

REPORT

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ON

THE RESOURCES OF VICTORIA.



TO THE COUNCIL OF THE ROYAL SOCIETY OF VICTORIA.

Melbourne, 9th April, 1860.

The Committee appointed by the Royal Society has now the honor to present the Report which it was instructed to prepare upon "The Resources of the Colony of Victoria," and regrets the delay which has taken place in the preparation of this document.

Originally appointed in September last, before the end of that month the Committee met, and having carefully considered the task entrusted to it, determined on subdividing the whole subject, and appointed sub-committees of its members to prepare reports on each of these subdivisions as follows:—

- I.—CLIMATE, EXTENT, AND GENERAL CAPABILITIES OF THE SOIL OF THE COLONY. Professor Neumayer, Messrs. Hodgkinson, Skilling, Ellery, and Dr. Macadam, M.L.A.
- II.—MINERAL RESOURCES. Professor McCoy, Messrs. Selwyn, Bland, and Dr. Macadam, M.L.A.
- III.—BUILDING MATERIALS. Messrs. J. G. Knight, Holmes, A. K. Smith, and the Hon. Captain Pasley.
- IV.—INDIGENOUS VEGETABLE RESOURCES. Dr. Mueller, Dr. Macadam, M.L.A., and L. Becker, Esq.
- V.—AGRICULTURE AND HORTICULTURE. Dr. Mueller, Messrs. Skilling, Bryson, Jones, and Corbett.
- VI.—ANIMAL PRODUCTS. The Rev. J. J. Bleasdale, Messrs. Bryson, Becker, and Professor McCoy.
- VII.—HARBORS, RIVERS, AND INTERNAL COMMUNICATION. H. Amsinck, Esq., R.N., Messrs. Bell, Bryson, Hodgkinson, Knight, Ligar, Captain Ross, R.N., and Professor Irving.

The gentleman whose name appears first in each list undertook the duties of chairman of that sub-committee.

It was originally hoped that the Report might have been thus prepared by the end of January; but this was found impossible. Delay was caused by the necessity of collecting information on several branches of the enquiry throughout the colony; and in addition to this, as almost every member of the Committee has his time fully occupied with duties, public or private, great difficulty was experienced in bringing together the sub-committees; and from the delay of the partial reports, the publication of the whole has been until now impossible.

No attempt has been made to fuse together the several partial reports into one connected whole; they have merely been arranged in the order that seemed most suitable.

None can be more fully aware than your Committee of the imperfections of this Report; but it has been judged wiser to present it even in its present form than to seek to perfect it through longer delay.

The members of the Committee have endeavored to discharge the duty imposed on them to the best of their ability, and imperfect though their Report may be, they trust that it will not be without value, as conveying to a certain extent an accurate and authentic account of the Resources of Victoria.

(Signed)

FERD. MUELLER,
Chairman of the Committee;

M. H. IRVING,
Secretary of the Committee.

REPORT

ON

THE RESOURCES OF THE COLONY OF VICTORIA.

PREPARED BY A

COMMITTEE OF THE ROYAL SOCIETY OF VICTORIA.

Melbourne:

PRINTED AT THE GOVERNMENT PRINTING OFFICE.

1860.

THE RESOURCES OF VICTORIA.

I.—CLIMATE OF VICTORIA.

The principal places in which meteorological observations have been conducted are as follows:—

South of the Dividing Range.

Melbourne	...	...	near the meridian	145°
Geelong	...	...	”	144° 30'
Camperdown	...	...	”	143° 10'
Portland	...	...	”	141° 30'
Ararat	...	...	”	143°
Ballaarat	...	...	”	144° 10'
Alberton	...	...	”	146° 40'

North of the Dividing Range.

Castlemaine	...	...	near the meridian	144° 10'
Sandhurst	...	...	”	144° 10'
Heathcote	...	...	”	145°
Wimmera	...	...	”	143°
Beechworth	...	...	”	147°
Echuca	...	...	”	144° 50'

The period during which meteorological observations have been systematically registered being too short to admit of exact conclusions with regard to climatological questions, the few remarks and facts given in this report will, most probably, have to undergo alterations and corrections as meteorological science in this country advances.

This applies more especially to the localities towards the interior of the colony, where only few meteorological stations have as yet been established, and thus it happens that those places with a sea climate will be more fully represented in the following remarks than those with a more continental climate. However, the facts contained in the following, deficient as they are, may prove to be of value for a comprehensive glance over the resources of the southern portion of the Australian continent.

The Colony of Victoria is situated in the ectropical or central system of winds, and chiefly within the subtropical belt, and has its characters accordingly. Ample support for this will be found in the following facts, if we only make due allowance for the close vicinity to an eastern shore.

The mean temperature of air for the different quarters and different stations assumes the following values, according to the various meteorological reports published in this colony:—

STATIONS.	Sept., Oct., and Nov.	Dec., Jan, and Feb.	Mar., Apr., and May.	June, July, and August.
	o	o	o	o
Geelong	56·0	68·3	58·0	49·4
Heathcote	53·9	72·5	56·5	45·6
Melbourne	56·9	71·0	59·8	50·2
Mount Egerton ...	51·5	66·9	53·8	45·3
Port Albert	54·7	64·5	58·0	49·2

The mean temperature of air in Melbourne, for the years 1858 and 1859, amounts to 57°·8.

The mean range in temperature of air, as derived from hourly observations in Melbourne, is as follows:—

March 17°·37	June 13°·23	Sept. 16°·94	Dec. 18°·92
April 15°·64	July 10°·62	Oct. 17°·84	Jan. 14°·90
May 11°·95	August 12°·53	Nov. 18°·92	Feb. 19°·39
Mean 14°·99	Mean 12°·13	Mean 17°·90	Mean 17°·74

The mean temperature of the surface soil for the different quarters, as derived from observations in Melbourne, is as follows:—

March } 61°·47	June } 48°·49	Sept. } 62°·02	Dec. } 70°·33
April } 61°·47	July } 48°·49	Oct. } 62°·02	Jan. } 70°·33
May } 61°·47	August } 48°·49	Nov. } 62°·02	Feb. } 70°·33

The mean temperature of surface soil for the year amounts to 60°·58, and the mean diurnal range in this element for the single months is as follows:—

March 33°·39	June 15° 87	Sept. 23°·18	Dec. 43° 94
April 24°·98	July 14°·63	Oct. 48°·74	Jan. 38°·14
May 16° 03	August 22°·12	Nov. 46°·19	Feb. 49°·53
Mean 24°·80	Mean 17°·54	Mean 39°·37	Mean 43°·87

The mean direction of the wind for Melbourne is N.W. by N., and very likely is so for the greater part of the colony, although the number of observations has, except in Melbourne, been too small for the accurate computation of values.

The relative frequency of the wind is shown in the following table:—

	Between S. and S.E.	Between S.E. and E.	Between E. and N.E.	Between N.E. and N.	Between N. and N.W.	Between N.W. and W.	Between W. and S.W.	Between S.W. and S.
Mar., Apr., May - -	2.7	1.5	1.0	3.6	1.25	1.5	1.0	2.0
June, July, Aug. - -	3.9	1.0	1.2	17.0	9.8	6.0	7.8	3.3
Sept., Oct., Nov. - -	7.8	3.8	1.0	6.4	5.9	4.8	5.6	7.7
Dec., Jan., Feb. - -	5.2	2.6	1.0	2.7	2.2	1.7	3.5	4.6
Year - - - - -	4.3	2.4	1.0	5.5	3.5	2.6	3.3	3.8

Hot winds frequently sweep the country, and the temperature of air on such occasions reaching in the shade the high value of 111° and even more, causes considerable damage to fruits and cereals.

The number of hailstorms is comparatively speaking small, although the size of the stones is sometimes considerable.

The following table contains the amount of rain and hours of rain, as derived from observations made during two years in Melbourne :—

Quarter.	Year.	Amount.	Hours.
		Inches.	
March } April } May }	1858 1859	2·881 3·414	100·6 83·5
June } July } August }	1858 1859	4·014 5·854	190·6 175·1
September } October } November }	1858 1859	5·625 6·142	136·01 145·1
December } January } February }	1858 1859	9·170 2·796	136·0 49·0

The amount of rain for the year collected in various parts of the colony is as follows :—

Geelong, 1858	...	...	17·26 inches.
Heathcote, 1858	...	...	23·554 "
Melbourne, 1858	...	...	21·69 "
Portland, 1858	...	...	27·22 "
Wimmera, 1859	...	...	14·86 "
Beechworth, 1858	...	...	32·95 "
Camperdown, 1858	...	...	27·85 "

As mentioned in the commencement, it is impossible, with the few facts as yet registered, to arrive at definite results with regard to the climatology of this country. These few lines contain however the principal features of our climate, and may suffice to fulfil the general scope of this report.

II.—MINERAL RESOURCES.

THE mineral resources of Victoria, excluding building materials, are principally gold and tin.

GOLD.

The distribution of gold is much more general than that of tin.

The area in Victoria over which gold deposits extend, according to the examinations of Mr. Selwyn, is about 20,000 square miles; this estimate excluding the whole of the country west of the Grampians, and Swan Hill on the Murray, in which there is no present reason for supposing gold to exist (the country not having been as yet geologically examined), and the whole of Gipps Land, in which several promising gold fields have lately been opened.

Of this great area of 20,000 square miles, only about 250 square miles have been actually worked.

From this small proportion of the auriferous area, export duty has been paid on upwards of 3,003,811 oz. in 1856, 2,729,655 oz. in 1857, 2,536,983 oz. in 1858. The year 1859, and the first two months of 1860, show a corresponding small diminution. This diminution, although made more formidable by the large amount of machinery, gradually added during the period, admits of satisfactory explanation.

1. In the first place, the alluvial gold fields, having an old reputation, making them well known to the bulk of the population by name, are the spots on which people still congregate, although they are being more or less worked out with the progress of time, so that these limited areas no longer pay the great number of men, with insufficient means, which they formerly supported. In connection with this point we have only to refer to the very large unworked area alluded to above, including tracts in all probability as rich as any that have been yet worked, to indicate the reasons for our belief, that no gloomy views of failing gold supply could properly be supported by the decreasing figures of the gold returns of the last few years.

2. Very large tracts of rich gold fields have within the last two years been taken up by mining companies, with the intention of applying powerful pumping machinery, and of

erecting such stamping and amalgamating, and steam puddling machinery, as would exhibit a large profit from the working of materials scarcely yielding any profit with less efficient means; the preliminary arrangements have stopped the working by the old proprietors, while scarcely any of the companies have yet got to work. This explanation would account for a very large deficiency in the official returns. As an example of the amount of machinery being applied in special cases, and the actual result and profit of comparatively poor, or as least ordinary average tracts, we may most instructively refer to some details of the Clunes mines.

In 1859, 21,202 oz. of gold, value about £84,808, were obtained from the crushing of 21,078 tons of quartz, raised from four "reefs" rather below the ordinary average richness of the worked gold reefs of the colony, and from reefs which, without such machinery, and with the small "claims" formerly attainable, would have yielded no profit to the miner. The total cost of extracting the gold, including calcining, crushing, and amalgamating, with somewhat expensive management, has been in this case about 17s. per ton; while the usual price for crushing throughout the gold fields in 1856 was from £3 to £4 per ton. The extensive application of such machinery to the richer tracts taken up by the numerous companies now formed will obviously enormously increase the yield of gold in future years, even independent of the great increase to be anticipated from extending operations into the tracts known to be auriferous, though at present unworked. As a general rule, the mechanical appliances now used in Victorian gold mining would compare favorably with the best employed in other countries. It is a popular mistake to suppose that very great improvements are expected or required in the technological part of gold mining; the great room for improvement being rather in the management and conduct of mining companies, than in the appliances for extracting the gold.

TIN.

Tin is at present worked in any important quantity only in the Ovens district, though it has been observed in the upper branches of the Yarra, in the Coliban river, and a few other localities. The amount annually exported cannot be ascertained, as no duty is paid upon it;* but in the year 1856

* The quantity is always declared at the Customs, and may be assumed as nearly correct. The returns of 1858 give 357 tons 17 cwt. of black sand, valued at £19,596, and 1 ton 6 cwt. of tin, worth £100.

25 tons exported yielded an average of 75 per cent. of pure tin. The ore in Melbourne cost £47 per ton, and yielded in London a net profit of £32 per ton.

ANTIMONY.

Sulphuret of antimony occurs in considerable quantity in the Yarra basin and other localities, and may be expected to add considerably to the resources of the country when the expenses of land carriage have been reduced by the formation of railways and roads to the interior.

LEAD.

Sulphide of lead, with a small per-centage of silver, occurs in Gipps Land and in some other localities, but has not yet been extracted in any important quantity.

COPPER.

Copper in carbonate and sulphides, and also native, occurs associated with the gold-bearing quartz veins, in several districts, but has not yet been found in sufficient quantities to be profitably extracted.

IRON.

Hydrous oxides of iron are abundant in many localities in the colony, and projects for smelting them have frequently been brought before the public, but the scarcity and expense of fuel and manual labor, as well as of carriage, have hitherto prevented these iron ores from forming any material addition to our mineral resources. Titaniferous iron sand is very abundant in the tertiary, basaltic, and sedimentary formations of many localities in the colony, but neither has been, nor is likely to be, profitably applied.

COAL.

Seams of coal of good quality have been discovered at or near the surface in several localities, but with the exception of those on the coast at Cape Patterson, from 6 inches to 3 feet 9 inches, and on the River Bass, at Western Port, 3 feet to 4 feet 3 inches, none of them are sufficiently thick to be profitably worked. Owing to the difficulty of transport and the high price of labor, even those have not yet been made available for a supply of fuel.

About eighteen months since, the "Victoria Coal Company" was formed, for the purpose of working the Cape Patterson seams, and a lease was granted to the company by the

Government on profitable terms, but they have not yet succeeded in bringing any of the coal to market.

There is every reason to hope that many more good and profitably workable seams will eventually be found in some of the extensive, but as yet unexplored, districts in which the coal-bearing rocks are known to exist in Victoria.

PRECIOUS STONES.

Topazes, zircons, and sapphires occur occasionally in the beds of streams, but not in sufficient quantity to be of economic value.

CHINA CLAY.

China clay occurs in large quantity and of good quality at Western Port and in many other localities in the colony, and some rude pottery is made in several manufactories on a usefully extensive scale, but as there are not here the same facilities as in Cornwall from continually flowing streams for lixiviating the clay, with little help from manual labor and machinery, it is unlikely that the finer sorts of porcelain will be attempted in this country with profit; but the coarser and more homely wares, the carriage of which from Europe is disproportionately expensive, may be manufactured from the native material occurring in Victoria in sufficient quantity to supply the colonial demand.

SALT.

Salt in almost any quantity can be procured at a small cost from many of the shallow lakes situated about forty miles west of Geelong. Very little has yet been sent to market, but it is in common use among the settlers in the districts in which it occurs. It is inferior in quality to the imported Liverpool salt, and worth about £1 10s. to £2 per ton less in the market. Hitherto it has only been collected during the summer months, when the lakes are partially dried up. No attempts have been ever made to improve it by refining.

Salt is also found in the desert, towards the junctions of the Darling and of the Murrumbidgee with the Murray; where also it is in use among the neighboring settlers.

III.—BUILDING MATERIALS.

BUILDING STONES.

The principal building stones which are known to exist in this colony are basalt (locally known as bluestone), granites, clay-slate stones, sandstones of various kinds, and a few limestones.

Basalt is spread over a large area of the country, and is the most abundant of all our materials. The stone is too well known to need any technical description; its durability is unquestionable, but its suitability for works of much architectural pretension is generally doubted. The color of bluestone destroys the proper effect of shadows, they are to a great extent absorbed by the stone instead of reposing distinctly upon it, and as a natural result the beauty, proportion, and character of minute enrichments in basalt are comparatively lost, when contrasted with stones of more appropriate color. While suggesting the exceptions to be made in the use of bluestone it must be admitted that for ordinary purposes both in architectural and engineering works no other material could be so generally employed. For foundations it is eminently suitable; for stores, its sombre hue imparts an appearance of commercial as well as of structural solidity; for ecclesiastical buildings if relieved by freestone dressings, it can be used in a cheap and most effective form, while for engineering works its moderate first cost and the facility with which it may be cut into plain forms, leave no occasion to wish for a better material. There is absolutely no waste on bluestone, the smallest chippings are valuable for road making, and when we further consider the abundance of the supply, and the trifling cost of quarrying it for ordinary purposes, we may safely say that bluestone is one of the most useful of the mineral products in Victoria.

Granite of good quality abounds in many parts of the colony; it has however been but little used owing to the great cost of working it for ornamental purposes. Quarries have been opened at Gellibrand's Hill, near Broadmeadows, and at Mill Park, about three miles off the Plenty road. It can also be obtained by water carriage from Corner Inlet, Mounts Martha and Eliza, and from the You Yangs, by means of a short tramroad to the Geelong

Railway; the latter would probably be the cheapest source for supplying Melbourne. It is not however to be supposed, with the present price of labor, that granite can be much employed. The cost of putting good work upon this material is something enormous compared with bluestone, and for the same description of workmanship the rate is about two and a quarter times more for granite, and comparing the labor on granite with the Bacchus Marsh or Darley freestones the former is four and three-quarter times dearer than the latter.

The most prominent specimens of granite building in Melbourne are the Government offices in William-street, the pilasters of the Town Hall, and portions of Prince's Bridge. The stone for these works was procured from Gellibrand's Hill, near Broadmeadows. Most of it appears to have been taken from or near the surface, and none of the works mentioned exhibit the material in a very favorable light—they present a somewhat rusty appearance, and, in some instances, the original color of the stone is altogether destroyed by metallic oxidation. It is not at all impossible that age may have a similar effect upon the more recently erected examples. The plinth of the new Custom House is also of a species of granite, syenite, from Gabo Island (to which the remarks on oxidation will not apply). This material is exceedingly hard, and, on inspection, it will be seen that without expending an extraordinary amount of labor, it is impossible to produce a fair and even surface upon it, and of course more difficult to form channels, sinkings, or mouldings. Most of the colonial granites have a strong resemblance to those obtained from Cornwall, in England, which are distinguished from those of Scotland by having their constituents more unequally divided. The peculiar fitness and greater durability of the Scotch granites for building purposes are principally owing to the even and regular distribution of the particles of which these plutonic rocks are composed.

Clay-slates.—The clay-slate stones of the silurian formation next deserve a brief notice. Samples have been produced from the neighborhood of Templestowe and of Kilmore. Both are exceedingly hard, compact, and closely laminated, in color a dark blue, and in general appearance resembling the Caithness flagging imported from Scotland. The extreme toughness of this description of stone and the great difficulty of cutting across the planes of bedding render it unavailable for general building purposes. It is however exceedingly well fitted for street flagging, steps, lintels, or other similar purposes. Applied

as "random coursed work" it would be found effective in ecclesiastical architecture as filling in between freestone or brick dressings.

Sandstones.—It would appear, that in the early days of Melbourne, even prior to the gold discoveries, all parties were not quite satisfied with the appearance of bluestone. Several buildings were raised with a sandstone, principally obtained from a quarry on the Saltwater River, near the Melbourne Racecourse. The stone, however, had but little to recommend it for general use, being very irregular in its composition, as well as defective in color. In many parts of the colony sandstone was obtained in the neighborhood for local wants, but no great effort appears to have been made to find a substitute for basalt.

The employment of sandstone in Melbourne for any building of architectural pretension is of recent occurrence. Amongst the earliest works may be mentioned, the Union Bank and Supreme Court House, built of stone from Geelong, but of inferior quality to that now quarried at Barrabool Hills. The first named building was painted, as a measure of precaution, and appears now to be in good preservation, but the latter is now too far gone to be benefited by such a precautionary operation.

The only colonial freestone at all extensively employed, excepting that now brought from Bacchus Marsh and Darley, has been used at Geelong. The stone belongs to the Australian carboniferous formation, and the best quality is obtained from the quarries of Messrs. Holdsworth and Firth, in the township of Ceres, on the Barrabool Hills. It is to be regretted, both for the character of the stone and the durability of many of the buildings in Geelong, that an inferior material has been frequently used in preference to the best stone from the Barrabool Hills quarries.

The result of this want of care in selection is now plainly exhibited, many costly buildings in Geelong giving evident indications of slow decay. The color of the stone is not very favorable for architectural display, the prevailing tint being a greenish yellow. Nevertheless, the buildings in Geelong contrast very favorably with those of the City of Melbourne, the former being sensibly cleaner, brighter, and freer from the extremes of blackened bluestone and whitened stucco, which prevail in the streets of our own metropolis.

The Geelong freestone does not, however, appear to have found much favor beyond its own township, and even within

it there seems to have been some doubt as to its beauty or durability, for the Bank of Victoria is erected with the freestone from the quarry of Mr. Pitfield, at Kangaroo Point, Tasmania.

The Barrabool Hills stone has been subjected to experiments, with the following results :—

Under the action of sulphate of soda, a test which assimilates to that of freezing, the stone has become partially disintegrated.

An inch cube was crushed by a weight of 2150 lbs.

A scantling, 4 in. by 4 in., placed in the position of a beam or lintel, with a span of four feet between its supports, broke with 4 cwt. 2 qrs 20 lb. suspended from its centre.

Its specific gravity is 2.207.

Until a recent period the principal buildings of Melbourne have been erected with a sandstone procured from the neighboring colony of Tasmania, but in consequence of a strong feeling having been manifest against the importation of material of this description, the Government of Victoria was induced to offer a reward of £1000 for the discovery of a good building stone within the precincts of the colony. A large number of stones were developed in consequence of this inducement, but none were considered fully equal to the conditions appertaining to the reward. The most important stones brought to light by the above agency are from the neighborhood of Bacchus Marsh, about 40 miles from Melbourne. The stone is brought to town by drays returning from the gold-field, at the cost of about £2 per ton. There are no properly formed roads to the quarries, and it is somewhat astonishing how the carriers contrive to cart it at any price.

The Bacchus Marsh stone is being used in the erection of the new Treasury and Custom House ; both are very large and costly buildings. The stone belongs to the coal formation, and is rather soft when first quarried. It does not resist the freezing test of sulphate of soda. Its power to stand against crushing is equal to 1949 lbs. to the cubic inch. A 4 in. scantling, with a clear space of 4 feet, broke with 2 cwt. 3 qrs. 24 lbs. Its specific gravity is 2.213, and analysis shows its component parts to be—

Silica ...	...	...	...	92.7
Carbonate of lime	...	...	...	2.2
Carbonate of magnesia	...	...	...	0.8
Oxide of iron	...	...	...	1.42
Alumina	...	...	...	2.88

100

Beautiful fossil vegetable impressions abound in the above quarries. The color of the stone is usually a very light brown

The Darley stone is quarried at about six miles distance from the last named material, and is of the same geological formation, though nearly destitute of fossil remains. Its color, a light buff, is not unlike the Anston lime stone, of which the Houses of Parliament in London are built. The Darley stone has been selected for the erection of the outer façades of the Victorian Houses of Parliament, the internal, or court yard portion of which are of blue basalt. The general characteristics of the Darley stone differ but little from that of Bacchus Marsh. A cube of 1 inch crushed with 2118 lbs.; a 4 inch scantling, with a bearing of 4 feet, carried 3 cwt. 0qr. 2lb. Its component parts are—

Silica ...	...	...	...	...	93.05
Carbonate of lime	...	...	...	...	.55
Magnesia	...	...	...	...	2.40
Iron oxide	...	...	...	...	2
Alumina	...	...	...	...	2
<hr/>					100

There are other sandstones more or less used, but principally employed for local purposes, among which may be mentioned the stone from Mount Sturgeon, in the Western District, about 60 miles north of Belfast; this is a highly indurated material in color, and hardness not unlike the Craigleith stone of Scotland. A cube of 1 inch sustained a pressure of 3 tons without being affected. Its specific gravity is 2.386. A 3 inch cube absorbed only 15 dwts. of water after 6 hours' immersion. The principal objection to the use of this material is on account of its hardness and the cost of bringing it to Melbourne, which would not be less than 8s. per cubic foot.

The stone from Kyneton, about 60 miles from Melbourne, on the Castlemaine Road, is nearly white in color, very fine in texture, and easily worked, but is found to be not sufficiently hard or cemented together to resist the action of the weather. It is well fitted for inside work, and can be as readily carved as Caen stone. Analysis shows it to consist almost entirely of—

Silica ...	...	...	...	...	99.3
Carbonate of lime	...	...	...	...	.3
Alumina	...	...	...	...	.4
<hr/>					100

A sandstone, generally smaller, but somewhat harder than the last, is obtained at Ballan, about 55 miles from Melbourne, on the road to Ballaarat.

Quarries of sandstone, principally laminated like the flagging from Yorkshire, have been opened within 14 miles of Melbourne—one at Bulleen, and the other at Doncaster. Neither have turned out well, the stone being too soft for street paving, and the beds usually intersected by cross joints or veins, which render the stone liable to crack, as well as prevent its being quarried in sound large blocks.

Very hard and compact sandstones belonging to the coal formation, are found at Western Port, Apollo Bay, Cape Patterson, &c. On the coast and near to the entrance of Port Phillip these stones more closely resemble those obtained near Whitby, and if freed from an objection to be hereafter referred to, are otherwise well adapted for general purposes, and especially for street pavement, a thing particularly needed in Victoria.

The constituents of the Western Port stone are—

Silica	...	...	...	...	81.7
Carbonate of lime	...	...	...	...	2.5
Oxide of iron	...	...	...	...	7.2
Alumina	...	...	...	...	6.2
Magnesia, soluble salts and water	...	...	...	...	2.4

100

This stone has been used in the erection of one of the Melbourne Banks, and the surface commenced exfoliating after 18 months' exposure.

Samples of a good hard sandstone have been procured from Kilmore, about 40 miles from Melbourne, on the Sydney road, but the material has not yet been tested in any building.

Sample blocks of sandstone have been forwarded to the Museum for Building Materials, at Melbourne, from the silurian rocks in the Plenty District, about 18 miles from Melbourne, and from Keilor, about 12 miles from Melbourne; neither are of very good quality, or likely to be usefully employed, except for very ordinary purposes.

Limestones.—With regard to the limestones it may be briefly observed, that none which have yet been discovered appear to be fit for building purposes of an important character. No compact building limestones have yet been found inland; those known are found on the coast, and those at present used are procured from Point Nepean, Hobson's Bay, Cape Schanck, Cape Nelson (near Portland Bay), Warrnambool, &c. They are usually coarse sandstones with calcareous cement and appear to belong to a very recent geological formation, they are very porous and are considerably affected by the weather;

a 4 inch cube of the Cape Nelson stone, weighing when dry 33oz. 10dwts. 12grs., absorbed 4ozs. 7dwts. of water after six hours' immersion.

A very important discovery has recently been made which unless counterbalanced by chemical or other scientific agency is likely to affect the use of nearly all the colonial building stones.

Symptoms of exfoliation have lately been exhibited in the stone of which some of the most important of our public buildings are constructed, and wherein the Bacchus Marsh, Darley, Western Port, and Geelong stones have been used.

A chemical examination of the decayed particles shows all the stone to be impregnated more or less with a large quantity of salts, the principal and worst ingredient being sulphate of soda. A survey of the quarries has also been made, and salts have been found in very large quantities; these are not distributed equally over the rocks, but in veins and patches, so that without the constant application of chemical tests it would be impossible to distinguish the good from the bad stone. In one case a small block containing only five cubic feet of apparently equally good stone was found to contain in one part of it salts equal to 35lbs. to the ton, and in the other part only 18ozs. to the ton. Further examination proved that the stone near the surface of the quarry was free from salts, while the deeper the bed was worked the more salts were obtained. The quarries at Bacchus Marsh are about 500 feet above the level of the sea. The stone impregnated with salts does not appear to be in any way injured so long as the blocks remain in a moist or wet state, or are kept perfectly dry. It is when the sulphates are drawn out to the surface of the stone by solar heat or evaporation that they become crystalized and thrown off the particles which previously enclosed them, that the crumbling away or exfoliation takes place. The stone from the quarries referred to was analysed before being used for the public buildings in which it is now employed, but being opened expressly for these works the samples experimented upon were necessarily from near the surface and hence exhibited no indication of salts. It is usual to find better stone below the surface of the rock, and in the present instances the quality of the material appears to improve in all other respects excepting the presence of saline matters. A portion of these consist of the chlorides of calcium and magnesium, so that in the event of Ransom's process for preserving stone being proved efficacious, the application of

silicate of soda will complete the formation of the double silicate of lime. Experiments are now being tried to test the value of this plan for indurating masonry, the result of which will be hereafter communicated.

LIME.

Limestone yielding lime for building purposes is found in many parts of the colony, but is not generally abundant. Latterly several new discoveries of limestone have been made near inland townships, and much benefit will be derived therefrom, though none of the limestones at present discovered are thoroughly hydraulic. The principal kilns for supplying lime to Melbourne are at Geelong, and near the Port Phillip Heads. The lime from the latter place is principally formed of decomposed shells; these yield a mild description of lime, which is well fitted for plastering. The Geelong roche lime is usually considered the best for general purposes. Other kilns have recently been opened at Mount Franklyn, on the Castle-maine Road, about 55 miles, and at Pyreeth Creek, 40 miles from Melbourne.

Many samples of newly discovered limestones have lately been forwarded to the Museum of Building Materials at Melbourne, where they are now in the course of being tested.

Gypsum is found in many parts of the colony, especially on some portions up the River Murray, but it has not been discovered in sufficient quantities to pay for its manufacture into plaster.

No cement stones have yet been brought to light.

BRICKS.

The most striking illustration of the progress of this colony in the industrious arts, is manifested in the great improvements which have been made in the manufacture of this most indispensable article for promoting the comfort of mankind. Six or seven years ago bricks were sold at from £12 to £20 per 1000. At the present time numerous instances could be referred to where these very bricks have actually washed away; and, as a general remark applicable to those golden times, it may be stated, that the dearer building materials became the worse was their quality, and the more flimsy and unstable the workmanship bestowed upon them. This is an unpleasant fact, which many who have spent large fortunes upon what is now regarded as inferior and worn-out property would be able to verify.

Since the affairs of the colony have sobered down, and people have thought it wise to build for the future, an entire change has taken place in this branch of trade. The fields of Prahran, about three miles from Melbourne, where these miserable cakes of clay were principally made, have been entirely deserted, and entirely new districts have been selected for the manufacture of the bricks at present used. The principal places where they are now made for supplying the Melbourne market, are at Phillipstown, Brunswick, and Hawthorn, all within a few miles of the city. The colors of bricks now made are white, red, and iron-grey. The white bricks are made of a fine pottery clay, and are capable of resisting a very great heat. They are equal to the ordinary fire bricks, and are used for furnace purposes.

Considerable care is now bestowed upon the treatment and admixture of the various clays, which are of a very superior kind, and capable of making the finest pottery; and the result is, that bricks are now made which are believed to be equal in durability to those of which the old Roman walls were constructed. The best facing bricks are now worth about £6 per 1000; the best hard grey bricks about £3 5s., and ordinary bricks about £2 10s. per 1000.

In trying some experiments upon the power of stones to resist crushing, a cubic inch of it was cut out of a white facing brick. This resisted pressure up to 4600 lbs., which is 1465 lbs. more than was sustained by a cubic inch of the Portland oolite stone.

Moulded bricks of various kinds are now being made, and bid fair to supersede the use of colonial freestone, the bulk of which is infinitely less durable, and much more costly.

The Chinese on some of the gold fields are now making bricks of very good quality, and of a dark blue color.

DRAINAGE PIPES.

Drainage pipes of excellent quality, suitable for sanitary purposes, are also manufactured at Melbourne.

SLATES.

Slates have been found in many parts of the colony, particularly at Sandhurst, Kyneton, Kilmore, &c. They have, however, been but little used, except in a few cases for local works. The Museum for Building Materials at Melbourne, which is devoted for the collection of all descriptions of building products, is partly roofed with slates from Sandhurst. They

are not so strong or even as those from Bangor, but more closely resemble the Westmoreland slates.

TILES.

Efforts have long been made by Mr. Knight, the architect and projector of the museum above referred to, to promote the manufacture of colonial roofing tiles, such covering for buildings being evidently better suited to resist the powerful heat of the summer sun in Victoria. Several specimens of tiles are now being laid upon the roof of the museum, and it is expected that their manufacture will to a great extent supersede the employment of imported slates, or the most objectionable use of galvanized iron.

TIMBER.

Information on this subject will be found in the Report on the Indigenous Vegetable Productions of Victoria.

IV.—INDIGENOUS VEGETABLE PRODUCTIONS.

IN the following very imperfect sketch of the resources which the indigenous vegetation furnishes to the colony, it has not been attempted to enumerate all the uses of the native plants, as far as they have been hitherto ascertained.

Many of these, although of local advantage to the districts in which they occur, are not such as to equal or supersede similar productions used in other countries; some are not sufficiently abundant to become available for export, and the properties with which providential nature undoubtedly has endowed numerous others, are not yet revealed to the scrutinizing eye of the scientific observer, or subjected to the tests of the practical artisan.

Many, indeed, of the species which constitute our flora have only of late received their systematic position, but thus we may henceforward at least reduce to exact bases those observations on their practical utility, which have hitherto been instituted or shall be made in future time.

Allusion has, therefore, only been made on this occasion to what we have already learnt to acknowledge as belonging to the main treasures of the indigenous vegetable empire. This, however, will suffice to show, that our colony possesses in this direction also ample means for the exercise of native industry. In grouping the plants according to the products which they furnish, we cannot fail to be at once attracted by the manifold variety, the abundance, the colossal size, or the durability of many of our native timbers.

First in importance stands the bluegum tree (*Eucalyptus globulus*). It is identical with the Tasmanian species, and constitutes, in many of the humid coast tracts, the main part of the forest. In durability, and in gigantic size, it yields to few trees of any part of the globe. Individual trees have been found attaining a height of 300 feet, while those of 200 feet are by no means rare in favorable rich sheltered parts of the forest valleys, and their trunks are generally of a beautiful straightness. The tree attains, in about eighty years, its full height, and increases afterwards more in circumference than in height. The hardness of its timber has rendered it esteemed far beyond the limits of the colony, and thus a lucrative trade has sprung up in supplying it for railroad sleepers

in India. Saw mills have been erected on several parts of the coast, and tramroads been formed into the recesses of the ranges, for the purpose of conveying the huge logs to the shore, and rendering them extensively available not only for our own building works but also for exportation.

Many fine vessels, built in Tasmania, testify to the importance of this tree, as yielding a lasting material for ship building. On account of its great specific gravity, it is often employed for ships' keels, for which purpose it is equal to oak. Tough and hard, as the bluegum is, it proves equally durable submerged, or exposed to the air, or sunk into the ground. Whilst it also thus far resembles oak, it far exceeds the latter in size. Wherever elegance of woodwork has to yield to durability, this valuable wood may be employed. "It is," to quote the words of an experienced engineer of Victoria, "largely used in engineering works, such as the construction of bridges, jetties, viaducts, wharves, also in buildings, particularly warehouses, for girders, or breast-summers; further, for standards, sleepers, shaft poles, and frames of drays, and the felloes of wheels." Except the white oak of Canada, timber better suited for piles cannot be found. These may be obtained in large quantities 70 feet long, perfectly straight, and free from knots. It is not much used in private dwellings, owing to the expense of working it in small scantlings. The price per cubic foot in Melbourne varies from 2s. to 3s., according to size.

The unusual rapidity of growth of the bluegum tree, and the readiness with which it accommodates itself to less favorable localities than its moist native forests, recommend it for lining our roads, and for timber plantations here as well as in other countries of the warm temperate zone. The height of the tree varies according to its situation: in sandstone formations the trunk is known to measure 120 feet from the ground to the spring of the branches; in basalt it is known to attain the altitude of 180 feet. A bluegum tree in a valley near Mount Wellington, in Tasmania, showed the following dimensions:—

Circumference near the base	...	90 feet
5 feet from the ground	...	65 ft. 6 in.
7 feet from the ground	...	60 ft. 6 in.
21 feet from the ground	...	25 ft.
Approximate height of the whole tree, 300 feet.		

Judging by analogy this stem contained 800 concentric rings. The redgum tree, or flooded gum tree (*Eucalyptus rostrata*),

is the only *Eucalyptus* which ranges over almost the whole Australian continent. Although still a large tree, it is inferior in size to the bluegum and also less durable. Its wood is brittle, but of a fine red brown shade and capable of receiving a beautiful polish; but although harder than the timber of the East Australian cedar (*Cedrela Australis*), which is here universally used as the principal furniture wood, cannot by any means compete with it, being much more difficult to work and apt to warp. Underground, it decays much sooner than the bluegum timber; but it still resists long the influence of water. Though seldom used for beams or piles, it makes excellent planking, and is extensively used as wooden kerbing. The price in Melbourne is about 10 per cent. above bluegum.

The whitegum (*Eucalyptus acervula*) is similar to the preceding, but of paler color.

The timber of the ironbark tree (*Eucalyptus resinifera*) is tough, hard, and therefore durable, but difficult to work, and is mainly used for spokes and felloes. It grows chiefly on barren ranges, and usually indicates an auriferous formation. A noble species of *Eucalyptus*, occurring in the eastern part of Gipps Land, has, for the excellence of its dark timber, received the name of mahogany.

The blackwood (*Acacia Melanoxydon*) may in many of its qualities be compared to the walnut. It is foremost amongst the indigenous furniture woods, and surpasses in durability the Australian cedar, but is less easily wrought. In the rich soil of our forest valleys the tree attains the height of 120 feet, furnishing then fine straight logs of timber. For staves of casks that variety of blackwood is selected which is grown in more open localities, and is characterized by a more dense texture. Mr. Ch. Mayes, C.E., remarks, "that it has been largely used in the construction of the pontoon bridge at Echuca, and also in the construction of the railway carriages and trucks for the Victorian railways. It is less liable to crack or warp than most other Australian woods." The price in Melbourne is about 4s. per cubic foot.

The stringybark wood (*Eucalyptus fabrorum*) is one of the most frequently used timbers, the stems being tall, remarkably straight, and easily split. In barren mountains this tree is available in endless abundance, and in size almost rivalling the bluegum. Whilst its fissile quality renders this wood superior to any other native wood for shingles, palings, and rails, in regard to durability it ranks far below bluegum wood, and fence posts of it are much more subject to decay

than those of many other Eucalypti. Its price is about 10 per cent under blue gum.

The *Melaleuca squarrosa* forms in deep inundated forest valleys a large timber tree. Its wood is close, hard, and durable, of pale color, well suited for the manufacture of furniture and turners' work.

The *Acmena floribunda* forms a stately tree in Eastern Gipps Land. Its hard and tough wood may be recommended for machinery work. The same may be said of that of the species of *Notelæa* and *Pomaderris*, but neither of these woods is obtainable in large size. The wood of *Pittosporum bicolor* seems well fitted for tools and implements. *Hedycarya Pseudomorus*, and more especially the pale wood of the *Exocarpus cupressiformis*, or native cherry tree, furnish a wood to be compared to that of the lime for technical purposes.

The very solid wood of *Callistemon salignus* claims our attention, having proved useful in xylography, although inferior in quality to the genuine boxwood.

The sassafras wood assumes, when polished, a hue similar to that of walnut wood, and is less liable to crack than most other Victorian timber.

The Australian beech (*Fagus Cunninghami*) is less compact in its wood than that of its English congener, still it affords a useful, but not readily attainable timber.

Banksia integrifolia and *Lomatia Fraseri* furnish planks. Their polishable wood has also been used for furniture, window frames, and similar work; it is less heavy than that of most Eucalypti.

It is to be regretted, that on account of the want of tall Coniferous trees, we possess no wood suitable for ship masts.

The *Casuarina* wood is used for axe handles, dray spokes, and similar articles; and furnishes excellent fuel.

The Myallwood, obtained from some species of *Acacia*, chiefly *A. homalophylla*, is valued for its fragrance, and participates in the hardness and solidity which characterize the timber of most of the Australian species of the genus. The indigenous Sandalwood (*Santalum cognatum*) is also fragrant, and like the Myall, is obtained in the Murray desert. The tree is identical with the species which has for many years furnished to Western Australia an article of export, but the dimensions of its stem are inconsiderable.

Acacia stenophylla, a gum-exuding tree, which graces the banks of the Murray and its desert tributaries, yields furniture wood, scarcely less valuable than blackwood.

The woods of *Bedfordia salicina* and *Eurybia argrophylla* (Musk tree), although neither of large size nor of great durability, are occasionally sought for fancy work.

The Tasmanian cider tree occurs also in the alps of Victoria.

FRUITS.

Amongst the few edible indigenous fruits, those of the bramble (*Rubus macropodus*) are not dissimilar to the raspberry. It is, however, generally in sheltered valleys only that the Australian bramble bears plentifully, although it is by no means rare along the water courses and banks of rivers. The plant ascends to subalpine altitudes.

Generally in alternate seasons, the fruit of the quandang or native peach (*Santalum Preissianum* Miq. *Fusanus acuminatus* R. Br.) may be gathered in abundance throughout the scrubby north western depressions of the colony. The fruit, notwithstanding its thin pericarp, is still one of the most largely available for food. In taste, it may be compared to acidulous apples. The order of *Santalaceæ*, offers in *Leptomeria aphylla* another fruiting bush, with berries grateful to the taste, not dissimilar to grapes.

The *Exocarpi*, also *santalaceous*, yield pleasant fruits, which in large quantities are obtained from *Exocarpus dasystachys*, but rather scantily produced by the more frequent *Exocarpus cupressiformis*. *Nitraria Billardierii* furnishes a good sized fruit in the subsaline deserts of the Murray.

The arborescent *Cissus hypoglauca* is the only plant of *Ampelideæ* found in Victoria, and offers a fruit of grape like taste. The *Mesembrianthemum præcox*, from the Murray desert and the much more common *Mesembrianthemum aequilaterale* from the coast, afford also agreeable fruits.

NATIVE VEGETABLES.

Amongst the indigenous plants which are available as culinary vegetables, the *Chenopodium auricomum* may be mentioned as a nutritious and pleasant spinage. This plant extends from the tropical regions of Australia, as far south as the Murray river.

The New Zealand spinage (*Tetragonia expansa*) is to be found in many places on the coast; whilst the equally useful *Tetragonia implexicoma*, is still more widely diffused, occurring abundantly on the whole southern coast of Australia.

The Purslane, not originally indigenous in Victoria, but now spreading over the country, is, as a vegetable easily procurable for travellers, not to be omitted on this occasion.

The roots of *Microseris Forsteri* resemble in taste very much those of *Scorzonera Hispanica*, and are, although of small size so frequently to be found on all meadows from the alps to the low lands, as to form together with the amylaceous *Typha* root, one of the principal articles of vegetable food of the natives. The bottle tree (*Brachychiton populneum*) although restricted to the N.E. parts of the colony, is here deserving of notice, the root of the young plant forming a mucilaginous esculent.

The tall cabbage palm of East Australia, (*Livistonia Australis*) reaches in Gipps Land its southern boundary.

GUMS, RESINS, AND DYES.

The gum of the "wattle" *Acacia* is principally obtained from *Acacia mollissima*, *A. dealbata*, and *A. pycnantha*, these being not only more universally diffused over the colony than most other arborescent species, but also more prolific in their yield of gum. This gum, although generally less transparent and pale than the genuine gum arabic and of less solubility, is nevertheless very valuable for gluing purposes, cotton printing, &c., having the advantage over the Arabian, Nubian, and Senegal *Acacia* gum, in being less brittle after application. In transparency and solubility it is surpassed by the gum of *Pittosporum acacioides* and other *Pittosporums*, none however being sufficiently gregarious to render their products readily obtainable.

The Sandarac resin can be rather abundantly gathered from the *Callitris verrucosa* (*Frenela crassivalvis* Miq.), a pine which is not unfrequent along the sandy tracts of the Murray, and is scattered also sparingly through the interior, extending westward and northward to Shark's Bay and Arnhem's Land. The similarity of its exudation with that of the Mediterranean Sandarac pine is evident.

From the balsamic resin of the grasstree (*Xanthorrhoeas*), in many aspects akin to Benzoin, a fragrant spirituous varnish can be prepared. The resin has been used for fumigation and in the preparation of sealing wax. It has also been employed as a Nankin dye for calico. Investigations seem hitherto not to have pointed out any important dye-plants indigenous in Victoria, although it may be presumed that some of our various woods and herbs may yield such; and indeed the berries of *Hymenanthera* have already been found to furnish a lasting violet pigment.

FIBRES.

The Victorian and South Australian stringybark tree claims particularly our attention amongst those indigenous plants yielding fibres. The thick fibrous bark, employed by settlers whenever obtainable as their first roof, is devoid of tenacity, but may, as experiments have shown, be employed for the manufacture of a rough kind of paper, although of brittle texture.

The bark of *Sida pulchella*, and of various *Pimeleas*, and of *Brachychiton* affords to the natives the means of making cordage, but none of these fibres can be compared in yield to those which European culture has now made universally available.

MEDICINAL PLANTS.

For investigations into the medicinal properties of plants, a wide field is evidently still open. What we have hitherto learned in this direction has been principally through the guidance of systematic botany, which, whilst it reveals the structural affinities of plants in a comprehensive view, points also generally to the close similarity of their properties. Thus we learn that, for the European gentianeous plants, used so extensively as tonics, Australian species may be substituted, such as the *Sebæa ovata*, which abounds during the spring in our meadows, or *Sebæa albidiflora*, an annual plant scattered over the subsaline pastures of the coast tract, or *Erythræa Australis*, occurring in humid localities. It appears also that the closely allied order of *Goodeniaceæ* offers, in numerous species, a substitute for gentianeous plants.

Pervaded with tonic bitterness are also most of the *Comespermas*, which in our colony replace the *Polygalas*.

The root of *Lavatera plebeia* has been brought into practical use instead of *Althæa*. The bark of the well known Australian *Sassafras* tree is employed as a tonic and stimulant. Its powerful bitterness, probably depending on an alkaloid, is combined with a pleasant peculiar aroma. As this valuable and beautiful tree abounds in many of the fern-tree gullies of Victoria, New South Wales, and Tasmania, it is not unlikely, that it will some day, when its medicinal properties are more appreciated abroad, form an article of export from these colonies.

The numerous diosmaceous plants, which ornament in varied forms almost every part of the colony, from the summit of the alps to the scrubs and forests of the lowlands,

deserve notice, as possessing more or less sudorific and diuretic properties, in which respect some of them may be compared to the Bucco.

More attention should be directed to the circumstance, that all the myrtaceous plants, which throughout Australia constitute the main part of the timber, and generally also of the scrub vegetation, yield in a greater or smaller degree an essential oil. Unlimited quantities of Eucalyptus and Melaleuca-leaves might be turned to account by the simple process, by which in India from the leaves of Melaleuca Leucodendron, the Cajuput oil is obtained. The oil of the leaves of the redgum tree is similar in flavour to the Cajuput oil, and may be safely used instead of the latter in spasmodic and rheumatic affections. The Eucalyptus leaves have, on account of their abundance of volatile oil, been used already for the manufacture of gas in lighting the township of Kyneton.

It is also worthy of record that a bark of equal properties with that of Mezereon, may be obtained, as the natural system prognosticated, from our Pimelea. Nothing, for instance, can surpass the mezereon-like acidity of Pimelea stricta. The gum resin of Eucalyptus resinifera and other species, has, since the early days of the Australian settlement, been occasionally exported as New Holland Kino; and, being a powerful astringent, it is entitled to our attention, particularly when we remember in what vast quantities it is obtainable in every part of Australia. In domestic medicine it has been often employed against diarrhoea. It is not improbable that the Gipps Land Smilax latifolia may serve the purpose of sarsaparilla, this being the only Victorian plant allied to the genuine American drug. The pungent juice which pervades all parts of the so-called pepper tree, Drimys aromatica (Tasmania aromatica R. Br.), affords another instance how felicitously the natural system of phytology can be applied for ascertaining properties of allied species, although they may belong to very distant countries. This tree supplies us here with the Winteran bark of Magellan Straits.

The saccharine secretion known as Australian manna is occasionally, during the hottest months of the year obtainable in considerable quantities from the leaves and tender twigs chiefly of the Eucalyptus viminalis, but containing no mannite, it cannot be regarded as a substitute for Ornus manna. The exudation, which incrusts now and then the bark of Myoporum platycarpum, a small desert tree, resembles raw sugar.

The wattle bark, chiefly from Acacia mollissima and pycnan-

tha, is used medicinally as an astringent; but technically it is employed in all our tanneries, and formed, previous to the Australian gold era an article of export to the English market. The gum resin of the *Eucalypti* is likewise employed for tanning.

The abundance of salsolaceous plants, as well inland as along the coast, favors evidently the manufacture of soda.

There are few plants indigenous to Victoria, as far as known, which may be regarded practically valuable for their perfume; none of them would supersede in odor or in yield of essential oil any of those already elsewhere in use; but it should be remembered that many of our native plants are as yet imperfectly examined in this respect, and it is, therefore, possible that future experiments may prove the existence of plants possessing a sufficiently copious supply of scented oil to render them available for distillation.

The great prevalence of myrtaceous trees and shrubs throughout Australia is a well established fact. All, without exception, are characterized by the presence of a greater or lesser quantity of essential oil, pervading leaves and flowers. This applies not only to the huge masses of *Eucalypti*, which mainly constitute our forests, and all yield, as stated before, an aromatic volatile, often, however, somewhat camphoric oil, but also to the "tea-trees," species of *Melaleuca* and *Leptospermum*, so called because their oil, which gives to an infusion of their leaves an aromatic taste either strong or pleasant, was used by Cook and other early Australian navigators as an antiscorbutic tea.

More important as perfume plants are some of the species of *Bæckia* and *Chamælaucieæ*, embracing numerous handsome and common shrubs of the myrtle family, of which some are impregnated with large quantities of truly well scented oil. But of their actual yield we have no exact record.

How far the plants of the rue tribe, which are all strongly odorous from essential oil, are of value for perfume distillation, future experiments must prove. The impression, however, will probably be correct, that they furnish an oil useful for medicine rather than for the toilette.

The plants of the mint tribe deserve here particular notice; for our three kinds of native mint possess an exceedingly pleasant odor, very different from that of the crisp or the peppermint. The species of *Prostanthera* are nearly all strongly and agreeably scented. Their oil could be cheaply

enough obtained, but would be only useful for admixture with other scents.

The *Humea elegans* has been recommended as a plant perhaps worthy of distillation on account of its balsamic fragrance.

Very many of the *Acaciæ*, indigenous to this country, produce flowers of a most agreeable odor, and a useful distillation may possibly be obtained from them. If so, this point will require more attention, as these trees and shrubs are very gregarious, and produce flowers in the utmost profusion.

V.—AGRICULTURAL AND HORTICULTURAL RESOURCES.

THE following report on the agricultural resources of Victoria has been compiled from authentic information, kindly furnished by some of our best informed agriculturists; and to render the respective resources of each district more easily understood, they have been separately considered according to the three main geographical divisions of the country—namely, that south of the Dividing Range and west of Port Phillip, and that north of the Dividing Range and south of the Murray River, and that of Gipps Land and the Western Port District.

DIVISION I.—SOUTH OF THE DIVIDING RANGE, AND WEST OF PORT PHILLIP.

Melbourne District.

The subjoined summary of the average agricultural produce of the metropolitan district, together with a statement of the crops experimentally cultivated, and other items of information, are furnished by the committee of the Port Phillip Farmers' Society.

The principal crops grown in this district, and those which succeed best, are wheat, oats, oaten hay, and potatoes, the estimated average yield being—

Wheat	...	22 bushels per acre.	
Barley	...	25	" "
Oats	...	35	" "
Oaten hay	...	1½ tons	" "
Potatoes	...	6	" "
			in those portions of the district best adapted to their cultivation.

Of the crops experimentally cultivated, beans, peas, tares, mangold wurzel, and carrots, have yielded excellent harvests, but owing to the attacks of the aphis the turnips and cabbage crops have been complete failures during the last few years. The cultivated grasses, trefoils, lucerne, &c., have been found to succeed well, as also maize and sorghum, when sown

for green fodder ; while Canary seed, millet, mustard, and tobacco have been successfully grown.

Of the imported agricultural produce, only grain for horse feed is used to any extent.

In average seasons, the cereals grow well throughout the whole of the district ; but potatoes and the other root crops are principally grown on the alluvial flats bordering the rivers, and on the volcanic soils wherever they occur.

Two crops are taken occasionally off the land in the course of a twelvemonth ; viz., potatoes, mangold wurzel, turnips, and sorghum, succeeding oats or Cape barley, cut for green fodder in spring ; two crops of peas also have been obtained in one season.

Of the influences adverse to cultivation in the district, long droughts, hot winds, and the ravages of the aphis are the most prominent.

It is estimated, that were the means of irrigation available, the produce of the land would be doubled thereby.

It will be perceived, that the principal productions of the metropolitan district are the cereals, oaten hay, and potatoes ; indeed, for some years, the growth of oaten hay has formed the chief occupation of the farmers, and, until within the last two years was the one which, on account of the character of the soil and other circumstances, was found to yield the most profitable return.

The quality of the soils here alluded to varies from poor sandy or clayey loams, to alluvial soils of the finest description, and in volcanic soils of a very productive kind.

The report points to the hot winds and long droughts as the great disadvantages to agriculture, whilst irrigation is suggested as the most fitting remedy for counteracting them.

District comprising the valley of the Rivers Yarra and Plenty.

The principal crops grown in this part of the colony, and the average produce indicated by the returns of the Victoria Agricultural Society are—

Potatoes	...	...	5 tons per acre.
Wheat	...	...	20 bushels „
Oats	...	...	23 „ „
Oaten hay	...	...	1 ton „

On the low alluvial soils forming the banks of the rivers, where the growing of potatoes is carried on extensively, the

crops often average eight tons per acre ; and on the same land wheat has been known to yield forty bushels per acre.

The valley of the Yarra has already earned a reputation for the production of fruits of all kinds ; among which may be mentioned, as successfully grown, the vine and the mulberry ; wines of excellent quality being made from the former.

These facts point to a vast extension of the resources of the colony, in this direction, at a future day ; and it is worthy of mention that, owing to the facilities afforded, an attempt is being made to commence a system of irrigation from the Yarra, and with every prospect of success.

Geelong and Western District.

This important agricultural district exhibits a general resemblance to those previously described. The average yield of wheat is stated by the Agricultural Society of the district to be twenty bushels per acre ; that of oats, twenty-six bushels per acre ; the former succeeding best on the "chocolate," and the oats (and barley, when grown) on the stiff clay soils.

The influences adverse to cultivation are droughts, and sudden changes from hot north to cold south-west winds.

On that portion known as the Barrabool Hills the cultivation of the vine, and the making of wine, has been carried on successfully for some time, and is likely to progress.

Melton District.

The crops to which the attention of the farmers located therein has hitherto been directed are wheat, oats, and in some few instances English barley. The average yields obtained are—

Wheat	...	...	25 bushels per acre.
Oats	...	...	30 " "
Barley	...	...	22 " "

Of the crops experimentally tried, the cultivated grasses, and trefoils, are mentioned by the Melton Society as having been particularly successful, forming valuable auxiliaries (for the feeding of stock) to the indigenous grasses of the colony ; and particular stress is attached to the advantages likely to accrue to the district, could water be obtained for the purpose of irrigation.

Bacchus Marsh District.

The most important crops grown are wheat, oats, English

and Cape barley, and oaten hay, the yields per acre being set down by the Agricultural Society as—

Wheat	...	...	...	27 bushels.
Oats	...	...	...	40 „
Barley	...	...	...	40 „
Oaten hay	...	...	...	2 tons.

In rich alluvial plots, as much as eighty bushels of wheat per acre have been obtained, and the other cereals have yielded in proportion.

Villiers and Heytesbury District.

The Agricultural Association reports “That the climate is moist and genial, and by no means so subject to any drought as other portions of the colony;” “that there are no climatic influences adverse to agriculture;” “that any crops except those belonging to tropical climates grow freely;” and, “that a greater amount of good would result from an extended system of drainage on the low lying lands than by any artificial irrigation of the upper.”

As might be inferred from the foregoing account, the wheat and oat crops are grown largely and successfully; while potatoes are found to yield very heavily with comparatively little trouble in the cultivation.

The average of wheat per acre is 26 bushels, but in many places it exceeds 40 bushels per acre.

Oats	...	...	50 bushels per acre.
Barley	...	...	45 „ „
Potatoes	...	...	6 tons „
Oaten hay	...	...	2 $\frac{1}{4}$ „ „

and all root crops, artificial grasses, &c., are found to thrive admirably.

Hamilton District.

As the district represented by the Hamilton Pastoral and Agricultural Association consists principally of extensive plains, the crops, as might be anticipated, are said to suffer materially from the hot winds and want of moisture.

Oaten hay is the principal crop, but mangold wurzel and tobacco have been tried, the latter very successfully; and it is to be noted, as an important fact in connection with this arid district, “that good water can be obtained, wherever tried for, at an average depth of seventy feet.”

Colac District.

We learn from the Committee of the Colac Agricultural Society that, although the land in the district might be improved by irrigation, yet, in their opinion, the climate is so humid as not to require a resort to an expensive operation of this nature.

Except the ravages of the caterpillar, there are no adverse influences calculated to retard the progress of farming throughout the district. All kinds of root crops flourish.

The averages of the various crops are as follows:—

Wheat	...	...	23	bushels per acre.
Oats	...	...	30	” ”
Barley	...	...	30	” ”
Potatoes	...	...	2 $\frac{1}{4}$	tons ”

Burrumbeet and Lake Learmonth District.

This tract of country is considerably elevated, supplying streams to the basin of the Murray and to the southern coast. A large proportion of the soil is of the fine description locally termed chocolate soil, formed by the decomposition of the lava, and is of great depth.

The temperature here is said, in the report of the society, to be cooler and the effects of the hot winds less felt than in many other districts of the colony. All the English fruits grow to perfection, while, although the grape ripens in some localities, it is considered to be too cold, generally speaking, for a wine producing district. The crops usually grown, and found to succeed best, are wheat, oats, and potatoes, and the average yields as follows:—

Wheat	...	...	30	bushels per acre.
Oats fully	...	...	35	” ”
Potatoes	...	...	3 $\frac{1}{2}$	tons ”

The crops that have been experimentally cultivated are: English barley, mangold wurzel, and sorghum; but as it is found that the potatoes and other vegetables sometimes suffer from late frosts, the sorghum, as might be expected, has not been found to succeed well in that climate. About one-fourth of the district, or 30,000 acres, is under cultivation, and the position of the lakes, such as Learmonth and others, offers every facility for converting the land around them into irrigated meadows.

Glendaruel District.

In the Glendaruel district, which in regard to soil and other circumstances is very similar to the foregoing, we have an instance quoted by the committee of the society of the successful results of irrigation on a farm where it had been experimentally tested.

From potatoes, the crop on which the experiment had been made (the soils in both cases being chocolate of equal quality), the returns were as follows :—

Produce of potatoes, irrigated	...	8 tons per acre.
Ditto	not irrigated	2 „ „

We have an account also of an experiment instituted for the purpose of ascertaining the effects of draining on some heavy clay bottom lands in the district, where the produce of the wheat crops on the drained land was found to be 30 bushels, as compared with 19 bushels per acre off the undrained land.

From the report of the committee we also learn that two crops have been obtained in one year, viz., barley, succeeded by sixty-days' maize, grown on well-manured "chocolate" soil. Wheat is the principal crop, and barley, gram, potatoes, and mangold wurzel do well.

Kyneton District.

The committee of the Kyneton Agricultural Association state that the crops are chiefly wheat, oats, caten hay, and potatoes, of which oats seem the most successful, and mangold wurzel, sorghum, and rye, all do well.

The average yields are—

Oats	...	...	45 bushels per acre.
Wheat	...	...	25 „ „
Oaten hay	...	...	2 tons „
Potatoes	...	...	3½ „ „

Except for change of seed, there is no agricultural produce imported into the district, and the only impediments to the success of the crops are frosts and cold winds, which may in a great measure be ascribed to the general elevation of this portion of the colony.

Kilmore District.

The returns relative to the climate, nature of the soil, and crops cultivated, correspond generally with those previously given. The staple products are wheat, oats, oaten hay, and potatoes; while of the crops experimentally tried, mangold

wurzel, carrots, lucerne, and turnips, are stated by the local society to thrive admirably.

The best crops of wheat are obtained off the stiff clay soils, and of oats, off the light dry land; and it is pleasing to learn that, inasmuch as the district is subject to no adverse influence, it may be regarded as peculiarly adapted for the extension of agriculture, the proportion under cultivation at the present time, taking the area of the district as forty miles in diameter, being one acre under crop to forty acres of waste land.

Gisborne District.

From the report of the Association, we learn that on the deep alluvial and volcanic soils "abounding in that moist and elevated portion of the country lying around the base of Mount Macedon," there is every facility for carrying on agriculture.

In addition to very large crops of cereals, all the root crops and English grasses grow extremely well, as much as 60 tons of mangold wurzel having been produced per acre; and an instance is given of a ten-acre field of self-sown white clover, irrigated by one of the mountain streams, keeping as much stock as 200 acres of the best pasture land.

The average returns of farm produce are for—

Oats	...	50 to 60 bushels per acre.
Wheat	...	30 to 40 " "
Barley	...	50 " "
Oaten hay	...	2½ tons "
Potatoes	...	5 to 6 tons "

It is worthy of note, in reference to the preceding, as to all the returns of produce previously quoted, that these results have been obtained without the aid of manure of any kind; the regular application of the latter, and the systematic rotation of cropping having only very partially prevailed hitherto among the farmers of the colony.

DIVISION II.—NORTH OF THE DIVIDING RANGE, AND SOUTH OF THE RIVER MURRAY.

This subdivision of the colony is particularly well watered towards its eastern parts, which are traversed by the south-eastern tributaries of the Murray River. It abounds in patches of the very best agricultural land, and in rich pastures

intersected by ranges, barren rather than fertile ; but in many localities profusely traversed by reefs, more or less rich in gold and other metals.

Albury and River Murray District.

From the Albury and Murray River Agricultural Society we learn that—

Agricultural and horticultural operations are very primitive in places so remote and so thinly populated as the Albury and Murray River District.

The general description of crops grown, and the average yield per acre is as follows :—

Wheat	...	...	20 bushels per acre.
Barley	...	...	25 " "
Oats ...	...	...	30 " "
Maize	...	...	40 " "

Sorghum saccharatum, lucerne, Trifolium incarnatum, white and red clovers, English and Italian rye, and other grasses, hops, and cotton seem on experiment suited to the locality.

The grape vine promises to become the staple production of this locality, and there are already several vineyards, varying in extent from fifteen acres down to a quarter of an acre ; nearly every cottage having a vineyard of its own.

In the year 1850 a few Germans settled here, and in a short time were followed by about three hundred others, most of whom are experienced vigneron. Every year adds to their number, and to the extent of the vineyards.

Wine, in considerable quantity, has been produced from the different varieties of grapes, among which may be alluded to the Scyras, Malbec, Brown Muscat, Hermitage, Reisling, Carbenet Sauvignon. The quality of the wine has, by connoisseurs, been pronounced excellent.

Potatoes produce two crops annually, the second crop frequently proving better than the first ; larger experience, greater inducements, and facilities for irrigation, will bring about results little dreamt of.

There are portions of this district entirely unsuited, by the aridity of the climate, for agricultural operations. Of course, in the most rainy season, and in favored situations, instances have been known of the crops reaching maturity, and producing fairly ; but, generally speaking, it is found to be labor lost, as the crops become prematurely ripe, and the grain useless. In the neighborhood of Albury, and for twenty to fifty miles down the River Murray, the aridity of the climate is less. At Albury and upwards, during a period of ten years, a failure of crops has been unknown.

Situated as we are, possessing great facilities for irrigation, I have never known but two instances where experiments of this nature have been tried, and they were both successful, completely counteracting any natural aridity peculiar to the particular localities ; and it is only caused by scarcity of population, absence of skilled labor, and consequent expense, that a system of artificial irrigation is not more extensively employed, as the very best expedient to obviate the ill effects of dry seasons, and to improve the yield of even the most fertile places,

while hundreds of miles of country, now looked upon as useless to the farmer, could, by artificial irrigation, be rendered productive.

Ovens and Murray District.

The following extracts are from a report of the Agricultural Association :—

Wheat and oats, the latter being grown in large quantities, both as food oats and for hay, are equally successful. Wheat varies, according to the seasons, from 20 to 25 bushels per acre, oats from 30 to 50 bushels per acre, and oaten hay from 1 to 2½ tons per acre. Wheat succeeds best in the stiff clay lands and in the red loamy land with clay bottoms; oats, either in the clay or sandy soil; potatoes of excellent quality are grown in the mountainous parts of the district, but are very uncertain in other parts.

Maize and tobacco have been experimentally tried; the former succeeds well in the low lands, or alluvial flats, yielding about 50 bushels per acre, and there are good reasons for believing that tobacco can be cultivated profitably in this district.

Vineyards only six years old have yielded at the rate of 500 gallons of wine to the acre, and vines of three years old have produced 12 lb. weight of grapes to each vine; and it is the opinion of competent judges that this district is destined to become the vineyard of the colony. In this district nearly every description of fruit of the temperate zone grows well.

The uncertainty from, and the blighting effects of hot winds prevailing, sometimes from October to March, are adverse to cultivation, except in the case of the vine, which resists everything but the late frosts. But, for the last few years, we have suffered very little from the hot winds.

It is quite impossible to estimate the immense benefit which would accrue from a system of artificial irrigation, if it could be economically applied.

Seymour District.

The following extracts are from a report of the Seymour Agricultural Society :—

Wheat is the general description of crop grown in this locality; but barley, oats, and potatoes do well. The average yield per acre is as follows :—

Wheat	...	...	25 bushels per acre.
Oats	...	...	40 „ „
Potatoes	...	...	4 tons „

Maize, sorghum, lucerne, and vines promise well, and are likely to be extensively cultivated. In a wet season almost any kind of grain and fruit can be grown, and as double crops in one year, potatoes and barley will succeed if rain is plentiful.

Want of rain, hot winds, and the aphid are to be contended with. Owing to the latter, turnips and cabbages are a failure; and the oats and barley in some places have suffered from the same cause.

Castlemaine.

The Agricultural Society reports that the important crops are, wheat, oats, and oaten hay; lucerne, sorghum, maize, and turnips are also grown: the only two crops in the one year that can be depended on are potatoes after barley. Mainly adverse to cultivation is frost. Vast tracts of country are admirably situated for irrigation, and would at least be doubled in value if such a system was scientifically introduced.

Bendigo.

The Agricultural Society reports—

Oats ...	...	...	30 bushels per acre.
Wheat	...	...	20 " "
Cape barley	...	...	40 " "
Oaten hay	...	...	30 cwt. "

Maize, sorghum *sacharatum*, millet, ryegrass, lucerne, mangold wurzel, English barley, clover, white and yellow, have been experimentally cultivated with success. Rape and turnip are subject to blight.

Oaten hay or green barley may be succeeded in one year by maize, sorghum, mangold wurzel, potatoes, or turnips.

The influences adverse to cultivation in these districts are drought, hot winds, and unseasonable frost.

Artificial irrigation would be universally beneficial as a corrective to the prevailing drought, but it has not been hitherto attempted, labor being too expensive.

Carisbrook District.

The Agricultural Society reports that—

The crops, and their average yield per acre, are as follows:—

Wheat	...	...	25 bushels per acre.
Oats	...	...	30 " "
Barley	...	...	25 " "
Potatoes	...	...	1½ tons " "
Hay	...	...	1½ " "

The crops experimentally cultivated are as follows:—Maize, lucerne, sorghum, tobacco, hemp, carrots, parsnips, and turnips.

The imports into these districts are very large, chiefly oats, flour, and potatoes.

Wheat, oats, barley, and lucerne, are most suited to the soil of these districts.

Hay and potatoes for a double crop.

Adverse influences are late frosts, early hot winds, and want of rain.

The introduction of a system of artificial irrigation would probably double the producing property of all the land.

DIVISION III.—SOUTH OF THE DIVIDING RANGE, AND EAST OF PORT PHILLIP.

The county of Mornington, lying immediately to the west of Port Phillip, is the only part of this large district in which agriculture has been carried on to any extent. In it we learn that wheat, oats, and potatoes, form, according to information kindly furnished by the Mornington branch of the Port Phillip Farmers' Society, the principal articles of cultivation. The average yield of wheat has been 22 to 23 bushels, that of oats 31 to 32 bushels, and that of potatoes 5 tons, per acre. The cultivation of mangold wurzel, onions, tares, peas, beans, and all the varieties of clover, has been tried with very great success. Sainfoin, kohl rabi, and carrots, likewise succeed well. Sorghum does not yield so good a harvest in the Mornington district as more inland; but the cooler climate of this part of the country renders English fruits generally prolific; apples especially so. In favorable localities two crops are obtained, either of potatoes, or of green fodder succeeded by potatoes, or of peas, or of the latter and potatoes.

The difficulties encountered by cultivators in this district are heavy rains during the winter months. Damage to the ripening grain is occasionally done by caterpillars, and to turnip and cabbage fields by the ravages of the aphis. Drainage and irrigation, for which there are great facilities, would contribute largely to the agricultural prosperity of the district. It may be worthy of note to state, in connection with this question, that in the Mornington District an area of more than 100,000 acres could be, by a judicious outlay, reclaimed and rendered highly productive. This area is at present covered with stagnant water, but as there is a sufficient fall of the country towards the coast, a very moderate expenditure of money would provide for laying it dry, and at the same time would afford great facility for irrigation. It has been estimated that these measures could be effected at a cost of about 10s. per acre; and the subject has attracted considerable attention from many experienced residents, well qualified to form a correct opinion of the feasibilities of the project.

Turning, finally, to the agricultural capabilities of the south-eastern part of the colony, comprising the district of Gipps Land, we have one of the most promising, but still least generally known and appreciated, tracts of the colony before us.

Isolated by natural boundaries—which are formed northward by Alpine mountains; eastward and westward by morasses,

swamps, and ranges (the latter clothed with dense underwood); and southward by a coast hitherto accessible to vessels at few points—this part of the colony has remained as yet but comparatively scantily populated; and its resources have become, therefore, but sparingly developed. Yet the serenity of its lowland climate, and the extensive fertility of the soil, offer every inducement to the agriculturist to settle in the district.

Whilst the influence of the Pacific Ocean renders the climate of the eastern part of Gipps Land milder than in equal latitudes westward, and whilst the Alpine ranges afford a shelter to the country against the distressingly hot winds, to which many other parts of the colony are subject, Gipps Land enjoys also the great advantage of possessing a never-failing supply of water from mountain streams, available for extensive and easy irrigation; and many delightful ever-verdant valleys run back into the ranges. All this combines to open there for husbandry a most extensive field of operation.

If we further take into consideration that a considerable tract of the territory promises to be auriferous, and that probably, ere long, the activity of the miners will enliven the solitudes of the Alps, it cannot be otherwise than gratifying to learn that, however limited the information hitherto gained on the agricultural productiveness of this part of the country may be, all that we have learned has proved satisfactory in so a high degree, and augurs so well for future prosperity. Thus we are informed by A. McMillan, Esq., the discoverer of Gipps Land, that not less than 80 bushels of maize per acre, for several successive years, have been obtained on that gentleman's estate on the Avon river, whilst the yield of wheat amounted to 35 bushels, oats 50 bushels, barley 45 bushels, and, on an average, potatoes 6 tons to the acre. A double crop of potatoes is not uncommonly gained from the same piece of ground. The proprietor of Clyde Park, the Honorable R. Thomson, estimates the average produce of wheat during three years in newly ploughed land at 18 bushels per acre. The harvest during the subsequent years yielded from 24 to 28 bushels per acre, without manure, for a series of years. Oats, on previously worked land, were produced on the same estate at the rate of 30 to 38 bushels per acre. The average yield of potatoes may be fixed at about 4 tons per acre. Lucerne is extremely prolific, so many extensive localities being suitable to its growth.

John D. Smith, Esq., obtained at his farm at Lindenau an average yield of 35 bushels of wheat, about 50 bushels of oats, 40 bushels of barley, and 6 tons of potatoes per acre. Vines,

fruit trees, and vegetables also thrive there exceedingly well. It is in the mountainous regions of Gipps Land that the culture of rye is likely to be more successful than elsewhere within the Victorian territory.

The accomplished first explorer and settler of this beautiful part of the colony, states, that vines, fruit trees, and currant bushes, &c., attain the greatest perfection. Apples grown at the Avon orchard attained a weight of 18 $\frac{1}{4}$ ounces.

Mr. McMillan finally remarks, that whenever a good road is formed from Port Albert through Gipps Land, this district would soon prove the garden and granary of the country.

How much remains yet to be done for tillage there may be ascertained by the fact, that of the extensive territory of North and South Gipps Land, comprising about 10 millions of acres, only about 3000 acres have been hitherto under cultivation.

It should, however, not be forgotten, that some very extensive tracts of Gipps Land are unavailable for cereal cultivation. Fertile meadows alternate with heath-ground and swamps, and open valleys with densely timbered, often barren, and scrubby ranges. The vast swamps may however one day be turned to profitable account by the cultivation of the New Zealand flax, a plant of vigorous growth in our climate, and requiring scarcely any attention in its cultivation. The machinery for separating the very tenacious fibre from the leaf has lately received so many improvements as to let us foresee that a staple of export may hereafter be obtained from the cultivation of this plant.

Some settlers, with wise foresight, have already turned to practical advantage some of the swampy tracts, by forming willow plantations, with a view of obtaining material for basket-work, no willows, nor any good substitute for them, being indigenous in Australia.

GENERAL REMARKS.

Throughout the colony millet might undoubtedly be cultivated with success, as well adapted to resist the droughts. The cultivation of tobacco has hitherto not been frequent; but the results obtained lead us to anticipate that a very superior article may be produced, both to meet our own wants and for export.

The white mulberry tree has become more and more distributed over the colony; and growing, as might be expected, with great facility in this climate, there cannot be the slightest doubt that ere long the rearing of the silkworm

will add a new and important branch to the resources of the country.

Many plants which a few generations hence may possibly add largely to the indigenous resources, are as yet not even introduced into the country. Might not our subalpine moors and forests produce an abundance of the pleasant fruit of *Vaccinium Myrtillus* and the other fruit shrubs of the colder climates? Might not fields of liquorice be grown here with advantage, in a climatic zone alike to that of its native country? Might not the Carob tree, which bears for a long succession of years, be grown not merely as an ornament of our gardens, but also for obtaining its fruit for cattle forage?

Much might be done for the improvement of our pastures by the introduction of nutritious perennial grasses. Besides the superior fodder herbs generally known, the *Bromus unioloides* has of late been deservedly recommended, as resisting the drought of the climate. The Chinese tea-plant grows vigorously in the milder parts of the colony. The cork-oak exists as yet but sparingly in Victoria, though our climate would invite the extensive cultivation not only of this useful, beautiful, and umbrageous tree, but also of the many other useful plants indigenous to, or cultivated in, the southern part of Europe, such as the Senna, the Mastix tree, the Ballota oak, the Tragacanth plants, the Manna ash, &c.

Scarcely any of those American oaks, valuable for their edible acorus, seem hitherto to have found their way into this country. Amongst pines with edible fruit, the stately *Araucaria Bidwillii* has been rather extensively distributed over the country, and is found able to resist both the occasional frosts of our rainy seasons and the sirocco of our summer, though, from its circumscribed geographical limits in the moist forests of Eastern Australia, this result was hardly to be expected. The same observation applies to the still rarer Dammar pine of East Australia, which is very closely allied to the Amboina Dammara, and should, for the usefulness of its timber for masts, and for its resin, be established in our forests; and, singular though it may appear, this species is much better adapted to our climate than the New Zealand kauri. The cones of *Araucaria Bidwillii* are perhaps the largest of the coniferae, approaching in size to cocoa nuts. *Araucaria imbricata* proves here of less celerity of growth than *A. excelsa*, *A. Cunninghami*, or *A. Bidwillii*. The useful stone-pine is well adapted to our climate, but as yet but little distributed over Victorian territory. Many of the Himalayan pines are gradually finding

a place in our arboreta; amongst them the noble and quick-growing Deodar will no doubt one day furnish us with its excellent timber. The Totara pine is here of quicker growth, and resists better the dryness of our summers (even on exposed localities), than any other New Zealand pine. The Norfolk Island pine, although the product of an insular most equable clime, raises its majestic form, even in unfavorable localities, notwithstanding the great changes of our atmosphere, and should, after a series of years, form a prominent and picturesque feature in all our landscapes. Of numerous other famous pines no observations on their relative value to this country can as yet be adduced, the various kinds being either not yet or but recently imported into Victoria. On the whole, however, almost all introduced coniferæ exhibit a most promising appearance. Thus, the huge *Wellingtonia gigantea* so far confirms our expectations of seeing it one day a prominent object in our vegetation.

The red cedar of East Australia, so highly valued for its timber, is perfectly hardy in the low lands of the colony. Its consociate, the Australian India-rubber tree (*Ficus macrophylla*), as well as the genuine caoutchouc tree, might also be cultivated with advantage; both species being little susceptible to the occasional inclemency of our climate. The cultivation of the saffron has, like many other branches of industry requiring a low rate of labor, never as yet been attempted, although the plant is well suited to a climate which ripens the grape.

Madder is of luxuriant growth, but not yet cultivated for practical purposes.

As the isothermal zones would lead us to expect, most of the Chinese plants have adapted themselves to our seasons. The camphor tree and the grass-cloth plants grow luxuriantly; and the rice-paper plant, and the tallow tree also, will probably succeed.

The tamarind tree may possibly be acclimatized in the milder parts of the colony. The castor oil plant vegetates with the utmost luxuriance.

It is not at all improbable that the mountain rice will succeed in the warmer and readily irrigated eastern parts of the colony.

The *Lygeum sparteum*, or South European Rope Grass, is not yet introduced into Australia, but the equally valuable and extremely tenacious leaves of the New Zealand flax serve here as a crude cordage. The S. European Tanner Sumach

is as yet no where cultivated. The true box tree suffers in any exposed localities from drought.

The various species of the cotton genus are too tender to ripen their seeds, at least in the southern parts of Victoria. Rhubarb has not yet been cultivated for its medicinal root, nor the South African species of aloe for their gum-resin, although the latter might in many barren districts be brought to perfection, where no other crop is attainable.

Neither the cultivation of sugary, nor of hops, has hitherto been effected to any extent in Victoria. Arrowroot has been obtained from plants grown even in the southern parts of the colony. Opium culture, as well as the culture of flax, hemp, and oleaginous plants, will be reserved for the future days of the colony. The excellence of the Australian olive oil has been sufficiently acknowledged in the great exhibitions of London and Paris. Almonds yield here an abundant crop. The bamboo, which now develops itself in all its grandeur as far south as Port Jackson, will undoubtedly afford its useful cane at a later period to the warmer parts of this colony, and the superb Nile Papyrus should be its companion.

The cultivation of forest trees has been no where yet commenced. But it is evident, that the present indiscriminate destruction of many of our forests, and the future increasing want of timber, will render this important branch of industry remunerative if not necessary; and it would be a wise foresight to raise in time forests of such trees as are most useful for the mechanic, and as have been found by experiment to succeed in the colony. By these means in many dry districts, the climate would also be ameliorated. As the Scotch fir produces best only in the colder regions, it might be recommended for timber plantations in our high lands, where it would, when grown on an extensive scale, be less than elsewhere endangered by bush fires. Small fir plantations on private grounds have been made already in South Australia. Since Victoria possesses extensive tracts of moist country, it seems well worthy of consideration, whether the invaluable red cedar of New South Wales, which is known to be hardy in our latitudes, might not be established and afterwards naturally disseminated in favorable spots now lying waste.

For the same purpose we may point to the East Australian Kauri, which whilst it seemingly possesses all the excellent properties of the New Zealand Kauri, proves here much more readily acclimatized. That the Kauri pines exhibit unusual durability of timber seems not generally known, but may

be demonstrated by the fact, that a Kauri which was felled eighty years ago at the Bay of Isles, and has since been continuously exposed to the influence of wet climate, was lately found, according to information of F. E. Maning, Esq., of Hokinga, perfectly sound. On account of this durability, the Kauri wood is recommended for telegraph posts and railway sleepers. We may choose from amongst many other trees, which it would be tedious here to enumerate, for introduction into our forests.

HORTICULTURE.

For the following valuable information on the culinary vegetables, and the orchard produce of the colony, we are indebted principally to Mr. F. Smith, of Melbourne.

During the last years our kitchen gardens have been, by the introduction of improved varieties of culinary vegetables, enriched to such an extent, that our assortment in point of value can bear comparison to that of England.

The climate is admirably adapted for all European vegetables, from the old Scotch kail to the delicious melon, the latter surpassing those of English growth in flavor and tenderness. Yet the climate is not without drawbacks to the culture of vegetables at certain seasons, such as long continued droughts with severe hot winds during the summer, or as heavy rain during the winter, when culinary crops suffer most severely in untrenched and undrained soils. But our spring and autumn are so congenial to growth, that amazing crops are produced even with the most simple modes of treatment.

The soils used for growing vegetables vary from the stiff adhesive clay to the sterile sandy soils, the worst of which produce crops to advantage at some season, when properly managed; but the most productive of all are either the deep brown loamy or black vegetable soils, well pulverized and free of stagnant water.

The best situations are low banks, sloping to the rivers or creeks, and low flats, if not subject to floods, with almost any exposure, the north being the least favorable. Where the site is on a declivity, the upper portion is selected for crops of winter growth, and the lower portion generally for crops of summer growth.

A few remarks on some of the leading crops will assist in

giving some idea of the culinary vegetable resources of this colony.

Cabbage.—Good supplies can be had daily all the year, as far as the growth of this wholesome and nutritious vegetable is dependent on climate. But the aphides have become so destructive during the last four years that crops can only be brought to perfection by great skill and attention; the chief remedies seem to be a perpetual examination of the plants, and frequent liquid stimulant applications, principally of guano, to the young growing crops; and it is worthy of remark that, in localities with cold underground the ravages of the aphis are more readily subdued than elsewhere.

Carliflower.—The principal crops are fit for use in June and July, and from October to January. To this as well as to all other brassicas, the aphides have become so very destructive that it is now comparatively little grown; but it was previously cultivated extensively, and under favorable circumstances produced very large heads of superior quality.

Peas.—Supplies can be had daily all the year round, but are sparingly to be got in very wet winters. The chief crops are available from October to January, then less abundantly obtained till March, and largely again till June. Although all English varieties are productive, dwarf sorts preferable.

Broad Beans are generally less esteemed, because of the wet winters, which cause them to produce only haulm and flowers, and the dry summers, which exhaust their fruit-bearing properties. They are only successively productive from October to December.

Kidney Beans are excellent summer crops, withstanding hot winds well, and forming an excellent substitute for peas, when the latter become scarce in midsummer. The supplies are available from November till May. Seeds ripen freely.

Onions.—Young green onions may be had daily; but the principal crops of those intended for keeping ripen only from November to February. They are cropped extensively, and their production is large and fine. Seeds generally mature well.

Carrots.—Daily supplies can be had without any difficulty. The chief crops are ready in January, and the winter storing crops two months later. They are extensively cultivated, and in size and flavor they are superior to those of England. Seeds generally mature well.

Parsnips, although long neglected, are now very requisite and esteemed. The main crop is ready in January,

and continues on till July in deep good soils ; they grow exceedingly large, and are very superior in quality.

Turnip.—Spring, summer, and autumn crops can be with difficulty obtained on account of the prevailing destructiveness of the aphis, and the dry hot nature of the climate.

Potatoes.—Three crops may be produced in one twelve-month ; one in May, the leading one on early soils in October and November, and another on late soils in January and February. They are, as may be imagined, extensively grown, producing heavy crops of fine quality, but their keeping properties are shortened on account of the mild winters.

Asparagus, Rhubarb, and Seakale bear very abundantly in their seasons. The former may be regarded as quite equal to any grown in England. Rhubarb produces good stalks in spring, gets rather exhausted and dormant in midsummer, and again grows freely in autumn. Seeds of the former only mature well.

Cucumbers and Vegetable Marrows.—On tolerably good soils there is no more trouble or care bestowed in the sowing and growing of these crops than there is with any common vegetable, they being simply sown during October in patches, each 5 to 7 feet apart, and if they are not destroyed in their infancy through cold winds, they are allowed to grow to run over the ground until they cover it. At this stage the plants furnish an abundance of beautiful tender fruit, some of the finest of the cucumbers measuring 20 to 24 inches, and even more. Supplies are obtainable from December to the end of May.

Melons.—The rock and English green and yellow fleshed varieties being more of a rich heavy nature, although not quite so much appreciated as others, are grown in very large quantities. These commence ripening their fruit about the end of January. The crops generally are very heavy, the plants having 6 to 8 fruits each, weighing from 4 to 10 lb.

Tomatoes are sown in October, and ripen their fruits very profusely from January onwards.

The above remarks apply more particularly to the gardens in the environs of Melbourne.

The Chinese yam has recently been cultivated, and promises to become an additional table vegetable of the colony. The long-podded Chinese bean, *Vigna Chinensis*, is found to be hardy in Victoria, and would unquestionably luxuriate in the northern districts.

THE ORCHARD PRODUCTS.

Perhaps there is not a more favored land upon earth than Victoria for producing, in abundance and perfection, a variety of the finest fruits, whether these are considered as a mere article of luxury, or as constituting one of the necessaries of life adapted to the wants of man in this hot climate, or as likely to become one of the staple articles of our commercial exports at no distant period. Nearly all the fruits that can be cultivated in any of the temperate latitudes can be produced here in the briefest space of time with the most certain success. However sterile and unpromising the land may appear, the simple act of breaking up the earth, and of introducing drainage when necessary, appears to act as magic on the newly-planted ground, converting the barren looking wilderness into the fruitful garden.

It is astonishing to observe how very rapidly and how vigorously the trees grow, when placed in favorable situations, under good treatment. But horticulture has to contend with the long parching droughts of the summer months, experienced particularly in low open districts, and occasionally with fierce burning winds, which, in some years, have had the effect of destroying the crops of fruit on the trees. A hot wind, however, seldom continues for more than two or three days at a time, and is almost certain to end in a good fall of rain, which soon rallies up the exhausted powers of vegetation.

Fruit realized this season the following average prices:— Apples, 1d. to 8d. per lb.; pears, 2d. to 1s.; plums, 3d. to 6d.; cherries, 6d. to 1s. and 1s. 6d.; apricots, 6d. to 1s. per dozen; peaches, 2d. to 1s. 6d. per dozen; walnuts, 3d. to 6d. per dozen. This may suffice to show that fruit is freely available for all classes, both for dessert and cooking purposes; and the community will no doubt soon be placed in a position to provide for the preservation of fruits on an extensive scale. The reasons why, comparatively speaking, but little land is as yet devoted to this lucrative and pleasant branch of industry, may be sought in the slow return for the capital expended, as long as the price of labor and the outlay for garden land continued so unusually high.

An eastern aspect, having a gentle declivity, is here the most eligible for fruit gardens; the trees are there least exposed to the inclemencies of the climate, such as late spring frosts, hot winds, and heavy rains. It is invariably found that, upon naturally sandy poor soils fine fruitful orchards can be

established under good management, when the choice, loamy, deep soils are not available. The deep alluvial cool soils along the river banks are very suitable for all kinds of stone fruits, and rich gravelly bottoms of the hill sides for apple, pear, quince, mulberry, &c.

None of the small English fruits, such as the gooseberry, currant, raspberry, or strawberry, succeed well, except in cooler valleys, or mountainous elevations, where they always attain the highest perfection for quality and productiveness.

A few remarks on the leading kinds of fruits will assist in judging of their comparative value in the colony.

The Loquat Trees delight on warm gentle slopes of hills on good soils, where they produce in some seasons very good crops of fine, large, well-flavored fruit.

The Quince Trees grow and bear to perfection, the banks of the rivers along the margins of orchards, being often thickly bedded with them; they also succeed admirably well on higher grounds.

The Walnut Tree is here highly prized for its stately grandeur of appearance, as well as for its abundant fruit; but to develop the tree to perfection, a cool, deep, loamy soil is needed.

The Sweet Chesnut is perhaps improperly placed here, but as it is invariably found in the orchard, we have classed it accordingly. When planted in a cool, deep, loamy, porous soil, in sheltered localities, it grows well enough.

The Apple Trees succeed here admirably well, especially when planted in a good well prepared situation, and properly treated after the first five years' planting. The fruit of this season was very fine, and yielded generally a good crop. Six apples of the custard variety grown, on the banks of the river Plenty, produced 7 lbs. weight. American blight is very destructive in many orchards, chiefly after being established eight or ten years. We are very deficient in all those newly imported varieties now cultivated in England.

The Pear Tree also succeeds remarkably well, attaining to perfection both in point of flavor and amount of produce. Some varieties of pears are not unfrequently found to weigh from, $1\frac{1}{2}$ lb. each up to $2\frac{1}{2}$ lbs.

Peach, Nectarine, and Apricot.—Perhaps there are no fruit trees which are more prolific here than these, whether as regards their vigorous growth, or the ample crops of fruit.

The Cherry and the Plum grow vigorously and produce

heavy crops of beautiful flavored fruit, equal, if not superior to those of English orchards, both in size and quality.

The Fig Trees grow to perfection, some varieties bearing their two crops in the year freely. The leading varieties are green and white Provence, green and brown Ischia, and Smyrna. It may be expected, that dried colonial figs will eventually supersede those imported.

The Black Mulberry Trees are reared with ease. Their compact habit renders them very ornamental, whilst they prove bearers of very superior fruit.

Oranges and Lemon Trees.—Although there are some few orangeries in favorite spots around the vicinity of Melbourne, yet they are generally planted in smaller quantities in the warm places of orchards, or in clumps on lawns more for the sake of ornament and variety than for profitable purposes. The most suitable situations for them are on warm declivities, having a good deep friable, dry, porous soil, in which they will attain the height of 15 feet, and form fine compact bushy heads. Single trees are known to have produced in one season upwards of 200 fine sized well ripened oranges; such a crop, however, is considered as yet an exceptional one. Hitherto the cultivation of oranges has not been remunerative in this colony, since oranges are largely and cheaply imported from New South Wales. In cold situations the orange and lemon trees are here neither healthy nor productive, but they prosper in the northern districts.

The Vine.—Amongst the branches of husbandry yet to be extensively developed, the cultivation of the vine will be one of the most important in this colony, the climate throughout the greater part of our territory being exquisitely adapted for the prolific growth of vines, although the severity of hot winds and long continued droughts occasion sometimes rather severe losses of fruit, and cold winds and early spring frosts are detrimental to the expanding flowers of vines planted in low and damp localities. The blight has, during showery seasons, in some localities affected the vines.

The vineyards hitherto established in various parts of Victoria comprise approximately an area of 600 acres. It seems, however, that their extent is annually increasing without a corresponding increase in wine manufacture, and, thus, notwithstanding some failures of grapes through the long lasting drought of this season, the Melbourne market is more plentifully supplied than ever with table grapes, prices ranging from 1½d. to 6d. per lb. There have been instances

even this season of an average weight of 25 lbs. of fruit on vines three or four years old, bunches attaining a weight of upwards of $2\frac{1}{2}$ lbs.; and it may be expected, that whenever the training of the vines is regulated more generally according to the particular climate of the locality in which they are established, with due reference to the varieties chosen, and by a more general adoption of the training on espaliers, that not only a considerable increase in the productiveness of some of our vineyards might be secured, but also often a fruit of superior quality. Instances are recorded, that this season in the vicinity of Melbourne, the return of grapes obtained by trellis training proved two tons per acre from vines two years old, whilst of several varieties, including the Muscat, Frontignac, Chasselas, &c., the produce obtained on adjoining land from plants of the same age, grown on the low stool and gooseberry bush fashion, was limited from five to eight cwt. per acre.

The space assigned to this document permits not to enter into details on the prospect of yield which the respective varieties of the grape hold out in the various localities of this country, and under varied climatic influences. The observations, moreover, on well-established varieties in different parts of the colony are as yet much scattered, whilst some important sorts have been only very recently introduced. Many of the northern parts of Victoria, however, bear so close a resemblance in point of climate with the territory of our western neighbors, that even the tender varieties, such as the Roussillon, will in all probability be luxuriantly developed. Wine made of the Scyras grape sold wholesale in South Australia at 20s. per gallon, and that prepared of the Mataro at 12s. per gallon; both of these grapes being well adapted to certain localities of that country.

The rapidity of growth of the vine in these latitudes is most encouraging for their culture. An experienced vine grower compares our plants at the age of three years to those of seven years' growth on the Rhine.

If the best varieties of raisin grapes were chosen for our vineyards, we cannot for a moment doubt that raisins of unsurpassed qualities may be produced at least in the milder and drier parts of the colony.

We may be permitted to introduce here a list of those varieties of vines which Mr. Alfred Seidel, near Geelong, has proved by many years' experience to be particularly adapted to the southern parts of the colony:—

The varieties of grape which are, up to the present time, known to yield the best produce in the vineyards near Geelong, are as follows:—

Black Grapes.—Hermitage, Black Cluster, Black Burgundy, Black Esparte, Carignan, La Gloire (Liverdun).

White Grapes.—Madeira, Verdeilho, Riesling, Chasselas, Gouais, Pineau blanc, Pineau gris.

The best of the red wines have been made from the Hermitage. This wine will keep very long, and will arrive at its prime after being about five years old.

Black Cluster and Black Esparte together yield a splendid wine, approaching in flavor to a strong Burgundy wine.

Black Burgundy is, with respect to quality, superior to Black Cluster, but inferior in bearing.

Carignan approaches in quality the Esparte; is a prolific bearer, but is subject to blight.

La Gloire (Liverdun) yields a light wine, of not very great value; but its bearing capabilities are very prominent.

Madeira yields a strong, well-keeping, excellent wine.

Verdeilho of equal excellence.

Riesling, ditto.

Chasselas yields an agreeable, soon drinkable wine.

Gouais yields a wine similar to Sauterne, but stronger, and is a prolific bearer.

Pineau gris and blanc yield excellent, fiery wines, but not in large quantity; nor do these wines keep well.

One acre of vines well laid out and well kept will give an average yield in this colony of from 300 to 400 gallons of wine; but there are particular varieties of grapes which would yield double the quantity, though it should be kept in mind, that the general rule puts the more prolific bearers among those of less excellent qualities.

In concluding this sketch of the agricultural and horticultural capabilities of Victoria, we append the respective statistic tables, obligingly furnished for this purpose by W. H. Archer, Esq., Registrar-General of Victoria, showing the extent of land under occupation and under cultivation, and the totals of crops produced in this colony during the season 1858–1859.

SUMMARY OF VICTORIA.

COUNTIES AND PASTORAL DISTRICTS.

TABLE I.—Showing the Number of Holders of Purchased Land, the extent of their Holdings, the Quantity of Land Enclosed, the Area Cultivated and Uncultivated, and the Extent in Statute Acres under each description of Crop, for the Year ending 31st March, 1859.

COUNTIES AND PASTORAL DISTRICTS.	Number of Hold- ings exceeding 1 Acre.	Total extent of Holding.	Total extent Unculti- vated.	Extent not En- closed.	Total extent of Enclosed Land.	Extent of Enclosed Land not Cultivated.	Total extent under Tillage.
	acres.	acres.	acres.	acres.	acres.	acres.	acres.
Anglesey	86	17,341 $\frac{1}{4}$	15,191 $\frac{1}{4}$	6,074	11,267 $\frac{1}{4}$	9,117 $\frac{1}{4}$	2,150
Bourke	3,090	548,682 $\frac{1}{4}$	476,653 $\frac{1}{4}$	133,729 $\frac{1}{2}$	414,952 $\frac{3}{4}$	342,923 $\frac{3}{4}$	72,029
Dalhousie	667	94,833 $\frac{3}{4}$	67,391 $\frac{1}{4}$	9,911	84,922 $\frac{1}{4}$	57,480 $\frac{1}{4}$	27,442
Dundas	126	42,639 $\frac{1}{2}$	41,041	32,468 $\frac{1}{2}$	10,171	8,572 $\frac{1}{2}$	1,598 $\frac{1}{2}$
Evelyn	192	45,613 $\frac{3}{4}$	41,138 $\frac{1}{4}$	8,045 $\frac{1}{2}$	37,568 $\frac{1}{4}$	33,092 $\frac{3}{4}$	4,475 $\frac{1}{2}$
Follett	14	8,041	7,950	620	7,421	7,330	91
Grant	2,289	458,496 $\frac{3}{4}$	401,858 $\frac{1}{2}$	152,583	305,913 $\frac{3}{4}$	249,275 $\frac{1}{2}$	56,638 $\frac{1}{4}$
Grenville	317	100,534 $\frac{3}{4}$	94,844 $\frac{1}{4}$	50,067 $\frac{3}{4}$	50,467	44,776 $\frac{1}{2}$	5,690 $\frac{1}{2}$
Hampden	104	121,320 $\frac{1}{2}$	119,473 $\frac{1}{4}$	67,587	53,733 $\frac{1}{2}$	51,886 $\frac{1}{4}$	1,847 $\frac{1}{4}$
Heytesbury .. .	77	40,334	38,182 $\frac{1}{4}$	4,519	35,815	33,663 $\frac{1}{4}$	2,151 $\frac{3}{4}$
Mornington .. .	217	86,911	82,141 $\frac{1}{2}$	25,120 $\frac{3}{4}$	61,790 $\frac{1}{4}$	57,020 $\frac{3}{4}$	4,769 $\frac{1}{2}$
Normanby	395	87,697 $\frac{1}{4}$	82,764 $\frac{1}{2}$	40,703 $\frac{1}{2}$	46,993 $\frac{3}{4}$	42,061	4,932 $\frac{3}{4}$
Polwarth	169	84,156 $\frac{1}{2}$	80,281 $\frac{1}{2}$	23,806	60,350 $\frac{1}{2}$	56,475 $\frac{1}{2}$	3,875
Ripon	277	61,670	47,223	15,783	45,887	31,440	14,447
Talbot	1,243	239,216	201,175 $\frac{1}{2}$	60,446	178,770	140,729 $\frac{1}{2}$	38,040 $\frac{1}{2}$
Villiers	833	195,240 $\frac{1}{2}$	168,501 $\frac{3}{4}$	47,681	147,559 $\frac{1}{2}$	120,820 $\frac{3}{4}$	26,738 $\frac{3}{4}$
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Gipps Land	244	65,386 $\frac{1}{2}$	61,854 $\frac{1}{4}$	15,238 $\frac{1}{4}$	50,148 $\frac{1}{4}$	46,616	3,532 $\frac{1}{4}$
The Loddon .. .	733	109,116 $\frac{1}{2}$	92,978	48,471	60,645 $\frac{1}{2}$	44,507	16,138 $\frac{1}{2}$
Rodney	41	13,382	11,600 $\frac{1}{2}$	5,651	7,731	5,949 $\frac{1}{2}$	1,781 $\frac{1}{2}$
The Murray .. .	400	83,700 $\frac{1}{2}$	73,899	39,428 $\frac{1}{2}$	44,272	34,470 $\frac{1}{2}$	9,801 $\frac{1}{2}$
The Wimmera ..	59	14,843	14,054 $\frac{1}{4}$	6,846	7,997	7,208 $\frac{1}{4}$	788 $\frac{3}{4}$
Total	11,573	2,519,156 $\frac{3}{4}$	2,220,197	794,780 $\frac{1}{4}$	1,724,376 $\frac{1}{2}$	1,425,416 $\frac{3}{4}$	298,959 $\frac{3}{4}$

COUNTIES AND PASTORAL DISTRICTS.

TABLE I.—Showing the Number of Holders of Purchased Land, &c., for the Year ending 31st March, 1859—*continued*.

COUNTIES AND PASTORAL DISTRICTS.	EXTENT UNDER CROP IN STATUTE ACRES.						
	CORN, PEAS, BEANS, ETC.						
	Wheat.	Oats.	Barley.	Maize.	Rye and Bere.	Peas, Beans, and Millet.	Total.
	acres.	acres.	acres.	acres.	acres.	acres.	acres.
Anglesey	660 $\frac{1}{2}$	597 $\frac{1}{2}$	44	..	..	1	1,303
Bourke	14,277 $\frac{3}{4}$	12,434	773 $\frac{1}{2}$	40 $\frac{1}{2}$	25	13 $\frac{1}{2}$	27,563 $\frac{1}{4}$
Dalhousie	5,409	13,253	495	35 $\frac{3}{4}$	14	4	19,210 $\frac{3}{4}$
Dundas	668 $\frac{1}{2}$	240 $\frac{1}{2}$	21 $\frac{1}{2}$	..	2	..	932 $\frac{1}{2}$
Evelyn	1,493	1,468 $\frac{1}{4}$	47 $\frac{3}{4}$	6 $\frac{3}{4}$	..	9	3,024 $\frac{3}{4}$
Follett	12	2	3	..	..	..	17
Grant	18,019 $\frac{1}{4}$	13,484 $\frac{1}{2}$	1,066	4	10	125 $\frac{1}{2}$	32,709
Grenville	743 $\frac{3}{4}$	2,038 $\frac{1}{2}$	91 $\frac{3}{4}$	..	..	4	2,878
Hampden	636	692 $\frac{1}{2}$	33	..	..	1	1,362 $\frac{1}{2}$
Heytesbury	1,386	185	132	..	..	4	1,707
Mornington	1,460	2,201 $\frac{1}{2}$	105 $\frac{1}{2}$	8 $\frac{3}{4}$	..	12	3,787 $\frac{3}{4}$
Normanby	2,076 $\frac{1}{2}$	579	53 $\frac{3}{4}$	..	2	..	2,711 $\frac{1}{4}$
Polwarth	1,179 $\frac{1}{2}$	1,892 $\frac{3}{4}$	61 $\frac{1}{2}$	..	1	..	3,135 $\frac{3}{4}$
Ripon	2,895 $\frac{1}{2}$	4,528	154	$\frac{1}{2}$	..	14	7,592
Talbot	6,794 $\frac{1}{2}$	15,616	582	34	3	11 $\frac{1}{2}$	23,041
Villiers	15,871 $\frac{1}{4}$	2,796 $\frac{3}{4}$	1,062 $\frac{1}{4}$	1 $\frac{3}{4}$	..	54	19,786
Gipps Land	868 $\frac{1}{4}$	702	80	8 $\frac{3}{4}$	..	..	1,659
The Loddon	840	2,213 $\frac{1}{2}$	253 $\frac{1}{2}$	47	..	5	3,359
Rodney	186 $\frac{1}{2}$	236	43	2	..	..	467 $\frac{1}{2}$
The Murray	2,751 $\frac{3}{4}$	2,260	192 $\frac{1}{2}$	290 $\frac{1}{2}$	$\frac{1}{2}$	6 $\frac{1}{2}$	5,501 $\frac{3}{4}$
The Wimmera	5	104 $\frac{1}{2}$	26 $\frac{1}{2}$	..	..	..	136
Total	78,234	77,526 $\frac{1}{2}$	5,322	480	57 $\frac{1}{2}$	264 $\frac{3}{4}$	161,884 $\frac{3}{4}$

COUNTIES AND PASTORAL DISTRICTS.

TABLE I.—Showing the Number of Holders of Purchased Land, &c., for the Year ending 31st March, 1859—*continued.*

COUNTIES AND PASTORAL DISTRICTS.	EXTENT UNDER CROP IN STATUTE ACRES.							
	GREEN CROPS (exclusive of Market and Kitchen Gardens).							
	Potatoes.	Turnips.	Mangold Wurzel.	Red Beet.	Carrots and Parsnips.	Cabbage.	Bare or Summer Fallow.	Total.
acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.	
Anglesey	214½	6	1	..	..	..	..	221½
Bourke	5,357½	13¾	29	2	7¾	30½	1,908	7,348½
Dalhousie	3,292¾	85¼	1½	¼	..	..	294	3,673¾
Dundas	140	1	..	..	..	..	..	141
Evelyn	506½	4½	..	..	..	..	71½	582½
Follett	14	..	..	..	..	..	..	14
Grant	3,758	48½	74½	1	34¾	15½	1,735¾	5,667¾
Grenville	1,126½	4	..	..	5	..	..	1,135½
Hampden	229	..	..	..	2	..	10	241
Heytesbury	313½	1	1	..	..	..	..	315½
Mornington	377½	4¼	30½	..	..	..	43½	455¾
Normanby	368½	..	..	..	..	..	17	385½
Polwarth	194¼	6½	..	..	..	..	21	221¾
Ripon	2,331½	6½	5	..	6½	10	113¼	2,472¾
Talbot	6,736½	34¼	7	..	20	8	486	7,291¾
Villiers	3,147¼	52¼	23¾	..	3½	2½	58	3,287¼
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Gipps Land	341¼	14¼	½	..	¼	..	139¾	496
The Loddon	1,031¼	37¼	9¾	..	13¾	5¼	440¼	1,537½
Rodney	48½	..	½	49
The Murray	418¼	9¾	1	½	3	2¼	616½	1,051¼
The Wimmera	79½	3	½	..	..	1	44	128
Total	30,026¼	332	185¼	3¾	96½	75	5,998½	36,717¼

COUNTIES AND PASTORAL DISTRICTS.

TABLE I.—Showing the Number of Holders of Purchased Land, &c., for the Year ending 31st March, 1859—*continued*.

COUNTIES AND PASTORAL DISTRICTS.	EXTENT UNDER CROP IN STATUTE ACRES.										
	HAY.			GREEN FORAGE.							Total.
	Cereal Grasses, Wheat, Oats, and Barley.	Rye Grass.	Total.	Cereal Grasses, Wheat, Oats, and Barley.	Maize.	Lucerne.	Clover, Vetches.	Sorghum.	Permanent Arti- ficial Grasses.		
										acres.	
Anglesey	577	6	583	..	..	5½	4	..	19½	29
Bourke	32,833¾	148½	32,982¼	657¼	167	41	1½	41¼	268	1,176	
Dalhousie	4,394½	..	4,394½	20	3	½	2	5	98	128½	
Dundas	443½	..	443½	5	..	½	..	..	4	9½
Evclyn	687¾	..	687¾	22½	5½	..	57¾	..	8	93¾	
Follett	46	..	46	..	..	..	..	..	3	3
Grant	13,920½	311	14,231½	2,377¼	20	76¾	9½	19¾	159	2,662¼	
Grenville	1,543	..	1,543	26	..	30	..	..	..	56
Hampden	222½	1	223½	..	..	..	..	..	1½	1½
Heytesbury ..	101	..	101	5	..	..	..	..	10	15
Mornington ..	334	..	334	30	3	4	9	3½	62½	112	
Normanby ..	1,474½	9	1,483½	11	..	4	1	..	158	174	
Polwarth	383	24	407	..	..	4½	5	..	50	59½
Ripon	4,032	..	4,032	85	1½	11½	4	4	35	141	
Talbot	7,259	6	7,265	75	10	10	2	8½	..	105½	
Villiers	1,936½	30	1,966½	22½	1¾	17¼	5¾	..	1,403½	1,450¾	
—											
Gipps Land ..	653¾	14	667¾	30	..	7½	225½	½	322½	586	
The Loddon ..	10,383	1	10,384	106	84	45½	..	16¾	..	252¼	
Rodney	1,126	..	1,126	134½	..	..	..	..	..	134½
The Murray ..	2,845¾	5½	2,851¼	116	19½	22¾	1	1	..	160¼	
The Wimmera ..	410	..	410	56½	..	1¾	..	½	..	58¾	
Total	85,606¾	556	86,162¾	3,779½	315½	283	328	100¾	2,602½	7,409	

COUNTIES AND PASTORAL DISTRICTS.

TABLE I.—Showing the Number of Holders of Purchased Land, &c., for the Year ending 31st March, 1859—*continued.*

COUNTIES AND PASTORAL DISTRICTS.			EXTENT UNDER CROP IN STATUTE ACRES.					
			OTHER CROPS.					
			Gardens.	Tobacco.	Vines.	Other Crops.	Orchards.	Total.
acres.	acres.	acres.	acres.	acres.	acres.			
Anglesey	10	..	$\frac{3}{4}$	..	$2\frac{3}{4}$	$13\frac{1}{2}$	
Bourke	$2,559\frac{1}{2}$	1	$88\frac{3}{4}$	$159\frac{1}{2}$	$150\frac{1}{2}$	$2,959\frac{1}{4}$		
Dalhousie	$18\frac{1}{4}$	..	$4\frac{1}{2}$	..	$11\frac{3}{4}$	$34\frac{1}{2}$
Dundas	$54\frac{3}{4}$	$15\frac{1}{2}$	$\frac{1}{4}$	..	$1\frac{1}{2}$	72	
Evelyn	$35\frac{1}{2}$	..	$34\frac{1}{4}$	$4\frac{1}{4}$	$12\frac{3}{4}$	$86\frac{3}{4}$	
Follett	10	1	..	..	..	11
Grant	$836\frac{3}{4}$	$2\frac{3}{4}$	$323\frac{3}{4}$	$89\frac{3}{4}$	$114\frac{3}{4}$	$1,367\frac{3}{4}$		
Grenville	$66\frac{1}{2}$	$2\frac{1}{2}$	5	..	4	78		
Hampden	$9\frac{1}{2}$	2	$\frac{1}{4}$	..	7	$18\frac{3}{4}$	
Heytesbury	$12\frac{1}{4}$	..	1	..	..	$13\frac{1}{4}$
Mornington	69	..	$1\frac{3}{4}$	..	$9\frac{1}{4}$	80	
Normanby	$175\frac{3}{4}$	$1\frac{3}{4}$	..	..	1	$178\frac{1}{2}$
Polwarth	45	2	..	..	4	51
Ripon	192	$2\frac{1}{4}$	$5\frac{1}{2}$	$3\frac{1}{2}$	6	$209\frac{1}{4}$		
Talbot	$290\frac{1}{2}$	$9\frac{1}{2}$	$7\frac{3}{4}$	5	$24\frac{1}{2}$	$337\frac{1}{2}$		
Villers	222	6	$6\frac{1}{2}$	4	10	$248\frac{1}{2}$		
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Gipps Land	99	..	$2\frac{1}{2}$	$2\frac{1}{2}$	$19\frac{1}{2}$	$123\frac{1}{2}$		
The I oddon	539	$3\frac{1}{4}$	$38\frac{1}{2}$	$15\frac{3}{4}$	$9\frac{1}{2}$	$605\frac{3}{4}$		
Rodney	$3\frac{1}{2}$	1	$4\frac{1}{2}$		
The Murray	198	..	$26\frac{1}{2}$	4	$8\frac{1}{2}$	237		
The Wimmera	$39\frac{1}{2}$	16	..	..	$\frac{1}{2}$	66
Total	$5,486\frac{1}{4}$	$66\frac{1}{2}$	$547\frac{1}{2}$	$288\frac{1}{4}$	$397\frac{1}{2}$	6,786		

COUNTIES AND PASTORAL DISTRICTS.

TABLE II.—Showing the Gross Produce of each description of Crop, for the Year ending 31st March, 1859.

COUNTIES AND PASTORAL DISTRICTS.	QUANTITY OF PRODUCE.						Total.
	CORN, PEAS, BEANS, ETC.						
	Wheat.	Oats.	Barley.	Maize.	Rye and Bere.	Peas, Beans, and Millet.	
	bush.	bush.	bush.	bush.	bush.	bush.	bush.
Anglesey	15,140	18,035	1,095	..	..	12	34,282
Bourke	253,351½	333,294	15,005	1,106	205	202½	603,164
Dalhousie	126,424	466,709	10,783	815	280	200	605,211
Dundas	14,070	5,036	395	..	40	..	19,541
Evelyn	29,777	39,924	1,116	130	..	82	71,029
Follett	328	25	30	..	..	..	383
Grant	258,313	222,773	14,940	80	60	1,652	497,818
Grenville	12,193½	48,698½	2,062	..	..	40	62,994
Hampden	14,149	18,392	840	..	..	15	33,396
Heytesbury	35,729	4,565	4,485	..	..	120	44,899
Mornington	34,089	67,492	4,115	105	..	180	105,981
Normanby	40,103	12,865	1,176	..	30	..	54,174
Polwarth	26,566	47,028	1,395	..	..	20	75,009
Ripon	84,128	164,630	4,301½	10	..	262	253,331½
Talbot	160,215	513,112	12,921	1,145	21	296	687,710
Villiers	365,137	73,600	29,502	80	..	1,668	469,987
<hr/>							
Gipps Land	16,960½	15,444	2,063½	228	..	..	34,696
The Loddon	12,648	40,895½	3,569½	216	..	10	57,339
Rodney	2,862	3,908	910	80	..	..	7,760
The Murray	60,846	61,756½	4,588½	5,703	15	73	132,982
The Wimmera	83	2,175	326	..	..	..	2,584
Total	1,563,112½	2,160,357½	115,619	9,698	651	4,832½	3,854,270½

COUNTIES AND PASTORAL DISTRICTS.

TABLE II.—Showing the Gross Produce of each description of Crop, for the Year ending 31st March, 1859—*continued.*

COUNTIES AND PASTORAL DISTRICTS.	QUANTITY OF PRODUCE.						
	GREEN CROPS (exclusive of Market and Kitchen Gardens).						
	Potatoes.	Turnips.	Mangold Wurzel.	Red Beet.	Carrots and Farnsips.	Cabbage.	Total.
	tons.	tons.	tons.	tons.	tons.	tons.	tons.
Anglesey	721½	24	1	..	..	..	746½
Bourke	23,543½	77	528	..	43	..	24,191½
Dalhousie	11,525¼	343	5	..	..	..	11,873¼
Dundas	339½	4	..	..	..	..	343½
Evelyn	2,312	2	..	..	..	..	2,314
Follett	26	..	..	..	..	..	26
Grant	9,929	302½	1,143½	1	181	48	11,605
Grenville	3,273¼	4	..	..	25	..	3,302¼
Hampden	906	..	..	..	4	..	910
Heytesbury	1,038	6	6	..	..	..	1,050
Mornington	1,651	..	..	..	..	..	1,651
Normanby	1,098½	..	..	..	..	..	1,098½
Polwarth	644	10	..	..	..	..	654
Ripon	9,366	30	50	3	39	40	9,528
Talbot	25,402½	117	142	..	117	23	25,801½
Villiers	11,311	319	215	..	66	13	11,924
<hr/>							
Gipps Land	1,442¾	58	..	..	½	..	1,501¼
The Loddon	2,162¼	24¼	64	½	48½	12½	2,312
Rodney	148	..	2	..	..	..	150
The Murray	1,425¼	14	..	½	4	4½	1,448¼
The Wimmera	201½	..	..	..	..	..	201½
Total	108,466¾	1,334¾	2,156½	5	528	141	112,632

COUNTIES AND PASTORAL DISTRICTS.

TABLE II.—Showing the Gross Produce of each description of Crop, for the Year ending 31st March, 1859—*continued.*

COUNTIES AND PASTORAL DISTRICTS.	QUANTITY OF PRODUCE.								
	HAY.			OTHER CROPS.					
	Cereal Grasses, Wheat, Oats, and Barley.	Rye Grass.	Total.	Onions.	Tobacco.	Grape.			
						Number of Vines.	Fruit sold.	Wine pro- duced.	Brandy manu- factured.
	tons.	tons.	tons.	cwt.	cwt.	No.	cwt.	gal.	gal.
Anglesey	1,157	12	1,169	..	..	..	..	..	..
Bourke	41,956 $\frac{1}{4}$	176 $\frac{1}{2}$	42,132 $\frac{3}{4}$	10	..	47,080	544 $\frac{1}{2}$	120	30
Dalhousie	7,689 $\frac{1}{2}$	..	7,689 $\frac{1}{2}$	..	..	56	5	..	..
Dundas	711 $\frac{1}{2}$	..	711 $\frac{1}{2}$	..	200	400	..	..	..
Evelyn	1,111	..	1,111	..	..	7,150	30	100	..
Follett	71 $\frac{1}{2}$	..	71 $\frac{1}{2}$	..	20	..	..	..	..
Grant	15,065 $\frac{3}{4}$	310	15,375 $\frac{3}{4}$	1,795	15	778,266	2,663	7,405	42
Grenville	1,905 $\frac{1}{2}$	..	1,905 $\frac{1}{2}$	..	15	17,000	45	..	..
Hampden	229 $\frac{1}{2}$	2	231 $\frac{1}{2}$	..	60	..	..	..	..
Heytesbury	165	..	165	..	..	..	15	..	..
Mornington	625 $\frac{1}{2}$	..	625 $\frac{1}{2}$	..	..	1,040	..	..	..
Normanby	1,963	13	1,976	..	40	..	..	..	..
Polwarth	633	34	667	..	20	..	..	..	..
Ripon	7,893	..	7,893	..	30	17,650	..	..	..
Talbot	9,979	10	9,989	273	5	16,786	28	..	..
Villers	3,663	15	3,678	132	190	..	135	..	..
—									
Gipps Land	764 $\frac{1}{2}$	25 $\frac{1}{2}$	790	..	..	7,100	31	..	..
The Loddon	10,878 $\frac{3}{4}$	$\frac{1}{4}$	10,879	480	31	59,182	27	5	$\frac{1}{4}$
Rodney	1,371 $\frac{1}{2}$	..	1,371 $\frac{1}{2}$	..	10	..	..	..	..
The Murray	4,497 $\frac{3}{4}$	4	4,501 $\frac{3}{4}$	..	..	41,892	55	110	..
The Wimmera	608 $\frac{1}{2}$	..	608 $\frac{1}{2}$	..	237	..	..	..	..
Total	112,940	602 $\frac{1}{4}$	113,542 $\frac{1}{4}$	2,690	873	993,602	3,578 $\frac{1}{2}$	7,740	72 $\frac{1}{4}$

W. H. ARCHER, Registrar-General.

VI.—ANIMAL PRODUCTS.

THE peculiar character of the Australian indigenous animals is due to the geological character of the land. Australia, the oldest part of our globe, has to some extent, a corresponding fauna; the greater portion of the land as well as many of the types of its animals dating as far back as the pre-oolitic period. Nearly all the Australian mammals are pouch-bearing (Marsupiateda); some show other signs of the low rank which they hold in reference to the development of their physical organization.

The same observation may, in some degree, be applied to the birds and other animals inhabiting Australia. There are no animals here of a higher order, and more useful to man, than these marsupiateda, whose utility to him is but limited. Fortunately, the physical condition and the climate of the country offer considerable advantages for the introduction of many species of quadrupeds, birds, and fishes, from abroad. The alpine region of our colony with its never-parched meadows, the thickets of the forests, the cool and verdant glens of the ranges, the more arid scrubby plains in the north-west, all are apt to receive such animals as are accustomed to live in corresponding places in other parts of the world.

Amongst the more useful of our native animals are the different species of *kangaroos*; their skins form an article of commerce, and their venison is brought to our markets. Excellent meat is also furnished by the *porcupine anteater* (*Echidna hystrix*). *Opossums*, *native cats*, *wombats*, in fact, nearly every marsupiate quadruped, as well as the *platypus* (*Ornithorhynchus paradoxus*), are clad in a valuable fur.

Of birds, the following may be mentioned as valuable to man; The *emu*, whose flesh is highly prized, as well as its eggs and their shells; *geese and ducks* on account of their flesh, feathers, and eggs; the same may be said of the *native turkey* (*Otis Australasianus*); the *Murray pheasant* (*Leipoa ocellata*), and many others; the *mutton bird* (*Puffinus Brevicaudatus*) for its feathers, oil, and eggs. A great number of other birds are used for food, and the brilliant plumage of many of the members of the feathered tribe render them much sought for private collections of natural history, and a considerable traffic exists

in skins of the *lyre bird* (*Menura superba*), the different species of *parrots*, *cockatoos*, &c.

Guano is found on some of the islands in Port Phillip.

Our waters, fresh and salt, contain many treasures awaiting only enterprising men to raise them. Several species of seals are found near our shores, which are also occasionally visited by whales. Of fish, there is a considerable variety. The Chinese here have already commenced curing fish, a pursuit which might be followed up advantageously. Deep-sea fishing in our waters would render importation of cured fish unnecessary, and at the same time would supply poor and rich with a cheap, wholesome, and plentiful food. Of the *freshwater fish* the so-called *Murray Cod* (*Grystes Peelfi*) is the most important; besides this there are great number of smaller fish. Along with fish, *eels* of enormous size and excellent flavor are found in the lagoons and creeks of the rivers falling into the sea. We have also excellent *oysters*, *crabs*, *lobsters*, and *crayfish*; of the latter, the large *Astacoides serratus*, from the River Murray, is worth mentioning.

The most useful animals for importation are: *camel*, *dromedary*, *Alpaca*, *Cashmere*, *Angora*, and *Californian goat*, *Merino sheep*; then the different species of *deer*; the *hare*, *beaver*, &c.; the *gazelles* and *antelopes* of Africa; the *asses* of the east; the *genet* (*viverra genetta*) and other vermin-destroying animals.

Of *birds* it is desirable to introduce partridges and pheasants—invaluable on account of the abundance of ants throughout these colonies.

Of *insects*, the *silkworm* and the *cochenilla*, deserve our attention as desirable for introduction.

When contemplating how much by the introduction of new treasures of the animal empire, may be added to our wealth, we cannot refrain from merely alluding in a single instance to the vast amount of food, which for our increasing population may be obtained by transferring the salmon to our alpine streams—a plan which has hitherto not been merely the subject of vague surmise, but of actual experiments, and which presents apparently no obstacle which perseverance and care could not overcome. Again, if we turn our view to the introduction of game, we may safely anticipate that with the gradual extirpation of the dingo, such animals as the deer or the hare would surely multiply in our forests. More difficulty may be encountered in domiciling the pheasant and other birds in our ranges, where they have to contend with the hostilities of numerous rapacious birds, and the *Dasyuri*.

PASTORAL RESOURCES.

The area of the colony of Victoria is about fifty-five millions of acres. Of this only two millions and a half have been alienated to purchasers, thus leaving above fifty millions still in the hands of the Crown.

The country, from causes which will be hereafter referred to, is yet comparatively in a state of nature; and scarcely an effort has been made to increase its grazing capacity. Large tracts of country have to be vacated in summer, from the absence of surface water. Again, in wet seasons, a great extent of level land is inundated in water, and thus becomes for the time unavailable.

Cattle.—These are of no very distinctly-defined breed, and until late years have been generally of inferior description. Latterly, however, a very marked and steady improvement has been effected by the importation from England of high-class animals, principally of the Durham breed. Herefords, Devon, and some other breeds, have also been introduced. Experience has proved that all of these speedily adapt themselves to the climate; and it is not uncommon now to see, in the Melbourne yards, cattle from the best grazing districts equal to the stall-fed animals of Smithfield.

Horses.—In this description of stock great improvement has also been effected by the importation of thoroughbred stallions from the best studs in England, and of Clydesdale and other breeds for draught purposes. The climate appears to be peculiarly adapted to the development and improvement of this description of stock. Considerable numbers have been lately exported to India, where their character for endurance and strength has been well established.

Sheep.—Though the produce from these is one of the greatest resources, and one of the chief elements of wealth of the colony, no kind of stock has made so little progress towards improvement. Cattle and horses form part of the economy of a farm, and their improvement has to a certain extent been fostered and encouraged by the owners of land. Sheep, on the other hand, are almost exclusively owned by the occupants of Crown or public lands. The uncertain tenure upon which they hold these lands has not only checked improvement in the breed, but has also prevented those improvements being effected that would have added to and extended the grazing capability of the country. The breeds of sheep, though very mixed, have more of the merino type than any other. The flocks of the

country now contain the materials from which an Australianised merino could be formed—an animal that would produce a quantity of wool equal to any sheep in the world fed in the same manner, and of a quality adapted to the highest manufacturing purposes.

Though the pastoral resources of the colony admit of very great expansion little has been done by the occupants of Crown lands, owing to the uncertainty of their tenure, beyond availing themselves of the natural advantages of their position. Many of the sheep and cattle runs are as yet imperfectly stocked; there are many tracts of the Alps available for summer pasture, as yet unoccupied; there is still the possibility of rendering many parts of the north-western district available for pasture by draining the water of the winter rains into main channels and in sheltering it from evaporation, or by sinking Artesian and other wells; in other places where too much water lies in winter, plough-draining or surface-draining may be advantageously employed; runs already stocked may be made to carry more stock, when subdivided by fencing, while the area of pasture ground may be extended by a judicious burning of the underwood, transforming our forest wilderness into fertile grassy uplands.

Again, we may introduce with advantages such perennial grasses and herbage as are calculated to resist the drought of our summers, and the few experiments which have been made with ryegrass and clovers have been most encouraging. Competent judges estimate that by these means the grazing capabilities of the colony may be increased threefold.

STATISTICS OF ANIMAL PRODUCTS OF THE COLONY OF VICTORIA, BROUGHT DOWN TO 1859.

I.—Live Stock (*vide General Summary and Summary of Counties and Pastoral Districts*).

II.—Exports of Animal Products in Quantity and Value for Year ending 31st December, 1858.

Description of Article.	Quantity.	Total Value.
Bones and Hoofs	472 tons, 2 cwt., 2 qrs.	£ 3,067
Hides	124,580 No.	83,064
Horns and Hoofs	311,013 No.	6,154
Birds (alive)	4 packages	105
Horned Cattle	12,292 No.	87,804
Horses	2,300 No.	71,177
Poultry	1 crate	20
Sheep	38,634 No.	36,974
Specimens of Natural History	50 packages	1,238
Skins	166,811 No.	23,463
Tallow	1,015 tons, 13 cwt.	43,987
Wool	21,515,958 lbs.	1,678,290
		£2,035,343

RETURN of the Number and Amount of Preferable Liens on Wool and Mortgages on Live Stock registered in the Colony during 1858.

PREFERABLE LIENS ON WOOL.			MORTGAGES ON LIVE STOCK.				
Number of Liens.	Number of Sheep.	Amount of Liens.	Number of Mortgages.	Number of Sheep.	Number of Cattle.	Number of Horses.	Amount Lent.
60	730,000	£ s. d. 86,758 11 7	171	839,702	78,598	1,418	£ s. d. 983,735 4 0

RETURN of the Number and Description of Manufactories and Works connected with Animal Products in the Colony during 1858.

DESCRIPTION OF MANUFACTORIES AND WORKS.						
	Curled Hair Manufactories.	Soap Manufactories.	Candle Manufactories.	Tan-neries.	Currier.	Bone-crushing Manufactory.
Number in Colony of each Manufactory or Work ..	3	18	13	25	1	1

W. H. ARCHER, Registrar-General.

VICTORIA.—CLASSIFICATION OF HOLDINGS.

TABLE showing the Extent of Land cultivated on Holdings of different sizes in each County and Pastoral District, during the Year ending 31st March, 1859.

COUNTIES AND PASTORAL DISTRICTS.	Total Extent Cultivated.	EXTENT IN ACRES OF LAND CULTIVATED BY HOLDERS OF								
		Less than 5 acres.	5 acres and under 15 acres.	15 acres and under 30 acres.	30 acres and under 50 acres.	50 acres and under 100 acres.	100 acres and under 200 acres.	200 acres and under 350 acres.	350 acres and under 500 acres.	500 acres and upwards.
Anglesey	2,150	30½	76	50	173	445	308½	352	325	390½
Bourke	72,059	803½	3,804½	3,548	3,749½	8,890	15,476½	15,332½	4,853	15,571½
Dalhousie	27,442	18½	590½	1,016½	1,807	5,757	8,916½	5,080	1,779	2,477½
Dundas	1,598½	23½	139½	198½	116½	339½	167	144	..	470
Evelyn	4,475½	56½	60½	95½	86½	86½	1,347½	554½	271½	1,140½
Follett	91	6	48	1	..	..	..	12	..	24
Grant	56,638½	431½	1,821½	2,532½	3,834	10,304½	14,735½	10,667½	3,613½	8,708
Grenville	5,690½	19½	201½	478½	858½	1,302	915	878	47	990½
Hampden	1,847	6½	60½	122½	207	509	338½	218	52	333½
Heytesbury	2,151½	..	11	32	41	40	1,168	428	56	375½
Mornington	4,769½	3	63	60	125½	384½	607½	1,097½	509½	1,919
Normanby	4,932½	32½	205½	327	371	950½	1,271½	606½	267½	900½
Polwarth	3,875	18½	114½	163	205	871½	1,191½	613	55	640
Ripon	14,447	9½	106	228½	812	4,081½	5,198½	1,825½	1,125½	1,059½
Talbot	38,040	78	619	1,585	3,128½	10,631	10,823½	6,075½	1,613	3,487
Villiers	26,738½	64½	496½	863	993	3,392½	9,105½	7,878	1,389	2,556½
Gipps Land	3,532½	21	120½	204½	321	356½	1,031½	428	223	826½
The Loddon	16,138½	102½	505	1,328½	1,877½	3,755½	3,368½	2,668½	618½	1,996½
Rodney	1,781	..	28	57	117	105	136	345½	32	99
The Murray	9,801½	56½	251½	276½	341	2,169½	2,723	1,654	257	2,072½
The Wimmera	788	7	57	124	53	125½	216½	23	26	156½
Total	298,959½	1,786½	9,379½	13,291½	19,216½	55,275½	79,026½	56,882½	17,113½	46,985½
Per Cent. ...	100·0	·6	3·2	4·5	6·4	18·5	26·4	19·0	5·7	15·7

W. H. ARCHER, Registrar-General.

VICTORIA.—LIVE STOCK.

GENERAL SUMMARY.

TABLE showing the Number of Live Stock in Victoria in the Month of March, 1859, distinguishing the quantity on Alienated Land from that on Crown Land ; and exhibiting the Total Stock on Stations, inclusive of Alienated Land connected therewith, as well as the Stock on Alienated Land, exclusive of that connected with Stations.

DESCRIPTION OF LAND.	DESCRIPTION OF STOCK.			
	Horses.	Cattle.	Pigs.	Sheep.
Alienated land	52,255	275,529	37,756	591,303
Crown land	16,068	423,801	..	4,987,110
Alienated land unconnected } with stations }	41,762	188,476	34,925	272,555
Crown and alienated land } connected with stations }	26,561	510,854	2,831	5,305,858
Total of Colony ..	68,323	699,330	37,756	5,578,413

NOTE—With reference to the number of pigs, it is to be observed that, owing to there being no assessment levied on that description of stock, no return is required or furnished of the quantity on the stations of those who hold Crown land alone, though there is, no doubt, a considerable number on them. It may also be noticed that the returns for Crown land are obtained some weeks earlier than those for purchased land.

W. H. ARCHER, Registrar-General.

LIVE STOCK.
SUMMARY OF VICTORIA.—COUNTIES AND PASTORAL DISTRICTS.

TABLE showing the Number of Holders and Quantity of Live Stock held on the 31st March, 1859, on Land Alienated from the Crown, distinguishing Land unconnected with Stations from that connected with Stations.

COUNTIES AND PASTORAL DISTRICTS.	ALIENATED LAND BOTH CONNECTED AND UNCONNECTED WITH STATIONS.				ALIENATED LAND UNCONNECTED WITH STATIONS.				ALIENATED LAND CONNECTED WITH STATIONS.					
	Number of Holders of Stock.		Stock.		Number of Holders of Stock.		Stock.		Number of Holders of Stock.		Stock.			
	Horses.	Cattle.	Pigs.	Sheep.	Horses.	Cattle.	Pigs.	Sheep.	Horses.	Cattle.	Pigs.	Sheep.		
Anglesey ..	76	2,297	355	1,389	61	349	1,050	305	989	15	203	1,247	50	450
Bourke ..	2,959	50,713	7,331	144,189	2,949	10,369	49,097	7,283	119,519	10	157	1,516	48	24,670
Dalhousie ..	610	8,895	1,575	10,997	596	2,030	6,332	1,505	71	15	199	2,563	70	10,926
Dundas ..	116	526	574	25,922	90	366	1,604	418	6	26	160	849	156	26,916
Ev Evelyn ..	183	957	397	4	177	782	3,274	364	4	6	175	3,633	33	..
Follett ..	9	376	28	7,999	5	25	376	18	360	4	25	..	10	7,639
Grant ..	2,142	36,883	7,749	160,873	2,116	8,165	33,433	7,684	93,338	26	283	3,460	65	67,585
Greenville ..	305	1,894	1,185	46,431	277	1,687	5,400	1,098	11,634	28	207	3,523	87	34,797
Hampden ..	90	16,358	475	31,922	70	439	1,786	452	200	20	463	14,572	23	31,722
Heytesbury ..	110	1,298	384	3,370	104	1,057	6,334	346	2,570	6	241	3,220	38	800
Mornington ..	206	2,756	489	..	188	1,758	6,655	1,103	..	18	998	4,393	76	..
Normanby ..	376	1,863	1,244	19,800	346	1,296	7,712	1,103	3,928	30	567	4,413	141	15,872
Poerwarth ..	148	1,427	485	11,592	126	703	3,200	386	4,520	22	724	11,416	99	7,072
Ripon ..	265	7,356	952	9,299	241	924	3,190	848	50	24	367	4,166	104	9,249
Talbot ..	1,007	21,083	4,394	57,860	985	2,962	13,943	4,157	17,280	22	709	7,140	237	40,580
Villiers ..	832	37,124	5,741	31,025	799	4,315	28,459	5,705	13,028	33	889	8,665	36	17,998
Gipps Land ..	242	3,080	1,356	3,041	204	1,442	6,469	997	2,490	38	1,638	5,741	359	551
The Loddon ..	661	7,168	1,588	13,542	615	1,530	5,683	871	2,221	46	491	1,485	717	11,321
Rodney ..	39	352	207	700	26	123	310	115	..	13	229	175	92	700
The Murray ..	300	2,782	1,017	5,647	225	1,196	3,470	662	397	75	1,586	4,250	355	5,250
The Wimmera ..	53	426	230	4,700	41	244	699	195	..	12	182	526	35	4,700
Total ..	10,729	52,255	37,756	591,303	10,240	41,762	188,476	34,925	272,555	489	10,493	87,053	2,831	318,748

W. H. ARCHER, Registrar-General.

VII.—HARBORS, RIVERS, AND INTERNAL COMMUNICATION.

THE Colony of Victoria has its sea face entirely on the south shore, and reaches from Cape Howe, in 150° E. long., to 141° E. long. at its junction with South Australia. From Cape Otway to Cape Howe, Victoria forms the northern shore of Bass's Straits; and from Cape Otway to the west it is entirely exposed to the ocean and an unbroken sea setting on its shores. As none of the rivers are of sufficient size and volume of water to force a passage into the open sea, so as to form an entrance for vessels of size, there are no river harbors; and the formation of the coast is somewhat deficient in bays or sheltered places. From Cape Howe, along the Ninety-mile Beach, lies a chain of lakes, some of salt and some of fresh water: these lakes are fed from various streams flowing from the Snowy Mountains on the northern boundary of Gipps Land, and receive, at certain periods of the year, a large supply of water, some of which forces its way by narrow and shallow channels through the beach into the sea; these channels exist only during the season of rain or melting snow, and for any useful purpose in communicating with the lakes, and thereby the interior, would require artificial means: if such were successfully applied, a large agricultural and pastoral district might receive the benefit of water transit. The portion of the country around the lakes, and the rivers falling into them, is highly spoken of, both as to its climate and powers of producing all European fruits and cereals.

Port Albert has a narrow bar entrance, and, although used as the shipping place of the Gipps Land district, is evidently deficient in its capabilities as compared with Welshpool, which is situated in Corner Inlet, an extensive basin, into which flow some small streams, which take their rise in the Hoddle Ranges. Corner Inlet can admit vessels of light draught of water, and is entirely sheltered. Between Corner Inlet and Wilson's Promontory, the most southern point of Victoria, there are two bays, Sealer's Cove, whence much timber is shipped, and Waterloo Bay, wherein the coasting vessels take shelter in bad weather from the westward.

Western Port is another bay, having in its entrance Phillip Island, with a shallow channel on its eastern side and a deeper

one on its western: there is a larger island higher up the bay, called French Island, around which is also a channel for boats. There is at present a considerable trade in oyster fishing carried on in Western Port, and eventually, if coal, which exists in this neighborhood, is worked, this port will become of much importance.

Port Phillip Bay is a magnificent basin of water, having at its northern end a smaller bay, called Hobson's Bay, wherein lie all the large ships coming to the Port of Melbourne. The Rivers Yarra Yarra and Saltwater fall into the western side of Hobson's Bay. Vessels of 10 to 12 feet draught can pass, at high water, over the bars at the entrance of the rivers and go up to Melbourne. The River Yarra is otherwise deep enough for any vessels, but is very narrow throughout its entire length: it is navigable to Melbourne for all vessels which can cross the bars. At Melbourne, advantage has been taken of a natural barrier of rock to secure fresh water for the supply of the city, by preventing the sea tide from mixing with it. Hobson's Bay can contain from 300 to 400 vessels, which lie in entire safety, even with sky-sail yards across, in the heaviest weather. From the uniformity of bottom, both in this and Port Phillip Bay, the sea never rises to any height, and 3 feet 6 inches is, perhaps, the greatest altitude of wave: thus, ships of the heaviest burthen and largest draught of water lie alongside the pier extended into the bay, without accident or chafing, and anchor close into the shore.

On the western part of Port Phillip Bay lies Corio Bay, the port and harbor of Geelong: unfortunately this beautiful sheet of water has a bar of sand across the entrance which precludes large vessels from crossing and unloading at the town. A channel is being dredged in the hope of obtaining 18 feet of water, a slow and expensive process; if, however, it should be successfully completed, Corio Bay will receive such ships as the channel will admit, to unload and load close to Geelong. At present they anchor off Point Henry, some four miles distant. The entrance to Port Phillip Bay, between Point Nepean and Point Lonsdale, is only about a mile and a-half wide, and under a mile for channel use. This causes at times a heavy surf across, and the tide to sweep in and out with great velocity; it has also formed sand banks within the harbor for some miles, through the channels of which the vessels navigate according to their draught of water. The channels are buoyed and partially lighted, as is also the entrance. From Point Lonsdale to Cape Otway the only place of even partial shelter or anchorage is

Apollo Bay; from thence lies an exposed coast open to the southern ocean.

In long. $142^{\circ} 32'$, at the entrance of the River Merri, Warrnambool has become a shipping place for the surrounding district; the holding ground is good, but the anchorage is too exposed to form a harbor until a breakwater is constructed. Port Fairy, a few miles west, is also used as a harbor for the agricultural and pastoral products of that district; it is protected from the westerly winds by Griffith and Rabbit Islands; both at Warrnambool and Port Fairy there are landing jetties. The River Moyne runs into the sea here, and is navigable with 12 feet of water to the town of Belfast.

Portland is the most western, and is the oldest settled town in the colony, the Messrs. Henty having established a whaling station at this place antecedent to the first establishment of the colony. Portland has an open roadstead, partially sheltered from the westerly winds, and a jetty whence wool, &c., is shipped to Melbourne.

From Cape Howe, the eastern extremity of the seaboard of the colony, a line of about 100 miles in length is drawn, nearly W.N.W., crossing the Snowy River to the south-eastern sources of the Murray, which forms the northern boundary of the colony from this point to the 141st meridian. From the sources of the Murray stretch chains of mountains, varying in width and in altitude, but continuing without interruption to the 142nd meridian, which form a backbone to the colony, whence its rivers run to the seaboard on the south, distant on an average about 75 miles, and towards the Murray on the north. At first the direction of the Murray is nearly north to the intersection of the meridian of 148° and the parallel of 36° . It then runs nearly west to Echuca on the meridian of 145° , where it receives the Goulburn, its largest Victorian tributary. From this point to the 141st meridian, where it ceases to form the Victorian boundary, its course is towards the north-west.

The Murray is very variable in depth, according to the season of the year, but during the winter months is navigable from Lake Victoria, in South Australia, to Albury on the 147th meridian; and by this channel the pastoral districts in the north-west of Victoria and the northern gold fields receive from Adelaide part of their supplies of flour.

The most easterly river in the colony is the Genoa; the next is the Snowy River in Gipps Land, which takes its rise partly in the dividing range beforementioned and partly in the Alps of New South Wales; through Victoria its course is nearly north

and south. The quantity of water brought down by it from a large drainage area both in New South Wales and in Victoria, and from the Snowy Mountains is at some seasons very large, though it is not able to form for itself a permanent opening into the sea through the beach. The lower part of its course has not yet been surveyed, so that it is impossible to estimate its value as a channel for internal communication.

Midway between Cape Howe and Wilson's Promontory, commences a chain of lakes, separated from the sea by a narrow strip of sand, named Lakes Tyers, King, Victoria, and Wellington. The first named is small, receives but small streams, and has its sea-mouth usually choked with sand. Lakes King and Victoria, which are salt, save during floods, communicate with one another, and with the sea by a narrow passage at the east end of Lake King, in which, on the 21st December, 1859,* there was only a depth of three feet, and which would probably entirely close before the end of the dry season. Lake King receives the rivers Tambo, Nicholson and Mitchell, the first running from north to south, and the last from north-west to south-east through Gipps Land from the dividing range. The course of the Nicholson is short, between steep banks of calcareous limestone.

Lake Wellington, the west end of which is about thirty miles from the east end of Lake King, is fresh, and receives the Rivers Avon and La Trobe. The Avon and its tributary the Perry are short in their course. The La Trobe runs from east to west from spurs of the Dividing Range, interposed between it and the Yarra Yarra, while its tributaries the Thomson and the Macalister, come down from the north-west from the main Dividing Range. These rivers, as will be seen from the tables appended, bring down considerable bodies of water, even at the most-unfavorable season. If it were possible to open a permanent channel to the lakes from the sea, they would all be navigable for some miles from the lakes inland. They are well adapted, from their nature and from the climate of the country, to receive the salmonidæ, if the attempt to bring them to this country be successful.

The rivers of the south-western district of Gipps Land, towards Wilson's Promontory, are numerous but small and call for no special notice.

Proceeding westwards, we come to that part of the colony south of the dividing range, which drains into Port Phillip.

* All measurements of depths, velocity, &c., refer to this day, the Australian Midsummer Day.

The rivers of any note running into Port Phillip are—the Yarra Yarra, which receives the Saltwater, and the Werribee.

The Yarra Yarra, taking its rise in the same southerly spur of the dividing range from which the La Trobe flows eastwards, is fed, like the Gipps Land rivers, by perennial streams, taking their rise in the primitive rock formations in a district where vegetation is so luxuriant as to be almost impenetrable. The course of the Yarra is most tortuous in the lower part; and the distance from its source to Melbourne may exceed eighty miles in a direct line. One peculiarity in the Yarra is, its great depth in proportion to its width. It receives numerous feeders, mainly from the north, as it recedes from the dividing range, the course of which is, on the whole, westerly. Of these tributaries the most important is the Plenty, which enters it from the north, after a course of about thirty miles from the dividing range.

On this river, about nineteen miles from Melbourne, we have an example of what may be done here in the way of intercepting and storing water. By a solid embankment, a reservoir called the Yan Yean has been formed, with a surface area of about 1,300 acres, and an average depth of 18 feet. Into this the stream of the Plenty, which here drains an area of broken country estimated at 40,000 acres, is conducted, and an amount of 6,400,000,000 gallons of water secured for the supply of the city of Melbourne, to which the water is conducted in closed pipes.

The Saltwater River takes its rise in Mount Macedon, a point in the dividing range about 3000 feet high, and the last portion of the range towards the west, which supplies water in abundance.

The river takes its name from the saltiness of its water in the last ten miles of its course, caused by the influx of water from salt springs about Keilor. It is navigable for some few miles above its junction with the Yarra, three miles from Hobson's Bay. This river and its tributary creeks are peculiarly depressed below the generally level surface of the County of Bourke, through which they run.

The Werribee runs into Port Phillip Bay on its N.W. side, between Geelong and Melbourne, rising to the N.W. about sixty miles off, in the Blackwood ranges, about 2000 feet above the sea. These ranges are unlike the Yarra ranges, hardly able to maintain a constant supply of water during the summer.

The next district which claims our attention, is that extending westward of Port Phillip, to the confines of the colony. The