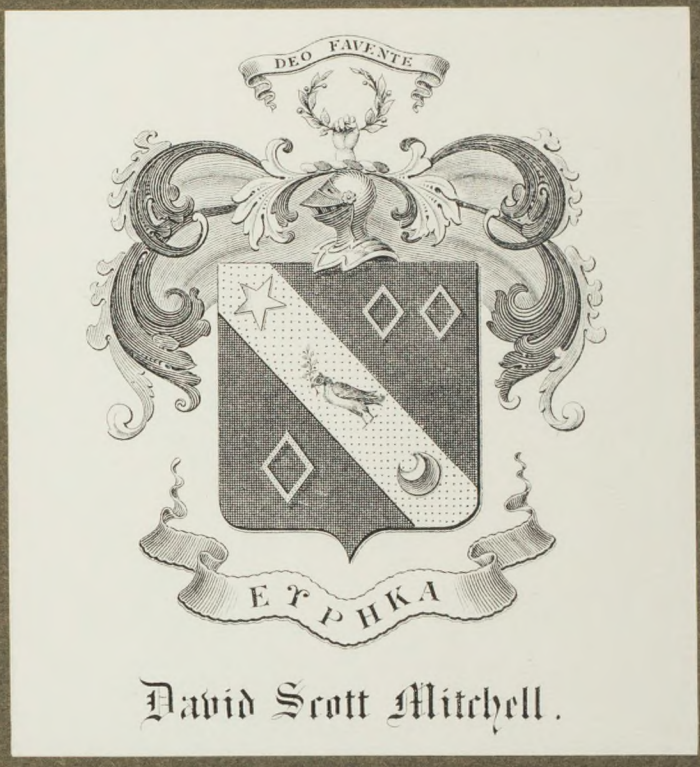

David Scott Mitchell.

Dr. Mitchell

VITICULTURE

AND

WINE-MAKING

IN THE

SOUTHERN DISTRICTS OF QUEENSLAND.

REPORT OF THE UNDER SECRETARY FOR AGRICULTURE.

BY AUTHORITY:
JAMES C. BEAL, GOVERNMENT PRINTER, WILLIAM STREET, BRISBANE.

1889.

VITICULTURE AND WINE-MAKING IN THE SOUTHERN DISTRICTS.

Department of Agriculture,
Brisbane, January, 1889.

Sir,—In reply to your B.C. of the 2nd November, 1888, desiring to be informed what steps could be taken to increase the area under vines and to improve the manufacture of wine, and instructing me to visit the chief centres of vine-growing and wine manufacture in the southern parts of the colony, I have the honour to report that I have visited Mitchell, Toowoomba, Warwick, Ipswich, Pimpama, Coomera, Nerang, and several vineyards in the immediate vicinity of Brisbane.

MITCHELL.

At Mitchell very little has as yet been done in the planting of grape vines. The only vineyard of any importance in this district, so far as I could ascertain, is a small one of about 2 acres, situated in the township, and owned by a Mr. Searle.

Mr. Searle's Vineyard.—I visited this vineyard, and went carefully over it in company with the proprietor.

The township of Mitchell is situated on the western bank of the Maranoa River; the surface is flat, of a siliceous formation, and the soil in Mr. Searle's vineyard is a fair sample of the surrounding district.

Although, as Mr. Searle admits, he is but an amateur viticulturist, he appears to be possessed of a good deal of common sense, and is quite aware that it is not sufficient for the growth of vines to dig a hole and stick a vine into it, or to plough the land shallow and then lay out the vineyard and plant the cuttings. All the ground in this vineyard is trenched to a full depth of 2 feet, the soil well turned up to the weather, and by these means a good crop of fruit has been secured even in dry weather. At the time of my visit his vines looked remarkably healthy, and were heavily laden with fruit. The vines are planted well apart, affording plenty of space for light and air.

In training the vine for fruiting purposes, different growers have adopted different systems, without regard to the nature of the plant. Some adopt the "trellis" system, others again simply tying to stakes; while at one vineyard at Roma the owner, Mr. Twine, has, with some of his vines, adopted what is called the "goblet system," which is accomplished by taking a long fruit vine, bending it round in arch form, and tying it back to the main stem. For convenience in working the ground and keeping it clean, the stake or goblet system is preferable to the trellis; but, on the other hand, a larger quantity of fruit is secured by the latter system. Mr. Searle has adopted the trellis, as it answers his purpose very well with the small area of land he has under cultivation, and which can be easily worked and kept clean.

As knowledge of the nature and habits of the grape vine increases amongst the viticulturists of this colony, it will doubtless be found when viticulture has become a fixed industry that different varieties of vines require different varieties of soil.

In the Mitchell district are to be found different classes of soil—rich, deep loam, scrub land of volcanic formation, and sandy soil well drained, and yet retaining sufficient moisture to develop the fruit even in such a protracted drought as the district was suffering from at the time of my visit.

Although Mr. Searle is but an amateur, he has got hold of the correct idea that by grafting he can increase the hardihood of his vines and secure a better class of fruit. As yet he has experimented with only one vine, but to judge from appearances his graft has been a thorough success.

Grafting is a matter that the viticulturists of this colony cannot too soon devote some time and attention to, for it is a well-known fact that by grafting the more delicate vines on to stocks that have proved themelves more able to resist the diseases that grape vines are subject to in this colony, the better chance there is of securing a crop than by growing direct from the parent stock. And there is another point which must also be kept steadily in view: So far, Queensland has been exempt from the dreaded *Phylloxera vastatrix*. As this disease has already attacked some of the vineyards in New South Wales, it may almost be looked upon as a certainty that at no distant day this disease will visit Queensland; therefore it behoves every viticulturist to commence without delay raising resistant stock on which to graft the weaker kinds, which would be more liable to be attacked by this enemy to vignerons.

Riparia.—This Department was fortunate enough to secure a few small parcels of the *Riparia*, one of the wild vines of America, and distributed them to some of the principal vignerons. This is one of the best varieties of resistants, and will adapt itself to the worst soils; is at home in either arid, pebbly land or strong soil. Some writers in Europe affirm that it is so little attacked by *Phylloxera* that it is able to resist this scourge. Others again believe that although not absolutely phylloxera-proof, it is one of the varieties most able to resist the attack.

MEETING AT MITCHELL.

While at Mitchell I held a meeting of those interested in agricultural pursuits, and after addressing those present, desired expressions of opinions upon the future prospects of agriculture and viticulture in that district. In reply, I was informed that unless some means of providing water for irrigation purposes could be devised, there was little prospect for either agriculture or viticulture.

In nearly every case those who have selected land in this district are men of limited means who are not able to incur the expense of the storage of water by dam-making, or procuring an underground supply by sinking.

Sinking for Water.—If a bore were put down by the Government to test the district, and water was procured, it would be the means of stimulating private enterprise, as farmers and others would then know that by incurring certain expenses they would be sure to obtain water, which, when applied to the land, would speedily recoup them for any expenses incurred in obtaining it.

The Divisional Board at the time of my visit were sinking a well for the supply of the town, but water was not reached before my departure from Mitchell.

ROMA.

At Roma I visited the vineyards of Messrs. Bassett, Bourne, Caddell, Smith, Robinson, Twine, Leach, and Randall.

Bassett's Vineyard.—Mr. Bassett's vineyard is situated about 1 mile from the town of Roma. The soil is of a loose, sandy nature, evidently well adapted to the growth of the grape vine. The area under crop is about 60 acres. Mr. Bassett states that, like many others when first entering upon this industry, he was possessed of very little knowledge of grape vines, or the proper method of laying out a vineyard, consequently, after planting the first portion, he found that he had placed the vines too close together, and the rows also too near to each other—viz., 5 feet between and 4 feet in the rows.

In the second portion of the vineyard planted he improved his system of planting by placing the vines wider apart—viz., 6 feet in and 5 feet between the rows.

More experience was gained by his second planting, the result being that in the last portion planted he adopted what he considers to be the proper space in the Roma district—viz., 10 feet between and 6 feet in the rows.

In preparing the soil for the vines, the land was ploughed in the usual manner to a depth of 6 or 7 inches. This shallow ploughing may be sufficient for the loose sandy soil around Roma, but I am of opinion that even in that class of soil considerable advantage would be gained by a subsoil plough following the first plough, thus bringing the soil under the mellowing influence of the atmosphere, and which would undoubtedly prove beneficial to the grape vines, especially young vines.

Mr. Bassett has adopted the stake system in his vineyard, and having such a large area of ground to work, he is probably right in adopting this system.

Although the trellis system has many advocates, tillage is greatly facilitated with the stake system, by allowing the use of horses in keeping the ground clean, and in stirring up the soil both along and across the rows. The hoe can then be used in cleaning up near the roots of the vine.

I learnt from inquiry that, except in close, muggy, wet weather, the vines in this district are seldom attacked by oidium, and when attacked the fungi gives way readily to an application of sulphur mixed with fine ashes. This freedom from disease is, no doubt, to be attributed to the absence of the humidity which induces the disease in the coast districts. Black spot occasionally appears on the vines, but not to such an extent as to do any serious damage to the fruit.

The average yield from this vineyard is about 2 tons to the acre, making 200 gallons of wine; and as Mr. Bassett has a name for making good wine, he is able to dispose of all he produces without difficulty.

The cellar, which is partly above and partly below ground, is built of corrugated iron in 7 feet 6 inch lengths, with a space of 18 inches filled in with battens to the wall-plate, and covered with corrugated

iron. The building with one part underground is about 36 feet by 40 feet, and attached to the end is a building of the same material, about 50 feet by 24 feet, constructed on the same principle.

No effort appears to be made to keep a regular degree of temperature in this cellar; indeed, from the mode of construction, great difficulty would be experienced in securing a regular degree of temperature in such a building. From what I have ascertained of the manner of wine-making in other countries, there is no doubt that the question of temperature plays an important part in the production of really first-class wine.

This subject is of great practical importance and deserves more consideration than it has hitherto received at the hands of our wine-makers, and may to a certain extent be the reason why so much of the wine manufactured in Queensland has been so far below the standard in quality.

Bourne's Vineyard.—The next place visited was Mr. Bourne's, situated upon Bungil Creek. The soil is much the same as Mr. Bassett's, and a large amount of money has been expended in bringing the place to a high state of cultivation. The vines are well and regularly planted in rows 10 feet apart and 6 feet in the row. This vineyard has been planted about five years. The vines looked healthy, and were fairly well loaded with fruit; but, as in many other vineyards, the vines suffered very much from a severe frost which visited this district as late as the 6th October last.

An attempt has been made at irrigation from a waterhole in the creek. A force pump has been erected, worked by horse gear, the water being pumped into a 400-gallon tank, then run into a barrel, whence it is lifted out in watering-cans similar to those used by the Chinese in watering their gardens. But irrigation carried out on such a scale is comparatively valueless, as the area irrigated—viz., twenty acres—is too large to be successfully treated by such means.

Smith's Vineyard.—Mr. Smith's was the next place visited. He has about 4 acres of three-year-old vines, and has planted 6½ acres this season.

The old vines were bearing well for their age, but it was only by careful and continuous watering from a well on the ground that the newly planted portion was saved during the drought. The soil is very light and sandy, and to judge from appearances would require some fertilising agent, if a succession of crops is to be gathered.

Robinson's Wheat.—At Robinson's, a short distance along the road, I was pleased to find that he had succeeded in growing some of the wheat sent out by this department in the early part of the year, notwithstanding the very dry weather.

The sandy soil of Roma, retaining what little moisture it received, enabled this man to gather a small crop, whereas on stronger land the wheat has been a complete failure.

Robinson has a small area under vines, but they are not so well looked after as in other vineyards.

Twine's Vineyard.—A drive of some 8 miles brought me to Mr. Twine's vineyard, where there are 17 acres situated on the side of a ridge under vines.

The soil is of a very sandy nature, and to all appearances would yield but poor returns, but Mr. Twine informs me that he generally

gathers a very good crop. This year, however, will be an exception, as the late frost was very severe at his place, destroying nearly three-fourths of his fruit. At the time of my visit the vines were languishing for want of rain, and were it not for the retentive nature of the sandy soil there would have been no fruit whatever, and in all probability many of his stocks would have perished. The vines are planted 10 feet by 6 feet. In one part of the vineyard the trellis system has been adopted, and in the other part stakes are used. Mr. Twine has also tried the goblet system with a few of his vines, and is so thoroughly satisfied with it that he expresses his intention to adopt it extensively in further pruning.

Mr. Twine works his land deep before planting, and the appearance of his vines during such a protracted drought proves the wisdom of such a course. His cellar, 24 feet by 20 feet, is a very primitive building, consisting of bark walls and roof, the walls being about 4 feet in height. I am of opinion that such a building is not at all adapted for the making and storage of wine. Mr. Twine has a considerable quantity of wine in stock, small barrels being used in preference to the larger ones in general use in wine cellars.

Leach's Vineyard.—On my journey back to Roma I visited the vineyard of Mr. Leach, which is situated on a ridge, with a fall to the east, west, and north. The soil is a strong, reddish loam of a calcareous nature, and in my opinion, strengthened by the appearance of the vines, this is the best class of soil in the district for the grape vine. The land was broken up with a bullock plough 17 inches deep, harrowed, and then cross-ploughed to the depth of nearly 2 feet. The effect of this treatment tells its own tale, as in no part of the Roma district did I see such healthy vines, and showing such a large crop of fruit. Altogether there are 26 acres under vines, one-half being wine grapes and the other half table fruit.

Some distance from this vineyard, Mr. Leach has 10 acres more planted, making in all 36 acres. No wine has yet been made, the vines being only three and four years old. A large amount of money has been spent on this place, and the owner is entitled to every success.

Although neither an agriculturist nor viticulturist, this man evidently knows how a vineyard should be prepared, laid out, and worked. The vines are planted in rows 10 feet by 6 feet, and the stake system has been adopted. The frost did little injury to the vines, and in a short time this will be a very valuable property.

Harlan's Vineyard.—Nearer the town there is another very fine vineyard, the property of Mr. Harlan, who was from home at the time of my visit, but I went carefully through his vines, which are planted on a sandy ridge, and although suffering from the effects of the frost, give evidence of a large crop. The stocks are about five years old, and looked remarkably well considering the season; careful tillage, no doubt, conducing to this result.

MEETING OF FARMERS AT ROMA.

During the time I was at Roma, I held a meeting of farmers and others in the Town Hall, kindly lent for the occasion by the Mayor, who occupied the chair. After addressing the meeting, and exhibiting samples of raisins prepared by Mr. Spawn, at Melbourne, I invited expressions of opinions from those present, as to what steps could be taken to increase the area under grapes and improve the manufacture

of wine. The following clipping from the *Western Star* gives the gist of what was said on that occasion. Mr. Bassett was not present at the meeting, but subsequently wrote giving his views on the subject, which letter I also append :—

"Mr. John Page said he had been in the colony since 1852, but he thought the Queensland Government had been backward in coming forward to assist the farmers since separation from New South Wales. He considered that the best kind of assistance that could be given would be in establishing some system of water storage. Without that farmers could do nothing. They required a good supply of water so that irrigation of the cultivated land could be brought about. Without water they could not make things grow. It was all very well to preach, but they required practical help in this direction, and it would be a great benefit to the public at large.

"Mr. Alexander Robinson referred to no market being available for either grapes or wine. He himself made excellent wine from black cluster grapes, as good a wine as any produced in any part of the world. One thing required to improve the condition of the farmers and improve the quality of the wine was a wine manufactory. That would help the district as much as anything, for if they had a market or buyer for the grapes or 'must' they could extend their vineyards and employ men to work them. Not only that: they required a distillery where a good marketable brandy could be produced; also a bonded store. The farmers were all poor men, and could not provide these things, but they could grow excellent grapes from which good wine could be made. If the wine industry were established on a sound footing the vignerons would become prosperous and Roma would grow into a big city. At present the farmer got nothing for his crop after the charges for sending to Brisbane were paid, and the best thing he could do was to make a few barrels of good wine for himself and get drunk. They all knew that in favourable seasons there was not a better district in the country for wheat-growing. As to the storage of water, they could not expect the Government to sink a well on every selection. But the Government had helped the sugar industry by enabling sugar-growers to start central mills. Why should not help be given in a similar way to the wine-grower?

"Mr. Bing thought that so far as a central wine-making company was concerned the farmers and residents of the district had an opportunity offered them to help themselves. He held in his hand a prospectus of such a company, and if the people here would only come forward and take up 2,000 or 3,000 shares work would be begun almost immediately, and the affair would be bound to be a success. There was nothing to prevent a really good return for the outlay, and such a company would advance the interests of vignerons and the townspeople generally better than anything else he knew of. Already some 7,000 or 8,000 shares had been arranged for disposal to people in Brisbane, and if the people here would show some confidence in an undertaking calculated to be of so much benefit locally the company would be carried to a successful issue. He hoped the residents here would lose no time in applying for shares. If they once got a wine company at work there was no reason why they should not also make brandy and dry grapes for raisins as well. If the proper description of grapes were grown they could make as good raisins here as in America or Victoria.

"Mr. Shorman said that not many vines were suitable for raisins, but they wanted the wine company here. It was unfortunate that through bad seasons and the want of a market for their produce the farmers here were just now so poor. If they were better off the shares of the proposed company would be much more readily taken up. If the company could be formed and be got to work this year it would do more to advance the interests of the district than anything else.

"Mr. Twine said he understood the Government was desirous of assisting as far as possible in increasing the area under vines and in improving the

quality of the wine. No doubt if the Government could assist by facilitating the formation of the wine company it would be done, but the company would be formed if the people here would only put their shoulders to the wheel. He strongly urged the people of Roma to take up shares. It depended upon them whether the company was floated or not. As to Mr. McLean's visit, he thought the farming industry might be benefited by the department starting experimental farms in various districts; not model farms, but farms where new descriptions of plants would be raised. And these might be developed into training schools for the youth of the country who intended to follow argicultural pursuits. In Victoria large sums were voted by Parliament as bonuses for raising agricultural products, and he advocated a similar policy here. Mr. Twine referred to the inadequate number of trucks suitable for carrying fruit to Brisbane, and said one such truck should be attached to each train. He also advocated that better facilities should be provided by the railway for sending fruit to New South Wales and to the westward. It was not because there was no market that so many tons of grapes had in past years rotted on the ground. It was because of the want of means to get the fruit to the railway. The Government had reduced the freight on grapes from 56s. to 17s. per ton, and he thought all had been done in that direction they could expect. Mr Twine concluded by referring to bores for artesian water, which he thought might very properly be entrusted to the divisional boards.

"Mr. Lister said that although the drought had been very bad, some of the farms near the Minmi were looking very well. There was no doubt something else should now be done to develop the resources of the district, and when the wine company was established there would be a good future for Roma. He thought artesian bores might be put down by the Government in central places, and a charge made to farmers on a sort of time payment system.

"Mr. McLean said he was very much pleased to find so much interest taken in agriculture in this district, and expressed his thanks to the farmers for having attended the meeting. That was the largest meeting of farmers he had met, and it was a pleasure to him to meet them. He proposed a vote of thanks to the Mayor for presiding, which was carried amidst loud cheers."

Wine Company.—In support of what was stated by some of the farmers about the formation of a wine company, I have not the slightest doubt that such a step would be a complete solution of the difficulty under which the grape-growers at Roma are labouring. Firstly, farmers as a rule have not sufficient money at their disposal to purchase the proper appliances and for the construction of proper cellarage to carry on successfully the industry in which they are engaged. Secondly, they are not able to afford to be out of their money long enough to allow their wine to mature, and to place a superior article upon the market.

Pasteurization.—Doubtless by the discovery of M. Pasteur, of Paris, wine can be matured, or at least all the qualities of matured wine can be imparted by the process called "Pasteurization" in a comparatively short time, but as certain apparatus are required in carrying out this process, the question of money is again raised. By the establishment of a company the grower would find a ready local market for his produce. The company being in the possession of means would be able to purchase and bring to bear all the most modern appliances, aided by the scientific knowledge necessary in the manufacture of wine, and could also afford to keep it long enough to properly mature.

There cannot be a doubt that the chief reason why colonial wine has not hitherto been in favour has been in consequence of the very inferior article placed before the consumer.

In dealing with this subject a great many points have to be taken into consideration, as certain conditions affect more or less the composition of wine, such as the soil, climate, mode of cultivation, weather during the particular season that the grapes were ripened. Thus the same varieties of grapes grown under different conditions of soil, climate, &c., produce different wines, and even in the same country the same variety of grapes produces wines varying considerably in different seasons.

The vignerons of Queensland have not had sufficient experience, or have failed to take sufficient interest to consider the points, and it will only be by some educational system inaugurated by the Government that the vignerons will be made alive to their own interests, and to the importance of the industry in which they have embarked.

TOOWOOMBA.

At Toowoomba, and more especially in that part of it called the "Middle Ridge," is about the only part of Queensland where the principle of intense culture is carried out. The farms are all small, from five to ten acres in extent, and in the absence of irrigation, these small areas prove, I believe, very profitable to the cultivators. The majority of the farmers are Germans, and nearly all of them have some land under vines, varying in area from half-an-acre up to 10 acres.

The soil is very rich, of volcanic formation, and in almost every case where vines are growing it has been trenched to a depth of 2 feet, and kept remarkably clean and free from weeds. Oidium and black spot attack the vines, owing, doubtless, to the humidity of the atmosphere, there being occasionally heavy fogs, but as the land is kept so clean there is little difficulty in keeping the disease under proper control.

A large variety of vines are grown in this district, and, in some places, in rather limited areas In one case, I was informed by the proprietor of a farm that he had 160 varieties of vines growing in 10 acres, and in another case, in 3½ acres there are forty varieties of American vines, in addition to a goodly number of European types. This mode of cultivation is, I am convinced, a mistake, as there is no part of the world where it would be possible to make such a large variety of vines thrive in a given district and in a given area.

Although the grape may be said to flourish in Toowoomba, it will never be a first-class wine district, so that it would be wise if those farmers who are determined to devote their land to viticulture would select a few varieties of the types which thrive best, discard all others, and thereby profit considerably by their action.

A mistake has been made by the viticulturists of Toowoomba in planting their vines too close, in some cases not more than 3 feet by 3 feet, in others not more than 4 feet by 4 feet, and seldom are they placed wider apart than 5 feet by 5 feet. When asked why they planted so closely, the answer invariably was because they are planted the same distance apart in Germany. They have not yet learned that a difference of soil and climate demands a different mode of treatment.

Notwithstanding the small areas under cultivation, the people appear to be in comfortable circumtances, with good houses well

furnished, the necessary outbuildings, with very often a buggy house and buggy. I visited a number of these vineyards, but as they closely resemble one another, I will only particularise one or two as a type of the whole.

Bayer's Vineyard.—Mrs. Bayer has an area of 10 acres under crop, part of which was laid out twenty years ago; the land was trenched 2 feet deep, and the vines planted 4 feet by 4 feet. The stake system is adopted; the vines look healthy, with a fair average crop of fruit, which would probably have been better, had there been fewer varieties, and only those best adapted for table and wine making been grown. The bulk of the fruit is made into wine, for which there is a ready market in the colony, some of it being sent to the Northern ports. Mrs. Bayer has the proper appliances for making wine, with a good cellar, and every convenience for storage.

Herzer's Vineyard.—Mr. Herzer, 3½ acres. This land was broken up 14 inches deep with a German pronged hoe and planted about 4 feet by 5 feet. There is not a sign of a weed to be seen in the whole vineyard, and the vines are remarkably healthy and heavily fruited. He sells as many table grapes as possible, making the balance into wine. The vines are all staked, of which there are no less than forty varieties of American vines, besides of many European types.

Kean's Vineyard.—Mr. Kean has about 3½ acres under vines. The soil is trenched 2 feet deep, is very gravelly, containing a large percentage of ironstone. Fair average crop, but showing signs of disease, which is owing to the bad state of the health of the proprietor, who is not able to look after the place. Good wine must have been made from this vineyard at one time, as Mr. Kean holds a certificate of merit and a medal for wines, gained at the Colonial and Indian Exhibition in London.

As the oidium makes its appearance, the sulphur bellows are kept at work and the disease brought under.

Besides being an important grape district, Toowoomba will, before long, produce large quantities of apples, pears, plums, figs, and peaches. These can all be produced in large quantities, and of as fine quality as in any part of the world, and therefore it is a mystery why these fruits are imported from California when they can be grown equally well here.

WARWICK.

In the Warwick district there are a few vineyards, but comparatively little has been done in the way of viticulture, but this will ultimately be, without doubt, one of the best wine-producing districts in the colony.

Kircher's Vineyard.—The vineyard of Mr. Kircher, one of the oldest in the district, is situated about 10 miles from the town of Warwick, and consists of 10 acres of deep sandy loam, very free and easily worked. The land was ploughed and subsoiled to a depth of 18 inches. Three different styles have been adopted—trellis, stake, and bush forms. He has confined himself to a few of the best wine-producing varieties (*vide* list at end of report), and has profited thereby. A large quantity of wine is made every year, part of which is exported to Scotland. This is the only case that I came across in which the

viticulturist exported wine from Queensland to Great Britain or Europe. The manufacturing appliances are very complete, the cellarage accommodation being most ample. The cellar, which is of stone, consists of three flats; on the top flat the pressing and straining is carried on; the wine is then drawn off into large casks on the second flat, where it is allowed to ferment, and finally it is run into large casks on the bottom flat, which is below ground, where it matures and is bottled off.

The oidium is kept in check by sulphur used three times in the season.

Tetzel's Vineyard.—Mr. Tetzel has about 20 acres under crop, about 2 miles from the town.

Mr. Tetzel's vines are much younger than Mr. Kircher's and look remarkably healthy. He has also a very complete wine manufacturing plant.

Sterling's.—I was much interested in visiting a small area of half-an-acre planted two years ago by Mr. Sterling on decomposed granite. Although only two years old, the vines had a large quantity of first-class fruit, showing clearly that this class of country was well adapted to the growth of the vine. This is the first instance I met with of vines growing upon a granite formation, and I would point out that some of the most celebrated wines of France are produced from vines growing upon such a formation—viz., Côte-Rotie, Rousillon, and Hermitage.

Judging from appearance, and the fact that the climate of Warwick is well suited to the growth of the grape, I am of opinion that a large area of the granite country could be profitably utilised for grape culture.

Mr. Beresford Hudson, of Rosehill, near Warwick, has a considerable area under table grapes, which he intends to grow, as I am given to understand, for the supply of Brisbane and other markets.

IPSWICH.

In the Ipswich district little attention has been paid to the grape vine, but there is an old and important vineyard established on Warrill Creek, about 5 miles from the town.

Irwin Bros.—This property is owned by Messrs. Irwin Bros., and a large quantity of wine is annually made there, the bulk of which is shipped to the Northern ports. The vineyard consists of 28 acres, in which the chief varieties grown are Hermitage, Black Spanish, Tinto, and Solferino. The soil is a deep black loam containing magnesia, lime, and iron, three important constituent elements in the production of good wine. The land was broken up with a bullock plough, with eighteen bullocks, after which followed a subsoil plough, giving a depth of 18 inches. Drains 35 feet apart form an important factor in this vineyard. The vines are planted 5 feet by 5 feet, and are trained to a wire trellis. The past dry season has militated greatly against the fruiting; still there is a fair crop, which only requires a continuance of dry weather to ensure a good output of wine. Mr. Irwin reckons that in a fair average season he makes 300 gallons of wine to the acre.

There is large cellarage accommodation on this vineyard—the largest, I believe, in the colony; and also a small distillery for the manufacture of spirit from the refuse of the grapes.

Notwithstanding that the Warrill wine has a good reputation, and a ready market is found for all he can make, Mr. Irwin is of opinion that wine-making will never be a profitable or successful undertaking on the coast side of the Main Range, and in this he is supported in his opinion by men of experience in Toowoomba, who doubt that even in their district a really first-class wine will be produced, the climate not being dry enough.

This season being so dry, little oidium has appeared, but in a close, wet, muggy season sulphur has to be resorted to.

BEENLEIGH, &c.

In that portion of the colony south of Brisbane, embracing Beenleigh, Pimpama, Coomera, and Nerang, comparatively little has been done in the way of grape-growing, either for wine-making or table use.

Cox's Vineyard.—The only place of importance is that of Endcliffe Vale, owned by Mr. C. W. Cox, and situated near to the township of Pimpama. The vineyard consists of 24 acres. The vines are planted on a poor stony ridge, which must have cost a large amount of money to break up to a depth of 12 inches. The varieties grown are chiefly black and white Hermitage. The rows are 8 feet apart, and the vines are planted 4 feet apart in the rows. The land is drained every 30 feet by stone drains 4 feet deep. The vines are trained to a trellis composed of three wires and about 4 feet high, and notwithstanding that the vines are very subject to oidium, and require constant care and attention, there was a really good show of fruit at the time of my visit. The land is carefully cultivated and free from weeds. The cellar, which is a fine one, is a double building of wood with iron roof. The walls are about 16 feet high, and admirably adapted for the purpose. The fruit is passed through rollers, and then run into the must vat, whence it is drained off, and put into large 1,000 gallon barrels or tuns, which were made on the premises, of American oak, imported by Mr. Cox. Everything here is complete, perfect and clean; but the owner complains that he is unable to sell his wine, which is probably owing to the bad reputation that colonial wine has acquired, though I am informed by judges that the Endcliffe Vale wine is very superior.

Batten's Vineyard.—At Nerang, Mr. Batten has about 5 acres under grapes, chiefly of the Isabella varieties, and makes a small quantity of wine. The soil is a black alluvial on the river bank, and produces a large quantity of fruit, but is not adapted to the production of a first-class wine.

BRISBANE.

In the Brisbane district a number of vineyards have been established, and in the earlier days a considerable quantity of wine was manufactured; but as population in the metropolis and the surrounding suburbs increased, and a market opened up for the sale of grapes, less wine was manufactured, it being found more profitable to dispose of the grapes for table use, and again, as the demand for residence areas increased, some of the vineyards have been cut up into allotments and sold for building sites. The principal vineyards still under crop are those of Messrs. Pullen, Gerler, and Childs.

Pullen's Vineyard.—Mr. Pullen's vineyard is situated on the bank of Kedron Brook, near to the Bunya timber reserve, about 5 miles from the town.

The area under vines is about 16 acres, partly table and partly wine grapes; a considerable number of Iona stocks are to be found in this vineyard, but the fruit is not in favour with the public. It is in reality a first-class table grape, and Mr. Pullen thinks that the cause of the prejudice against it is its colour. The public seem to think that grapes should be black or white, whereas the Iona is a red grape. There was a large crop of fruit upon the vines, but as the oidium is very bad in this locality, constant care is required to keep the vines free, and a large quantity of sulphur is used for this purpose. The soil is a deep black loam, very free and easily worked. In a dropping season the scarifier has to be kept constantly at work to keep down the weeds.

Until lately Mr. Pullen made some of his grapes into wine, but as he found a difficulty in disposing of his product, whilst on the other hand there is a ready market for all the table grapes he can grow, he has therefore abandoned wine-making, and is devoting all his attention to supplying the market with table grapes.

Gerler's Vineyard.—Mr. Gerler's vineyard—one of the oldest in the colony—is situated near Nudgee, about 4 miles from town. The area under vines is 15 acres, the soil siliceous; the ground is trenched 2 feet deep and well drained with timber placed thus ⋀. The bulk of the vines are of the Isabella variety, with a few sweetwater and white Portugal. One stock of the Isabella variety is over 12 inches in diameter, and in one season carried over 2,000 well-formed bunches of fruit. Until lately wine was made on this property, but for the same reason that influenced Mr. Pullen it has been abandoned, and the cultivation of table grapes only carried on.

Mr. Gerler says that with the exception of a few of the early varieties, such as sweetwater, which he sends into town, he can sell the bulk of his crop to hawkers, who come and buy from the vine.

Childs's Vineyard,—Mr. Childs's vineyard and wine manufactory is situated near Nudgee, 9 miles from town. He has 20 acres under vines, and suffered considerable loss before he could get a few distinct varieties to succeed upon his land. Being so near the sea, and the land comparatively low, his vines suffer from repeated attacks of oidium, so that he has to use large quantities of sulphur to keep the disease in check. The soil being loose and gravelly, is well adapted to the growth of the vine, were the other conditions equally favourable. The varieties he finds most suitable are the Pineau, Hermitage, Iona, and Isabella. The whole of his crop is made into wine, besides which he purchases grapes for wine-making, and finds a ready market for his product. In addition to the usual class of wines, he has entered upon the production of a champagne, for which there is a great demand. His cellars are commodious, and his appliances for wine-making good, though not equal to some vineyards that I have visited. In addition to grapes, Mr. Childs grows large quantities of oranges, persimmons, and other fruits.

The time at my disposal prevented me from visiting anything like all the vineyards in the southern portion of the colony, but those I have visited and which I have instanced in this report are fairly representative of the whole.

Soils from Roma.—When at Roma I secured several samples of soils from different parts of the district, which I forwarded to the Government Analyst for analysis, but up to the time of writing this report no information of the analysis has come to hand.

The question of increasing the area under vines naturally brings up the law of supply and demand.

In a colony with a comparatively small population and a fairly large area under vines, no doubt there are many who are not able to find a market for their grapes, and who may argue that the present area is quite equal to the demand, but from information derived during my visit to the different districts I have arrived at a different conclusion. I believe that by the use of more energy, and a more careful appreciation of their industry, the viticulturists of Queensland could find a market for at least double the present production.

Without doubt, during the height of the grape season the fruit is sold in the Southern markets at a very low figure, but there is a very large demand in the North which has not yet been met by the Southern vignerons. There are, however, some causes for this, to which I will refer later on. In nearly every instance I was informed by the viticulturists whom I questioned upon the subject, that a market could easily be obtained for all the wine they produced, and in some cases they were compelled by the demand to dispose of their wine much sooner than they wished, and thus were not able to allow their wine to properly mature; I therefore conclude that there are no heavy stocks on hand. Some viticulturists, however, complain that they are heavily handicapped by railway freights and charges.

In addition to selling grapes for table use, and producing wine, raisins—of which a very large quantity are annually imported—could easily be produced in Queensland. The muscatel grape, from which raisins are chiefly made, grows well here, and by the introduction of Spawn's evaporating process, by which grapes are converted into raisins in eight hours, there is no reason why we should not grow our own raisins instead of importing them, the importation of which alone during last year amounted to 80,000 lb.

The sultana, a seedless variety of grape, succeeds over a larger area than the muscatel, and should be extensively planted for raisin purposes. In California at the present time wine vineyard property is not easily disposed of, raisin property now growing into favour with investors.

As a means of increasing the vine area, I would point out that the town common at Warwick, with an area of 16,000 acres, is of little intrinsic value to the people as it now stands, but would be rendered of great value if, say, 10,000 acres were resumed and surveyed into 80-acre farms, leaving sufficient areas at two or three points for township purposes, thus carrying out to all intents and purposes the Village Settlement Scheme. From what I have seen of the Warwick district, I am of opinion that this will be one of the best grape-growing districts of the colony, and a large number of farms would be quickly taken up and planted with vines.

Application is constantly being made at this office for information relative to village settlements by persons wishing to select, and dissatisfaction is often expressed that the majority of the settlements open to selection are so far from railway communication and markets, thus precluding selectors from taking up the land, as the small area

allowed—viz., 80 acres—is not enough to support a family at so great distances from market; but here in the vicinity of Warwick, with a railway and market close by, a successful grape-growing settlement could be established, which would prove a permanent benefit to the town.

I am of opinion that the importance of the vine industry would justify the Government in appointing an expert, who would be able to deal with the whole question of grape-growing and wine-making. A great number of the farmers of Queensland know little of agriculture, but a large proportion of the viticulturists know less of the nature and habits of the grape vine. An expert such as I have referred to would form part of the staff in connection with a School of Agriculture, which should be established at as early a date as possible, and which should have a viticultural laboratory in connection therewith. The school would be combined with a farm for practical teaching, and would soon become self-supporting.

At the present time railway freights militate greatly against the grape-growers, in support of which I would refer to Mr. Bassett's letter appended hereto. But one phase of the subject has evidently been overlooked by Mr. Bassett. I have before referred to the Northern market for grapes. Mr. Bassett informed me that if he could get pine sawdust carried at anything like reasonable rates he could pack large quantities of grapes and ship them north, but the railway freight on sawdust is so prohibitory that he had to abandon the idea. No doubt there are many others who would avail themselves of this market, did they see a reasonable margin for profit.

Although not strictly within your instructions for this report, but which has direct relation to existing vineyards, is a question which I would bring under your notice—viz., the danger of an invasion of *Phylloxera vastatrix*. The only Act bearing upon the subject in the Queensland Statutes is "*The Grape Vine Diseases Act of* 1877," 41 Vic. No. 15, but this Act deals only with the importation of diseased vines. No matter how strictly the Act is enforced, and supervision over the importation of vines carried out, there is still great danger to be guarded against. It is already in New South Wales, and the experience of Californian viticulturists proves that the winged female has been blown across high mountain ridges, and hitherto clean districts have by this means been infected. In view of such a danger I would suggest that a Bill be introduced into Parliament making provision for vineyards attacked by this pest being rigorously dealt with.

The subject of improving the manufacture of wine presents many difficulties. Notwithstanding that nearly every wine-maker professes to make good wine, the public verdict is that a large quantity is very inferior in quality. One reason for this is, I think, a want of knowledge of the proper variety of grapes to be grown to produce first-class wine; another, the suitability of the soil and climate to the production of a first-class article; another, want of proper cellarage accommodation, and also the want of care and caution during the time of fermentation; and, in addition, that a great number of those engaged in the industry are not in a position financially to wait until the wine has properly matured.

As a means in the direction of improving the manufacture of wine, and spreading information as to the proper varieties to be grown in each district, I am of opinion that viticultural associations should be

established in grape-growing localities. Every well-established community should form and perfect such organisations for mutual support and advantage. The meetings of such local societies afford opportunities for the interchange of opinions and advice, and enable every member to follow his calling in a more systematic manner and with increased intelligence. Such associations being established, the Department of Agriculture would be able to inaugurate conventions, where all the branches of the industry could be brought together, and from which much sound opinion and information would be evolved.

In every vine-growing portion of the world great interest has been taken by the various Governments in viticulture.

Viticultural sections have been established in connection with schools of agriculture and agricultural colleges. If these institutions have been found a necessity in countries where the vine has flourished for centuries, and the people trained for generations to their special business, how much more necessary is it in a young community such as this, where the large majority of the people engaged in the industry have entered upon it without any previous training, and who are not ashamed to acknowledge that they are feeling their way in the dark, that a similar institution should be established here!

I have already alluded to the establishment of a wine-making company at Roma, and I again repeat that I believe that this is a step in the right direction for the production of first-class wine. On the principle that everyone who has a cow thinks that he can make the best butter, so everyone who has a few grape vines has an idea that there is no difficulty in turning out first-class wine, or, as one person said to me, "I cannot see that there is any secret in wine-making," and yet the great bulk of the colonial wine in the market is pronounced by the consumer as being not fit to drink. The establishment of butter factories has been the means of placing a better article on the market, which commands a higher price than that produced by the farmers; so in like manner would a wine company improve the quality of the wine, and also provide a ready market for the grape-grower.

The following papers and letters appended herewith, which were received by me upon the subject of this report, are forwarded for your consideration:—

1. Letter from Mr. Bassett, Roma, relative to railway freights.
2. Letter from Mr. C. W. Cox, of Pimpama, relative to license fees.
3. Manuscript of pamphlet on wine-making written by Mr. H. Tardent, of Roma, which I would suggest be printed in pamphlet form for distribution.
4. Schedule of varieties of grapes grown in the Roma District.
5. Schedule of grapes grown in Warwick District.
6. do. do. Toowoomba.
7. do. do. Ipswich.
8. do. do. Brisbane.
9. Return showing area under crop in 1887 for wine, table use, and unproductive, and showing the production of wine and table grapes.

I have, &c.,
PETER McLEAN,
Under Secretary for Agriculture.

The Honourable Secretary for Public Lands.

1. Letter from S. S. Bassett, Roma.

"Roma, 25th November, 1888.

"Dear Sir,—Not having attended your meeting, I will make my suggestions in writing—that is, the lowering of the freight on colonial wine. It is the principal product of the district, and the freight at present is £7 a ton. Now, it would be very convenient for myself and many others to sell our young wines if an opportunity offered at from 2s. to 3s. a gallon, but if we sold at these prices and paid 8d. a gallon freight, and often the cask has to be given in—then there are other charges for commission agents, &c.—that you can see plainly enough there would not be a great deal left for the producer after all these charges are taken from a price such as 2s. or 3s. a gallon; and if wine has to be sold young, that is to say, twelve months old, it must be sold at the price above mentioned, for neither a consumer nor a speculator would give more for it in its rough and raw state. And if our vine and wine trade is to be encouraged the freight should be made consistent with the price the article will fetch in its raw state, for there are many people here who could make wine greatly to their advantage if they could only sell it within the following twelve months; and if you will suggest a considerable lowering of the freight, such as would be consistent with the price the wine would fetch, you would be improving the interests of all concerned in the vine and wine trade, and in the course of time, when people find a sale for their production in wine, as well as at present in grapes, a growing increase of trade in both wine and grapes must follow. Hoping you will view the matter as I do, and do your best to further our interest in the direction suggested,

"I remain yours truly,

"S. S. BASSETT.

"P. McLean, Esq."

"P.S.—Brisbane people grow grapes and make wine as well as we do—they have neither to pay freight nor commission agent—and if we are handicapped to the extent of 1s. a gallon, where are we? It looks as if we would be all behind, and in the wrong place.—S.S.B."

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2. Letter from C. W. Cox, Pimpama.

"Sir,—On your recent visit to my vineyard you were kind enough to say that any suggestion on viticulture I might make you would be glad to hear.

"In the first place it is an industry that requires capital, to purchase and prepare the land, drain, plant, and purchase vines. It takes three years before the vines bear, and three years for the maturing of the wine—the expenses going on all these years. I find my expenses in the cultivation of twenty-six acres amount to £500 per year. Any season you are subject to violent hailstorms, which may destroy any returns for that year. It therefore requires the cheapest labour, like the sugar industry, to carry on this industry. You require to be ever watchful. As an example, this morning on going my rounds I found one vine thick with oidium; on calling the attention of the chief man to it, he remarked, 'There are millions of yellow bugs on this patch, which must have settled since yesterday.' Enough to destroy the

entire twenty-six acres in a very short time if not attended to at once —destroying them with kerosene. Another great drawback is the £10 license to sell wine. The license is seldom continued the second year.

"In the other colonies the license is from £1 to £2, thereby encouraging this industry. Why should not storekeepers be allowed to sell a bottle of wine if needed, as in England?

"Unless every assistance is given by the Government to the wine-maker, I am afraid it will prove unproductive, and therefore not entered into.

"Yours faithfully,

"CHAS. W. COX.

"Mr. P. McLean, Under Secretary for Agriculture."

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3. MANUSCRIPT ON WINE-MAKING, WRITTEN BY H. TARDENT, ROMA.

"DEAR SIR,—In spite of the difficulty of expressing technical matters in a language of which I have but a very imperfect knowledge, I will try, in compliance with your request, to formulate some practical hints on wine-making, trusting they may be of some use to such of our farmers as have embarked in vine-growing without previous training in this branch of agriculture.

"Let us suppose a selector having several acres under vines and wishing to transform his crop into wine either for his own use or to increase his income by selling some gallons of palatable wine.

"The first thing to be done is to build a slab or bark shed, with a wooden or bark roof, and so constructed as to be easily ventilated during the heat of the day and protected against currents of cold air during the night. If your means and the site at your disposal allow you, it is better to dig a deep underground cellar, sufficiently dry and ventilated to prevent the formation on the walls and casks of fungus and mould, even in the wettest season.

"The next thing is to obtain some casks, new if possible, and made from oak; if not, casks which have been used for French wine, spirits of wine, or brandy will do. Rum, whisky, or beer casks are unfit. Take care to ascertain that they have a sweet smell. If they smell foul or mouldy, on no account use them, for it is very difficult to get rid of the smell, and your wine will get spoiled.

"Wash your casks well, first with cold water, then with boiling water, into which put a handful of common salt and rinse again and again until the water comes out perfectly clean. A little sulphuric acid diluted in cold water, peach-tree leaves, or lees are also very useful in taking away the bad smell of casks and cleansing them of any germs of disease they may contain. After having rinsed the casks thoroughly, let them drip and put in the bung. Burn sulphur only in those casks which have to remain a long time unused, or in which you will put made wine for keeping or for sending away. Sulphuric vapours mixed with young must would stop the fermentation and give to the wine a bad garlic taste.

"Your casks clean inside and out, put them in your shed or cellar on strong firm beams, say at 1½ feet from the ground, so that it will be easy to place under the tap a pail or bucket. Leave also a space between the casks and walls to enable you to go round in case of leakage.

"Now you want a press. I give here the rough sketch of a simple wooden press without vice, which may be easily made at home, and which was used successfully during the early days of the colony of Swiss vine-growers at Shabag, in Bessarabia.

"It consists of two cross-beams, 4 feet in length, 3 inches by 6 inches; on them lay two long beams from 15 to 20 feet and 4 x 4 inches, one end of them projecting at least 2 feet beyond the cross-beams. Mortise through beams and cross-beams four upright posts (4 x 4 inches), two of them 5 feet long, the two others 10 feet. At the top, mortise again a cross-beam, thoroughly strengthen and brace the whole with wooden wedges at both ends. Then a long lever of strong flexible wood is fixed with an iron bar about the middle of the shortest posts, whilst the other end of the lever is pressed down by means of a rope coiling round a common horizontal windlass, working underneath the projecting sides of the long beams. On these latter, near the axle of the lever, put a wooden shelf and on it a strong wooden box, full of holes, in which you press your grapes covered with little planks and wooden blocks.

"*Gathering.*

"When all this is ready, begin your vintage, taking care not to gather the bunches when wet from dew or after rain, and also not before they are fully ripe. Put your left hand under the bunch to prevent the falling of berries, and with your right hand cut the stem with a sharp knife or ordinary scissors. Pick up the unripe or unsound berries, and put them in a distinct pail to make vinegar of, and place the sound ones in a pail or basket, taking care not to crush them in the vineyard. Do not forget to pick up the over-ripe berries which have fallen to the ground, for you would not only reduce the quantity but also rob your wine of its best elements.

"*Fermentation.*

"The fermenting process, which troubled for long centuries the learned of all wine-producing countries, was completely elucidated some ten years ago by the celebrated French scientist, M. Pasteur. His remarkable experiments have clearly demonstrated that fermentation is produced by the action of microscopic animalculæ (*Micoderma vini*). Those tiny and interesting beings are to be found on the bloom of the berries and on the stalks and leaves of the vine. When placed in favourable conditions of heat and atmosphere, they come to life, multiply with incredible fecundity, eat the sugary matter, excrete alcohol and carbonic acid, and then, like other microbes, being unable to live in their own products, they die and fall to the bottom of the liquid, whence they have to be racked off, together with some remaining albuminoid matters and other impurities. The other constituent parts of the grapes dissolve and combine in the alcohol, forming the product known as wine, more or less good according to the quality of grapes used and the perfection of the chemical processes. I have taken the trouble to compare some fifty different manners of making wine, and have always found that the empiric methods used in the celebrated vineyards fully bore out M. Pasteur's inferences, whereas, wherever fermentation was badly performed, there were some failures in the conditions indicated by Pasteur.

"I must apologise for intruding this little bit of theory amid

practical hints; but it seems to me that the more a man understands the why and wherefore of what he is doing, the better he can overcome the difficulties and find out the cause of his failure.

"*White Wine.*

"The grapes being brought as yet uncrushed from the vineyard, you pass them through a roller crusher, if you have one; if not, you may use a common corn-sheller, or simply, as it is yet being done for the best *crus* of France, you may thresh them in thin woven bags, with naked feet thoroughly washed. Then take a perfectly clean fork and stir the mixed mass over and over again to aerate it well: for the fermenting agents, the oxygen of the air, have to live. Now rack off the must by filtering it through a sieve or basket, to prevent the falling in of skins and pips, which would be very injurious to wine if fermented with it; and distribute the must in equal parts among your casks. This done, put the murk at once on the press and press gradually—say, from three to five hours—and distribute also the press must in equal parts among the casks, leaving about 4 inches empty for the working of the fermentation, and then leave it to itself.

"If you succeed in having an equable and moderate temperature, which may be attained by putting on the casks wet bags when the heat is too great, and woollen blankets when the nights are cold, the wild fermentation will set in in about twenty-four hours. Do not fill up the casks while fermentation is going on, as many people here do, for not only much wine will be lost over the bung-hole, but it will spread over the casks and floor, and form there plenty of nests for acetic fermentation. Moreover, you rob your wine of its bouquet, as you may easily ascertain by rubbing in your hands a little of the rejected scum and putting them to your nose, when you will perceive, even better than in the made wine, the finest smell of the kind of grapes used. If nevertheless you wish to fill up the casks, to have your wine clarified a little sooner, do it with wine fermented to the same extent as that which is in the cask, and not with fresh must, for this latter will never be thoroughly fermented, and will give a sour-sweet liquid—well known here—much more like sugared vinegar than sound wine.

"When the boiling (wild) fermentation is over, put on the bung-hole a bit of thick blotting paper with a brick over it, or a little bag of sand. Begin the filling-up—at least once a week, and with wine—only when the tumultuous fermentation is over. After three months, more or less, on a nice cloudless day, rack off into well-washed and sulphurated casks.

"*Red Wine.*

"The manufacture of red wine is a little more complicated, for here you want the colour, contained in the skin of the berry, and also the tannin. Therefore, after having crushed the grapes as for white wine, put them in a standing vat, or, for want of it, in a cask from which the head is taken away. If you leave all the stalks your wine will be coarse: if you remove them entirely, as is wrongly done in many Australian vineyards, the wine will be deficient in astringency and not keep well. My practice is to remove from a half to two-thirds of the stalks, according to the kind of grapes, and the result was always a good one. If you have not a grape-picker (egrapoir), the removing of stalks may be easily done by rubbing the branches on wire-netting spread over the

vat. Leave also about one-fifth of the vat unfilled and cover it with a wooden lid or a bag, leaving, however, a little hole for the escape of carbonic acid.

"If the temperature is not below 64 degrees Fahr., the vat, after twenty-four hours, is in full fermentation. The stalks and skins separate themselves from the liquid and form on the top a kind of crust. If left thus, the temperature will be much higher and fermentation quicker in the solid mass than in the liquid underneath, which would be injurious to the quality of the wine. As soon, therefore, as wild fermentation is over thrust the crust down and mix well. After a short time fermentation will set in again, but rather slowly. The right moment for racking off requires some skill to tell, and is better learned from practice. If done too early the wine is weak, deficient in colour, and gets easily spoiled; if too late, the wine is coarse, hard, and difficult to mature. As a guiding rule bear in mind this: when your ear applied to the vat perceives no longer the gentle noise peculiar to fermentation and the crust begins to fall of itself to the bottom, make haste, rack off, and press at once the residuum, distributing the juice in equal portions, and so forth, as for the white wine.

"Do not put any sugar or any foreign matter in the red or in the white must. Though there is nothing unlawful in the use of pure cane sugar—which is sometimes necessary in countries where grapes are poor and cannot ripen well—nevertheless it is rather noxious in a country like this, where grapes are rather too rich in sugary matters, and relatively poor in ferment, tannin, and tartaric acid.

"The important thing for securing success is to be always master of the fermentation, which has to be performed slowly but uninterruptedly to the end. If done too quickly, it gives a hard product, without velvety flavour and bouquet; if too slow, weak and unsound wine, liable to become sour and acid. If the above directions are exactly followed you will have the best wine which the season, soil, and species of grapes can produce—a wine fit for your own use and saleable to the wine merchant, who, with proper maturing and skilful blending, may accommodate it to every consumer. It is not made otherwise even by large producers, who have only the advantage of better cellars and better appliances, such as double lids, crushers, grape-pickers, hydraulic bungs, &c. But even then, wine-making, like butter-making, is less dependent upon external circumstances than upon absolute cleanliness and careful attention.

"Watch carefully to prevent the further fermentations which occur frequently in wines not fully free of albuminoid matters at blossoming and vintage time, and also its turning sour or into vinegar. For every such wine contains the germs of other microbes *(Micoderma aceti)*, which are always awaiting a favourable opportunity to come into life and transform the alcohol into acetic acid The best means for that purpose are absolute cleanliness, frequent burning of sulphur, regular filling up of casks to prevent the wine from coming into contact with the air, and better to heat the wine up to about 140 degrees Fahr., according to Pasteur's directions. I have experienced this during many years on a great variety of wines, and am fully convinced myself that it in no way injures the wine, but, on the contrary, ameliorates it, develops its bouquet, accelerates its maturing, and kills every germ of disease, so that a wine thus treated will never get sick until it comes again into contact with air, or rather with the germs contained in the air.

"I limit myself to the foregoing for the present, as I have the intention of writing ere long a treatise, specially adapted to Queensland, on vine-growing and wine-making, in which full particulars will be given about the various kinds of grapes and the manufacture of special wines.

"In the meantime I shall be very pleased to impart, through you, sir, or directly, to every would-be vine-growing farmer such experience as I have on the matter; for I am of opinion that a badly made wine is not only prejudicial to the interests of its owner, but also to the country which produces it. Queensland will take her stand among the sister colonies, and make good her footing in the markets of the world, only when she has some leading firms furnished with the best modern appliances, and backed up by a numerous phalanx of successful private producers.

"HRY. TARDENT.

"To the Under Secretary for Agriculture, Brisbane.

"Brisbane, November, 1888."

ANALYSES OF SOIL FOR VINE-GROWING.

"Myrtle Villa, Belle-vue street, Milton,

"2nd December, 1888.

"DEAR SIR,—In reference to analyses of soil for vine-growing, which you are intending to cause to be made, I send you the following list, as for us vine-growers it is important to know which of those bodies are deficient, and in what proportions are to be found those present in the soil:—

"1, Proportion and nature of sand; 2, Phosphate of lime; 3, Hydrate of alumina; 4, Oxide of iron; 5, Washed chalk; 6, Sulphate of potash; 7, Chloride of sodium; 8, Gypsum (anhydrous); 9, Carbonate of magnesia; 10, Oxide of manganese; 11, Peatate of potash; 12, Peatate of soda; 13, Peatate of ammonia; 14, Peatate of iron; 15, Peatate of alumina; 16, Insoluble peatic acid.

"I have, &c.,

"HRY. TARDENT.

"To the Under Secretary for Agriculture, Brisbane."

4.—SCHEDULE OF VARIETIES OF GRAPES GROWN IN THE ROMA DISTRICT.

European Varieties.—Black Prince, Black Hamburg, Black Spanish (wine), Black Cluster (wine), Black Hermitage (wine), White Syrian, White Solferino, Green Solferino, Sweetwater, Muscat of Alexandria, Muscat Red, Muscat Hamburg, Muscat Gordo Blanc, Golden Champion, Royal Ascot, Duke of Buccleugh, Verdeilho, White Portugal.

American Varieties.—Adirondack, Catawba, Elsinburg, Goethe, Iona, Israella, Isabella, Lenoir, Ives Seedling, Mascatawine, Monuka (seedless), Rebecca, Wilder.

5.—SCHEDULE OF PRINCIPAL VARIETIES OF GRAPES GROWN AT WARWICK.

Muscat of Alexandria, Muscat Red, Isabella, White Syrian, White Solferino, Black Prince, Black Hamburg, Black Spanish, Black Hermitage, Green Solferino, Verdeilho, Scuppernong.

6.—Schedule of Principal Varieties grown at Toowoomba.

Black Spanish, Isabella, White Solferino, White Syrian, Muscat of Alexandria, Muscat Red, Verdeilho, Hermitage, and a large variety of American vines.

7.—Schedule of Principal Varieties of Grapes grown in Ipswich.

Black Hermitage, White Hermitage, Tinto, Solferino, Black Spanish.

8.—Schedule of Principal Varieties of Grapes grown in Brisbane.

Black Hermitage, White Hermitage, Iona, Isabella, Black Hamburg, Pineau, Sweetwater.

Return showing the Area under Crop during 1887 for Wine-making, Table Grapes, Unproductive Land; and the Produce during that Year of Wine and Table Grapes.

District.	Area under Crop.			Produce.	
	Wine.	Table.	Unproductive Land.	Wine.	Table Grapes
				Gallons.	Lb.
Allora	11	11	8	2,550	28,666
Blackall	...	3	...	...	1,840
Brisbane	116	184	31	5,791	523,838
Bundaberg	...	9	3	...	9,560
Cleveland	4	12	5	686	18,710
Crow's Nest	1	2	6	214	5,500
Dalby	...	4	4	...	3,574
Esk	2	...	1	290	...
Gatton	22	4	14	3,665	4,224
Goodna	3	2	...	800	3,000
Gympie	3	18	1	60	38,600
Highfields	12	5	5	1,767	4,082
Ipswich	42	15	3	4,862	23,942
Logan	38	15	8	5,565	6,420
Marburg	23	4	3	3,689	11,570
Maryborough	3	17	5	450	22,903
Mitchell	...	2	11	...	5,130
Nerang	1	4	3	200	10,394
Normanby	29	2	5	5,600	310
Rockhampton	...	6	14	...	5,442
Roma	82	196	122	14,320	635,140
St. George	...	10	3	...	19,040
Stanthorpe	3	5	5	250	8,830
Surat	...	1	...	...	1,700
Taroom	...	1	...	...	3,080
Tiaro	...	2	2	...	5,480
Toowoomba	131	26	30	32,877	53,798
Warwick	77	66	76	22,300	265,581

ANALYSIS OF SOILS FROM MITCHELL, ROMA, AND MARANOA RIVER, REFERRED TO IN REPORT.

Constituent Elements.	Village Settlement, Mitchell.	Twine's Selection, Roma.	Tardent's Selection, Maranoa River
	Percentage.	Percentage.	Percentage.
Volatile matter	11·250	7·590	6·470
Insoluble silica and alumina	86·937	88·871	84·172
Soluble silica	·220	·140	·170
Oxide of iron	Trace	·800	3·520
Alumina	·600	1·210	3·360
Lime	·140	·150	·432
Magnesie	·163	·144	·252
Potash (K_2O)	·222	·380	·516
Soda (Na_2O)	·449	·688	1·005
Phosphoric Acid (P_2O_5)	Trace	Trace	·076
Sulphuric Acid S (O_3)	·019	·027	·027
Chlorine	Trace	Trace	Trace
Nitrogen	·074	·089	·107

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By Authority: JAMES C. BEAL, Government Printer, William street, Brisbane.