vapours capable of supplying 18 pounds of azote to the acre; and this may be even only a small portion of substances which the earth receives and deposits beneath the reach of annual plants, but which will be easily utilized by the penetrating roots of the vine by whose absorbing power the very rocks themselves are pulverized and metamorphosed.

In the Count De Gasparin's "Cours d' Agriculture," page 638, we may find "that it is impossible to discover a description " of soil that has not furnished an example of a celebrated vine " growing upon its surface.

The remarkable vineyards of the Côte-d'or are produced from *calcareous solitiques*, *calcareous magnesian marls*, and *tertiary alluvia* (similar to our own), the vines of Champagne, grow upon chalk, the Tokay on basaltic formations, those of Malaga, Granada, Arragon and Anjou upon argillaceous schists those of Tamalgue, upon mica-schists, and Bordeaux upon sand and gravel of quartz. The celebrated Hermitage upon granite, San Lucar upon limon, and lacrima-christi from volcanic formations are alone produced.

The essential constituents of *must* being—sugar, tannin, tartaric and malid acids, allbumen and mucilage, it will happen, that if you plant the same variety of vines in a dry gravelly or stony soil, you will have a great deal of sugar and little acids—in a moist rich soil, you will produce a larger

quantity of acids; and in a wet soil, little sugar and a great deal of acids, allbumen and mucilage.

The albumens and mucilage may, however, by the slow saccharine fermentation be transformed into sugar. These experiments have, however, demonstrated that the physical properties of the soil may explain the difference existing between the productions of the *same vine*—upon different soils.

In some countries they hasten the maturity of the grapes by covering the soil with coal, black slates, or the refuse of forges and rolling mills; that absorbs the solar heat and retains it better than soils of a lighter colour. In stony grounds also, the heat insinuates itself deeper and radiates more gradually; but the evaporation is also more considerable, and the vines may suffer from drought if moisture cannot be furnished to the roots by cappillary attraction.

A remarkable fact relating to this theory may be found in Pliny (Lib, xvii, cap. 4th), where he shows that the vineyards of the city of Emos, in Thrace, became withered and dried up in consequence of the river Ebre having changed its course and abandoned that city.

The neighbourhood of rivers and great sheets of water have ever been considered favourable to the vine, both by modifying the temperature and by preserving them from spring frosts by means of the morning fogs that arise from their surface.

Monsieur Verguette Lamotte remarks in his "Congres des Vignerons," page 342, that the best vines on the Côte D'or are found half way up the hills, at an altitude varying from 15 to 78 yards above the plains, and this undoubtedly is caused by the filtrations from above that leave the summits without sufficient moisture, and supply the plain with a superabundance.

The Vine is cultivated on the slopes of the Liban, without being able to succeed on the plains of Sennaar.

WINE.

I have previously explained the principles of this simple manufacture, and can only say that although extremely easy of acquisition, it *must* be *seen* and *practiced* in order to be

understood. There is an old Italian proverb that declares it impossible to learn how to make wine without making it; but if the manufacture of wine require practical experience, even amidst the old vineyards of Europe, where the qualities and defects of every individual vine, and I may say, of every vineyard or association of vines, is well known from centuries of experience, it must be easily understood that, in a new country where no perfect association of grapes yet exists, and where but a very imperfect knowledge of the vines themselves can be obtained, the greatest care and discernment is requisite in order to replace, in some degree, that knowledge which, the best authority in Europe declares, must be derived from *agricultural experience alone.*

I propose to propagate the experience we may obtain, and the knowledge we already possess by accepting a limited number of apprentices, who will be instructed for three years in return for their labor without any entrance fee whatsoever. And I am in hopes that Agricultural Societies will enable some capable and intelligent young men to profit by this opportunity of obtaining a knowledge, that by this means may rapidly extend itself over the entire Province.

I am also in hopes that the Minister of Agriculture may assist our Association in developing this important industry by increasing the number of apprentices beyond the limits to which we are confined by economical considerations.

Although it would be impossible to show by theory how good wines should be made, I may at least caution vine-growers against the practice of pressing and *grinding* so universal on this continent.

"* *Torcular calcavi solus,*" from Holy Writ, shows that from the commencement, "calce," or heel pressure, was the kind adopted, whilst the wine press was only used to separate the wine from the residue.

A large vat of oak should be provided and placed in a warm

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* "Why, then, is thy apparel red and thy garments like theirs that tread the "wine-press?

"I have trodden the wine-press alone, and of the Gentiles there is not a man "with me,"—ISAIAS. lxiii, 2 and 3.

room above the cellars. This vat nearly filled with grapes should be allowed to remain untouched for two or three days, after which they should be partially bruised with a stout cherry pole, two or three feet longer than the height of the vat; this pole placed erect in the centre of the vat should be stirred three or four times a day for three days until the grapes shall ferment and bubble strongly where the pole is stirred.

The juice should then be drawn off, and a man with bare feet (so as not to crush the stones or seeds), should enter the vat and press the grapes with the *heel*, until nearly all the juice has flowed from the vat.

This juice should then be returned to the vat, and as much water and sugar added as may fill the vat to about four inches of the top.

About three pounds of dry crushed sugar, or grape sugar to a gallon of rain water will be about the quantity required.

In a few hours the must will throw skins, stems, seeds and sediment to the surface, which should then be covered with rugs; in about three days the fermentation will subside, and heat generated by such fermentation will diminish, and that moment must be carefully watched to draw off the wine and run it into casks in the cellars.

The residue may then be pressed, and as it makes inferior wines may be kept separate.

In the casks which should be left with the bungs open, a new fermentation will at once commence, and froth will be forced from the bungholes; this froth, at first dirty, will gradually become pure and finally cease. In the meantime, the casks must be kept full, either with wine or, if stronger wine is required, with brandy.

In a few days the bung may be laid upon the surface of the bung-hole, and the casks filled up only once a day. In about fifteen days the bungs may be closed, and the casks henceforward need be filled only once a week.

In April the wines should be drawn from off the lees, and once a month the casks examined and kept full.

CONCLUSION.

The friends and patrons of our Association, to whom alone I address myself, will understand the reserve imposed upon me by present circumstances, and by my connection with an undertaking whose success must not be endangered by the exhibition of personal feeling against the intrigues and injustices arising from the blind and willful opposition of a certain class of men whom I decline to qualify, and who *now, as in all times past,* have been found, through imbecile vanity, and still more vile and sordid motives, opponents of every innovation of value and traducers of those who presume to range beyond their own limited comprehension and contracted mind, which I cannot illustrate more appropriately than by republishing my sketch of the efforts of Parmentier, near the end of the last century, towards introducing the cultivation of the potato into France.

PARMENTIER.

It was in 1565 that Captain John Hawkins brought to Europe some potatoes from Santa-Fe de Botoga, and endeavored to introduce the cultivation into Ireland.

Later in the same century, Francis Drake imported that plant to Virginia, from whence he brought a certain quantity to England in 1586, and confided them to his gardener and to the Botanist Gerard, who fruitlessly endeavored to propagate the culture, and forwarded some to Clusius, who speaks of them in his works.

At the same time the Spaniards introduced them on the Continent of Europe, and in 1616, we find them served at the King's table, but with little success, otherwise the courtiers would undoubtedly have made them fashionable, and propagated them.

Had they done so, they might have prevented the revolution, which perhaps was caused by want of bread.

However, every encouragement of eminent men failed to propagate the use of this valuable root, which fell so much into oblivion that Sir Walter Raleigh, in the 17th Century, introduced the cultivation into Ireland, as a new plant, from samples

imported from Virginia, where formerly they had been propagated by Drake.

It was, however, only towards the decline of the 18th Century, that they succeeded in France, and then, thanks to the tenacity of a man whose name in consequence has merited celebrity. Indeed, it would be difficult to overrate the advantages this plant produced to France during the period of the second famine.

Monsieur Parmentier took the potato, we may say, under his special protection, and passed many years of his life endeavoring to propagate it, without success, notwithstanding which he was penetrated with the conviction of its great value, and foresaw the important service it would one day be called to render, in contributing to the alimentation of the masses.

Grieved at this want of success, in a project which he thought might *even* then, ward off the approaching catastrophy; he had recourse to an ingenious stratagem, and one that showed him to have been a profound thinker, and accurate judge of human character.

He was authorized by Government to occupy the plains of Grenelle, and the sablons, which he covered with potatoes that succeeded admirably, and when ripe, he caused them, *during the day* to be guarded by a detachment of troops.

The population of the environs of Paris, very naturally supposed that plants so guarded must have the greatest value, and when night approached, and the sentries took their leave, Parmentier's fields were ravaged, and his potatoes transported, and distributed among the suburban populations.

This he expected, and was rejoiced. The children of Eve were then about to eat forbidden fruit.

The gardens in the neighbourhood of Paris were soon crowded with potatoes, which advanced from thence into the more extensive culture of the nearest farms.

Parmentier was delighted with his success, and redoubled his endeavours. But there, as in all countries, were found, the envious, malicious, and ignorant, who, by instinct, are the obstacles to every public good.

As the Almighty has created nothing without an object, we must presume that this disgusting class of bilious, venomous humanity, have, like toads, serpents, scorpions, some ignoble destiny to fulfil; perhaps ordained as contrasts, perhaps as punishment for us or them. None can, however, deny that they exist, and poor Parmentier found so to his cost, for soon a murmur spread around, that these much vaunted plants, were poisonous.

The people took alarm, and scenes occurred, like those when Cholera first came to Europe, and villains spread abroad that fountains, bread, and vegetables, were poisoned to destroy.

Parmentier fled, to save his life, but the two famines, that followed so soon upon the bloody revolution of that "Age of Rage" taught people the importance of Parmentier's favourite plants, and *then* in gratitude they tried *in vain* to rebaptise it with his name, and term it "Parmentiere."

APPENDIX.

REPORT OF THE SELECT COMMITTEE

ON THE

CULTIVATION OF THE VINE IN CANADA.

LEGISLATIVE ASSEMBLY, Thursday, 9th June, 1864.

Resolved,—That a Select Committee, composed of Mr. Huot, Hon. Mr. McGee, Hon. Mr. Alleyn, Hon. Mr. McDougall, Mr. Perrault Mr. Joly, and Mr. Pope, be appointed to enquire as to the possibility of cultivating the Vine in this country; with power to send for persons, papers and records.

Attest, WM. B. LINDSAY, Clerk, L. A.

LEGISLATIVE ASSEMBLY, 17th June, 1864.

The Select Committee appointed to enquire as to the possibility of cultivating the Vine in this country, beg leave to report:

That the Committee, after careful consideration of the evidence laid before them, are of opinion that the cultivation of the Vine may become an important branch of industry both in Upper and Lower Canada; and respectfully recommend that the Government give such encouragement as would be an inducement to practical men to develop, if possible, that important branch of industry in this Province. That the evidence adduced as to the practicability of successfully cultivating the Vine, be printed for the information of the House.

The whole, nevertheless, respectfully submitted.

P. J. HUOT, Chairman.

LEGISLATIVE ASSEMBLY, Quebec, 13th June, 1864.

(Circular.)

SIR,—The Select Committee appointed to enquire as to the possibility of cultivating the Vine in this country, has directed me to transmit to you the following questions, and to request you to reply to them at the earliest possible period.

You will please direct your answers to J. P. Leprohon, Esquire, 1st Assistant Clerk of Committees, Legislative Assembly, Quebec.

The Committee expect that the importance of the subject (which they are considering) to the country, will be a powerful inducement to you to grant your assistance on this occasion.

I have the honor to be, Sir,

Your obedient servant,

Mr. DeCourt. nay. J. P. LEPROHON, Clerk of Com's.

Question 1. In your correspondence with the Government in 1859, to be found in the Sessional Papers of 1860, No. 22, you solicit assistance for the introduction of Vine culture into Canada, expressing your conviction that the climate of this Province has been hitherto misunderstood, and that it should be classed not only as belonging to the wine region, but even to the most favored portion of that region; and having been, at that period invited to demonstrate in a *practical manner* the correctness of your views, will you be so good as to render to this Committee such information as you may be able on this important subject, and inform them of the *practical results* already obtained?

Question 2. To what reasons do you attribute the fact, that although this climate, as you assert, belongs to the favored region of the Vine, no such culture has hitherto been carried out?

Question 3. Will you explain the meteorological conditions of the most favored portion of the Vine region?

Question 4. Will you submit to this Committee what means you recommend for establishing successfully the above-mentioned valuable productions in this Province?

QUEBEC, 14th June, 1864.

To J. P. LEPROHON, Esq., Clerk of Committees,

Legislative Assembly.

SIR,—In answer to your communication of the 13th inst., I beg leave to return, for the information of the Select Committee upon Vine culture, the following answers to questions which they have done me the honor to propose,—and have the honor to remain, Sir,

Your obedient humble servant,

J. M. DECOURTENAY.

ANSWERS.

1st *Question*. In March, 1863, I published a pamphlet upon "The culture of the Vine and Emigration," which I forward for the information of the Honorable Committee, hoping it may prove that, since the publication of the Sessional Papers alluded to of 1860, No. 22, I have demonstrated, in a practical manner, the correctness of my views.

In the first instance:—By cultivating successfully, not only the wild vine of the country (now so fully appreciated in Europe) but, moreover, several delicate varieties of European vines; and proved that they may adapt themselves, without difficulty, to the vigor of this climate.

And in the second instance:—By the manufacture of good sound qualities of wine, from the produce of the above-mentioned cultivation. From the enclosed report to the French Institute, you will find—

"That a general introduction of the North American vines would be of the greatest advantage to the wine-growing interests of Europe;

"It being demonstrated that not only are the productions superior, both in quality and quantity' to that of the European markets, but also that its hardy qualities have permitted the extension of that important culture even to the shores of the Baltic."

Particularly favorable mention is there made of the Clinton varieties of which the vineyards of Clair House are composed.

2*nd Question*. I think the best answer to this question will be found in my "Views upon the culture of the Vine," chapter second: "The Wealth of Heat."

3*rd Question*. In answer to this question, I must again refer the Honorable Committee to my pamphlet, pages 15, 37, 47, 48 and 53, and conclude with the Count de Gasperin's estimate of a wine climate, which must naturally carry with it more conviction than any argument I can offer.

In considering many pages of statistics, taken from the delegates of wine

associations (Cours d'Agriculture, vol. iv., page 637), he remarks: "This same operation, made in a series of years, from 1862 to our day, gives us the same result.

"Thus we can conclude that climates most favorable are those where the duration of the season of vegetation is the shortest, and where, in such season, the total heat is the most elevated;

"Where the difference between the solar heat and the minimum heat is the greatest, and where, consequently, vegetation proceeds by shocks, and not by a uniform march."

This description of our climate, by DeGasperin, needs no comment.

4th Question. The Count DeGasperin, in his "Cours d'Agriculture," vol. iv., pages 616, 617, and 618, has demonstrated that the success of wine culture "must depend altogether upon the judicious choice and combination of plants, chemical analysis not being able to indicate qualities.

"It is, therefore, to *agricultural experience alone* that we must address ourselves for the knowledge required."

Such is the reason why, in my opinion, private enterprise should not be expected to sustain the expenses of *agricultural experience*, which can by no means remain a privilege, but which, from its nature, inevitably belongs to the public domain.

J. M. DeCourtenay.

Quebec, 14th June, 1864.

Sir,—I enclose herewith my answers to the questions submitted by the Select Committee appointed to enquire as to the possibility of cultivating the Vine in this country.

I have the honor to be, Sir,

Your obedient servant,

J. P. Leprohon, Esq., Chs. D. Day.
Clerk of Committees.

1. I am of opinion that vines for the production of wine may be successfully and profitably cultivated in Upper Canada, and in a large portion of Lower Canada.

Mr. De Courtenay's views on the subject are, I think, well founded and practical, although he may be too sanguine in his expectations of an immediate pecuniary return.

The wine already made by him from native grapes is of a quality to justify confidence, in a high degree, of ultimate success.

The production of native wine is, in my opinion, an object of public importance; and with a view both to economical and social interests, might justly be made the subject for Government assistance.

A subsidy, judiciously applied in making a fair experiment, would, I think, secure a satisfactory result.

2. The pressure of important engagements prevents me from entering upon any extended expression of my views in answer to this question. I would, however, observe that the opinions stated have been formed after a good deal of reflection and the consultation of books of authority on the culture of the Vine, and that I have for some time past been convinced that the subject is one which ought to receive attention and encouragement.

Chs. D. Day.

Hon. Justice Drummond.

I have considered carefully the views enunciated by Mr. De Courtenay respecting the introduction of the cultivation of wine into this Province.

I can pronounce no opinion upon the cultivation of silk; but I feel confident that many parts of Lower as well as Upper Canada are well adapted to the cultivation of the Vine.

I have tasted two different kinds of wine made by Mr. De Courtenay, from grapes grown at St. Augustin, in the neighborhood of Quebec, and I consider one of them especially superior to the *vins ordinaires* imported from France.

I have no doubt that if Mr. De Courtenay was encouraged by a reasonable amount of pecuniary aid on the part of the Government, he would succeed in making the cultivation of the Vine in this country highly profitable to its inhabitants, in a moral as well as in a pecuniary point of view.

My opinion as to the adaptability of the soil and climate of Canada to the cultivation of the Grape is founded, not only upon my knowledge of the practical results already attained by Mr. De Courtenay on a small scale, but also upon knowledge acquired by the perusal of many works written on the subject, and especially on the authority of Gasperin, who, in describing the climate best adapted to the production of the most highly flavored and least alcoholic wines, pourtrays minutely a climate similar to that which we possess in this Province.

I would respectfully refer the Committee to two articles which have appeared recently in the *Atlantic Monthly* and in *Harper's Monthly*, on the subject of "Vine culture in California," as to the effect which may be produced by timely aid on the part of a Government, in the development of the natural resources of a State.

LEWIS T. DRUMMOND.

QUEBEC, 13th June, 1864.

J. P. LEPROHON, Esq.

SIR,—I have to acknowledge the receipt of your letter of to-day, with a series of questions, to which I have the honor of submitting the following answers, for the information of the Select Committee appointed by the Legislative Assembly to inquire as to the possibility of cultivating the Vine in this country.

I have observed that the cultivation of the Wild Vine, as practised by Mr. deCourtenay, has had the effect of increasing the quantity and size of the grapes to an extent that I could not have believed possible if I had not witnessed it; and having closely observed the system adopted by that gentleman, I am persuaded that the success of the Vine culture depends altogether upon the perfect knowledge of the *art* of pruning and training.

I have, in two different instances, been a witness of the beneficial effects of his system, applied to the cultivation of delicate French Vines. One, the "Munier," is a vine that had stood in the garden of a friend for many years, without ever producing fruit in any quantity, and that imperfectly formed and unripe. The summer after its being pruned and trained by Mr. deCourtenay's vine-dresser, there was an extraordinary large quantity of beautifully-developed ripe fruit.

The second was the "*Chasselas Doré*," cultivated in the open air, and bearing magnificent bunches of fully-developed grapes.

I have examined the manufacture of wine by Mr. de Courtenay from grapes grown in the open air, which I assisted in gathering, and have no hesitation in expressing my firm conviction that if the cultivation of the Vine and the manufacture of the wine, as practised by that gentleman, was extensively prosecuted, it would be attended by such results, both moral and commercial as would be of immeasurable benefit to the country.

Having been for many years engaged in the Wine trade, I am able to affirm, that the wine so produced is such as would be of high marketable value in any country.

I am satisfied that a Government subsidy to an intelligent and respectable Company, who would undertake, in the two sections of the Province, to develop this important industry, would be attended with inevitable success.

I have the honor to be, Sir,

Your very obedient servant,

W. J. BICKELL.

The cultivation of the Grape in Canada, both under glass and in the open air, has engaged my attention for several years past, possessing, as I do, very extensive graperies at Spencer Wood. I have been struck with the very satisfactory results obtained by Mr. de Courtenay, from the out-door culture of the Wild Grape, at St. Albans, on the St. Louis road, near Quebec. Vines, barren, or next thing to it, in two years' culture were loaded with immense clusters of splendid fruit. Mr. de Courtenay submitted to me, during the last winter, delicious wine, from some grapes which, he stated, had been grown in this district. I saw the grapes during several periods of fermentation, and I firmly believe that such wine, produced in large quantities, would be an inestimable boon to Canada.

I think that Government would be found wanting in its duty towards the people, if it should refuse to encourage the development of such an important element of commercial prosperity.

I see no reason why the Wild Vine of the country should not improve under proper culture, and other varieties of Vines introduced in Canada, sympathetic with the climate and soil.

It is useless for me to dwell on the bearing of the Vine question in Canada —I do not believe that it has been fairly tried yet. There are secrets in the manufacture of wine as there are in all other industries, and failures can be explained by the fact, that few (if any) real Vine growers have attempted to make wine in Canada with the wild grape of the country, cultivated in the open air. I think I echo public opinion in urging the necessity of having the Wine question thoroughly ventilated.

Quebec, 14th June, 1864. J. M. LeMoine.

Quebec, 13th June, 1864.

Sir,—I have the honor to acknowledge your communication, propounding certain questions in relation to Mr. de Courtenay's success in the cultivation of the Vine, and in producing Wine from the fruit. I subjoin my reply.

In the fall of the year of 1861, I went to examine some wild Vines, then about to be taken into cultivation by Mr. de Courtenay. The plants were of considerable age, and had been grown for several years where they then stood. They had several bunches of fruit, scarcely any of the grapes being larger than the head of a common pin.

Late in the spring of 1862, I again visted the same Vines, still standing on the same exact spot. They had been pruned with a very unsparing hand, and showed a very handsome promise of fruit for that year. The cause of this last visit was a very severe and unseasonable frost, and I went to see the effect produced on the Vines. They were in very full blossom; but, though icicles were still hanging on some parts of the Vines they had suffered nothing. I again visited the same Vines in September, 1862, when they were loaded with bunches of grapes, highly colored, and the grapes—individually as large as I have seen them in the vine growing parts of France. I had the curiosity to watch the gathering and the making of *those* grapes into wine—which wine would have been pronounced good in any wine-growing country. In 1863, I again watched the making and fermentation of Mr. de Courtenay's wine, and I kept two bottles of it till the spring of 1864. It proved of superior quality.

I consider it highly desirable for Canada, in which country I have now resided forty-three years, that the fostering hand of the Government should be extended to encourage the cultivation of the Vine, and thus produce the inevitable result of a new, a very extended and a very beneficial National industry.

I have the honor to be, Sir,
Your very obedient servant,

J. P. Leprohon, Esq., R. B. Johnson.
Secretary of the Parliamentary Committee on Wine.

QUEBEC, June 14th, 1864.

SIR,—I have the honor to acknowledge the receipt of your letter of yesterday's date, conveying an enquiry with reference to the cultivation of the Vine in this country.

I have examined—generally, but somewhat carefully—the question of the native production of wine, as proposed by Mr. de Courtenay. I have no doubt whatever that its production to a large extent is possible, and as little doubt that the results to the country would be most advantageous—economically and socially.

I have the honor to be, Sir,
Your obedient servant,

J. P. Leprohon, Esq. W. DANN.

APPENDIX.

Extracts from "The Culture of the Vine": by J. M. de Courtenay.

THE WEALTH OF HEAT.

A combination of unfortunate circumstances have ever tended to drag down this country to a standard far beneath its natural position.

The original system of French Colonization was altogether military; and for the last century, emigration has been drawn from climates in no way resembling our own.

Our farmers and agricultural labourers have emigrated from more northern latitudes.

The Norwegian, Scotchman and Northern Englishman may feel at home during our winters, but no class of emigrants arriving in the St. Lawrence are prepared for the *heat* of our summers, and none know how to profit by the *wonderful wealth* of that heat, which appears to our population only as an inconvenience, and to be apologised for.

Had we endeavored to obtain even a limited emigration, accustomed to the broiling summers and rigorous winters of the slopes of the Jura, the Alps, Pyrenees or Appenines, or to many similar climates, from Hungary to the Crimea, we should long since have discovered that our lands had other resources and other riches than could ever be extracted from them by the *Ne plus ultra* of our agricultural imagination, a Scotch farmer.

Take away from France her wine, oil and silk, and imagine what would remain of her thirty-five millions of population, of her splendid army, of her Imperial Government.

As long as Canada does not produce wine, oil, silk and hemp in abundance, she may be considered in comparatively the same wretched position, of an imaginary France, reduced to the miserable resources of ordinary field crops.

In order that the importance of comparison may be understood, I must explain, with the authority of Count De Gasperin, the value to France of the productions I advocate. And as I shall on many occasions make use of this authority, I may here explain that it is looked upon as the best Europe can afford, *although* the Count was, for many years Minister of Agriculture.

Thus, in the 4th vol. of his "Cours d'Agriculture," pages 697 and 698, I find:

"The Mulberry accompanies the vine to its last limit in altitude, and we do not doubt that also in latitude this will be found the limit of its useful cultivation. It would be difficult to exaggerate the advantages Europe obtained by the adoption of this industry. Three hundred and twelve millions of francs is what the Mulberry produces to France, which is one-third of the production of its vineyards."

I find that these productions amount to

Wine	934 millions.
Silk	312 do.

Making a total of 1,246 million of francs, or 250 millions of dollars.

As to the production of oil, I can only speak here of that which is furnished by the Walnut, and which is at least equal in quality to that of the Olive.

The French have divided their Walnuts into seven varieties:

1st. Noyer à coque tendre.
2nd. Noyer tardif.
3rd. Noyer de jauge ou à gros fruits.
4th. Noyer à bijoux.
5th. Noyer à fruit dur ou Noyer noir.
6th. Noyer à grappes, ou du Canada.
7th. Noyer la Cerise.

And, in short, the "Noyer commun."

The fifth and sixth are originaries of North America, and known in this country as the black walnut and the butternut. The second only flowers in June, and would be the species suitable for this climate, and to graft upon the Canadian varieties.

Before the Empire of Napoleon I. many wallnuts, incapable of producing oil, were grown in France. But that great reformer—that regenerator of France—ordered men who understood the grafting of this tree to be sent all over the country, and, in two or three years, every barren walnut in France changed its nature and became an abundant source of revenue; in the "Vaucluse" especially, which was covered with the black walnut and the butternut. This measure changed the face of the country, which can easily be imagined, when it is considered that an average tree will produce 100 francs, or $20 worth of oil every year, and without labor. DeGasperin calls it "labor of nature."

Nothing could be more easily accomplished in Canada.

In the Eastern section we have thousands of butternut, in the Western as many black walnut.

What a change a few grafters would make, and how easily accomplished! I again introduce the Count de Gasperin's "Cours d'Agriculture," vol. iv., pages 753 and 754:

"The same region of mountains, in the centre of our temperate region, that obtains its bread, all prepared from the chessnut, receives also its oil from another tree—the walnut, which furnishes nearly half the oil that is consumed in France, more than three times the quantity that is obtained from the olive, and three-fourths of that produced by oleogenous grains.

"But no more walnuts are planted, whilst numbers are annually rooted out. It will finish by altogether disappearing from all lands susceptible of other cultivation.

"What are the causes of destruction to this fine tree, the veritable monarch of vegetation?

"As with the olive and the chesnut, it arrives from the decay, of *family feeling*, from the rapidity of the transmission of the soil, passing from hand to hand that renders transient all enterprises formerly belonging to many generations.

"It is from the little durability of positions, that makes the father foresee for his children another destiny than his own.

"It is from the haste to enjoy, and from repugnance to enterprises of long term, that prevents the new generations from undertaking any labor, the fruits of which they may be *themselves* unable to enjoy.

"The great value of the wood has to us a temptation we know not how to resist, as twenty walnut on an acre of land represents a value of 3,000 francs, often superior to that of the soil.

"This avidity deprives our valleys of that which requires no labor to produce, and substitutes the labor of man for that of nature.

"It is only in twenty years the walnut gives fair produce, and in sixty the maximum of its crops.

"What an enormous period for us, who are only passengers, upon that land where our ancestors seemed, like their trees, to have taken root!"

Such, to France, are the effects of the loss of entail; such the consequences of the division and destruction of property.

The action of the Revolution was hastened by land companies, or "black bands," as they were then stigmatized, who purchased properties in block, stripped them of everything valuable, and disposed of them in detail when impoverished and destroyed.

A moral may be drawn for us from these effects, of one of "The Four Revolutions."

WINE REGION.

Professor Hincks doubts "the growth of maize being a test of a climate suiting the wine." I am prepared to prove that the denomination of "sub-region of maize" is given in Europe to the southern portion of the wine region.

If, therefore, the grape is cultivated with success in that northern portion of the wine region, so distinguished from the fact of Indian corn being *unable* to mature its grain--*a priori*—such cultivation *must be successful within* the southern portion of that wine region to which we belong, and which is distinguished by the fact that *Indian Corn does* come to maturity.

Arthur Young is the first who endeavored to determine, in a precise manner, the limits of agricultural climates.

In his voyage through France (when he foresaw and foretold the destruction of an ancient monarchy), he established for that country four distinct agricultural regions.

The first region was the north or cereal region, where neither the vine nor Indian Corn could be cultivated.

In the next one towards the south, wine was produced, but maize could not ripen as grain.

The third region was composed of both wine and maize.

The fourth [illegible] of the olive. De Gasperin, vol. ii, page 318, declares:

"This [illegible] Arthur Young has never been surpassed; being founded upon the [illegible] of facts, it is generally true.

[illegible] places, altitudes, and many other circumstances, transform [illegible] lines traced by this author, into very sinuous ones."

[illegible] same vol., page 322, he says:—

"In the southern division of the wine region, the vine ripens on the plains, and without shelter. In the northern portion, the slopes of hills, more or less inclined to the south, are chosen, which in point of fact, transport these positions to a more southern climate, often equal to many degrees.

"In such cases the vine is not the general culture of the country. It becomes the speciality of certain expositions, that are not of the same climate as the surrounding country.

"In our opinion, therefore, the region of the vine should be traced on that line where this shrub can ripen without shelter, which would bring it to that limit where it is cultivated in common with maize. We shall, therefore define the sub-region of maize, believing that the northern portion, where it does not arrive at maturity, is only a climate of transition for the vine, and might well be classed in the cereal region.

"Having made this reserve, we shall confine ourselves altogether to indicating the sub-region of maize."

I consider it *perfectly impossible* for the delicate descriptions of either European or native vine to succeed upon the clay soils of Cincinnati.

Messrs. Joigneau and Moreau declare in their valuable work, vol. ii., page 651, that "If you take choice vines from light soils and plant them in clay, you will obtain a something very much approaching to a mixture of

half water, half vinegar." The same authors, in the same page, declare that "The vine planted in clay will only produce a great deal of acid and very little sugar;" and this will account for the quantities of sugar mixed with the wines of Ohio, and which, in my opinion, is no remedy to the evil.

Had Ohio obtained the assistance of able and scientific wine-growers from Europe, they would not have been groping for thirty-five years after (in my opinion) unsatisfactory results.

As to the value of the Ohio climate in comparison with the length of our winters, I assert that the best authorities in Europe consider that no remarkable wine is grown south of the 40th parallel.

Bordeaux, which lies in the 45th degree, produces the most southern aromatic wines, and all other valuable wines are yet further north.

As for sherry and port, they are not aromatic wines, but are manufactured with brandy and other ingredients, and for the English market alone.

Monsieur de Gasperin's estimate of a wine climate must naturally carry with it more conviction than any arguments I can offer.

In considering many pages of statistics, taken from the delegates of wine associations, we remark in his "Cours d'Agriculture," vol. iv., page 635: "This same operation, made on a series of years, from 1828 to our day, gives us the same result.

"Thus we can conclude, that the climates most favorable to the vine are those where the duration of the season of vegetation is the *shortest*, and where, during such season, the total heat is the most elevated;

"Where the difference between the solar heat and the minimum heat is the greatest, and where, consequently, vegetation proceeds by *shocks*, and not by a *uniform march*."

This description of our own climate, by so undoubted an authority as Monsieur de Gasperin, will convince many that it has been often sadly calumniated by "the learned of the land."

PRUNING AND PLANTING.

Pruning of any description, and there are five hundred different methods, is by *no means arbitrary*.

Both that and the distance to be preserved between the plants (and the former is always regulated by the latter) "must depend altogether upon the nature of your climate, the inclination of your land, and the *vigour* of the vine you propose to cultivate."*

As a general rule, you *must* keep your vines low, in the north, and plant them at about two feet apart. As you approach the south you *must* allow your vines to *rise*, and extend your distances as far as about eight yards. This practice is based upon the more or less vigour of the plant, which invariably increases as you proceed south, at least as far as extends the southern limit of the vine region, which has been by the best authorities traced upon the 35th parallel.

In our climate I plant in squares of four yards distance, and prune accordingly, and find I have by no means over-estimated the vigour of my plants. In Cincinnati, they imitate the feeble vigour of the extreme northern limit, and plant at two or three feet distances, pruning, of course, accordingly. By my estimate of their climate, I should judge eight yards *at least* as the distance to be preserved.

However, both here and in Europe the greatest care must be taken in planting vines, transported from another district, to preserve to them as much as possible not only the *full* degree of heat requisite for the maturity of each variety, but also the soil and aspect to which they have been accustomed. Even then, and under every possible precaution, you will *never* obtain exactly the same flavor, which *always* differs materially in the same parish, with the same assortment of vines, in the same climate, aspect and soil.

* De Gasperin, vol. iv., page 666.

As I previously remarked, the great art of vine culture consists in *planting* and *pruning*, which can only be acquired by considerable practical experience.

Independent of latitude, altitude, or the inclination of the land, the nature of the vine itself must be taken into the most careful consideration.

Certain varieties have a propensity to *rise* before bearing abundant fruit, and are generally to be found amongst the wild grapes of all countries,—the "Vignes de treilles," of France, and the "Pergulanes," of Italy. It is only from their horizontal branches, or "guirlandes," that you can hope to obtain an abundant fructification. The vigour of their vegetation, if allowed to run wild, will expend itself in wood branches and leaves. If kept low and short the same effects will be produced.

Monsieur De Gasperin, vol. iv. page 667, exemplifies this doctrine in an interesting manner. "We made an experiment upon a vine of Corinth, brought home from the expedition of Morea in 1828.

"Kept low during fourteen years, it produced only a very small quantity of fruit, used only as samples. Having then been allowed to climb upon a neighbouring tree, it covered itself with fruit, and gave that year a quantity sufficient to make a hectolitre (25 gallons) of wine."

I presume many persons in this country have remarked, even amongst the wild vines, that some prefer to climb to the summits of the highest trees, whilst others content themselves with spreading over brush wood.

The same thing exists in Europe, and in a greater degree with the cultivated vines (*vitis vinifera*), whose natural propensities have become fixed habits from many centuries of judicious pruning.

Those varieties, therefore, that have long been preserved *low*, would wear themselves out immediately, and soon cease to be productive if allowed to rise, or if the mode of pruning was materially altered.

All varieties, if abandoned to themselves, produce an innumerable quantity of branches, and become wild within three years.

As the vigour of the vine varies according to the climate, and increases as it approaches the south, so (in the same proportion) does the distance between plants extend itself.

The increasing evaporation of the vine as it proceeds south, makes it also absolutely necessary to allow a greater cube of earth, so that its roots may extend themselves and absorb the degree of moisture required for its vegetation.

Another reason may be discovered, from the recognized fact "that the closer the plants the sooner the fruit arrives at maturity."

The action so produced is, because the stronger the vines the later they blossom, and therefore they have time to develop more branches and leaves than are necessary.

An isolated plant blossoms and ripens long after those that are crowded together, and have therefore less vigor.

The first ripe grapes are never to be found on the borders of a vineyard, and old vines planted on poor soil are considerably in advance of those younger and better manured.

These become very important considerations in the extreme northern limit of the vine region, where the maturity is uncertain; and some days gained may be of great advantage in obtaining drinkable wines; for although you can obtain an equal quantity of wine by increasing the distance between the plants, yet the contrary practice in such climates is found more advantageous, in order to improve the quality.

It need not either be necessary to proceed to the extreme northern limit of the vine region, in order to appreciate the advantages a few days of earlier maturity may produce—to obtain which, they have been obliged, even in Burgundy, to decrease the distance between the plants, notwithstanding their climate lies in the centre of the vine region—"the sub-region of maize."

As to the production in Canada—except in some most exceptional situa-

tion—of the Catawba or Isabella grape, it only proves again how dangerous the futile efforts of ignorance seeking impossibilities, have ever been to real progress.

The Romans took thirteen centuries to transport the southern vine from Italy to Chalons, and yet the task was easier than to introduce the Isabella and Catawba grape into Canada. Those vines were brought from North and South Carolina to Cincinnati, and require more heat than can, even there, in ordinary seasons be produced. I am persuaded the Catawba requires more than 6,000° of heat, and the Isabella 5,000,° besides being, in my opinion, worthless and unprofitable *as a wine* grape.

The vines of France are classed in seven divisions, according to the heat required for the maturity of each. The first four divisions alone can ripen in Canada.

Division. *	Degree.	Ripens.			
1st total heat	2264	15th of July ;	South of France,	20th Aug.—Paris.	
2nd "	3400	25th Aug. ;	do	do	7th Oct.—Paris.
3rd "	3565	1st Sept. ;	do	do	20th Oct.—Paris
4th "	4133	27th Sept. ;	do	do	Does not ripen at Paris.
5th "	4238	2nd Oct. ;	do	do	
6th "	4392	10th Oct. ;	do	do	
7th "	5090	31st Oct. ;	do	do	

I believe that the 5th division might ripen in the most favorable positions of our climate, but there would be no advantage gained by it. The best vines in France belong to the 3rd division. The best white vines (the Chasselas doré.) which I cultivated in Canada, and ripen early in September, belong to the second.

The art of wine culture consists in the judicious assortment of plants, established at such distances between each other, as may accord with the nature of the climate and the vigor of each variety ; and, above all things, success depends *upon the manner of pruning*, which, in my opinion, has never been properly understood on this continent.

Considering our climate as the *centre* of the wine region, I planted and pruned accordingly, and found I was correct.

German laborers, from the Rhine, have planted and pruned in an extreme southern climate—Cincinnati—in the same manner they have been accustomed to treat the Rhenish vines of their own *northern limit* of the region.

The vigor of the vine diminishes as it approaches the north, and while in the south† it furnished the staircase of Diana's temple of Ephesus, in the extreme northern limit it would not produce the wand of a centurion.

† Pliny, Book 14, cap. 5.

WINE.

It will be easily perceived the importance attached in Burgundy to their wines, and there is no reason why we should not produce *better ones* on the norders of the St. Lawrence.

And why should it not be so ? if Monsieur de Gasperin is correct in asserting that the *best* wine is made where the greatest heat is concentrated in the *shortest* season of vegetation, and where there exists the greatest contrasts of temperature. Now, the season of vegetation in Burgundy, Mr. de Gasperin informs us, varies from 168 to 174 days, with an exceptional year at 162. Our season of vegetation varies from 135 to 150 days, calculated (as in Burgundy for the grape) when the temperature rises to 12 centigrade and returns below that degree.

Our amount of heat during a season of vegetation of 135 days is *far superior* to that of Burgundy with its 174 days ; notwithstanding that our contrasts between the temperature of day and night are much greater.

Purity of atmosphere, the next greatest advantage for a wine climate, we possess in a much greater degree than Burgundy, or indeed than any part of France. The very variations in our temperature demonstrate this purity of

* The first division are vetting grapes alone, and unfit for the manufacture of wine.—De GASPERIN, vol. iv., page 606.

atmosphere, *as the former is produced by radiation of heat, which is the consequence of the latter.* We have always been in the habit of praising our long winters, and apologising for our short and burning summers, whereas the *real* advantage of our climate consists in the *heat* and *brevity* of those very summers, which can, by the wonderful riches they produce, *when properly managed,* compensate for even the unpleasant and unprofitable length of our winters.

As to the effects of vine culture upon emigration, it can be well understood that the *moment we commence* such operations upon any important scale, we *remove* from the European imagination that chill and shudder ever associated with Canada, supposed to be only productive of snow, wood and ice.

The physical, moral and social effect of wine upon our population can neither be over-rated nor exaggerated. A French political economist declares that *wine* is to the French and Latin race in general what *beef* is to the Anglo-Saxons. I am persuaded that wine is "meat and drink" to every division of the human race. It is the antidote to *dyspepsia* and *delirium tremens* —has ever, at the same time, *banished the use of spirituous liquors,* and "made the heart of man glad." It seems to be a *necessity* of the human organization. It awakes the forces of the stomach, excites the fibres of the brain, and exercises an action of radiation upon the entire nervous system and the complicated vital functions, and appears to be a beverage *indispensable to man,* being that which is most easily obtained and the most agreeable and most generally appreciated, which is proved by the *fact* of the exclusion of all others *within the climates* where *it can be produced.* But in order that wine should become the universal beverage of the country, it must be produced of every quality and at every price.

The attempt to produce *only* sparkling Catawba reminds one of the unfortunate Queen who proposed to substitute "sweet cakes" for that bread, the want of which (as foreseen by Arthur Young) caused the French Revolution.

Good sound ordinary wines are the *only* real basis upon which such cultivation can be established; for it must be remembered that, as for every other description of merchandize, poor consumers are the most numerous.

Unlike most other productions, it is by no means a *defined* substance, presenting everywhere the same composition.

For some it is a delicate beverage, the merit of which consists in the odor, or "bouquet,"—in the unctious and agreeable savour to the palate, much more than in the more or less quantity of alcohol it contains.

For others it is only a spirit more or less diluted; between these extremes all tastes and necessities may be discovered. But as the mass of consumers are poor, so are the ordinary wines the most numerous, and their value (which consists in the spirit they contain) more easily appreciated.

With regard to fine wines, on the contrary, you can discover no other guage than the palate of the connoisseur, whose opinion will only be guided by either an *acquired taste* or the fashion of the day.

These qualities of so much value may be obtained by any one within the wine regions, but never in an infallible manner, and to a degree foreseen in advance.

With the plants, soil, and aspect of Clos-vougeot, wine is made *in the same district* in no way resembling that of Clos-vougeot.

A great number of questions present themselves to the wine-grower in a new country, where no agricultural experience can guide him; and the problems he must solve are so complicated and so numerous, that I find it impossible within the limited space of a small pamphlet to give even an outline of the agricultural, economical and commercial considerations necessary for, relating to, or dependant upon, the success of so arduous an undertaking.

The *fact* that a good sound wine can be produced in this country, I consider, has been by me practically demonstrated. It may, moreover, be

proved by a mathematical calculation that we belong to a wine district. The Count de Gasperin, vol. ii., page 354, declares a simple rule, without an exception: "The climate of the vine is characterized by the possibility of attaining a total heat (solar and atmospheric) of 2,680 degrees" (centigrade.) I assert that we possess much more than 3,000 degrees (centigrade,) and I have based my theories—

1st. On the *fact* that *all* countries in Europe capable of producing Indian corn are considered to be in the *centre* of the wine region, which extends more than 200 miles north of where Indian corn ceases to ripen.

2nd. On the other *fact* that the only aromatic wines in Europe are grown *north* of the 45th degree of latitude, and on the principle recognized by the Count de Gasperin, vol. iv., page 637, that the best wines are produced where the season of vegetation is the *shortest*, and where there exists the *greatest variations* of temperature, so that vegetation may proceed by *starts* and *not by a uniform march.*

As to the quality of wine, allow me to declare it to be a question of *agricultural experience*, and such is, indeed, the reason why private enterprise cannot be expected to undertake the expenses of experience, which cannot by any means remain a privilege; and I quote the Count de Gasperin, vol. iv., pages 616, 617 and 618, as authority for such assertion.

In conclusion, it must be evident that my object was not to make a *superior* wine, but to produce a *wine from the native grape alone.* In doing so, I only made use of two varieties of the native grape; and I am persuaded that the varieties of our native vines are as numerous as Virgil once declared those of Europe to be:—

"Quem qui scire velit *Libyci* velit æquoris Idem
Discere; quam multæ zephiro turbentur arenæ.
Aut, ubi, navigiis violentior incidit Eurus,
Nosse quot *Ioni* veniant ad littora fluctus."

GEO. II.

AGRICULTURAL REGIONS.

Agricultural regions upon the surface of the globe are governed by certain laws.

Some, inherent to the nature of the soil and climate, are invariable.

Others, on the contrary, depend upon the progress of civilization, the distribution of population, and other variable causes.

They may all be classed within four limits:

1st—Meteorological;
2nd—Economical;
3rd—Statistical;
4th—Agricultural.

The Meteorological limit may be established—

1st. By the temperature of the atmosphere and the soil, under the influence of solar heat, during the season of vegetation of each plant;

2nd. By the hygrometric state of the atmosphere, the frequency and direction of the winds, and the moisture of the earth during each season:

3rd. The temperature of the atmosphere and soil during the winter.

ECONOMICAL.

Economical limits depend upon extremely complicated calculations, the basis of which may be considered as:

1st. The quantity and quality of possible production in the situation under consideration;

2nd. The prices to be expected in the home market for such productions;

3rd. The expense of such cultures.

The results of a comparison between the above considerations have a tendency to extend or contract the limits of the cultivation of such plants, either beyond or within the boundaries of their natural limits.

Excellent wine was formerly produced in abundance in the neighborhood

of Paris; economical considerations have caused its culture there to become extremely limited.

In Belgium, on the contrary, the custom house duties have caused the extension of wine and silk culture beyond their rational limits.

In Lower Canada, the facilities of water communication with the West are an economical limit to the extensive production of grain or maize, and, in self defence, we are bound to meet such changes, by providing other agricultural productions, and by obtaining a substitute for the grain culture that was formerly the wealth of our flat lands.

Hemp should be the great staple commodity of such lands, not only from its peculiar adaptation and great value, but also from its tendency to *improve* the general system of agriculture in those countries where it has been cultivated *with success*.

The great secret of popularity with the Bonaparte family in Italy is, that the rich plains of Central Italy owe their incalculable wealth to the introduction of hemp culture by the First Consul, who never did things by halves.

Had we taken the trouble to examine the means employed by the Great Emperor, we should long since have endowed the Province with this source of immense prosperity; but, notwithstanding some more talk about it, the introduction appears now as far off as ever.

I have, in the *Journal de Quebec*, treated in detail the importance of hemp, and the absurdity of fine flax culture in Lower Canada, and shall, on a future occasion, return to this important question more fully, and in English.

STATISTICAL.

Statistical limits are dependant upon the distribution of population.

It has, by M. de Gasperin, being calculated that it requires the labor of two persons to produce 250 lbs. of raw silk.

The real labour of such production does not extend over the space of a week, being the last of the five comprising the ephemeral existence of the silk worm.

The "Department of Gard," France, "producing more than five million pounds of raw silk" (2,700,000 kilogrammes), must employ more than half of its population above the age of twelve years during the *last* week of such production.

The statistical limit of silk culture may therefore be fixed by the amount of population capable of being employed in such production during *one* week of the year.

The extreme brevity of this season of labour would facilitate its introduction into Lower Canada, where it would interfere with no important agricultural occupation.

As to Vine culture, a vigneron would supply the wants of an entire parish, as far as local consumption may be concerned, and the French population would return by instinct and with avidity to their ancient beverage.

AGRICULTURE.

Agricultural limits are marked principally by the tenure of land.

Were you to propose the cultivation of the vine, the mulberry or the walnut, to farmers holding short leases (the greatest curse of a country, whether to land or water), you would only be answered by ridicule.

Even small proprietors, who must exist upon the annual produce of their land, will not dare to make experiments, except upon mature reflection, and having the example of success before their eyes.

Agricultural reforms, therefore, must depend altogether upon the tenure of the soil, which, after all, is the *only* regulator of its wealth.

It will be difficult to *develop* the agricultural resources of a country without the assistance of wealthy landed proprietors who can *only* be created by means of *entail*.

Nothing is more true than the old French proverb :

"Telle étable, telle bête."

"Tant vaut l'homme, tant vaut la terre."

No doubt many acquirements and great energy are necessary in order to carry out large projects of agricultural reform.

I presume the time may not be far distant when it will become generally admitted, that upon the intelligent and zealous exertions of the Bureau of Agriculture must depend our best prospects of immediate prosperity and future greatness.

Under such circumstances a complete reorganization of the Bureau would become indispensable, so that the position of Minister of Agriculture should be sought after by our most able men of both sections of the Province.

A short Act of Parliament, authorizing the Commissioner of Crown Lands to dispose of any amount of land (for cash payments, to be applied to roads upon said land) under guarantee of entail, would introduce millions of foreign capital into the country.

An appeal to foreign capitalists by *such men* and under *such circumstances*, would undoubtedly create a sensation in Europe, and be attended (for the Province) with most advantageous results.

The liberty, equality and mendicity system has been *tried* and *found wanting*. If the one I propose effects so many nervous susceptibilities, let a *better one* be laid before the public and the country.

THE WINE REGION.

Meteorological Limits.

The limits imposed upon all cultures must naturally affect, in a very remarkable manner, the important and highly valuable ones I have endeavored to bring before public attention.

I have shown, I hope, that we are within all the *variable* limits previously described.

And I presume I have proved, as far as can be reasonably expected from the limited space I have occupied, that we are *far* within the circle of the most important of all limits, because the natural, and invariable one, that which has been ordained by our Creator.

In order to explain, with any degree of lucidity, the limits assigned to that region termed "of the vine," but which includes so many others of great value and importance, I must compare two distinct climates—

The one decidedly in, the other absolutely without, the limits in question.

I shall, therefore, establish the comparison between Paris and Brussels.

In the first of these situations, wine culture has been successful; in the last, it has never been able to succeed.

PARIS.

Atmospheric heat during the season of vegetation	1925.67
Solar heat " " "	751.00
Total heat.....	2676.67

This appears the lowest degree of heat required for the cultivation of wine.

At Brussels the thermometer descends below 12° centigrade, as in Paris, by the 1st of October, and I find it possesses up to that period—

BRUSSELS.

Atmospheric heat.....	1914.02
Solar heat.....	619.00
Total heat.....	2533.02

Thus a simple difference of 144 degrees of heat separates the region where the culture of the vine is possible, from that where it is not so.

Ten days more of heat added to the climate of Brussels, and the vine could ripen its fruit.

Ten days more added to the climate of the South of France, and cotton could there be successfully cultivated.

And thus may everywhere be distinguished the limits of agricultural climates, of which Monsieur de Humbolt has attempted to furnish a classification, by a—

MAXIMUM TEMPERATURE.

Cacao	29°	to	23°					
Indigo	28°	"	22°					
Banana	28°	"	18°					
Sugar Cane	28°	"	22°					
Coffee	27°	"	18°					
Cotton	28°	"	20°					
Dates	23°	"	21°					
Citrons	"	"	17°	absolute minimum,	7°	–5		
Olives	19°	"	13°	"	"	5°	–5	
Chesnut	"	"	9°					
Vine	*27	"	20°	with one month at	19°			
Wheat	25°	"	15°	"	"	"	10°	to 12°
Barley	"	"	11°	"	"	"	8°	" 9°

No one has more felt than the author himself how insufficient a proof can be afforded by a maximum of temperature.

In calculating the temperature of a country, we must not forget that the slopes of hills of a southern aspect transport such situations to a more meridional latitude.

The heat of the sun is in proportion to the number of its rays that strike a *plane*, and proportionally to the *simus* of its angle of *incidence*.

Before arriving at the earth, the solar rays traverse the atmosphere, and a part (about a fourth of the calorific) are absorbed by the air and the vapors that enter into its composition.

It is according to the density of these vapors that the caloric rays penetrate to the surface of the earth, and their density, quantity and state of dissolution renders them an element most variable, according to the period of the year or of the day, and, indeed, dependant upon numerous causes, scarcely appreciable.

The air becomes less saturated as the temperature of the day increases, and *vice versa*, which will enable us to calculate the extinction of light or heat produced by a relative humidity of atmosphere.

From the zenith, each degree that removes the sun from the vertical position augments the angle of inclination, and consequently diminishes its calorific power. Its angles with an inclined plane will be the same as those it would make with a country whose horizen would be parallel to the same plane.

Suppose the ground inclined to the south, its plane would be parallel to the horizon of a more meridional latitude; if to the north, to a more septentrional one; to the east, its latitude will not vary, but it will find its parallel with an oriental longitude; to the west, with an occidental longitude.

In the intermediate positions—a south-east inclination, for example—it will change both its latitude and longitude.

Thus, the effect of each inclination will be, if north or south, to transport the position to another climate; if east or west, to change the hours of the day when the heat will be the greatest.

A slope exposed to the south, with an inclination of 25 degrees, and in latitude 45, at the "Solstice," will obtain its rays at right angles; the solar heat being therefore 27-72, and the atmospheric, 27-8, will produce a heat of 55-6 degrees.

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* 9° less than maximum of Montreal.

SOLAR HEAT.

I desire to explain, for the benefit of those who may not be conversant with agricultural calculations, the meaning of solar heat, which differs essentially from the atmospheric heat, daily represented by a given thermometrical figure; giving the heat of the air a transparent body, that only absorbs about a fourth of the solar rays in their passage through it, and which arrives afterwards on the earth and upon plants, who absorb in their turn a much greater portion.

Solar heat, therefore, is a question of immense importance, as an element exercising considerable influence upon all vegetation, and very materially upon the classification of agricultural climates, according to its power of action, either from the absence or abundance of opaque vapors interposing themselves between the sun and the earth, or from the inclination and exposition of the soil, or from any other shelter that may reflect or intercept the solar rays.

As the effect is often altogether local, scientific men had long neglected its application; but they have now perceived the enormous influence it exercises upon the march of vegetation, and Monsieur de Humbolt has never ceased to recall the necessity of studying its effects, in order to be enabled to judge with any accuracy upon the comparative maturity of plants.

Monsieur de Gasperin, after seventeen years' observations at his residence, near Orange (South of France), gives the following calculations on the spring season in that climate:

Atmospheric Heat.	Solar Heat.	Difference.
12°-0	18°-6	6°-6

In the hope of having been so fortunate as to convey, in such limited space a perception of those principles upon which I have founded my convictions respecting the extraordinary value of our exceptional climate, I presume I cannot more appropriately conclude than by inserting, under the undoubted authority of Lieut. Ashe, R.N., F.R.S., an official statement of the atmospheric heat of our climate in this city.

TABLE *of Maximum and Minimum Temperatures, extracted from the Meteorological Observations made at the Observatory in Quebec Citadel.*—BY LIEUT. ASCHE, R. N., F. R. S.

MONTH.	1861.				1862.			
	Mean Max.		Mean Min.		Mean Max.		Mean Min.	
	F.	C.	F.	C.	F.	C.	F.	C.
	°	°	°	°	°	°	°	°
From 15th to 31st May	62.1	16.7	45.0	7.2	68.4	20.2	44.6	7.0
June	73.3	23.0	51.9	11.0	75.7	24.3	53.4	11.9
July	74.9	23.8	58.5	14.7	73.4	23.0	55.8	13.2
August	72.6	22.5	55.8	13.2	74.0	23.3	56.5	13.6
September	63.7	17.6	50.0	10.0	68.8	20.4	49.4	9.7
From 1st to 15th October	53.1	11.7	42.3	5.7	59.0	15.0	43.2	6.2

NOTE.

The column F. is Fahrenheit Scale.
" C. is Centigrade "

The difference between the Scales may be expressed thus: C = 5-9 (F = 32°)
Total Atmospheric Heat for 1861—3079°—3 Centigrade.
" " 1862—3294°—3 "

These calculations, therefore, demonstrate that we have enjoyed during the season of vegetation in the year 1861 :

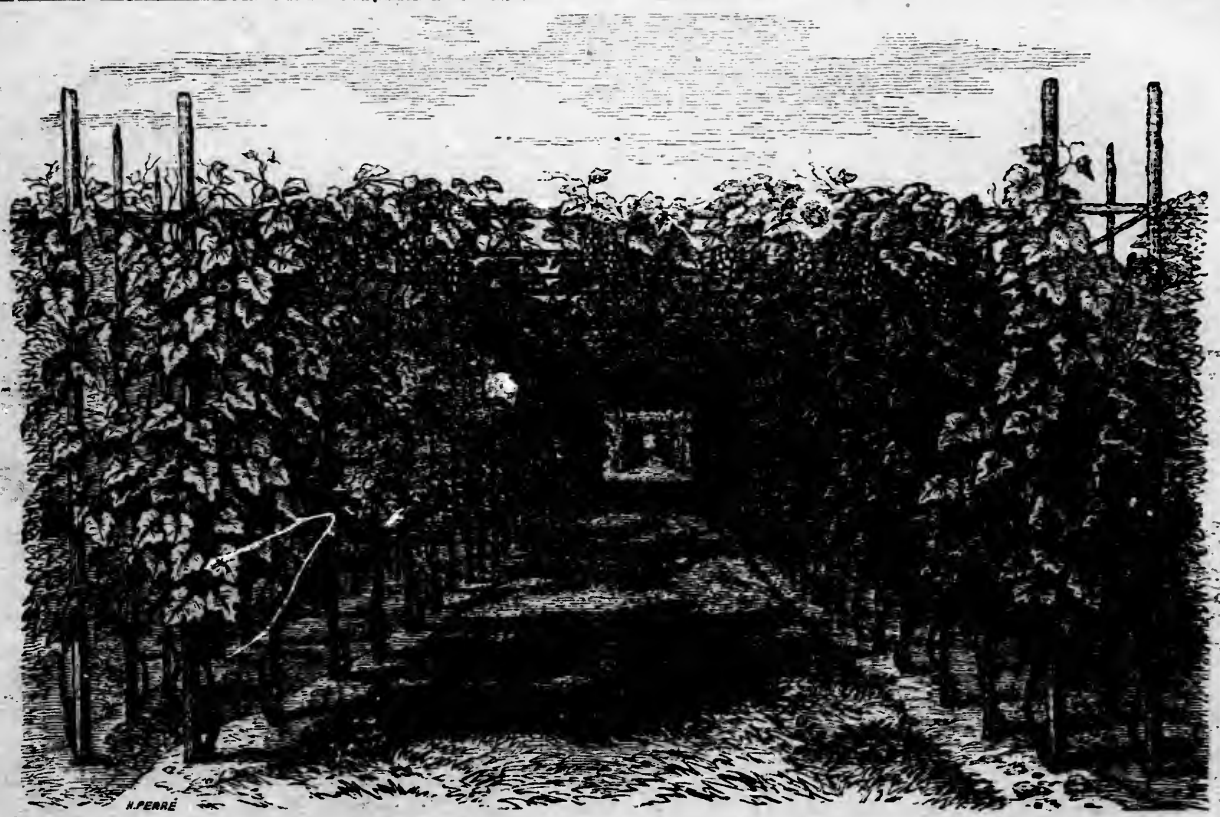
Atmospheric heat	3079.3
Solar heat	1026.4
Total	4105.7

And for the year 1862 :

Atmospheric heat	3294.3
Solar heat	1098.1
Total	4392.4

And Mr. Ashe authorized me to state, that the atmospheric heat at the Citadel was some *hundred degrees* beneath the ordinary temperature of the climate.

Such facts require no comment. They *prove* our climate to be *in the centre of a wine region.*


H.PERRÉ


H.PERARÉ