REPORT

OF THE

JOINT COMMITTEE ON COLONIAL INDUSTRIES,

TOGETHER WITH

MINUTES OF EVIDENCE AND APPENDICES.

BROUGHT UP 5TH SEPTEMBER, 1870, AND ORDERED TO BE PRINTED.

WELLINGTON.

1870.

ORDERS OF REFERENCE.

Extracts from the Journals of the Legislative Council.

TUESDAY, 12TH JULY, 1870.

Ordered, That a Select Committee be appointed to inquire what steps, if any, should be taken to ascertain and develop the producing and manufacturing resources of the Colony. The Committee to have power to confer and act with any other Committee of the House of Representatives on the same subject, and to make either a joint or separate Report; also, to have power to call for persons and papers. Report to be brought up on this day fortnight. The Committee to consist of the Hon. Mr. Mantell, the Hon. Dr. Renwick, the Hon. Mr. Seymour, the Hon. Mr. Waterhouse, and the Mover.

A true extract,

(On motion of the Hon. Mr. Gisborne.) L. STOWE, Clerk, Legislative Council.

WEDNESDAY, 20TH JULY, 1870.

Ordered, That the name of the Hon. Mr. Gray be added to the Committee on Colonial Industries.

A true extract,

(On motion of the Hon. Mr. Seymour.) L. STOWE, Clerk, Legislative Council.

Extracts from the Journals of the House of Representatives.

FRIDAY, THE 8TH DAY OF JULY, 1870.

Ordered, That a Select Committee be appointed to recommend what steps, if any, should be taken to ascertain and develop the producing and manufacturing resources of the Colony. The Committee to have power to confer and act with any similar Committee of the Legislative Council on the same subject, and to make either a joint or separate Report. The said Committee to consist of Mr. McGillivray, Mr. Parker, Mr. Rich, the Hon. Mr. Stafford, Mr. Studholme, Mr. Travers, Mr. Ludlam, Mr. Graham, Mr. Farmer, and the Mover. The said Committee to have power to call for persons and papers, and that three members shall form a Quorum.

A true extract,

(On motion of the Hon. Mr. Vogel.) F. E. CAMPBELL, Clerk House of Representatives.

TUESDAY, THE 12TH DAY OF JULY, 1870.

Ordered, That the following names be added to the Committee on the Development of the Industrial Resources of the Colony, namely, Mr. Reader Wood, Mr. Bunny, Mr. O'Neill, and Mr. Macfarlane.

A true extract,

(On motion of the Hon. Mr. Vogel.) F. E. CAMPBELL, Clerk, House of Representatives.

TUESDAY, THE 26TH DAY OF JULY, 1870.

Ordered, That Mr. Potts and Mr. Kelly be added to the Select Committee on Native Industries.

A true extract,

(On motion of the Hon. Mr. Vogel.) F. E. CAMPBELL, Clerk, House of Representatives.

THURSDAY, THE 28TH DAY OF JULY, 1870.

Ordered, That Mr. Birch be added to the Select Committee on Native Industries.

A true extract,

(On motion of the Hon. Mr. Vogel.) F. E. CAMPBELL, Clerk, House of Representatives.

REPORT OF THE JOINT COMMITTEE ON COLONIAL INDUSTRIES.

The Joint Committee appointed to inquire what steps, if any, should be taken to ascertain and develop the producing and manufacturing interests of the Colony, regret that the time at their disposal, as well as the numerous important duties, which during the Session have engaged their attention in common with that of all other members of Parliament, have prevented their devoting to the subject remitted to them that continuous attention which its importance deserved. The subject, however, was so comprehensive, and opened up so extensive a field of inquiry, that under no circumstances would it have been possible for them to do full justice to it within the limits of an ordinary session of Parliament. They can only indicate the direction they think legislation should take, with a view to developing the Industrial resources of the Colony; while they leave the Parliament to decide as to the desirability or otherwise of instituting further inquiries by means of a Committee to be specially appointed for that purpose.

The Committee took such evidence as was readily available upon the spot, but did not deem it desirable to incur the expenditure which would have been requisite to bring it from a distance. This evidence, as well as numerous communications bearing upon the subject of their inquiries which the Committee have received, are appended herewith.

The evidence given by Dr. Hector is of an extremely valuable character. It affords abundant proof of the vast natural resources of the country, and establishes the insufficieney of the efforts which have hitherto been made to develop them. Increase of population and improved means of communication, doubtless, are the primary requisites to the development of the industrial resources of the Colony; but as these matters already engage the attention of the Legislature, the Committee do not feel called upon specially to report in reference thereto. The Committee have confined their inquiries to the consideration of those steps which should be taken to develop industrial resources which can be successfully prosecuted with the high wages current in these colonies. To attract and to keep a large population, those industries which yield the highest return to the labour employed in their prosecution should first be developed. Nothing is more calculated to attract a large labouring population to these shores than the knowledge that constant employment at remunerative rates of wages is to be found here. A general prosperity of the labour class implies, in these colonies, where this class of the population is more or less of a migratory description, increase of population and revenue, with a development of the productive resources. Low wages and irregular employment imply emigration to more favoured regions, a falling off in the revenue, and a general depreciation of the value of property of all descriptions. It therefore becomes a matter of the utmost importance that, without artificially stimulating high wages, we should yet do all in our power to promote the development of those industries which can be worked to the greatest advantage to the labouring classes, and thereby promote a constant flow of immigration.

The Committee have agreed to the following suggestions:—

1. That to promote the development of large tracts of country known to be auriferous, but at present unworked, owing to the absence of any adequate water supply, it is desirable that Government should grant pecuniary assistance to enable a sufficient supply of water to be introduced.

2. That the law regarding the finding and working of minerals should be assimilated throughout the Colony. A mining population is always of a migratory character; and to insure to the Colony the results of the observations and investigations of persons practically acquainted with minerals, it is essential that these should feel assured of being able to obtain a beneficial interest in their discoveries, in whatever Province their business or inclination may lead them. The great attention devoted to mining matters in Australia and California is undoubtedly to a great extent due to the enlightened and liberal mining regulations which prevail there.

3. That the law as regards the working of quartz reefs should be altered, so as to adapt our legislation to the different circumstances under which quartz-reefing is prosecuted in this Colony, as indicated in Dr. Hector's evidence. It appears that in New Zealand the quartz reefs in which gold is at present generally mined are of a horizontal rather than vertical character, and thus quartz reef claims are likely to be worked out sooner than in most other auriferous countries. The present state of the law, it is probable, will practically put a stop to the working of these reefs when any considerable depth is reached, as it may pay a company to continue to follow the lode down to a greater depth when it may not pay them to compensate a neighbouring claim for working in their boundary.

4. That the existing uncertainty as to the right of owners of the soil to the precious metals existing below should be settled by law. The uncertainty existing upon this subject consequent upon a recent decision of the Law Officers of the Crown alike deters private landowners as well as gold miners from prosecuting explorations upon private property.

5. That with a view to attracting attention to the tin mines which not improbably exist in the Middle and Southern Islands, and to promote their speedy development, a suitable reward should be offered to the first discoverer of a remunerative mine.

6. That special attention should be directed to the development of the coal mines at the Grey and Buller Rivers, so as to render the Colony independent of foreign supplies; and that, if requisite, the Government should advance, on the security of any responsible company formed to work these mines, the amount of money requisite for the construction of a tramway or railroad. The evidence taken by your Committee leads to the belief that of all the coal mines known to exist in New Zealand (and of which the value and importance can scarcely be exaggerated, and promise to have the most important

influence upon the future of the Colony), the coal found at the Grey and Buller Rivers is the best adapted for general requirements, being superior even to that introduced from Newcastle, N.S.W., and that great facilities for its economical working exist. It appears to your Committee that were these mines efficiently worked, the Colony would speedily become independent of all foreign supplies. Dr. Hector's evidence in reference to the coal fields of New Zealand is eminently interesting and suggestive.

7. That it is desirable, with a view to encouraging the planting of timber in the treeless regions of the Middle Island, that persons planting timber trees upon unsold Crown Lands should, upon terms to be fixed by the Government, be secured in the freehold of the country so planted out, either by pre-emptive right of purchase or by free gift. The strong winds prevailing over many parts of New Zealand greatly tend to check the operations of agriculture, while the open and shelterless state of the country causes the soil to become much more readily dried and parched up than would otherwise be the case. If land occupiers could be induced annually to plough up and sow with the Tasmanian black wattle a few acres of land, the shelter so much desired would be obtained at a cost comparatively trifling, a supply of good fuel would speedily be provided, and a valuable article, now much required by our tanners, and at present imported from a distance, would be procured on the spot.

8. That special assistance should be granted to Mr. Batchelor, in the prosecution of his interesting experiments in sericulture. That this assistance should be £50 per acre for first five acres of land planted with mulberries, and kept two years under good cultivation. The interesting papers laid upon the tables of Parliament upon this subject render any further comment unnecessary. Your Committee would only observe, that where private assistance is afforded by the State in the manner now proposed, it is of the utmost importance to confine it to those who have taken up a subject enthusiastically, and made it, as it were, their speciality.

9. That to promote the general introduction of sericulture, premiums not exceeding in the whole £500 per annum should be granted to persons planting out mulberry plantations, upon obtaining therefrom not less than a hundredweight of silk cocoons, or eggs to the value of not less than £50. The experience of California, as set forth in the interesting paper upon the subject by Mr. Baldwin, sufficiently shows with what great advantage to a country assistance such as that indicated may at times be afforded by the State.

10. That there are many industrial pursuits peculiarly adapted to the Colony which might be introduced with advantage, and would become sources of wealth to the Colony if adequately protected during the period of infancy. That the present position of the brewing and malting branches is stated by the witnesses to be due to the protection they have thus received, which has raised them to such a state of efficiency that in a short time protection will probably cease to be necessary. That an indiscriminate system of protective duties is undesirable, and would be injurious to the Colony; but that a temporary protection to certain specified articles would develop many manufactures, peculiarly adapted to the Colony, and which, once thoroughly established, would be self-supporting and cease to require the fostering aid of protective duties. Amongst these the Committee would especially mention

Tweeds, cloths, and coarse woollen goods,	Starch,
Rope and cordage,	Leather,
Soap,	Malt.

11. That the development of some other industrial pursuits would often be best promoted by the offer of a bonus upon production. They would mention the following articles as deserving this particular encouragement:—Common Glass Bottles, fast becoming scarce and too bulky to be imported to advantage—a bonus of, say, 1s. per dozen upon manufacture of first 10,000 dozen; Paper, printing or packing, a bonus of 10s. per ream upon manufacture of first 500 reams of packing, and 20s. per ream upon first 500 reams of printing paper; Woolpacks, 1s. 6d. each for first 6,000; Cornsacks, 6d. each upon first 20,000; Scrim Cloth, 6d. per yard upon first 10,000 yards; sugar or syrup produced from beetroots the produce of the Colony, a bonus of £10 per ton upon first 100 tons of sugar, and £5 per ton upon first 50 tons of syrup.

12. With a view to developing the manufacture of fine flannels and cloths, still extensively followed by small farmers in Wales and Yorkshire, the Committee suggest that it may be desirable to encourage the introduction of small colonies of Welshmen and Yorkshiremen acquainted with these processes, the Colony paying their passages, and afterwards granting them farms in fee-simple, subject only to their manufacturing certain specified quantities of flannel or cloth.

13. That, with a view to facilitating the operations of commerce, and to enable repairs to be effected upon steamers and other vessels plying in these waters or frequenting this Colony, and thus saving the great cost of money and loss of time attendant upon their proceeding to the other colonies, the Government might with advantage grant its assistance, either by a grant in aid or a guaranteed loan, towards the erection of a dock sufficiently large to contain the largest ships of the navy or of the mercantile marine.

14. The Committee recommend that all regulations affecting the introduction of stock into the Colony, or their passage from Province to Province, should proceed from the General Government alone, and that the scab-laws of the Colony should be enacted by the General Assembly. The evidence given before the Committee upon this subject sufficiently shows the undesirableness of the existing regulations upon this subject.

15. That it is highly important to provide means for affording to the youth of the Colony the opportunity of obtaining technical education. As it appears the services of the existing Geological Staff may, without much additional cost, be rendered available for this purpose, the Committee recommend—

1. That an addition be made to the existing Institute building, adapted to the purposes of a lecture room.
2. That suitable apparatus be obtained from Europe.
3. That scholarships, of £30 a year each, be established, and placed at the disposal of the various Superintendents of the Provinces, so as to provide means for the gratuitous education in technical science of lads who are desirous and show themselves qualified to benefit thereby.

The correspondence appended to the report will explain under what circumstances this subject was brought under the notice of the Committee. Its importance can scarcely be overrated, and the Committee would be delighted if the success attendant upon taking the initiatory steps recommended should authorize the eventual establishment of similar educational appliances in all the Provincial centres. It appears to the Committee that the action to be taken by the Government should be only of the tentative character they recommend.

16. The Committee call special attention to the interesting communication from Messrs. Webley and Sons, cloth manufacturers, Nelson, and suggest that their recommendations should receive the careful consideration of the Government, more especially with a view to providing protection for Colonial trade marks.

Your Committee feel that they have done little more than glance over the extensive subject of inquiry remitted to them. They have indicated the direction they think legislation should take, but they feel that any sweeping measures of legislation with a view to fostering Colonial industries and manufactures would be injurious to the best interests of the country, and prove eventually injurious to the very industries that it might be sought thus to promote.

G. M. Waterhouse,

5th September, 1870. Chairman.

MINUTES OF EVIDENCE.

FRIDAY, 22ND JULY, 1870.

James Hector, Esq., M.D., F.R.S., in attendance, and examined.

1. *The Chairman.*] This is a Committee appointed to inquire what steps, if any, should be taken to ascertain and develope the producing and manufacturing interests of the Colony. The Committee believe that, from your scientific acquirements and extensive knowledge of the Colony, you are eminently qualified to give them much information calculated to advance the object of their inquiries. You will perceive the subject referred to them is a very wide one. We therefore purpose to divide it into distinct branches, and to take up one at a time. The first subject of inquiry will be the Mineral resources of the Colony; and on this branch of inquiry we purpose devoting our attention, first, to the gold-mining resources of the Colony. Will you kindly inform the Committee what is your opinion of the extent of the gold-bearing formation area within the Colony,—whether this has been worked to any material extent,—and whether the development of this particular branch of industry may be promoted by any legislative measures?—I produce to the Committee a copy of the geological map of the Colony. The gold fields, commencing with Otago, extend over an area of about 10,000 square miles, crossing the Island obliquely, thence stretching through the County of Westland into the Province of Nelson, and may be considered to embrace the whole western slope of the Island within that area. There is a probability of another auriferous area in the south-west, between Te Ano Lake and Foveaux Strait. Throughout the whole of the area thus indicated, which amounts to between 15,000 and 20,000 square miles, gold has been obtained in greater or less quantities. In addition to the above gold fields proper, there are several isolated localities lying beyond that district where gold has been obtained; for instance, the Mataura River, the Waitaki, and Wakamarina. In the North Island, the gold-bearing district is limited at present to the Colville Peninsula. Indications of gold have been found in other parts throughout the length of the North Island, from Wellington to the North Cape. The total area occupied by rocks which may be auriferous from their nature is very small as compared with the area in the South Island. However, as in the North Island all mining is of the character of lode or vein mining, the area of the rocks exposed to the surface does not indicate the extent of the diggings in the same way as it does in the South Island, where the veins or reefs from which the gold has been derived have rarely been discovered, the gold being obtained from alluvial deposits which are spread over a wide area. The chief characteristic of the alluvial diggings in New Zealand as contrasted with other countries, and especially with Victoria, is that the oldest alluvial drifts, from which all the more modern drifts are redistributed, rise to a higher level than the present water level of the country. The richest diggings have therefore been where such deposits, rising at a higher level, have been discovered, and have been capable of being worked by water brought from a distance by races or other means; or where, on the other hand, such rich patches have been cut through by the formation of the natural watercourses of the country. The careful and judicious administration of the water-rights is, therefore, a point of the greatest importance to the successful exhaustion of these fields. Hitherto, the yield of gold from these alluvial diggings, after the first excitement which attends a new rush, has always been in proportion to the number of men employed; and on this ground alone, I am inclined to the opinion that in no sense can they be considered as being worked out, the falling off in the yield having been produced simply by the continual migration of the diggers from one district to another.

2. To what extent do you consider these gold fields have been developed or been worked out?—They have been worked to that extent at which, except in a few localities, they cease to pay unless properly organized measures are taken to supply sufficient water; but there are large areas both in Otago and Westland which would yet prove remunerative if a proper water supply were provided—although not remunerative with certainty to the same extent as those richer re-assorted leads which first attracted attention. I produce a map of gold fields on the western slopes of the Middle Island. I may observe that anything I say as regards Westland applies equally to Nelson.

3. Are there any great difficulties in the way of conducting adequate water supply?—No, I think not. There are greater facilities than are usually met with in most countries. All the streams have a rapid fall, and run in channels cut into the surface, which also has a decided slope in the same direction. The country, as a rule, is terraced so that water-races can be carried for long distances with the requisite fall without meeting great obstacles. This especially applies to the West Coast District. The rainfall there is enormous, but that operates almost as much against the works of the digger as in their favour, because it carries away their dams, and tends to clear away the water from the upper level ground, from which a supply of water could be obtained.

4. *Hon. Mr. Gray.*] Is the soil of such a nature that the water can be conducted in channels formed in the soil itself, without the use of pipes or wooden flumes?—I cannot give a general answer to that. In some cases the ground is perfectly able to carry the water, and at the present time in Otago there are many miles of water-races cut in the ground; and such is also the case in Westland. But there are extensive tracts where the ground is loose and shingly, where timber flumes would have to be provided. The ground is of about the same average character as that in California, where the whole of the digging country is traversed by water-races in every direction. I think pipes would be suitable in many cases.

5. *The Chairman.*] Would the work of conducting water be of such magnitude as to be beyond the ability of private diggers to undertake, or do you think the work should be undertaken by the Government?—I think, in the case of water supply for the use of miners, the Government should refrain, if possible, from interfering in the way of giving direct assistance.

6. *Mr. Macffarlane.*] Why?—Because it would be almost impossible to control the expenditure, and to see that it was rightly applied. It should be done by guarantee, or any indirect method, arranged so that the company of miners who undertook the works would be secured against loss beyond the ordinary risk of the adventure. That is a subject which would require consideration to arrange a scheme. I do not feel able to give an opinion at present.

7. *The Chairman.*] Are alluvial diggings now conducted in a scientific manner, and are the appliances of the best description?—The only way in which they could be improved would be by organized combination among the diggers, so that they could conduct their operations at the least expenditure, and make the most of the water supply that they have. In a single case, where the alluvial digging extends below the average water-level or becomes deep sinking, as at Ross, on the West Coast: there, I understand, the machinery is very perfect, and the works are conducted in a thoroughly scientific manner—they were, at least, in 1867, when I saw them last. I may state that all I have said hitherto applied to the alluvial diggings, with the exception of what I said of Cape Colville.

8. You are acquainted with the Californian mines: are you acquainted with the working of the extensive organizations that exist for supplying water?—In 1860, when I travelled over California, the water companies were quite distinct from the miners, who bought the use of the water at a certain prescribed rate. The capital at that time for the water companies was chiefly found in England, and I was informed that they made a very handsome profit. The water was supplied both to alluvial mining, by the system known as hydraulic, and was also supplied to the reef mines and quartz machinery.

9. I understand you to be of opinion that similar organizations here would very much develop the gold-producing capabilities of the country?—That would depend upon whether the diggers would remain spread over the gold fields, and so keep up the average yield; but probably the first great find that took place, as the result of the undertaking, would lead to a rush, and a constant fall in the average yield. That is an element that could not be controlled.

10. *Hon. Mr. Gray.*] Do you not think money expended for the purpose of bringing water to the gold fields would make a material difference in the average yield of gold over New Zealand?—Yes, I think it would, especially on the West Coast, where many deposits are known to exist in positions perfectly beyond the means of the present diggers to reach. I may point out that there is a general tendency in the gold deposits, in passing northward from the neighbourhood of Hokitika, to rise in level, so that the continuation of the leads, which are in accessible positions in the South, are in the North only found in hill tops and inaccessible places, and on the tops of high terraces.

11. Is the supply of water required for alluvial diggings greater than that for reef mining?—Yes, much greater. The cradle diggings, which is the only form of alluvial digging where a small quantity of water is required, may be considered as practically exhausted.

12. *Hon. Dr. Renwick.*] Do you consider that the alluvial diggings will be found to extend over a greater extent of country than has yet been discovered?—Not to any material extent. So far as I can judge from the data I possess, there will be no material addition to the area of alluvial gold digging. I do not wish to be understood as meaning that no diggings will be found in other places. There is one form of alluvial diggings which I have not noticed, and that is the beach or black sand diggings. They require particular attention, as they are practically inexhaustible, although not retaining the richness which they have when first discovered. They extend along the whole of the Westland coast, and in patches along the West Coast of Nelson. In the west of Otago there are no beaches, the cliffs rising abruptly from the sea. Around the South-east Coast, as far north as Waitaki, where the shingle plains commence, gold is also obtained in the beaches in small quantities. The source of this gold is partly from that brought down the rivers and distributed along the beach by the sea, and also from the re-sorting of old river deposits, or old drifts, as they are gradually encroached upon by the sea. After experience of many years, it is found that these deposits are continually re-forming, every storm and high tide re-arranging and laying bare fresh streaks. A proper water supply is required for these diggings, but in most cases it can very easily be applied. As they are generally contiguous to the best alluvial land on the coast, and possess a good natural road along the sea beach, I think it would be desirable, if possible, to give these diggings a more permanent character, by giving the holders a more secure and permanent tenure than is the case with other diggings, and thereby lead to the permanent settlement of the district.

13. *The Chairman.*] Is there any large amount of production of gold at the present time from the black sand?—At one time the chief production of gold on the West Coast was from the black sand. Although I have no exact information on the subject at the present time, I should think they constitute a large proportion of the yield of gold. Considering that these diggings will be more or less continuous it might be worthy of consideration whether some arrangement similar to that by which the coast fisheries are held in some countries in conjunction with the freehold of the land might not be adopted. If some such step is not taken with regard to the West Coast, as soon as the chief diggings are worked out, a great part of the country will be deserted, as it presents but few attractive natural features as compared to other parts of New Zealand.

14. Are the gold-bearing veins in the Middle Island being developed to any great extent, and do you consider that they are capable of much increased development?—They are hardly worked at all as yet, the total quantity which has been directly extracted from the matrix in the Middle Island being quite insignificant compared to the amount of alluvial gold.

15. *The Hon. Mr. Gray.*] Can you state approximately what the area of quartz reefs in the Middle Island is?—The quartz reefs have been largely developed throughout the whole auriferous area which I have previously indicated, but they have only proved auriferous in a few cases, and it is doubtful if a great part of the gold has been derived directly from quartz reefs, as is generally supposed to be the case in Australia. There appear to be well-marked lines in the auriferous formations from which

gold has been dispersed, and one of these extends throughout the whole length of the South Island, along the line of junction of the metamorphic and palæozoic strata, which line nearly coincides with the cres of the mountains as far south as Otago. The chief veins hitherto worked are in the neighbourhood of the Wakatipu Lake in Otago, where they were abandoned, I believe, owing to the great expense of working and inaccessibility, and partly also owing to the discovery, at the time of their being first worked of the Westland diggings. In the eastern district of Otago, reefs have also been worked at Waipori Hindon, and lately at Cromwell, with an average yield of about one ounce to the ton. In West, land, gold-bearing reefs have been discovered at Ross, but they are not yet worked. In Nelson, the north-western district consists of an isolated range of mountains. In most of the streams in the vicinity of heavy reefs irregular gold has been obtained, and many reefs have already been discovered in this area. It presents the most favourable circumstances for the occurrence of gold reefs of any part of New Zealand. In the North Island the mines are at present confined to the Colville Peninsula, as before stated. They are entirely different in their character from any of those in the south of New Zealand, resembling the mode in which gold occurs in Central America and some parts of Peru, the gold being found in conjunction with igneous rocks of modern date as compared with any of the auriferous formations in the South. Only a small area of the district has as yet been explored, in the proper mining sense of the term; and it may be long before it is so, as a proper exploration of it cannot be effected by diggers without the assistance of capital.

16. *The Chairman.*] Can you suggest any course calculated to expedite the exploration of the resources of the field in question?—I think they require special legislation of a different kind from that which has come into use for the management of the South Island gold fields. I would be in favour of adopting the ancient form of mining law by which the right of a reef was given to the discoverer on the run of the reef for a definite length and indefinitely in depth. I am under the impression that this is the law in California at the present time. The method of defining the claims by superficial area appears to have been borrowed from Australia, where, as the reefs plunge almost vertically in most cases, it causes practically no inconvenience; but at the Thames and in similar districts, where the veins underlay at a great variety of angles, and are sometimes more horizontal than vertical, great irregularity in the value of claims arises, although the surface area be equally distributed, and the risk of investing capital is greatly increased. In fact, the present state of the law will practically put a stop to the working of the field when any considerable depth is reached in these lodes. It might pay a company to continue to follow the lode down to a great depth, but it might not pay them to compensate the neighbouring claim for working within their boundary; nor, on the other hand, would it pay the neighbouring claim to sink a shaft for themselves. The chief peculiarity of the Colville gold fields is the large percentage of silver which the gold contains; and in other countries this has been the frequent indication that the mines will eventually turn into silver mines at greater depth.

17. If they are continued at all, would it be beneficial to the promotion of mining industry to grant facilities for the renewal of expiring leases?—Ultimately it would; but in the present unexplored state of the field it would be dangerous to give undue prominence to such a scheme.

18. What reasons have you for believing that ultimately it may be desirable to grant renewal of leases?—So that the holders of leases may be induced to work the mine properly up to the expiration of their leases, and not create obstacles to its future working, either for the purpose of rapidly exhausting richer portions of the mine, or for the purpose of deterring competition in the way of obtaining a renewal.

SATURDAY, 23RD JULY, 1870.

James Hector, Esq., M.D., F.R.S., in attendance, and examination continued.

19. *The Chairman.*] Are you aware of the existence of silver, or do you think the geologic formation favourable to the existence of silver mines?—Silver has been found in Otago in the native state and in Nelson, and at the Thames, combined with lead and gold. There is, as I have before stated, a fair prospect already of silver mines being discovered at the Thames. There are many parts of New Zealand where I should expect silver to be discovered; but as to the quantity, that can only be determined by actual mining. Only yesterday the first trace of tin was discovered in black sand from the upper part of the Buller River. In that neighbourhood there is a peculiar rock which indicates the presence of tin ore, the discovery of which about six months ago led me to recommend a search for tin. The same characteristic rock exists on the West Coast of Otago. Copper has been found associated with the metamorphic rocks in Otago; at Waipori, where a four-foot sulphide of copper lode exists, but has not been properly traced. It is tolerably solid, so far it has been traced. Waipori is distant about fifty miles from the shipping port; it has not been worked, as it could not compete with gold fields. The lode is in mica schist. An attempt has been made to trace it, but after spending a good deal of money they abandoned it at that time. I believe it is now leased by a company. Copper has been found as carbonate in the same vicinity, but only in rolled fragments. The district is one where quartz reefs and irregular deposits containing cinnabar have been discovered; and on the north and south line in the same place indications of several other mineral lodes have been found. At Wakatipu Lake, another strong lode of copper pyrites has been found associated with carbonate and native copper. It was here that the native silver was found, and where several quartz reefs in the same district contain gold. On the West Coast of Otago, at Charles Sound, there is a copper-bearing lode associated with granite rock, and also at Milford Sound and several other points indications of the presence of copper mines have been observed. I consider the South-west District of Otago as probably remuneratively metalliferous. I have also seen specimens of copper ore from Stewart's Island, but cannot vouch for their being authentic. As regards the other places mentioned, I speak from personal knowledge. I have seen fragments of copper ore in the hands of the miners on the West Coast. I think there is no doubt that the copper and the chrome ore associated with serpentine in the Dun Mountain, and in the northern parts of Nelson, will be found at intervals in a line extending throughout the Island as far south as Milford Sound. Copper with serpentine is not commonly remunerative; but all the rocks hitherto examined, especially at the Dun Mountain, are either superficial or are above the water level of the country, and in consequence are

decomposed. They are therefore not rocks in which one would expect strong copper lodes to occur. The copper in chrome and serpentine rocks appears more in the manner of concretionary masses, in the same way that iron-stone appears in clay, than as distinct lodes. The copper undoubtedly exists in the North-west District, and one lode has been opened in the neigbourhood of Collingwood. The ore is a sulphide, and specimens I have examined contained from 22 to 25 per cent. of metallic copper. Copper has been found at various points along the eastern flank of the mountains, and the occurrence at intervals of the same rocks as characterizes the Dun Mountains sufficiently accounts for its presence, but no decided lodes have been discovered. The main slate range in the Northern Island extends parallel with the East Coast, but is as yet very imperfectly explored. The chief copper mines which have been worked in New Zealand are in the Province of Auckland—on the Barrier Island, from which place 2,323 tons have been exported as sulphide, and in Kawau Island from which about 2,000 tons have been exported, the copper being of the same character as that at the Barrier. Copper also occurs at Doubless Bay, but has never been worked to any extent. In the Thames diggings, copper ores are of frequent occurrence associated with the auriferous lodes.

20. Are there any practical suggestion which you could make with the view of promoting and developing of the copper-mining interest?—I do not feel competent to give a decided opinion, but I should say that the difficulty and risks of the first opening of copper mines in a country like this are such that I think any conditions proposed by the Government should be of the most liberal and favourable character.

21. Extensive deposits of sulphur, I believe, exist in different parts of New Zealand: would it not be possible to turn these to practical account?—I think the quantity of sulphur that exists has been greatly over-estimated. It occurs associated with the existing or extinct boiling springs which are found in a line through the North Island, and in White Island in the Bay of Plenty. The springs in the interior deposit domes and terraces of silica, and the sulphur that is found associated with them is condensed in the cracks and fissures of the deposits and in comparatively small quantities, and in such form that it could not be economically collected. On White Island, no doubt owing to the access of sea water to the sources of the heat, the chief deposit is sulphate of lime, or gypsum; and the sulphur that is found there is certainly in larger quantity than in the springs of the interior, but is also confined to the deposit in the cracks and fissures. It would require much more careful examination than I have yet been able to make of White Island, before deciding whether it could be made available for any kind of chemical manufacture; but I am not aware of any other source from which native sulphur could be obtained in New Zealand. The manner in which the blocks of gypsum have been coated with a thin film of native sulphur has led to exaggerated notions of the value of the deposits there. Manganese exists, and has been exported from the vicinity of Auckland. A strong lode of it occurs at the Bay of Islands, and fragments of rich ores of the same metal have been found in Otago and Canterbury. It is doubtful if it would become an article of raw export, but it might become of use in the event of chemical works being established in the Colony. The same remark applies to chrome. Cinnabar occurs only in Otago; but metallic mercury has been found near the hot springs, near the Bay of Islands.

22. Has there been any thorough exploration made to ascertain the source of the mercury in the Bay of Islands?—It has not been officially reported. I do not think it would be possible to discover more than what the vapours of the springs bring up to the surface.

23. Do you know of the existence of any deposits of lead?—Lead occurs at Galena in the Province of Nelson, and also at the Thames Gold Field. It invariably contains silver to a considerable amount. It has not yet been found in payable, workable quantities; but, like almost all other ores, the explorations hitherto have been of the most superficial character. Iron is very abundant in New Zealand, the lode stone ores occurring as veins in several parts of the Colony, but more generally in the form of iron sand, which is largely distributed, especially along the western slopes of both Islands.

24. What has been the obstacle hitherto to the manufacture of that sand?—I am at a loss to say; probably the high rate of returns expected have not been obtained from the small efforts that were made; and no doubt the outbreak of the war at Taranaki, where the only attempt has been made to work the sand, has retarded its progress. The black sand is adapted for making what is known as charcoal iron, and is largely used in Japan and many parts of India for the purpose of making the iron from which the finest qualities of steel are manufactured.

25. Is there any difficulty in Taranaki in obtaining sufficient supplies of charcoal for the manufacture of that iron?—Not the least, as it is all a bush country at the back. I should think some of the brown coals might be applied successfully to the manufacture of the iron sand.

26. Would not that iron sand be particularly adapted for the manufacture of articles such as American axes, spades, and tools of a superior description?—Certainly.

27. Do you think it could be manufactured at prices to compete with the foreign market?—The price of cutlery very much depends on the quantity and variety produced from an establishment. An establishment for making axes or one or two kinds of cutlery only would not be able to compete with the imported manufactures.

28. Would it not be advisable to manufacture it in a rough state, so as to render it available for export or for internal requirements?—If labour could be had at a moderate rate, it would.

29. What is the difference between this iron sand and the Swedish iron ores?—The same ore occurs in Sweden, but in a compact form. The chief difference is, therefore, the state of division in which the ore occurs. This lessens the expense of obtaining raw material, but increases the difficulty of manufacturing it into iron. I do not consider the presence of titanium is any advantage, as has been represented. The Taranaki sand contains less titanium than that from any other part of New Zealand. I have analyzed all the different black sands, and shall submit a table of the different compositions.

30. The Committee would be glad to hear any information regarding the coal deposits in New Zealand, and their adaptability to supply fuel for the Colony?—The carbonaceous deposits occur in New Zealand as lignites, the brown coals, and bituminous coals. There is one instance of a seam of anthracite. The lignites occur in the interior of Otago, and in other places in superficial deposits of

limited extent, and are only of local value where timber cannot be procured. They have proved of very great service to the diggers, inasmuch as the interior of Otago would be almost uninhabitable if such fuel did not exist. The brown coals occur at the base of a great marine formation underlying limestone, clays, and sandstones, which have a thickness of many hundred feet. These coals vary in quality from bituminous coals of the highest value to those of very inferior quality. In valuing these coals, I am in the habit of considering them according to the quantity of constitutional water which they contain, which is a very fair indication of their value as a fuel—those coals which have least water in their composition burning more freely and giving out more heat than those which have water combined with them. The two classes of coals thus distinguished are termed anhydrous and hydrous. The anhydrous coals in New Zealand are equal, and in many cases, in my opinion, superior as fuel to most of the samples of coal obtained from Australia, or even from many parts of England.

31. Are they in equally compact form?—Their specific gravity is not so high, but that is on account of their containing less ash or incombustible matter. This causes them to be somewhat friable; but in other respects they are equally compact. In the case of the Grey River coal, and several others, 95 per cent. of the whole coal is combustible, which is a very high proportion for a bituminous coal. The common brown or hydrous coals are found throughout the Islands, almost wherever the horizontal marine formations already alluded to are in contact with the older rocks. The anhydrous coal is more limited in its distribution, and in many cases has been undoubtedly produced by local modification of hydrous seams owing to the disturbance of the strata. In the North Island, the only coals which come under the class of anhydrous, are the Kawakawa coals, near the Bay of Islands. The thickness of the seam at Kawakawa is about thirteen feet. I have never been able to satisfy myself of the existence of more than one seam.

32. What is the quality of this particular coal at the Bay of Islands?—It has intense heating properties but has a good deal of dirt, containing sulphur irregularly dispersed through it, so that a good deal of trouble has to be expended in getting the coal clean. Where this has been done, it has invariably given satisfaction as a steam generator. When not carefully screened, it acts injuriously on furnace bars.

33. Would not this disadvantage to a great extent disappear as the mine becomes developed?—Probably it would. I do not think the workings are yet below the level of the lowest outcrop.

34. Is it coal calculated to compete with the Newcastle coal?—Certainly, for local consumption. It is largely used for driving machinery on the Thames Gold Field; but the quality is too variable, as at present extracted at least, for the use of ocean-going steamers, as they could not run the risk of having their furnace-bars injured. At Whangarei the same coal has been worked to a very considerable extent; but the operations have been suspended, the quality and thickness of the seam being inferior to that at the Bay of Islands, and the expense of obtaining the coal considerably greater.

35. What cause, in your opinion, has prevented the full development of the Kawakawa Coal Mine?—The want of sufficient capital at first retarded the proper development of the mine. Now it is being worked more energetically, but whether profitably or not I cannot say.

36. Are the arrangements for shipping coal from that mine complete?—I understand they are being now completed. Hitherto the coal has required to be handled three times in being placed on board vessels, which greatly increases the cost of its production. When the contemplated arrangements are completed, there will only be one handling of the coals. There are very important and extensive deposits of brown coal, which may be considered as intermediate between the hydrous and anhydrous, in the Waikato Basin. These deposits have a most important influence in assisting the steamboat navigation of the Waikato River, and its various branches; and there is no doubt they would be largely used in Auckland, were the land transport between the Waikato and that city provided for.

37. *Hon. Dr. Renwick.*] Are the Waikato coals free from sulphur?—Yes, they are remarkably free from sulphur, but are not adapted to ocean-going steamers, their bulk being too great in proportion to their heating qualities. Many years ago I suggested a plan how this defect might be overcome, and a valuable artificial fuel manufactured from coals of this description, by depriving them of their moisture, and supplying its place with a small percentage of bitumen; but it has never been practically tried as yet. Towards the East Cape, although the country has not yet been examined, there is reason to believe that coal seams of considerable value exist. Between the Mokau River on the West Coast, and the sources of the Whanganui River, coal seams are also known to exist, but their exact nature is not yet ascertained. The chief deposits of anhydrous coal in New Zealand are on the west coast of the Middle Island. I produce a map showing the area occupied by these coal-bearing deposits, and indicating where seams have actually been discovered. As a rule these coal seams occur in rugged country, and in rather inaccessible positions; but by the proper use of inclined tramways,—and in many cases, probably, wire tramways—many of them might be profitably worked. At the present time the coal is only being worked from two places, namely, on the Grey River, where the seam is over eighteen feet in thickness, and is remarkably pure and free from irregularities either in structure or quality. The roof is generally hard and sound, and the mining operations are of the simplest character. Hitherto the mine has been worked above the water level, so that there is no expense incurred for pumping or hauling. I estimate the quantity of coal ascertained to exist in the one mine already open as several millions of tons. The coal dips to the west. The formation continues to the north for seven or eight miles, and rises to a considerable altitude in the mountains to the eastward. Immediately to the north, in the extension of the present mine, faulted ground has been reached; but whether it cuts off the coal or not is not yet determined. I do not think, however, that a seam of such thickness and steadiness of quality will run out in such a short space. Further to the north small irregular seams have been discovered, the thickness being four feet. In the south, within the Province of Canterbury, the coal formation is chiefly below the water level, and the coal seams which exist have not been properly followed.

38. *The Chairman.*] Is the Grey River coal equal in quality to the Newcastle coal?—I consider it superior, because every part of it may be rendered available, the smallest slack forming, without any difficulty, coke of the highest quality—better coke than you could get in any part of the world.

39. To what cause do you attribute our failure to drive the Newcastle coal out of the market?—

There has never been enough of coal produced to meet the demand at Grey River. The coal has hitherto been brought down the river in barges, and, owing to the shallowness of the river, only a few tons could be taken at a time.

40. Is there any difficulty in the formation of a tramway?—None at all. A line for a railway has been surveyed along both sides of the river. The estimated cost of a locomotive line on the north side is, I believe, £21,000.

41. What would be the cost of a tramway adapted for horse-power?—About £7,000 or £8,000.

42. In that case would there be any difficulty in supplying the local requirements of the Grey River?—Certainly not; the supply at present is limited only by the difficulty of the transit down to the mouth of the river. The bar at the mouth of the Grey River would prevent any large export?—It might cause an interruption of traffic from time to time; but vessels drawing ten feet could carry a large quantity of coal—that is, they could be constructed so as to be able to convey a large quantity of coal. I understand that natural difficulties equally great have been overcome in delivering coal from the mines in New South Wales.

43. On what other part of the West Coast has coal been worked?—Near Collingwood. At Pakawau, seven miles north of Collingwood, thin, irregular seams were explored many years ago, but the formation is very disturbed and broken at that point, and no large amount has ever been obtained. At West Whanganui, a four-foot seam has been worked, but as it cropped out below high water-mark, the coal was obtained under very great difficulties. The whole of the West Whanganui inlets are surrounded by the coal formation, and several small coal seams are known to exist, so that it is not improbable that valuable seams might yet be discovered. The coal formation in this district is, however, characterized by a tendency to false bedding, by which is meant the horizontal substitution of a deposit of one nature for another, so that shales pass into sandstone or conglomerates within a very short horizontal distance, and in like manner the coal seams would probably prove of limited area. The last-opened mine is on the west side of Ahuriri River. The seam, which is from 4 feet to 6 feet thick, is dipping into the brow of the hill at an altitude of 600 feet. The coal is of excellent quality, but it is divided into two subordinate seams by a middle band of shales. If an admixture of this with the coal be not carefully guarded against, it will depreciate the value of the coal. The coal formation occurs along the West Coast of the Island in isolated patches. One of these, north of the Buller River, known as the Mount Rochfort Coal Field, deserves mention, from its containing a 10-foot seam, the coal from which is of the best quality yet obtained, being better even than the Grey River coal. It occurs, however, at an altitude of 2,300 feet, the formation being on the surface of a flat-topped range of mountains extending parallel with the coast. The coal is dipping to the westward, and I think there is some chance of its being yet obtained at a lower level. Probably this coal might be profitably worked if a tramway were carried as far as possible on the level towards the position where the mine is to be established, and communication effected with the top of the hill by wire tramways or inclined planes, such as those in use at the Thames Gold Field. The great advantage of working this coal would be its vicinity to the excellent outlet afforded by the Buller River.

44. Is there any encouragement that could be afforded by the Government which, in your opinion, would be calculated to promote the speedy development of this mine?—What is wanted to insure the coal being favourably received and preferred for use by the steamboats on these coasts, is simply that the supply should be sufficient, which it never has been hitherto. In order to effect this, increased facility for transport between the mine and shipping place is the primary requisite. The first extraction of coal involves a small cost compared to that of its subsequent land carriage and repeated handling. I think if some means were devised for inducing the bringing of these coals to market in the different ports of call of the interprovincial steamers, there is no doubt that they would use them. The supply, however, would require to be ample, as it might be necessary for them to make some alteration in their furnace bars. One of the great advantages of the Grey and Buller coal, from past experience, is the comparatively small amount of stoking that is required. If too much disturbed, it does not burn in the furnaces so well, and probably this may account, to some extent, for the prejudice which many stokers have shown against its use.

TUESDAY, 26TH JULY, 1870.

James Hector, Esq., M.D., F.R.S., in attendance, and examination resumed.

45. *The Chairman.*] You have already given the Committee valuable information respecting the existing coal mines in the North Island: will you be so kind as to resume your narrative, and refer to such coals as you know to exist in other parts of the Colony?—The coals in the eastern side of the Middle Island and in the Province of Otago are chiefly brown coals—those which contain so much water as to make them comparatively inferior as fuel. There are, however, a few localities where a better quality of coal occurs. In the Malvern and Clent Hills there are a number of detached basins containing coal seams, the quality of the coal in some of them being very valuable. The extent of these deposits in any one place appears very small. The coal which has been recently tested in the House of Representatives is from one of these detached basins which intersects the Selwyn River. The area of this coal basin is limited, and the coal occurs in several well-defined but thin seams, the thickest seam being less than two feet. Near Lake Coleridge, which is in the western part of the same district, a coal seam occurs which has been converted into a true anthracite by the influence of volcanic dyke. This seam of of anthracite is four feet in thickness. Throughout this district which is very much disturbed by volcanic rocks, there will no doubt be found many other places where the coal has been altered and rendered of superior value as fuel. The Malvern Hills are forty miles from Christchurch, and are easily accessible. I traced the outcrop of coal seams of varying quality in these hills over a district thirteen miles in extent.

46. Does the coal in the Malvern Hills exist in sufficient quantity to render the working of the mines remunerative?—The chief difficulty arises from the prevailing thin character of the seams, and the detached localities where they occur. They are scattered about over a rather broken country.

47. *The Hon. Mr. Gray.*] Is the small area of which you spoke the particular locality from which the coal tested in the House of Representatives was obtained?—Yes; it is known as Hart's coal.

Further down the Selwyn River, on what is known as the Church Reserve, a thicker seam of coal occurs, but it is of the quality of brown coal—similar to that obtained in Jebson's mine, close to Waimakiriri River, seven miles further north. I think it probable that this brown coal seam is more or less continuous in this district. Jebson's mine has been worked in sixteen-inch and two-foot seams. Two of these seams were worked together in the same drive, the intervening shale being excavated. All round the western border of the Canterbury plains, outcrops of the same brown coal formation are of frequent occurrence, and it is probable they may extend a considerable distance to the eastward, underlying marine formations and the superficial shingle deposits. This is an important character, as it renders the tracing of these seams in depth more promising than if they were merely ordinary tertiary lignites.

48. What would be the scientific name of Hart's coal?—Non-caking bituminous brown coal.

49. For what purpose do you think it would be suitable?—I believe for any purpose except the manufacture of coke. It is quite as useful for ordinary fuel as the coal imported from New South Wales.

50. Does it contain such a quantity of sulphur as to render it unfit for blacksmith's work?—No, not in the samples I have examined. There is a larger quantity than I have hitherto operated on undergoing analysis at present, and I shall be able to give the result to the Committee before it closes its proceedings. Sulphur frequently occurs in these coals as sulphuret hydrogen, and not in combination with iron to form "brass," which is so objectionable.

51. *The Chairman.*] Are any of these coals adapted for steam purposes?—Hart's coal is adapted to any purpose for which coal is usually applied as fuel. It is not a bulky coal. If it could be had in quantities, and be equal in quality to the samples I have seen, it might be used by ocean-going steamers.

52. What we are to gather from your statement is, that the coals upon the eastern side of the Middle Island are adapted more for local supply than for purposes of export?—Yes; that is my opinion. In Otago, deposits of very superior brown coal occur at the mouth of the Clutha River, the seams having a total thickness of 50 feet. They were at one time extensively worked. Within six miles of Dunedin, seams of the same coal have been worked for many years to a very considerable extent for local supply of the City of Dunedin, for household purposes. At Shag Point, forty miles north of Dunedin, several seams of a still better quality of coal have been worked, varying in thickness from 4 to 7 feet. This coal contains a large percentage of gaseous matter and illuminating oil. The formation in which these seams occur extends for at least fifteen miles in a northerly direction, dipping to the eastward under the marine formations which I have before described. This coal is more adapted for gas purposes than any of the other coal mentioned.

53. *Mr. Stafford.*] Do you know the reason why the working has been discontinued?—It is still being worked, but only to a small extent, owing to the difficulty of shipping the coal—the coast being very much exposed, and there being no land communication.

54. *The Chairman.*] How far is it away from an available port?—Seven miles north is Port Moeraki, where there is a jetty with a draught of eleven feet of water alongside and safe shelter. Owing to the occurrence of building stone and lime stone, as well as this coal, in the district, it is very desirable that it should be opened up by a line of railway running parallel with the coast.

55. What length of railway would be sufficient to open up that country?—About 60 miles of railway would connect Oamaru with Dunedin, but less than 40 miles of railway would be sufficient to connect Shag Point with Dunedin.

56. *Mr. Stafford.*] The Shag Point Coal Mines are of greater depth than the ones at Molyneaux?—None of these mines go to a greater depth than water-level.

57. I do not mean the mines; I mean the coals?—I expect the coals run to a very great depth. The same coal as that found at Molyneaux is also worked at Tokomairiro, being in fact a continuation of the same field. The same formation also extends westward almost continuously towards Preservation Inlet, and is worked at several points along the southern slopes of the Hokanui, Takutimo ranges. In the latter locality, at Morley Creek, the seam is 10 feet thick, and is of better quality than is usual in brown coal, owing to the large quantity of resinous matter which it contains. It has been successfully tried for the locomotives in the Bluff Railway Line. There is an older formation flanking these hills which also contains coal seams, but none of great thickness or value. One of these was worked for a short time at Wakava, where there is a good harbour. The seam occurs in the sandstone, and is very irregular in thickness, but the quality is very good. It resembles Hart's coal. The same coal seam as at Wakava has been partly explored on the Otapiri Creek, north of Invercargill, but the seams there present the same objections as that at Wakava. At Preservation Inlet there is a small patch of this older coal formation, forming what is known as Coal Island, and also occurring at several points on the mainland. The seam of best quality in this locality is only 4 feet in thickness, and is irregular. The coal is good, but is somewhat dirty, containing a considerable admixture of iron pyrites and ash. On the south side of the Inlet the seam is much thicker and more steady, but its quality is the same as that described as being found on Morley Creek; it, in fact, passes into a brown coal. The only other coal deposits that require mention in Otago are the lignite beds, occurring throughout the interior. They are only of local importance.

58. *Mr. Macfarlane.*] Why?—They would not be worth the expense of carrying to any distance.

59. *The Chairman.*] Is there any particular coal mine to which you think the attention of the Government should be specially directed, in order to render the Colony independent of foreign supplies?—I think the mine best adapted for being immediately worked is that on the Grey River, but I doubt if it could be worked immediately so as to render the Colony independent of foreign supply.

60. Upon what do you base that opinion?—The coal from a newly-opened mine worked under difficulties would be successfully competed with by coal from the long-established mines which are in full working order in Australia. The difficulties that would have to be encountered in opening a mine extensively in this country would only be discovered as the works are proceeded with.

61. *Mr. McGillivray.*] Have the results been satisfactory of the coals used in the locomotives on the Bluff Railway?—It was only a small experiment, and the report of the Engineer I considered

so far favourable as to establish that the coal can be used successfully; coals of much inferior quality are largely used in locomotives in Europe. The distance to Morley Creek Mine from the Winton Railway is about twenty miles; but I have reason to think that an outcrop of the same coal might be obtained at a less distance.

62. *The Chairman.*] Will you favour the Committee with such observations as you desire to make respecting the limestone and building stone existing in different parts of the Colony?—The best and most compact limestones which occur in accessible positions, and where coal is available for the purpose of burning them, is near Collingwood, where there is an abundance of very compact crystalline marble. Limestone is also obtained in the Dun Mountain. The quality that is intersected by the present line of Dun Mountain Railway, and brought to market, is not the best in the district. Near Shag Point there is also a very valuable range of blue crystalline limestone which makes excellent lime. On the West Coast there are veins of true crystalline statuary marble. The chief limestones which are at present used in the Colony are derived not from these older and better classes, but from the white tertiary limestones, which are extensively burnt in some parts of the country. The chief localities where this limestone is worked is at Tata Islands, in Nelson; the Amuri Bluff, for the supply of Christchurch; Oamaru and Waihola, for the supply of Dunedin; and Forest Hills, for the supply of Invercargill. Limestone of an intermediate quality, and very useful, occurs in abundance in the neighbourhood of the coal mines at Whangarei and Kawakawa; and the tertiary limestone at Drury could supply Auckland, were it not for the difficulty of transit. At present Auckland is chiefly supplied with shell lime, and a small quantity is brought down from various points on the coast. Lime for agricultural use will be an essential to the profitable working of the greater part of the land in the Province of Auckland. Any of the above limestones are adapted for building stones; and perhaps one of the best building stones, taking into account the facility of working, is that which is quarried in the vicinity of Oamaru. A considerable quantity of this building stone has been exported from time to time to Melbourne, and been used there in the erection of public buildings. There is probably no stone that excels the Oamaru stone in its useful qualities. It is very soft and easy to work, and at the same time, if properly selected, it is not affected by atmospheric influences. Most valuable building stones are the granite rocks on the South-west Coast. These rocks, which are of the most enduring character and highly ornamental, occur in immense variety of colours and grain, and under circumstances that will admit of their being quarried and shipped with such facility that they may successfully compete with the supply of granite from any part of the world. Any settlement of the South-west Coast of Otago must be considered in connection with the development of this industry.

63. *Mr. O'Neill.*] Are you aware if any attempt has been made to test the value of these granites in Melbourne, where a large demand for supplies from Europe is said to exist?—No; the only granite that has been quarried in New Zealand is from Adele Island, in Blind Bay, for the supply of Nelson.

64. Could not the granite be easily shipped?—Yes; there is deep water alongside, and safe shelter. There is also good roofing-slate in the same district.

65. *The Chairman.*] Can you make any suggestions with the view of developing this particular industry?—I have previously advocated the formation of a penal establishment in Dusky Bay, having chiefly in view the profitable employment of the prisoners in this industry. The volcanic rocks of Otago Peninsula, Banks' Peninsula, and the vicinity of Auckland, are already largely used as building stones. They are easily worked and durable; but their chief defect is their porosity, the walls not keeping out the damp. Cement-stones occur in the lower part of the marine tertiary series, and in some cases are quite equal in quality to those which are burnt for the manufacture of hydraulic cement in Europe. They are most accessible at Moeraki, in Otago. Useful Roman cement might, however, be easily manufactured from some of the varieties of volcanic tufas that occur in both Islands.

WEDNESDAY, 27TH JULY, 1870.

James Hector, Esq., M.D., F.R.S., in attendance, and examination resumed.

66. *The Chairman.*] We purpose this morning taking up the reproductive interests of the Colony; and first with regard to animal productions, I wish you to give the Committee information that will be useful and beneficial to the Colony?—There is nothing that occurs to me about wool, hides, and tallow.

67. Can you give us any information with reference to the silk productions?—I think there is no doubt that many parts of the Colony are very well adapted to the growth of the silkworms and their food. The chief advantage which this country offers is the evergreen character of the vegetation, which would allow of mulberry leaves being gathered throughout a much longer period of the year than in other countries, and thereby greatly increase the produce of silk. My views on this subject have already been laid before the Assembly this Session.

68. Is it not a fact that experience shows that the growth of silk is only adapted to the system of small culture?—I believe it seldom succeeds when taken up as a business. It would not pay for a man to go into silk culture as a business. Where successfully prosecuted, the mulberry leaves are brought to market and sold like vegetables. The whole business is subdivided into a number of subordinate branches, and practised by small cotters. It pays very well to have a standing grove of mulberry trees for the supply of feed; and it pays persons who have spare labour, especially children, to undertake the rearing of the cocoons. There is no difficulty whatever in cultivating the mulberry.

69. *Mr. Graham.*] Can you give us any information as to the adapability of the Ailanthus silkworms to this Colony?—I believe that generally the rearing of them has been a failure.

70. *Mr. Potts.*] Do you think the leaves of the Whau (*Entelin racemosa*) might be applied to the feeding of silkworms?—It has never been tried, so far as I am aware, but I should expect they would.

71. *The Chairman.*] You have been preparing a Report as the Chairman of the Fisheries Commission respecting the fisheries of the Colony: is there any information, in addition to that contained in the Report, which you could give to the Committee?—The general result of the inquiry is that we possess very valuable fisheries if they were developed. There are kinds of fish quite equal to those found on the coasts of Great Britain. Of all the chief British varieties, there are none which are not represented in our seas by closely allied forms.

72. The Committee are desirous of ascertaining whether you can give information as to the formation and mercantile value of Adipocere?—I believe Adipocere, as far as I understand it, is ammoniacal soap, which is formed by the slow decomposition of animal bodies, the lean giving rise to the ammonia, which combines with the fat of the animal and forms a soap in those cases where the atmosphere is excluded by the submergence of the body, under circumstances where the products of decomposition are not removed as formed. It takes generally six years to form, and requires rare and very peculiar conditions.

73. *The Chairman.*] You are not aware of what are the results of the experiments which have been made in Canterbury?—I have heard nothing authoritative about them.

The Honourable Mr. Gray volunteered the following information to the Committee:—

The experiment in Canterbury in making adipocere has been tried for some months past by Dr. Barker. It may be said in the first place to be the result of accident. A number of sheep had been from time to time drowned in small shingle-bottomed creeks near the banks of the Orari. A whitish substance was seen at the bottom of one of these creeks including the bones of sheep, and on taking it up Dr. Barker came to the conclusion that it was adipocere; whereupon he "tried it out," and the result has been a substance closely resembling in appearance beeswax in different states of purity. He finds that it burns very freely, and he is of opinion that it would make candles of very superior quality. He has also found that in combination with potash it makes an excellent soap adapted for sheep washing, or kindred services.

Dr. Hector's examination continued.

74. *Hon. Mr. Gray.*] Have you any idea of the market value of adipocere?—No, I think its marketable value can hardly have been determined, but from its composition, when in a pure state, I would expect it to have the value of stearine.

75. *The Chairman.*] Passing from this branch of the subject of inquiry, are there any serials other than those now cultivated in the Colony which you think might be introduced with advantage?—As far as I am able to judge, the farmers are not setting themselves in this Colony to discover what crops are best adapted to different parts of the country. They are blindly following methods of agriculture, and adopting crops from the notions they brought with them from other countries; and there is a very great difference between the majority of the agricultural districts in New Zealand and the agricultual districts in England and Scotland from which settlers bring their experience. I think a great deal of the failure of agricultural pursuits that we hear of arises from their not taking into proper account the difference in the seasonal changes. I mean, that the rules they work by require modification. I do not feel competent to give any decided advice on this subject. In general terms, I may say that the western part of both Islands is more adapted for the growth of green and root crops, while the eastern part is better adapted for the growth of serials. The best ripening districts for serials frequently suffer from droughts in early spring, and from the prevalence of high winds at harvest time; but this will in time be overcome by irrigation, and by the intersection of the country with live fences. Large tracts of country, which are at present looked on as comparatively useless, will by this means come to be of the highest value. I may mention that a great number of the soils have been analyzed in different parts of the Colony, and nothing has yet been discovered to indicate that there is any defect, as a rule, in the soil to cause any deficiency in the agricultural produce that one would expect from the nature of the climate and other circumstances.

76. *The Chairman.*] Could the European flax be cultivated in New Zealand with advantage?—Undoubtedly, as far as the natural conditions are concerned.

77. Is the soil and climate adapted for its growth?—Yes, certainly in some places. The proper rotation of crops would be essential to the proper growth of flax, as it cannot be grown twice in the same land without an interval.

78. The same remarks would apply to a great extent to the cultivation of hemp?—I should think so; but I have never seen hemp growing.

79. Can cinchona be grown in this Colony?—The cinchona plant is adapted for growth in this Colony. It is a tropical alpine shrub, its natural habitat being in regions where the temperature and the moisture is similar to that of the North Island of New Zealand; but where it flourishes most, the valleys are generally bathed in warm fog and mist. The plant grows well, as far as the experiments made have shown; but whether the same amount of alkaloid (quinine) is developed, has not been tested.

80. Can you give the Committee any information on the cultivation of madder, and its value as an industrial product?—I do not know anything about it.

81. Are there any general observations you would like to make to the Committee with respect to the vegetable productions of the Colony?—There are many valuable grasses which might be available for paper-making, and to which attention has not yet been directed. I think much of the waste in the flax mills might be profitably employed also for paper-making; and by modifying the machinery, I am inclined to think that the pulp from flax might be converted into a paper of qualities which could be substituted for the lighter kinds of calico and scrim. By restoring the gum to the pulp in the process of manufacture, and submitting it to a high temperature, a waterproof material is obtained. The timber trees of the Colony are, with few exceptions, more adapted for ornamental and indoor purposes than those that are obtained readily from other countries. The subject of the immediate planting of large portions of the Colony, from which the natural forest has been denuded, with the most profitable class of introduced trees is one of the most important in this Colony, to which public attention should be directed. As a rule, pine trees would be found to be best adapted for New Zealand,—and among the pine trees, those which develop the least resinous matter. I should think the wood of trees deciduous in other countries would be found inferior to the qualities that might be expected from it when grown in this country. There is however a much greater variety in the climate of New Zealand than is generally thought in relation to the question of the growth of trees, and no general rule could be laid down that would be applicable to the whole Colony. The most desirable step for Government to take

in assisting in this matter is, to provide machinery for the distribution at a moderate price of the best varieties of trees. They should be raised from seed on a large scale, and distributed when they have reached the proper time for transplanting. In many of the treeless parts of the country, land which is at present of comparatively no value would become readily saleable in the course of a few years, if reserves were set apart and planted out at once,—not merely owing to the value of the timber that would be grown, but though the influence that the rising forest would exercise on the climate of the district.

82. If by any alteration of the Land laws encouragement could be given to the planting of trees, would it not be extremely desirable?—I do not know anything that would prove more advantageous to the development of the agricultural interests of these Islands than a properly organized and carried out scheme of planting. There is a large part of the Middle Island that will remain practically valueless without such a scheme for planting, combined with one for the irrigation of the high level terraces.

83. *Mr. O'Neill.*—Should any steps be taken for the conservation of the existing forests?—The rapid destruction of the native forests I consider to be most wasteful, and as having the effect of rapidly reducing the natural resources of the country. It is not at all necessary that the forest should be completely removed in the way that it usually is, either for the purpose of agricultural settlement or the obtaining of timber for mills, firewood, or fencing. The thinnings of the forest would be ample in most cases to supply all the latter wants. By carelessly opening up tracts of forests, and especially the firing of the dead forests, the young growth of trees which comes up to supply the place of the trees that are removed is wholly arrested, and in a short time the air and sun dry up the surface soil of good quality which characterizes freshly cleared bush land, and it is washed away by the rains. Large tracts of land in the north of Auckland which naturally possess great capabilities for agriculture, have been rendered absolutely worthless for centuries to come, without a great expenditure, by the above wasteful process. With reference to drug plants, I may say that there are many native shrubs which possess medicinal qualities which have not yet been investigated.

84. We will now proceed to consider the manufacturing interests of the Colony; have you any observations with regard to them?—The most obvious advantage, at first sight, in all manufactures, which New Zealand possesses, is the immense command of water power, without having to go into the more inaccessible parts of the country. This is a point of special importance with regard to the manufacture of woollen goods. With regard to the manufacture of leather, there are several excellent tan soaps to be had from the native forest; but the black wattle occurs so freely and possesses such a superior quality of tan bark that I think it would pay better to grow it especially for the purpose than to destroy the native timber. The black wattle is spreading in some parts of the North of its own accord, so as to form thick dense copse. The bark is worth about £4 per ton, and the wood forms a most valuable kind of firewood. The manufacture of salt from the sea might be commercially successful in those parts of the Colony where the ratio of natural evaporation is high.

85. Are there any sands in New Zealand adapted for glass-making?—Yes, in several places, but especially in the vicinity of the North Cape.

86. *Mr. Studholme.*] Is there sand in the Middle Island adapted for making glass?—Commonly the sands contain too great an admixture of iron for the manufacture of fine glass.

87. *Mr. O'Neill.*] What is your opinion of the sand on the beach from Whangarei to Mahurangi? I think it would be adapted for glass-making. The sand at the North Cape is peculiarly free from impurity.

88. *Mr. Parker.*] Is there any clay suitable for pottery ware?—Yes; there is an abundance of such clay in various parts of New Zealand. Some of the Auckland clays are equal to those clays manufactured in Bohemia. Common brick clays are very abundant; also fire-clays, which occur in conjunction with most of the brown coal seams. Some very excellent firebricks have been manufactured in Otago from these clays.

89. *The Chairman.*] Are there any particular measures that you would recommend with the view of promoting the manufacturing and industrial interests of the Colony?—I am rather in favour of the system of premiums than any other method of inducing attention to special industries. Of course the market must exist, and proper means of internal communication must be provided. The latter condition lies at the foundation of all material progress in the Colony.

90. Are there any particular manufactures, in your opinion, which, with suitable protection in their infancy, would eventually be able to stand alone and unprotected afterwards?—Woollen goods would probably be at first manufactured of better quality than those that are ordinarily imported, and, in consequence, might cost more, and would labour under a disadvantage in the market until their superior qualities were ascertained. This is a trying period in the introduction of any new industry. There is no reason why, excepting the want of population, and the obstacles which attend the first introduction of a new industry in a new country, the Colony should not be independent of the majority of imported articles.

91. What are the manufactures which, in your opinion, are now most adapted to the circumstances of the Colony?—Woollen goods, and the using up of the collateral animal products, glue, leather, soap, preserved meat. These are obviously the class of industries that will turn to the best account the greatest natural capabilities of the country, which are in the direction of grazing. This country is more eminently adapted for grazing than perhaps any other country, and this is the direction in which the industrial resources should be developed.

THURSDAY, 28TH JULY, 1870.

Edmund Barff, Esq., M.H.R., in attendance, and examined.

92. *The Chairman.*] You have an extensive acquaintance with the gold-bearing districts of the Middle Island: can you inform the Committee of any measures that might be taken by the Government that, in your opinion, would be calculated to promote those interests?—In accordance with a resolution introduced by myself in the County Council, some two years since, surveys have been made

at a very considerable expense, something like £2,000, with the view of showing where any large supply of water could be obtained for the various gold fields in the County of Westland. The surveys have been completed, and the courses of the various large races as proposed, are now indicated by pegs. Maps have been prepared, showing the proposed line of the races; and specifications have likewise been prepared; showing the probable cost of each work, the amount of water which each race would carry, and the nature of the ground over which the races would have to pass. In addition to this, the water has been gauged at the proposed sources of supply; and I have no doubt but that, if the capital was forthcoming to construct some of the proposed works, the County of Westland could maintain at least four times the number of miners at present working there, and that they would be profitably employed. My object in moving the resolution in the Council was, that I foresaw that there would be considerable difficulty in raising sufficient private capital to carry out the works, and I anticipated that the Government would eventually take the matter in hand. As far as my calculations have gone, I am under the impression that if from £60,000 to £70,000 were expended under the head of "water supply" for Westland, it might be made reproductive to a very large extent, and that it would return interest at the rate of at least 25 per cent. per annum. I put that as the lowest estimate. I believe that the majority of the miners are perfectly willing to pay a small sum weekly for the supply of water, and that many thousands of acres are at the present time lying idle in consequence of the want of sufficient supply of water, which ground is known to be payable in the event of water being supplied. The proposed water-races I have alluded to can be brought in at comparatively high levels, and will each carry from 50 to 100 Government heads, of 40 inches to the head. I am further of opinion that the supply of water would be continuous, and that the number of heads I have mentioned might be counted upon to a certainty.

93. Is the proposed expenditure you recommend of £60,000 or £70,000 sufficient for the whole of the present requirements of the County of Westland?—No; that sum would barely construct three of the proposed races. I think the levels of five races have been taken, being one for the requirements of each large district in the County. The names of the districts which have been surveyed are Waimea, Greenstone, Kanieri, Totara, and Okarito. I may mention that to the south of Okarito there is a very extensive district proved to be gold-bearing, and on which only a few diggers are at present engaged. The County authorities are now taking steps to establish settlements along the coast in that direction, so that water-races will eventually be required.

94. What steps have been taken on the western coast to promote permanent settlement?—The County authorities are taking steps for the formation of settlements in the southern portion of the County, such settlement scheme to be based upon the Otago settlement scheme, but with modifications, as there have been found to be defects in the Otago Act. We propose to set apart large tracts of land in several classes, one portion of which is proposed to be given as free grants to settlers, one condition being that of permanent occupation for a period of years. Other blocks will be sold at a low rate, the price being sufficient to pay the cost of survey, &c. The first settlement under this scheme will probably be in the vicinity of the Haast River, where a large tract of agricultural land is known to exist.

95. Is the quantity of produce grown in the County of Westland materially on the increase?—Yes; the garden produce is quite sufficient for the wants of the County, and a considerable number of small farms are in occupation, and being cultivated in all directions. The one drawback to the success of farming is the want of roads to convey produce to the centres of population. I am informed, for instance, that the cost of conveying such articles as potatoes to the Hokitika market from some farms only a distance of six or seven miles up the Hokitika River, is as great as would be the cost of freight and shipping expenses, from any of the ports in Australia.

96. *Mr. Macffarlane.*] Can you say how much?—I cannot state exactly the amount, but I know that a deputation waited upon the County Chairman and represented the above facts.

97. *The Chairman.*] Has any attempt been made to constitute Road Boards?—Yes; there are Road Boards throughout the County, under which rates are struck and collected; but the principal difficulty in collecting a sufficient sum for any practical purpose is this, that it is exceedingly difficult to rate mining property, except on an old-established gold field, where large plant is required in working the ground. I may state that, for the last two years, all our available prison labour has been engaged in the construction of roads.

98. Is there any practical suggestion you could make in reference to associating the working of the auriferous sands with the occupancy of small farms, such a course having been recommended to the Committee by Dr. Hector?—I think that such a principle would be most objectionable and pernicious for several reasons, one of which is that in the event of any of the large water-races being completed as proposed, the whole of the beaches would be worked in comparatively small claims, and would afford remunerative employment for a large mining population. The second objection is, that in all the settled districts, the land immediately adjoining the beach has already been sold, as that land is more sought after by agriculturists in consequence of the fertility of the soil and the fact of its being more lightly timbered than that on the terraces.

99. Are you acquainted with the coal regions of Westland?—Yes.

100. Can you make any practical suggestions with the view to their speedy development?—I may state that a coal reserve of 2,500 acres has been made up the Grey River, at a point about seven miles from its mouth—that several companies have been formed to work the mine—but the difficulty of raising sufficient capital has hitherto prevented the development of that branch of industry. The coal is of the most superior quality, probably the best in the world. Recent analysis shows this to be the case. The seam, which is in some places 20 feet thick, can be easily worked, the seam lying horizontally immediately above high water-mark of the river. The principal difficulty has hitherto been that a tramway or railway is required to bring the coal to the seaport. The probable cost of such a tramway or railway would be about £25,000. The expense would depend on the nature of the road to be constructed. The same seam of coal has been proved recently to extend in a southerly direction, and to exist at a point situated some eight or nine miles above Hokitika. This portion of the seam

has not yet been properly tested, but where struck is from 18 inches to 2 feet in thickness, the coal being of the most superior quality. The party of men who discovered this portion of the seam were at the time of their discovery engaged in prospecting for gold. A coal reserve of 500 acres has been protected to these men, to enable them to prosecute their discovery.

101. In case tramroads were made, would the difficulty of exit arising from the existence of a bar at Greymouth River not operate to prevent any large export?—I think not. A merchant in Greymouth has recently had a vessel built in one of the neighbouring colonies expressly for the Greymouth trade. The vessel only draws some 8½ feet of water, and on her first trip she brought 420 tons of cargo to Greymouth.

102. What is the cost of the Greymouth coal in Hokitika and at Greymouth at present?—The cost is, at the pit mouth, 10s. per ton; at Greymouth, 16s. per ton; and at Hokitika about £2 per ton.

103. Are you acquainted with the coal deposits of the Buller River?—I have been at the Buller, but I know little of them.

104. Has the company at present working the Greymouth Mine any capital?—The Nelson Provincial Government are at present working the mine, but only on a small scale.

105. *Mr. O'Neill.*] What length of tramway do you consider would be necessary to connect the Grey River coal mines with the port?—The entire distance in a straight line is less than seven miles, and there would be no material deviation in the line.

106. *The Chairman.*] Is there any other observation which you would wish to make to the Committee?—I may state that a constant supply of water could be calculated upon in the large races alluded to in the first portion of my evidence, without the construction of large reservoirs, the water being simply diverted from the beds of rivers or creeks. I may also state that the money expended on water supply for the Victorian gold fields was to a great extent thrown away in the construction of large reservoirs, which were in a short time rendered useless by the accumulation of *débris* brought down by floods. Another cause which prevented many of these waterworks from being reproductive was, that the nature of the ground proposed to be sluiced was of so clayey a nature as to prevent sluicing operations from being successful, except the dirt had been previously puddled. That objection would not exist in any part of New Zealand, as the ground throughout the gold fields generally, can be readily sluiced in the ordinary manner, a very large proportion of it being sand and gravel. As an illustration, I may mention that in many cases on the Victorian gold fields, more especially in the Ballarat district, the red clay when put in the sluice, carried away the gold with it; and although the ground was proved to be payable when puddling operations were carried on, still, when the ground was washed in much larger quantities by sluicing operations, the greater part of the gold was lost.

FRIDAY, 29TH JULY, 1870.

Thomas Birch, Esq., M.H.R., in attendance and examined.

107. *The Chairman.*] You have had considerable experience as to brewing, malting, and hop-growing?—I have had experience in brewing and malting, but not in hop-growing.

108. Will you favour the Committee with your opinion as to the present position of the brewing trade—whether the article produced can compete with foreign manufacture?—Yes; an article can be produced equally as good as that imported; and as a proof that this is the case, there is very little ale imported into the Colony, especially to the Middle Island.

109. Do you think beer made in the Colony would bear transportation anywhere?—We sent bottled beer and stout, two years ago, to Great Britain, for the purpose of testing what effect the voyage would have upon it; and on the vessel's return it was ascertained that the article was of such a quality that it took the best judges to determine whether it was English manufacture.

110. *Hon. Mr. Seymour.*] Do you consider New Zealand, from its climate, to be suitable for making beer for the Australian Colonies?—I look upon the New Zealand climate as being the best climate in the world for making beer, and the water is good throughout the Colony.

111. *The Chairman.*] Has the existence of protective duties any effect on the development of this brewing trade?—Yes; it has. The imposition of a duty of £2 10s. on foreign beer has given an impetus to the Colonial trade.

112. *Hon. Mr. Seymour.*] Could it stand alone now if that duty were taken off?—I am not prepared to answer that question. I may state, from experience, that in the Province of Otago the people prefer the Colonial ale to the English; it is not so heavy or intoxicating.

113. *The Chairman.*] Do you consider that the existence of a protective duty is essential to the permanent continuance of this trade?—I believe that, although it is necessary at the present time, it will eventually become unnecessary.

114. Have you any special difficulties to contend with in your trade that do not operate as against the foreign brewer?—We have the difficulty of skilled labour and the increased rate of wages to contend with, as against the foreign manufacturer. The absence of accumulated capital is another element of difficulty.

115. Do you find any difficulty in obtaining skilled labour?—No, we can get maltsters, coopers, and others; the only difficulty is the high rate of wages.

116. Do you manufacture your own malt?—We do.

117. How do you find the Colonial barley adapted?—It is well adapted. The country is well adapted for malting and for the growth of barley, but nothing but the best barley should be sown; I would recommend Chevalier barley.

118. To what do you attribute the large importation of foreign malt?—To the fact that brewers hitherto have been prejudiced against Colonial malt. As a proof that brewers are beginning to recognise the fact that they can get the same extract from Colonial malt as English malt, the brewers in the Province of Otago are erecting malt-houses.

119. Do you find Colonial malt to be cheaper than English malt?—Yes, at least 40 per cent. cheaper. The price of English malt fluctuates; sometimes it is 10s. and sometimes 12s per bushel. Colonial malt can be manufactured at 6s. a bushel.

120. *Mr. Macffarlane.*] Is the barley grown in the Colony equal to that grown at home?—Generally it is not so, owing to the use of inferior seed; but I have seen samples in Christchurch equal to any English barley.

121. *The Chairman.*] Do you ever experience any difficulty in obtaining a sufficient supply of barley?—Not now.

122. If the rate of duty upon foreign malt were raised, would not the effect be to stimulate the use of Colonial malt?—Yes, it would.

123. The Committee understand you to state that if the brewers once got into the habit of using Colonial malt, they would not use English malt, owing to the cheaper price of the former?—There is a prejudice against using Colonial malt, but it is gradually wearing away.

124. At what price can Colonial malt, made in Otago, be laid down in Wellington?—At 8s. a bushel.

125. What is the ordinary price of English malt in Wellington?—I think, at present, it is 10s. 6d. per bushel.

126. Do you use Colonial hops in your brewery?—We use very little Colonial hops, as there is a difficulty in procuring them. We prefer Colonial hops to English hops, if we could procure them.

127. Do you not find the Colonial hops stronger than the English hops?—I am not able to give an opinion upon that matter.

128. What is the price of Colonial hops?—I would say 1s. 9d. per lb., but I can obtain English hops of good quality at an average price of 1s. 6d. per lb.

129. Have any attempts been made in Otago to grow hops?—Not for manufacturing purposes. If we had cheaper labour, we could grow an abundance of hops. The climate of Otago is admirably adapted to its growth. This industry should be developed.

130. Is it desirable that, by any legislative action, encouragement should be given to the development of this industry?—Yes, I think a bonus ought to be given.

131. Would an increase of duty tend to develop this industry?—No, I think not.

132. Can you make any general suggestions to the Committee, bearing upon the brewing, malting, and hop interests of the Colony?—No, I have no suggestions to make.

133. Do you think, eventually, that the beer produced in the Colony will be adapted for export trade?—Yes.

134. At what price can you produce beer fit for the English market to compete with the Indian market?—I do not think we could at present compete with the Indian market. The very best ale we could produce could be landed in Calcutta for about £9 per hogshead. The English ale could be landed there at a lower price.

135. How do you obtain the casks required for your trade?—By the purchasing of English hogsheads sent out here full of ale. No doubt brewers must give their early attention to the manufacture of hogsheads.

136. Are not several woods of the Colony adapted for cooperage purposes?—No, not for the manufacture of hogsheads for ale. All the hogsheads are manufactured from oak. Staves are generally imported from America. The large tuns are manufactured from New Zealand wood; but the Colonial wood will not bear the same usage as oak.

137. *Mr. Macffarlane.*—Is Victorian beer imported into Otago; and, if so, of what quality?—No Victorian beer is imported into Otago that I am aware of.

138. Is there any English beer imported?—Very little.

139. Is it of good quality?—Sometimes good, and sometimes bad.

140. *Hon. Dr. Renwick.*] Is there much sugar used in the manufacture of beer in this Colony?—I believe there are brewers who use a considerable quantity of sugar, but that arises from the circumstance that English malt is high in price, and it is not profitable to use it.

141. Is there much malt imported into the Colony from England?—There is not much imported now.

142. *The Chairman.*] With malt at 8s. per bushel, would sugar require to be used?—A little sugar is necessary in the manufacture of beer for the purpose of clarifying it. Malt at 8s. per bushel would drive out the use of sugar, except for the purpose of clarifying.

143. *Hon. Mr. Gray.*] Did you ever know honey to be used in the manufacture of beer?—I have never heard of it; I dare say honey would do as well, if not better than sugar.

144. *The Chairman.*] Do you bottle ale and stout?—We bottle both largely.

145. Does it enter into competition with imported ale and stout?—Yes, greatly. The Colonial article is sometimes sold as English.

146. Are the bottles readily obtained?—Not readily. At present we pay 1s. 6d. per dozen for ale bottles, and 1s. for stout bottles.

147. Will this supply of bottles fall off as the consumption of the English article diminishes?—Yes, we have experienced some difficulty at times in procuring a supply of bottles.

Witness was thanked, and withdrew.

T. A. S. Kynnersley, Esq., M.H.R., in attendance and examined.

148. *The Chairman.*] The Committee are anxious to hear any suggestions from you with regard to the development of the gold-mining resources of the Colony?—I think an adequate water supply is the most pressing requirement to the development of the gold-mining resources of the Colony. On the Nelson and West Coast Gold Fields there are many square miles of country—of low alluvial hills—all auriferous, and wherever there is any water the ground is now worked to advantage. Miners pay as much as £1 per day for a head of water to the proprietors of the few small water-races that exist at present. I know one large district alone, in the Grey Valley, where the levels have been taken for a water-race; and it has been estimated, by those best acquainted with the country, that if that race were brought in at an estimated cost of about £20,000, it would find work for between one thousand and two thousand men for the next ten years.

149. How is it that these works have not been undertaken by parties resident upon the spot?—These undertakings are too large to be carried out by any small parties of miners. There is not sufficient capital in the neighbourhood to invest in works of such magnitude, and the country is all very rough and densely bushed, and without roads. Capitalists would not like to invest their capital in a country like this, which they cannot visit, and about which the only information they can get is from the miners and storekeepers of the various districts, who, of course, are naturally supposed to be desirous of obtaining a large expenditure of money in their respective districts. In fact, there are no reliable statistics available. There have been works of the character indicated constructed on the West Coast on a small scale, at an expenditure of from £2,000 to £3,000, some of which have been found to be highly remunerative, and have repaid the original outlay within a year and a half. I may state that another reason why the miners do not undertake these works themselves is, that the nature of the country is unfavourable to the combination of miners for any undertaking. They are scattered over a large area of country. They very seldom meet together in any large numbers. There are no public meetings held, and the miners do not combine for any political or mining purposes the same as miners in Victoria, where they are in the habit of meeting in large numbers. The whole of the sea beach on the West Coast, for 200 miles, is auriferous. Some of the sand on the beach contains sufficient gold to keep men steadily at work; but there is also a large extent of beach where there is just sufficient gold in the sand to pay from £1 10s. to £2 a week to a hard-working man. This auriferous sand seems to be practically inexhaustible. After a very heavy gale of wind and westerly swells, the whole formation of the beach is entirely changed, so that I have known men living on the working of the same beach for two years,—and finding the sand at the same place to be quite as auriferous at the end of the two years as when they commenced work. If these sand deposits could be developed, either by improved machinery or the employment of cheap labour, great advantage would be the result.

150. *Hon. Mr. Gray.*] What is the rate of wages on the West Coast?—The Government day-labour wages is 10s. per day. Ordinary labourers about the town might sometimes be got to work for 8s. a day. The skilled miners receive wages according to their ability, ranging from 10s. to £1 a day.

Witness was thanked, and withdrew.

Theophilus Heale, Esq., Inspector of Surveys, in attendance and examined.

151. *The Chairman.*] The Committee, understanding that you have had considerable experience of the copper mines in this Colony, are desirous of ascertaining from you the causes of the decline of that branch of industry, and whether by any legislative action it would be revived?—I think that, as regards the North Island, the operation of the Native Lands Act has placed the subject out of the reach of legislation, the whole Island being practically private estate. As regards Otago and Southland, the Government regulations are not encouraging to explorers. The Otago Land Regulations enable the explorer to take up a section not exceeding eighty acres for mining purposes, subject to a royalty of one-fifteenth; but they do not enable him to purchase until after three years' work. He gets permission to occupy the land subject to that royalty, but as he cannot acquire the freehold until after three years' work, he has no inducement to make the mine successful during those years.

152. Have you reason to believe that Otago and Southland are rich in minerals?—There is a large extent of unexplored mountainous country in which minerals are very likely to be discovered.

153. Do you know of any formations peculiarly favourable to the development of minerals?—I have always thought that the junction of the granites and felspar on Stewart's Island presents very likely spots for finding tin.

154. Will you explain to the Committee the causes of the non-continuance of the copper mines at Kawau?—The ore in depth proved to be very poor. It was quite impossible to work it without smelting on the spot, and the great price of coal consequent on gold discoveries made that unremunerative.

155. With cheap coal, do you think these mines might again be worked with advantage?—I think, with the present price of coals, if the Kawau mines had not been closed, they could be worked at a profit; but I do not think they can ever be reopened.

156. *Mr. Macffarlane.*] Why?—The old workings, which were extensive and deep, will all have run in, and the capital required before any return could be realized is too large.

157. What was the richness of these ores?—Our first cargoes produced 16 per cent.; they then fell off to 8 per cent.; and I do not think at the bottom they were over 5 per cent. But then the ores were massive; there was no dressing or even selection.

158. What was the width of the lode?—It averaged not less than 8 feet.

159. Have you acquaintance with any other copper mines in the Colony?—I know of the existence of copper in several other places.

160. In any of these places, do you think copper is likely to be worked remuneratively?—After what has passed, copper mining will always be looked upon as very speculative.

161. It has been stated to the Committee by Dr. Hector that the generally received opinion as to the existence of a large deposit of sulphur on White Island is incorrect. Does that agree with your opinion?—The deposits of sulphur there are quite insignificant, and would not pay. On the adjacent island, Motutohora, the working would be more convenient, but I do not think they would pay unless there was an object in producing sulphuric acid on the spot.

162. Are there any general observations you could make bearing upon the subjects of investigation by the Committee, calculated to advance the object they have in view?—I have already stated that the Northern Island is practically private estate, and a serious question arises as to the operation of the law on the working of gold on private property. I am aware that a question arose on that subject in the early part of last year, which deterred parties from searching for gold on private estate.

163. Have you any suggestions to offer with the view to remedying that?—I think any determination of the law would be better than the present state of uncertainty. I think the rights to the minerals should pass with the freehold. As the law now stands, the freeholder has the power of preventing the working of the gold without being able safely to work it himself.

Witness was thanked, and withdrew.

FRIDAY, 5TH AUGUST, 1870.

George Didsbury, Esq., Government Printer, in attendance, and examined.

164. *The Chairman.*] Have you any experience with reference to the manufacture of paper?—No.

165. Can you give the Committee any information with reference to the manufacture of paper in the Colonies?—I believe printing paper is manufactured in Melbourne, and is used by the Melbourne *Argus*. I believe also that an attempt was made in Auckland some years ago to manufacture wrapping paper, but it was not successful.

166. Do you know the reason why that attempt failed?—I believe the principal reason was the want of proper raw material.

167. Do you know of any attempts having been made to manufacture brown paper in any of the other Colonies?—I am not aware of any attempts having been made to manufacture brown paper in any of the Colonies.

Mr. Didsbury, at the request of the Chairman, stated that he would endeavour to supply some information on the subject on a future occasion.

MONDAY, 8TH AUGUST, 1870.

James Hector, Esq., M.D., F.R.S., in attendance, and examined.

168. *The Chairman.*] A correspondence has been remitted to the Committee, which took place between yourself and the Government, respecting the formation of classes, with the view of promoting technical education. The Committee are anxious to ascertain whether you can make any practical suggestions with a view to the establishment of such classes, having particular reference to the peculiar circumstances of the Colony, arising from Provincial organization, and likewise to the amount of pecuniary means likely to be appropriated to such purpose?—I should state that the proposal was made from the Government, and submitted for the opinion of the Governors of the New Zealand Institute. The practical suggestions which they offered are embodied in the correspondence referred to only in a general way. As I understand the proposal of the Government, it was not intended that these lectures should be directly in connection with the Institute, but rather with the Geological Survey Department; the object being, not to impart a general knowledge of science to a large number of students, but to give practical instruction in several branches of science to a few students, in such a manner that they could afterwards employ that knowledge, either for the purpose of teaching others, or as a practical avocation. I am of opinion that, with very slight alterations, the present establishment at the Museum might be rendered sufficient to supply all the requirements for such a course for a considerable time to come. The chief expense of such an establishment is, of course, the salaries of the scientific officers who are competent to conduct such a course; but if the officers who are otherwise employed in the Geological Survey, and other scientific work in the Colony, devoted a portion of their time to such a purpose, very little extra expense would be incurred. I do not think that there would be a sufficient number of students to give employment to a staff specially appointed for such a purpose.

169. At what expense could the building be altered so as to give sufficient accommodation for the number of students likely to attend?—I think probably from twelve to fifteen would be the number who would be likely to avail themselves of the practical course for a time, and the laboratory could be so altered as to accommodate that number at an expense of about £350. A lecture room would be required in addition, and as probably a much larger number of persons would attend the general course of lectures than the few who would take the practical, a room of considerable size would be required. At present lectures are delivered in the Maori house, which is very badly adapted for the purpose. The plan of the Museum building contemplates the construction of a two-storeyed front, and of another wing similar to that at present at the north end. I think if the front were built, it would supply all the space that would be required for some time to come, and allow all the collections to be so arranged as to be more available for instruction than they are at present. The expense of the front, as originally contracted for, was £1,100, but of course the Maori house could be used in the meantime, if such expense could not be borne at present. The apparatus required for such a course of lectures would be divided into two classes. For the general course, the apparatus would cost, at a minimum, about £150. For the practical course, the supply of chemicals and other articles that would require to be kept in hand would cost about £250; but it is usual for students to pay for what they actually consume in a practical course of chemistry—the value of what each student uses in a course amounting to about five guineas.

170. What period of the year would you propose to hold these lectures, and over what length of time would the course extend?—At first about three months would be as much time as could be spared by the Geological Department, with due regard to the other duties of the Department; and the best season would be in the months of July, August, and September.

171. The question of the creation of scholarships has been raised in this correspondence: have you turned over that subject in your mind, and are you prepared to offer any recommendations to the Committee upon it?—That is the only method by which the benefit of such a course could be extended to other parts of the Colony. I think a scholarship of the amount of £30 would be sufficient to cover all expenses; and if ten such scholarships were established, I think that would be quite sufficient for the present. These scholarships should be the gift of the local authorities in each Province.

172. Do you think it would be practicable to connect the system of technical lectures with the creation of the Chair of Chemistry and Natural Science at the Otago University?—A Professor giving a general course in science would certainly not be able to undertake the conduct of the practical course in the different branches of science without an additional staff; and the question is, whether such an additional staff would find full employment for their time without having scientific work to perform. The Schools of Mines on the Continent and in England are directly connected with the Geological Survey on this account; but the practical instruction in science given at Jermyn Street does not in any way interfere with the general course of scientific instruction at the various Universities. I do not think a student can profitably devote his attention at the same time to what is termed a University course and also to a practical course in science, or in any other business.

173. Would not the class of students likely to avail themselves of the technical lectures be a different class to that ordinarily resorting to the Universities?—Yes; it has been found so in all countries.

174. Mr. *Macffarlane.*] On the supposition that there were to be a course of lectures at Auckland, Canterbury, Wellington, and Dunedin during the year on this branch of science, what additional assistance would you require to enable you to carry that out?—Of course one man could give a course of lectures extending over two and a half months in each place, but the expense of establishing a laboratory and class-room at each place could not be materially diminished by the moving of the apparatus from one place to another. The first expense of the establishment of a laboratory would, of course, be greater than in the case of Wellington, where only additions are required. I would wish to be clearly understood, that such a practical course as I have described is in no sense to replace the teaching of a general acquaintance with science at the leading public schools, and still less with that at any university colleges that may be established in various parts of the Colony. The two things are entirely distinct. Probably the greater number of those who availed themselves of the practical course would turn the knowledge they acquired to account as teachers, and so be the means of introducing scientific instruction into the various schools of the Colony. This is the idea expressed in Mr. Vogel's minute of reference.

Witness was thanked and withdrew.

The Hon. Mr. Holmes in attendance, and examined.

175. *The Chairman.*] You are extensively connected with the pastoral interests?—Yes.

176. In your opinion, are there any impediments standing in the way of the full development of that branch of industry?—One of the first necessities is legislation with regard to the extirpation of disease, such as scab in sheep, pleuro-pneumonia in cattle, and foot-rot.

177. Are the Provincial enactments upon this subject not adequate? The Provincial laws are good, so far as they go, but they work injuriously in consequence of the subdivision of the Islands into Provinces, causing great loss and inconvenience in stopping sheep on boundaries for the want of Inspectors. In travelling stock, very frequently the Inspector cannot be obtained when he is required, and the result is, that sheep are detained, to my personal knowledge, at the boundary of a Province for a fortnight or three weeks, to the great loss of the owners.

178. You are of opinion that legislation on this subject should be general and not local?—Yes; my opinion is, that one law should have force throughout the Island, and that one inspection should be sufficient to enable sheep to travel from one end of the Island to the other, subject to local inspection from time to time, provided they do not pass through scabby country. The present law has in some cases acted injuriously, in consequence of unnecessary prohibition between Provinces. For example, between Canterbury and Otago, sheep, no matter how many Inspectors had examined them and declared them to be clean, were permitted to enter Canterbury unless they were dipped. That was a virtual prohibition, because the expense of dipping was sufficient to deter the free interchange between one Province and another. The same may be said as regards pleuro-pneumonia. Although no disease has existed in Otago for eighteen months or two years, Canterbury is closed against cattle from Otago.

179. Do those regulations not often stand in the way of importing a superior stock for the improvement of the breed of cattle?—Certainly; I have known several instances in which it has acted prejudicially. For example, the Rev. Dr. Lillie imported some pure short-horns; they were not permitted to land, and had to be taken to Otago. The Rev. Mr. Bluett had a cow presented to him, before leaving home, by his parishioners, and although she had been landed for, I believe, three months, the police took possession of, and killed her, to prevent pleuro-pneumonia. Of course, if the animal had the disease she must have communicated it long before that period. The question of foot-rot should, I think, engage the attention of this Committee, in order to obtain information as to the best means of eradicating it. I believe it is largely on the increase. Some imagine it does not originate spontaneously, but that is not my opinion. I believe that on strong adhesive soil, or in damp situations, the disease will be produced without contagion. I also believe that it is contagious.

180. Are you of opinion that the regulations as regards the declaration of infected districts should be placed in the hands of the General Government?—I am distinctly of opinion that it should be placed in the Governor, and on no account whatever delegated to Superintendents.

181. Do you know what is the practice in England?—I think the Privy Council or the Home Secretary alone exercises that power.

182. Are there not some Provinces in the Middle Island where no efficient Scab Act is in force?—Yes; I believe in Nelson and Marlborough no Act has been put in force to compel the people to clean their sheep.

183. Do you think it is possible to stamp out the scab?—Yes, certainly. It requires fencing, a clean muster, and careful dressing.

184. Will there not always be danger so long as a scabby district remains in the Island?—Certainly there will; because, granting that every effort is made to clean particular Provinces or localities, scabby sheep may be taken on board a ship for the use of the crew, and afterwards clean sheep carried as freight in the same vessel, thereby infecting them, and causing the spread of the disease. That has been the cause of the spread of the disease in many districts hitherto.

185. You are of opinion that no sheep should be allowed to travel in any vessel, without being dipped upon arrival at port?—So long as scab exists in any of the colonies, all sea-borne sheep should, in addition to a close inspection, be compelled to be dipped properly before being permitted to travel through the country. I may state, in illustration of the necessity of having only one law in reference to infectious cattle, that although the different Provinces prevented cattle from crossing their boundaries, that prohibition was virtually inoperative, in consequence of the boundary lines, in some cases, being merely imaginary, without any natural boundary to prevent their crossing from one into the other. For example, between Southland and Otago the line is a mere imaginary one at some points. The same applies to Canterbury and Otago. A great grievance is, that in the

case of Otago, cattle actually grazing in Otago were prevented from going into Southland, and cattle in Canterbury are prevented returning to Canterbury because they have to pass through Otago, the natural road compelling them to enter the adjoining Province.

Witness was thanked, and withdrew.

The Hon. Mr. McLean in attendance, and examined.

186. *The Chairman.*] You are extensively connected with the pastoral interest. The Committee are anxious to ascertain whether, by any legislative enactment or other measure, the interests of that particular branch of industry can be in any degree promoted?—Yes, I think it can; its operations can be facilitated by legislative enactment.

187. By what particular means?—By uniform laws applicable to the whole Colony, more especially regarding the diseases affecting stock, and the transit and importation of stock throughout the whole Colony.

188. Do you consider that the Scab Act should be a general law, or that it should be left to Provincial legislation?—I think a general Scab Act would be preferable, but it would require great care to frame it.

189. But you would not recommend that it should be left to Provincial Governments to decide whether or not such an Act should be brought into operation within any particular Province?—No; an efficient general Act being passed, I should leave the Provinces no option in the matter.

190. Will any advantage arise from Provincial inspection in addition to the inspection by General Government officers?—No; there should be District Inspectors throughout the Colony, and they should be General Government officers.

191. You would propose that sheep approved by a General Government Inspector in any one district should be allowed to travel throughout the length and breadth of the Island?—Yes; provided that the disease be not subsequently detected by any other Inspector or any other person.

192. Do not the Provincial regulations often interfere to check the introduction of superior stock for the purpose of improving the breed of sheep and cattle?—In respect to cattle, it is a complete check upon it in the meantime. At present a cattle-owner on the north side of the Waitaki River, purchasing or importing a pure-bred bull, cannot pass the same into the Canterbury Province from the Province of Otago.

193. Are the Canterbury cattle markets open to the stockowners in Otago?—No.

194. Is there pleuro-pneumonia in Otago Province?—No, not now.

195. How long is it since there was any?—I have not known any cases there for the last eighteen months or two years.

196. Has there been any recently in the Canterbury Province?—I have heard that there have been some cases in the north part of that Province.

197. Do you think that if a General Scab Act were introduced, and stringently enforced, it would be possible to entirely stamp out the scab disease?—Yes, I quite think so; the efficacy of such Acts depends entirely upon their strict administration.

Witness was thanked, and withdrew.

APPENDIX.

No. 1.

SIR,— Nelson Cloth Manufactory, 10th August, 1870.

We received your circular of the 30th July, requesting information in connection with the branch of native industry we follow, namely, cloth manufacturing.

We are willing to give the desired information in as far as we can, and trust the following will meet the wishes of your Committee :—

1. We will give you a sketch of the history of cloth manufacturing in New Zealand, as far as we are, or have been, connected with it. This will embrace the rise, progress, and present position of the trade.

In or about the year 1864 the "Nelson Cloth Factory" was established in Bridge Street, Nelson, by Mr. Webley, senior. Having no regular employment, and also having been connected with this business in England, he naturally turned his thoughts and attention to the business alluded to, and, by dint of perseverance and carefulness, managed to import to New Zealand the following small shipment of machinery, with which he made a commencement: one carding machine, fittings for a fifty-spindle spinning machine, and fittings for two looms. With this a small beginning was made. This may be called the rise of this trade in New Zealand. The machinery was driven by water power; the number of persons employed in this pioneer establishment was six; the quantity of cloth produced was, on an average, 300 yards per month; and the quality was then acknowledged to be very good.

About 1867 another small shipment of machinery was imported, making a total of 132 spindles, two carding machines, and two broad looms. With this machinery Messrs. Webley and Sons have managed, by dint of industry and hard labour, to produce 800 yards of cloth per month. Fifteen persons were employed at this time: here, then, was a little progress.

Finding, however, that our machinery was not the thing for producing an article suitable for summer wear, and also that we had more demand for Nelson cloth than we could supply, we concluded to send for another shipment of machinery of the best make, with all the latest improvements, so that we might be placed in a position to compete, as far as possible, with other markets in quality and cost. This arrived in April, 1870. We have not yet started this machinery, having been delayed by a variety of unforeseen causes; we cannot, therefore, state exactly what additional quantity we shall be able to produce, but we think 2,000 yards per month will be an approximate amount. This, we trust, will be a far better article, suitable for all seasons of the year, and suitable for all classes. This new machinery comprises a complete set of carding machines, and also spinning machines containing 400 spindles; this, with our old machinery, will give us a total of 530 spindles. This is the present position of our trade, as far as appliances go. We may state that, with these appliances, we hope to be able to execute any orders we may be favoured with punctually and at reasonable prices.

2. You wish us to specify particularly the impediments which may at any time have retarded its progress. Well, Sir, we must confess the chief obstacle in the way has been the want of capital: not having received any pecuniary assistance from either General or Provincial Governments, and not having had the advantages of large capitalists, we have had to grope our way slowly along. Doubtless, had we but had the means to have developed this trade to a much greater extent, it would have been much better for the country at large. The want of capital, we repeat, then, has been the chief impediment to a more successful development of this trade. Another thing which we have reason to believe will prove an impediment to us in the future, is the importation and sale of spurious goods under the name of "Nelson cloth." We are not aware of any steps having been taken by our Parliament to secure colonial industry from such an imposition as this, but we trust you will consider the matter, and legislate accordingly. Another disadvantage we labour under is the high rate of wages in the Colony. This is a great detriment to us in competing with the home markets: labour being so cheap there, they are able to send the article out to the colonies cheaper than we can yet make it. This we trust soon to obviate. Under this head we may answer your query, "Facility, or otherwise, experienced in obtaining the skilled labour required in your business." Well, Sir, we find great difficulty at present in obtaining experienced workmen; so much so, that we have had to obtain them from England. Still, a great portion of the various processes in our trade can be accomplished by comparatively unskilled labour; in fact, the majority of those now employed are persons taught by ourselves.

3. "Suitableness, or otherwise, to the circumstances of the Colony." This head we can soon dispose of. There is no doubt that what we want at the present time throughout the Colony is employment for the unemployed. To obtain this there must be something new started from what we have hitherto had. Our gold fields will not last for ever. We must, therefore, turn our attention to manufacturing those articles which are the common necessaries of life. What more so than clothing, next to the food we eat? Under this head we will answer another of your queries, namely, "The raw material employed, whence procured, capability of the Colony to produce the same." Out of the answer to this we draw one of the chief arguments in favour of the suitableness of our trade to the circumstances of this Colony. It is a fact patent to all that New Zealand is a splendid wool-growing country, capable of producing thousands of bales annually, which is sent to foreign markets, and frequently, especially so of late, to a great disadvantage to the grower on account of the crowded state of the markets; what we want, then, is more extensive manufactories here, so as to use the raw material where grown, and thus keep labour and money in the place. The suitableness of this trade to the Colony cannot be disputed.

4. "Capability of extension, so as to meet foreign requirements." We think the extension of this trade must chiefly be restricted to this Colony and the adjacent islands: we cannot hope, for some time to come, to export beyond the bounds alluded to; still, we believe there is in this Colony ample room for extension, almost indefinitely.

5. "Capital requisite for the efficient working of your business." This is not an easy question to answer, but we may state, for your satisfaction, that were we to start afresh we should require at the least, to make it successful, £10,000.

6. Under this head we will answer the following: "Difficulty, if any, still standing in the way of the development of your trade," and "Generally upon any matter connected with your business which you think may promote its interests."

As we have before stated, the great difficulty we have to contend with is the want of capital to carry on business more efficiently and extensively. Now, Sir, we do not know whether the General Government are really desirous of assisting us or not; but we do say that such assistance would at the present time be very opportune, and gratefully received. We therefore throw out the following suggestions for your Committee's consideration:—

(1.) Is it not within the power of the Government to place at our disposal (by way of encouragement), from the trust or other funds, with a low rate of interest, a sum which would enable us at once to extend our factory, so as to produce any kind of fabric required by them in the various departments of the service, such as the military and police?

(2.) Can they not assist us by giving us orders for the material we make?

We regret that when the tenders were issued for supplying Government with flannel, serge, and blankets, we were not in a position to contract for the same; we trust, however, we shall be in a position shortly to produce the serge, and also to attempt the blankets. There would be no difficulty at all in this if you could get our first suggestion carried out.

We have thus dealt with all your questions as fairly and fully as possible, and trust your Committee will kindly consider the difficulties we have advanced, and strive to remove them for us.

We have, &c.,

The Chairman of Joint Committee on Colonial Industries. WEBLEY AND SONS.

No. 2.

SIR,— Nelson, 9th August, 1870.

In answer to your inquiries requesting information as to the development of sericulture within the Colony, I beg to state that, in my correspondence with the Government, I have attempted to show the difficulties that lie in the way of committing oneself, in writing, to a fixed plan. I consider that were I allowed the privilege of verbally stating my plans to the Committee, and producing the numerous letters I have received from all parts of the Colony, it would have materially assisted the development of sericulture; but, as you request my views in writing, I most willingly send the following suggestions.

First, the distribution of from 1,000 to 2,000 mulberry trees, by means of Acclimatization Societies, in each of the Provinces willing to carry on sericulture—not more than 200 trees to be given to any one person or family; and to distribute in the same manner, after the second year, 2,000 silkworm eggs of the best quality for each 200 trees.

That a bonus of £50 be given for the growth of 1,000 silk cocoons spun by silkworms fed entirely on mulberry leaves, the cocoons to be the actual production of the person or family claiming the bonus.

Second, that in January, 1871, a bonus of £100 be given to any person resident in New Zealand for rearing 2,000 silk cocoons, the silkworms to be fed entirely on leaves of the mulberry.

That, in January, 1872, a bonus of £100 be given to any person resident in New Zealand for rearing 10,000 silk cocoons, the silkworms to be fed entirely on mulberry leaves.

That, in January, 1873 and 1874, the same bonus be given as in 1871 and 1872, but any person taking the first or first and second years' bonuses, should not be entitled to those for the third and fourth years.

I have, &c.,

The Chairman of Joint Committee on Colonial Industries. T. C. BATCHELOR.

No. 3.

SIR,— Christchurch, 5th August, 1870.

I have the honor to acknowledge the receipt of a letter from you, dated 30th July, requesting information regarding adipocire, and my experience in its formation.

I must, in the first instance, disclaim any title to the character of "botanist," which you have been good enough to assign to me, as, having neglected its study for the last twenty-five years, my knowledge of botany is reduced to its minimum.

The attention of scientific men was first called to the substance in question by a French chemist of the name of Fourcroy, who found it abundantly in some old grave-yards in Paris, in the year 1786, and an account of his discovery is given in *Hooper's Medical Dictionary*, as well as in most works on chemistry, &c. It was subsequently experimented on by Chevreuil, and declared to consist, mainly, of margaric acid, in combination with ammonia, potassa, and lime. The substance was called by its discoverer "adipocire;" English chemists and writers have called it variously adipocire and adipocere, and the name has been applied indifferently both to the crude adipocire, as produced by the action of cold water upon animal structure, and the wax which is formed by melting the crude adipocire in water. I adhere to the spelling used by its discoverer.

My experiments have led me to conclusions slightly varying from the opinions I find expressed on the subject in the different works I have consulted. I find that not only the skin, muscle, and fat, are

convertible into this substance, but in one instance I received a specimen, consisting, with other parts of the body, of the shank bone of a sheep, which had been completely converted into adipocire, and exhibited, when cut through with a knife, a perfectly homogeneous soft substance, resembling cheese, and showing to the naked eye no trace of bony structure. The whole of it afterwards melted down into wax as readily as the rest of the adipocire.

I greatly regret that I did not preserve part of this specimen in its original state, as I have not since found any so completely converted from bone into adipocire. It was found in a creek below Timaru, and I do not know the date of its immersion. In general the bone is found friable and yellowish. The brain, however, as far as I have observed, has not been converted into this substance; at least in one case, in which a sheep's head had been placed in water by my son eight or nine months previously, in which the whole of the skin, muscles, and tongue, were turned into adipocire, the brain remained quite soft, and ran out from the interior of the skull of the consistency of thick cream.

I have also found that the fat on the body is the *last*, not the *first* or *only*, substance which undergoes conversion into adipocire. If, however, the process is sufficiently protracted, the whole of it is changed into that substance.

To answer your questions *seriatim*:—

1st. The raw material employed is any fresh animal matter, such as the bodies of sheep, cattle, &c.; any "crawlers," useless for boiling down, will answer the purpose.

2nd. Skilled labour is hardly required, other than in the construction of the apparatus for immersion; the requirements being immersion in a slow-running stream of water, care being taken so to weight the bodies that the gases generated by putrefaction shall not raise them to the surface of the water, and that they should be protected from the teeth of rats and eels.

3rd. The business is capable of great extension, limited only by the supply of otherwise useless sheep.

The process, as used by me, is briefly as follows:—I take sheep, and, having killed them and removed the skin, if worth keeping, immerse them in a tank constructed for the purpose, through which a small stream is kept *slowly* flowing. (This is important, as I lost the whole results of an experiment through a hole being made below a dam behind which I had immersed a considerable number of sheep. The increased rapidity of the current washed off all the adipocire, and left only bare skeletons.) Above the bodies of the sheep I place wire-netting, so weighted as to secure the complete and continuous immersion of the sheep. After remaining there a sufficient number of months to complete their conversion, which varies according to the time of year, but the longer the better, I take the bodies out, and separate the adipocire from the bones—which may then be returned to the water—and dry it in the open air, out of reach of animals, some of which will eat it. If it is proposed to sell it for the use of the candle and soap manufacturer, it is boiled in hot water, strained, and run into cakes for exportation. If, however, it is to be used for washing purposes, it has to be broken up and mixed with a sufficient quantity of alkali (either ammonia or potash is best) to permit of its saponification in water, when it is at once used either for washing wool, or cleaning flax, or any similar purpose.

Should the Committee wish it, and you will inform me how I can best do so, I will forward specimens of the substance for your inspection. I have only to add that, as soon as I have got a proper apparatus in order, I can produce an article which will prove a valuable addition to our list of exports.

I have, &c.,

ALFRED CHARLES BARKER.

The Chairman of Joint Committee on Colonial Industries.

No. 4.

SIR,— Dunedin, 30th August, 1870.

I regret to say that your communication, owing to it being directed "*G.* McGlashan," did not reach me until to-day, notwithstanding there is not another of the name in Dunedin.

I have now the honor to state, in reply to your queries, that the manufacture of paper from flax and other indigenous plants ought to be successfully carried out, and to large profit, in New Zealand. The capital, however, required to purchase and erect the necessary plant is considerable. Grocery, printing, and writing paper could all be manufactured to profit, particularly wrapping paper, which requires no bleaching material.

I have erected a breaking machine for making what is termed half-stuff, but have not, as yet, shipped any to the home country. I have forwarded samples to a number of paper-makers, both in England and Scotland, and expect, by the next mail, to receive information and quoting prices. The Melbourne paper Mr. Ramsden did not offer a paying price for. I enclose samples of half-stuff, bleached and unbleached.

Some years ago I forwarded to the home country a quantity of flax in its natural state, and had it manufactured into paper at some considerable cost to myself. The manufacturer could not report favourably, owing to the state of the flax when it reached there. I enclose a sample, also a specimen of the paper made from it. I also enclose a specimen of pulp made by myself from the tussock grass, and which does not require so much working up for paper as the flax.

I forward also three plans of paper-making machines. The cost of the smaller machine, for grocery papers, with the necessary engines, &c., &c., will cost about £2,400 in the home country; the larger one, for news, about £4,000; and for the largest of all I have no quoted price. In addition to the above outlay there is the necessary buildings, water-power, &c., and an expert would require to be sent from the home country to erect the machinery.

In the manufacture of paper I consider a bonus for a few years, at so much per cent., might induce parties to establish mills.

I have been endeavouring to get the necessary capital to erect a mill in Otago, but have not succeeded. In my own case, were I assisted by a loan from the Government, a mill could be in operation within eighteen months.

Will you please return the different plans to me after you have made the necessary use of them. Any further information required, so far as it lies in my power, I will be happy to communicate.

I have, &c.,
ED. MCGLASHAN.

The Chairman of Joint Committee on Colonial Industries.

No. 5.

SIR,— Oamaru, 10th August, 1870.

In answer to your circular respecting the rise, progress, and present position of agricultural implement and machine making in New Zealand, so far as we are aware, there is only a very small portion of agricultural implements and machines made in New Zealand at the present time, but in our opinion seven-eighths of all implements and machines imported could be made in New Zealand.

So far as our own district is concerned, up till three years ago, at which time we commenced to manufacture such ourselves, we imported all the implements and machines we required. About that time we commenced to manufacture ploughs and reaping machines, and the first year turned out implements to the value of, say, £1,650; next year to the value of, say, £3,100; and this present year we expect to nearly double the last figures.

Regarding the impediments to a wide extension of our business, skilled labour such as we require, except in rare instances, is not to be had in the Colony. Of the common or average skilled labour we think there is quite sufficient for the present wants of the Colony.

So much have we found the want of first-class skilled labour that some months ago we sent specially to the home country for two first-class hands, and have since sent for another. One difficulty to our getting out the men we desire, is, we stipulate that they pay their own passage, we guaranteeing them twelve months' constant employment, at 12s. per day of eight hours.

The high price of coal is a very great drawback. Three pounds per ton we pay for them in Oamaru, while the home makers we were connected with get their coal at from 5s. to 10s. per ton.

The very high shipping and landing charges also tells heavily against us, especially as the bulk of our raw material are heavy for their money value, for instance, coke, costing £2 10s. per ton in Dunedin, costs us £2 additional landed in Oamaru.

Various parts of agricultural implements require to be imported from home, and which parts are not made by home implement makers but by houses who make the manufacture of such parts a special branch, such as steel makers and makers of malleable iron castings.

The duty on these articles is, in some instances, very heavy, and is a burden only on colonial makers, as the home makers get their finished machines, and such etceteras as they choose to send with them, admitted duty free; and so much do we feel this as against us, that we have already wrote Messrs Fox, Macandrew, Holmes, and Graham on the matter.

Iron, in our opinion, cannot be manufactured to pay in New Zealand for years to come.

The hardwood we use is got from Sydney and Hobart Town, but we believe there is better timber in New Zealand, but which is not regularly in the market, and not kept in stock by timber merchants; we refer to goai and ironwood.

Coal we have already dealt with, but we may further remark that Grey River coal is nearly if not quite equal, for our purposes, to Newcastle coal, but has the same objection,—too high in price.

As to the capability of extending our business as a colonial industry, we do not think that one-tenth part of the implements and machines used are made in New Zealand, Oamaru district excepted; while, as we have already stated, seven-eights of all implements and machines used could be made. This last season we have sent a great many implements and machines of our own make into Canterbury, and have no doubt, if there were good roads, and bridges over the different rivers, and better shipping accomodation, we could nearly double our present business in that Province alone.

At present we employ about £4,000 in the business, but could employ double the amount with advantage.

For the last twelve months we have paid £2,500 in wages; the average number of hands in our employ during that time being twenty men and boys.

We are, &c.,
The Chairman of Joint Committee on Colonial Industries. REID AND GRAY.

No. 6.

SIR,— Dunedin, 15th August, 1870.

I beg to submit to you the following particulars, in reply to yours of 30th July ultimo:—

Very little can be said about milling, as it has gradually increased beyond the requirements of this Province—Otago.

Since I commenced, in 1859, additional mills have been erected, and are now capable of producing flour, &c., greatly beyond the requisite quantity. The chief reason of this is, the owners expected there would be a good demand on the West Coast; but this trade has almost entirely fallen off, as the Otago millers cannot produce so dry a flour as that sent from South Australia and California; the climate of which places being so much warmer, the flour is therefore drier, and takes a good deal more water than does the flour of this Province, and consequently gives a few more loaves per sack, which enables the baker to pay from £1 to £2 per ton more for the foreign article. On account of being shut out from the West Coast trade, the mills here are scarcely kept going half time.

The principal grain grown in the Province is wheat, and, in favourable seasons, a very fair sample is produced, which makes a first-class, strong flour, without the aid of foreign or interprovincial wheats for mixture; it, however, is not equal to South Australian or Californian, as before stated, nor is it so profitable, as a bushel of either of the latter will produce more flour than our wheat.

For growing oats, the climate of Otago is most suitable, and, with care in the choice of seed, the produce will, in most parts of the Province, be excellent. There is an abundant supply, and a great quantity is shipped every season to Australia.

The climate is also very favourable for growing barley, and first-class samples are offered, suitable either for milling or malting. This also is extensively shipped to Australia.

I have had considerable experience in malting, and was amongst the first to commence this industry in Dunedin, having erected brewing and malting premises in 1861. The malt required for brewing in Otago can now be fully supplied by the Dunedin maltsters, and English malt will soon be unknown here.

There is an abundant supply of skilled labour required for milling and malting, at from 10s. per day.

The grinding power of this Province, which is capable of manufacturing for upwards of 100,000 inhabitants, is forty-four pairs flour stones, capable of producing over fifty tons of flour in ten hours, and which could be doubled by working extra time, and would therefore grind, without increase of machinery, for over 200,000 people.

Twelve pairs oatmeal stones, which can grind over 2,000 bushels of oats per day, or equal to twenty-five tons of oatmeal in ten hours. This also could be doubled by working extra time, and then would be equal to five times the quantity consumed in New Zealand. At present the mills are not working a tenth part of time.

Six pearl barley mills, which can produce three tons per day of twelve hours. As, however, there is a very limited demand, the mills are seldom working.

Last year I manufactured over 43,000 bags of grain, and exported a good quantity all over New Zealand; also to Australia. I, however, sustained great losses in competing with Australia and California, as a greater preference was given to their flour. I will only grind about half that quantity this year, being compelled to supply only provincial demand.

Capital required for properly carrying on the milling business, £10,000.

My manufactured produce has given general satisfaction, both locally and in the other Provinces of New Zealand generally, but, as before mentioned, the foreign flour is preferred to provincial. There being no other market open, I think the proposed duty will be the only remedy to give us a market, and enable us to hold our present population, as the want of an outlet for produce is causing farming to be neglected, and is therefore turning a great number of men out of employment, and they are consequently leaving the Province whenever an opportunity offers.

I have, &c.,
G. Duncan.

The Chairman of Joint Committee on Colonial Industries.

No. 7.

Sir,— Auckland, 9th August, 1870.

Replying to your circular letter of 1st instant, requesting us to furnish you with any information in our power, with a view to develop the producing and manufacturing resources of the Colony, and especially having reference to the business of tanners and leather manufacturers, with which we are connected, we beg to state:—

That the principal impediment we have experienced in our business has been the introduction of Australian leather, boots, and shoes.

That the business is suitable to the circumstances of the Colony is proved by the fact that it has existed and enlarged its operations in the face of Australian importations, that it is still progressing, and can be extended so as to supply the full wants of the community, save and except, for the time being, the dearer and finer kinds of leather, such as French calf, and enamelled and japanned leathers. We have repeatedly exported to England parcels of leather tanned in this Colony, and it has left a satisfactory result. We anticipate an export on a larger scale than hitherto.

The raw material employed is hides and bark, both of which are obtainable in this Province. The latter, since the opening of the Thames Gold Fields, has not been procurable in such large quantities as formerly, thereby necessitating the importation from Australia and Tasmania.

The supply of provincial bark is, only for a time, partially suspended, and will develop itself again, very probably during next Spring.

The local barks referred to are towai and birch. The latter we have no difficulty in procuring in any quantity, but the former is the better bark, and the description that has experienced the shortness of supply.

We have experienced no insurmountable difficulty in obtaining the skilled labour required.

The business can be extended to meet the requirements of the whole Colony in all respects where leather is used, principally in boots and shoes, saddlery, and harness.

A large capital is required for successfully carrying on the manufacture of leather, and placing the same in the market in the form of articles suitable for private use. Nothing short of £10,000 would suffice to perfect the arrangement for plant, machinery, and a full working stock of materials. A much smaller capital would suffice where the operations are confined to certain branches only, such as tanning, currying, closing uppers, making boots, saddles, harness, &c., being all different branches which are frequently worked separately and distinct from each other.

We are of opinion that the interests of our business would be best promoted by excluding the importation of all manufactured articles, and by placing a reasonable duty upon all unmanufactured leather of, say, 2d. per pound; this to include sole, as well as kip, and other kinds.

Probably, the Committee would not go so far as to recommend the total exclusion above referred to, but a duty of 5s. per foot on all boots and shoes, and 4s. or 5s. per foot on harness and saddlery, would very soon exclude all goods suitable for manufacture by colonial industry.

Grindery of all kinds being free, as we believe it is in Melbourne, also saddlers' ironmongery, wooden shoe pegs, lasts, collar, check, and riding saddle-trees, would much benefit the trade, by enabling a cheaper article to be produced and sold.

With these encouragements the Colony would be able to employ a vast amount of labour, and to retain within itself the major part of the amount now annually lost in paying for the labour of others; at the same time, we have no hesitation in saying that competition would soon produce as cheap articles as those imported.

We have, &c.,

The Chairman of Joint Committee on Colonial Industries. IRELAND BROS.

No. 8.

SIR,— Wellington Soap Works, 3rd August, 1870.

Having been honored by a communication from you, in which you request certain information concerning my business as a soap manufacturer, I have now the honor of observing, in reply,—

1. That the industry in which I am engaged has hitherto been greatly obstructed through having to contend against large stocks of imported soap, which have been admitted at a duty insufficient to encourage and remunerate manufacturers who have engaged in the trade in this young Colony, where the demand has been naturally limited, and which duty, I would venture to say, if increased to prohibition, would not raise the price to the consumer, even temporarily, to any considerable extent, as it would encourage manufacturers to increase and economize their means of production, when competition would produce its unfailing result.

2. Tallow, the chief constituent in soap, being largely produced in New Zealand, the manufacture of soap is evidently a suitable trade to be carried on in the Colony, being easily and profitably exported in its raw state. I am not in a position to offer an opinion as to what extent the manufactured article could be exported to foreign parts, but have no hesitation in stating my belief that, if the manufacture is nurtured in its infancy, New Zealand will, in time, be quite able to take advantage of any export market that may offer itself.

3. The principal ingredients used are: Tallow, New Zealand; resin, Great Britain, Melbourne, and the United States; caustic soda, Great Britain and Melbourne; palm oil and cocoa nut oil, Great Britain and Melbourne.

4. Sufficient skilled labour is obtainable.

5. £1,000.

In conclusion, I would beg to humbly express my gratitude, felt, I believe, in common with the great bulk of the people of New Zealand, to the Government and honorable members of the House of Representatives, for their evident inclination to foster native industries, which must eventually benefit, directly or indirectly, every colonist of New Zealand, whether capitalist or labourer.

I have, &c.

The Chairman of Joint Committee on Colonial Industries. THOMAS BROWN.

P.S.—I have thought that you will, perhaps, pardon the liberty I have taken in forwarding a sample of my production, taken from stock at random, the wholesale price of which is 28s. net. I may mention that the moisture is attributable to want of age.

T. B.

No. 9.

SIR,— Wellington, 8th August, 1870.

In answer to your circular, bearing date the 30th July, requesting special information concerning my trade as an engineer and founder, I have the honor to report as follows:—

My establishment, the Lion Foundry, was erected in 1858, under great difficulties, and for the special purpose of supplying a pressing want, as, before that time, the most commonplace castings had to be procured from Sydney.

The number of men then employed was five, and the capital invested about £1,000.

The class of work undertaken consisted, principally, of repairs to agricultural implements, mill machinery, &c., and ordinary castings.

The difficulties mentioned were the want of skilled labour and material, the latter having to be imported from Sydney, at an exorbitant rate, and, owing to the very irregular communication, under great disadvantages.

The engineering department was added to the foundry about two years afterwards, when, by the introduction of machinery, the capabilities of the business were very much extended. During the last eight years, by the addition of steam power and extensive machinery, I have been in a position to execute any repairs that have been required by steamers or otherwise, the whole of the repairs to the vessels of the P.N.Z. & A.R.M. Company, executed in New Zealand, having been entrusted to me and carried out satisfactorily. I have now forty-five men employed, and the capital engaged is between £9,000 and £10,000. The great obstacle to the progress of this industry has been the want of a patent slip or dock, eight or ten steamers, requiring repairs to the extent of some thousands of pounds, having been obliged to leave this port for Sydney in consequence of this want.

I am now completing the erection of new premises on the water frontage of the reclaimed land, at a cost of £5,000, which, when finished, will be the most complete establishment of the kind in the Colony, and which, with additional machinery, and the use of a dock or slip, will enable me to undertake any repairs likely to be required for a long time.

I may here sum up the impediments retarding the full development of this industry as follows:—

The want of a dock or patent slip.

Skilled labour and larger capital.

Raw Material employed.

Pig Iron—Imported from England. This is unavoidable.

Bar and Rod Iron, Boiler Plate, &c.—Imported from England. This is unavoidable.

Coal and Coke—Imported from England and New South Wales. Both of these can be produced in New Zealand, the coal of Greymouth being superior to the imported article both for steam and smiths' purposes and for coking.

Copper and Tin—Both of Australian production.

Skilled labour is very difficult to be obtained and the rate of wages very high.

Capability of Extension—As before stated, I consider that with additional machinery I shall, on the completion of my new premises, be in a position to undertake any repairs likely to be required in this port for some years to come.

I am of opinion that my business could be carried on in an efficient and thoroughly satisfactory manner with a capital of £12,000 to £14,000.

In conclusion, I would point out the paramount importance of the immediate erection of a dock or patent slip, as, to my certain knowledge, numbers of vessels are constantly passing this port from the West Coast, and northern portions of the Colony, on their way to Port Chalmers for the purpose of being docked.

I am credibly informed that the head-quarters of the vessels of Her Majesty's Navy on the Australian station are, for the future, to be fixed at Wellington; and, if such be the case, I consider it absolutely necessary that every facility should be given them for executing any repairs they may require in this place.

Should the Committee require any further information I shall be happy to give all I can, either personally or by letter. I have, &c.,

The Chairman of Joint Committee on Colonial Industries. Ed. W. Mills.

No. 10.

Sir,— Nelson Brewery, Nelson, 8th August, 1870.

We have the honor to acknowledge receipt of your circular of 30th ultimo, requesting information regarding the rise, progress, present position, &c., of the brewing interest in the Colony; also, specially, as to the growth of hops and manufacture of malt.

Our brewery, which, we think, was the first established in the Colony, was commenced in the year 1843, and we believe the success which attended the undertaking induced others to embark in the business in other parts of the Colony to such an extent that now sufficient ale and porter could be produced by the various establishments, not only to supply all local requirements but also to do a large export trade. Our own plant alone is at present capable of producing 180 hogsheads per week, which could easily be largely increased if a foreign trade could be obtained.

There is no doubt that the climate of New Zealand, or rather of the southern portion of the Colony, is eminently adapted for brewing operations, not being subject to the excessive heat of Australia, which must render the production of sound beer a matter of the greatest difficulty, if not making it almost impossible. Again, some portions of this Island are eminently adapted to the growth of the finest samples of malting barley, and we can speak from experience that this Province is capable of producing hops of excellent quality; in fact, by preference, we now use nothing but locally grown hops.

With regard to "the extent to which the business is capable of extension," we can only say it is limited by the number of consumers. In this Province the local ales in bulk have virtually superseded imports, which had been increasing until 1863, when they reached 19,080 gallons. The imports for the year ending 30th June last were only 4,582 gallons.

The price of colonial ale has gradually been reduced as the consumption has increased, until now the profits are cut down to a minimum; and it is only the increase of business which now enables a profit to be earned for the requisite outlay of capital in expensive plant and buildings.

This brings us to the consideration of the impediments at present existing in the way of an extension of the brewing trade. A large export trade might be done to Australia in ale and porter (both bulk and bottled), in malt, and also in hops. The duties in Melbourne are: On beer, 6d. per gallon; on malt, 6d. per bushel; and on hops, 2d. per pound, which are prohibitive. Were these duties removed or reduced, by a reciprocity tariff between the colonies, a large extension of business would follow. There is another serious drawback to this particular branch of industry, which is, the want of a colonial manufactory of ale and porter bottles. At present we are, in common with other brewers, dependent for our supply of bottles upon those which have been imported with English beer, and, of course, this restricts this branch of our trade entirely to local consumption. Were bottles to be obtained from a colonial source, and at a reasonable rate, a large business could be done in export to Australia.

With regard to the growth of hops, we have been engaged in growing hops in this settlement for the last twenty-four years; and, as before stated, now use locally grown hops in preference to imported ones, as the latter deteriorate very considerably on the passage out. We estimate the cost of planting an acre of hops, containing 1,200 hills, as follows:—

Say—Rent	£5	0	0
3,600 cuttings, at 3s. 6d. per 100	6	6	0
Labour, planting	28	0	0
„ cultivating	28	0	0
2,400 poles, at £28 per 1,000	67	4	0
30 loads old manure, at 7s. 6d.	11	5	0
Labour, tieing	4	0	0
Oasthouse and storeroom, say	60	0	0
Total cost of planting	£209	15	0

An oasthouse, &c., large enough for ten acres could be erected for, say, £600; but even a building of this size would be required for one acre. We have, however, supposed that either ten acres are cultivated by one person, or that persons cultivating amongst them ten acres join in erecting the necessary buildings, when the cost would be reduced to £60 per acre, as above. The yield of hops, the first year, will be inconsiderable; in fact, it is never reckoned at all in England. We have, however, got as much as 6 cwt. to the acre.

The second, and subsequent years, the expenses will be nearly as follows:—

Interest on first year's outlay	£21	0	0
Rent	5	0	0
Renewal of poles, &c.	20	0	0
Manure	11	5	0
Tieing	4	0	0
Cultivating	28	0	0
Picking, drying, and treading (including fuel)	35	0	0
	£124	5	0

An average crop is 16 cwt. to the acre, or 1,792 lbs.; so that the cost of production is about 1s. 4½d. per lb. It must be borne in mind that every piece of land is not suitable for a hop-garden; and, although we have put down "Rent" as £5 per annum, we are paying as much as £15 for some of our gardens. It requires a practical experience to enable any one to cultivate hops successfully, whilst drying the hops is an art understood by few, even in the hop-gardens of England.

The question of fuel, both for hop-drying and malting, is of great importance. As nothing can be used in either process which gives off the slightest smoke, we have hitherto imported Welsh anthracite for the purpose, and used it in conjunction with locally-burnt charcoal. The great expense, however, has recently led us to recently experiment with coke, both from the Grey mine and also made here from Newcastle (N.S.W.) coals. As far as we have hitherto gone, we are inclined to believe that coke may hereafter be produced from the local mines at such a price as to supersede the anthracite, and answer the purpose as well. At present, however, the price is too high; but, as the mines become more developed, doubtless this will be rectified, when not only will the capital expended in procuring anthracite from England be retained in the Colony, but a new branch of trade be opened, which will employ a large number of hands in various ways.

Fuel being a serious item to all brewers, anything tending to reduce the price of coal will place the trade in a position to supply the manufactured article at a lower price, and thus enable an export trade to be entered on with a greater chance of success than at present. The Collingwood coal is an excellent fuel for steam purposes, but the company appears to lack the capital to place the coal in the market, and possibly a little temporary assistance from the Government might enable them to surmount their difficulties, when the coal would come into large consumption here, at or under 20s. per ton, as against 31s. or 32s., the price of Newcastle and Grey coals.

We have endeavoured to reply to the various points of your circular, although we find it extremely difficult to do so; but should the Committee wish further information on any point, it will afford us much pleasure to endeavour to furnish it.

We have, &c.,

The Chairman Joint Committee on Colonial Industries. HOOPER AND DODSON.

P.S.—To show that this climate is suitable for malting purposes we should mention that we hold a medal from the London Exhibition of 1851 for malt.—H. and D.

No. 11.

SIR,— Vulcan Lane, Auckland, 12th August, 1870.

I have the honor to acknowledge the receipt of your communication of 1st instant, requiring information respecting the industry with which I am connected, and which I presume to apply to distillation.

In reply, I may state that my plant is only now in course of erection, and will not be in operation for at least another month; therefore, I am scarcely competent or in a position to give the information which you desire. However, I may say that the distillery which I represent has been called into existence solely by the protection afforded and promised by the Government, and without which such an industry would probably never have been developed. The greatest obstruction to local industry is the local prejudice against the home-made article, which is always finally overcome, but is so strong and deep-rooted as to deter the most persevering from carrying it through its infant and early stages without the fostering care and assistance of the Government.

I see no difficulty at present standing in the way of the development of our particular industry; indeed, the produce of the country is peculiarly favourable to it, while the large demand, which is at present supplied from England and Australia, provides an immediate market. All kinds of grain will be the raw material to be employed, and probably some description of roots, which the farmers will now find it to their interest to grow. The labour will be obtained in Auckland, and the capital, including purchase of premises, will be £8,000. As regards supplying the foreign market, I can only hope that in time we shall so far progress and improve in our system of working that we shall be able to do so in fair competition.

I have, &c.,

W. J. CAWKWELL.

The Chairman of Joint Committee on Colonial Industries.

No. 12.

SIR,— Auckland, 12th August, 1870.

In reply to your letter requesting information with reference to the branch of industry with which I am connected, I beg to lay before your Committee the following remarks:—

I have been upwards of thirty years in this Colony, and have been carrying on business as a tanner, currier, and wool-scourer for the past six years, and have had a steady and increasing demand, year after year, for the goods which I manufacture. I have experienced many obstacles to the progress of my trade—some incidental to a young Colony, and which time will remove; others of a more serious nature, which I will now proceed to specify.

Bark suitable for tanning purposes has to be imported from the neighbouring colonies of Australia and Tasmania, New Zealand bark (as I shall presently show) not possessing enough of the tanning principle. The expense of importing such a bulky article is a serious drawback to my trade, as I have to compete with leather manufacturers in Australia and elsewhere, who, in addition to having this important ingredient on the spot, have the advantage of a more plentiful and cheaper supply of labour.

A moderately increased duty on boots, shoes, and leather, would, in my humble judgment, tend to foster the trade until the natural growth of the Colony and the enterprise of our agriculturists have provided those materials for carrying on the manufacture of leather of which we are now deficient.

The following I would respectfully suggest as the rate of duties necessary to encourage the manufacture of leather in this Colony:—Sole and harness leather, 2d. per lb.; all other kinds, 3d. per lb.; water-tight and Napoleon boots, 5s. per cubic foot; boots and shoes of all other kinds, 7s. 6d. per cubic foot.

Great quantities of boots, shoes, and leather are now imported from Australia, owing to the causes I have named, and which I think the imposition of an increased duty would tend to counteract.

The bad state of the roads, too, is an impediment to the profitable extension of my business.

At the present time I am in a position to tan from 350 to 400 hides, and 1,200 sheep-skins, per month; these are manufactured into sole, kip, harness, bag, rein, and grain leathers, and black and brown basils; and in the wool-scouring department I am capable of stripping, sorting, scouring, and washing 3,000 sheep-skins per month, having thirty-seven pits and limes, with extensive buildings and plant, for preparing leather in all stages of its manufacture, as well as for washing and drying wool. I employ about thirty hands.

The industry in which I am engaged is suitable to the circumstances of the Colony, from the fact that, as the rearing of cattle and sheep forms the principal occupation of a large number of the colonists, the raw material is produced in large quantities. I do not consider it capable of much extension so far as the exportation of leather from New Zealand is concerned; but its extension as a branch of local industry is only limited by the growth and prosperity of the Colony at large.

Hides and skins are the chief items of raw material employed in my business, and are procured principally from this Province (Auckland), and, as I have already intimated, are to be obtained here in quantities nearly, if not quite, sufficient for the supply of the manufacturers.

I can procure abundance of skilled labour, but at rates generally higher than are paid in the neighbouring Colonies.

Again, referring to one very important article used in my business, namely, bark, I may remark that the greater portion used by me has been the mimosa or black wattle, so called, both in Australia and Tasmania, to distinguish it from a much inferior kind named the silver wattle. This bark (the black wattle) is much used in England, where it realizes from £8 to £9 per ton. I have occasionally used a little New Zealand towai and rimu bark, but prefer the wattle. The barks in this country, with which I am practically acquainted, are inferior in quality, and, on account of their weakness, unprofitable in their operation.

When residing on the Hokianga River, in the year 1841–42, I tested the various qualities of the towai, rimu, tanekaha, and hinau barks, and although the results showed that they all contained a portion of astringent qualities, yet by no means sufficient to guarantee a profitable return for the outlay of capital. The towai is deficient in the gummy, resinous properties for which the English oak is so celebrated; the rimu possesses too much gum of a dark blood colour, and too little of the tanning principle; the tanekaha has a superabundance of dye, with a moderate amount of tanning principle, which latter is counteracted by the presence of a large quantity of turpentine; and the hinau contains too much black dye, which must be very objectionable in the appearance of leather.

I am impressed with the importance of introducing into this Colony, as speedily as possible, some substitute for barks which are almost valueless. I would, with due deference to your Committee, suggest that the cultivation of the black wattle ought to be at once encouraged, and also that of a plant known in India as "divi divi," and used by some tanners in England. About two years ago I imported five tons of divi divi pods, which, for strength in tanning, I consider unequalled. Each pod contained one seed, but nearly seven-eights of these seeds had been perforated by some insect. Selecting some of the sound ones, I planted them, but without success. I then gave a few to a gentleman of my acquaintance, who kindly planted them in his hothouse, when he too was unsuccessful, so I concluded that we had each of us planted at the wrong season, or else the climate was unsuited to the growth of the plant. Finding these pods expensive (£16 per ton), I discontinued importing, feeling satisfied that the seeds would not germinate; but to my very agreeable surprise, on removing a heap of spent tan and pods which had been thrown out of a pit and laid in a heap for three months, I found about a dozen, at a depth of three feet, which had grown about one inch and a half high, with three small circular-shaped leaves at the top of the stem. Carefully packing them up I returned home; but the sudden transition from their hotbed to a colder atmosphere had destroyed their vitality. What the degree of heat in which they had germinated was, I had not the means, at the time, of ascertaining, but, feeling it very hot, I could only conclude that the climate in which the plant luxuriated so quickly must be much

warmer than this. However, could not a few seeds be forwarded to Fiji, and form an article of commerce for importation in the future?

I have, &c.,

The Chairman of Joint Committee on Colonial Industries. BENJAMIN GITTOS.

No. 13.

SIR,— Nelson, New Zealand, 4th August, 1870.

In answer to your inquiries in your letter of 30th July, respecting the rise, progress, and present position of the industry with which I am connected, I consider that the rise and progress have been very little, the present position being, if anything, worse than it was when I first came here. The impediments which have retarded its progress are, in my opinion, want of capital. The grape-vines which I have in my vineyard were imported by the Honorable Mr. Fox and the Honorable Mr. Stafford about twenty-five years ago, which vines are only of two kinds, and produce very small grapes, and are not of a kind suitable for making wine. The Colony is capable of producing this kind of grape, and also the kinds suitable for making wine. There is no difficulty in obtaining skilled labour required in my business. I am the oldest son, and have two brothers who thoroughly understand the business, and all of us have families of boys growing up, some of whom are at the present time assisting us in our vineyards. The business of growing grapes and making wine could be greatly extended. I have recently purchased six acres of land in Brook Street Valley, Nelson, and which I intend to make a vineyard of, and I consider it to be—from its position, and having the sun upon it from sunrise to sunset, and sheltered from winds—a far better spot than my present vineyard, and I have no doubt that, were I in a position to do so, I could purchase six acres more adjoining; but, not having funds at my command, I am unable to import, from Australia, vines which I should like to see introduced to this Colony, and which yield grapes such as are suitable for making wine.

I and my two brothers have had, for several years, about an acre of vineyard, and the capital required for working it is from £50 to £60, which would realize about £180 to £200 sterling yearly; and were I in a better position, I could produce wine from 4s. to 5s. per gallon, which would be made entirely from the juice of the grape.

Could the cultivation of vines be extended I consider it would benefit the Colony at large.

I have, &c.,

The Chairman of Joint Committee on Colonial Industries. JACOB FRANK.

No. 14.

SIR,— Raglan Brewery, Nelson, 6th August, 1870.

I have the honor to acknowledge yours of the 30th ultimo. The raw materials used in brewing are, malt, hops, and sugar. The former is Nelson produce, as also the hops. The sugar is imported. All fuel used is the produce of Nelson. Brewing in New Zealand may be looked upon as a local business, not likely to extend beyond our own shores, but would increase with influx of population and public works. The capital required to erect and carry on a steam brewery ought not to be less than £10,000. I think that the import duty on foreign manufactures has been the principal means by which this branch of industry in New Zealand has been fostered.

I have, &c.,

The Chairman of Joint Committee on Colonial Industries. W. C. HARLEY.

No. 15.

Victoria Steam Carriage Factory,

SIR,— Auckland, N.Z., 11th August, 1870.

In reply to your circular of 1st August, we would state that the in dustry of carriage-building has made rapid strides in our Province during the past six or seven years. Previous to that time, nothing better than a dray or spring cart was manufactured. At the present time we turn out carriages, buggies, &c., of equal style and finish to those manufactured in other markets.

What we need, as manufacturers, is to be able to import our unprepared materials free of duty, and a slight duty on the manufactured goods, in order to enable us to compete with other markets, where labour is cheaper and machinery is employed. Hitherto we have not experienced the same difficulty with the best class of work as with the plain, common work.

Our opinion, after throughly testing many of the native woods, is, that we have almost if not all that are requisite for carriage-building in our forests. Hence the necessity for a slight duty on all prepared imported timber for coach and wheelwright purposes.

Felloes, spokes, naves, shafts, &c., in many cases are shipped as dunnage, and landed from the Australian market at the original cost.

Junk timber should be free. The American prepared timber for wheel purposes, namely, bent rims, morticed hubs, turned spokes, buggie shafts, &c., should be dutiable goods.

In answer to questions—

No. 1. Iron, spring steel, springs, axles, bolts and nuts, hickory and ash plank, enamelled leather, American cloth, trimmings, carriage cloths, lamps, mountings, and prepared woods for wheel purposes, shafts, &c., from England and America; and cedar, iron-bark, red gum, blue gum, and sawn felloes, from Sydney and Hobart Town.

No. 2. Difficulty in obtaining good hands in the following branches: coachsmiths, body-makers, coach-painters, coach-trimmers. Common hands plentiful.

No. 3. With the adapting of Colonial timber, the industry can supply the demands of the Colony and the adjacent islands.

No. 4. Average wages, £65 per week.

No. 5. The importation of common vehicles from Sydney is about four times as much as that manufactured here. Should the above suggestions be carried out by the Government, we have no hesitation in saying that we should employ four times the amount of hands we are now doing.

It might not be out of place to say we are erecting expensive steam machinery for sawing, bending, &c., and in a few weeks shall be enabled to take all timber from the log, and, with the use of some ten or twelve machines, shall be enabled to compete with the Australian market in plain vehicles.

We have devoted special attention to wheel machinery, as we have never found better woods for wheel purposes than our own native woods.

Machines specially ordered for this branch are yet to arrive, which may be some two months. All other machines are now being fixed. We have, &c.,

COUSINS, ATKIN, & Co.

The Chairman of Joint Committee on Colonial Industries.

No. 16.

SIR,— Geological Survey Office, Wellington, 12th August, 1870.

I have the honor to inform you that the specimens of adipocere submitted by you for examination prove to be ammoniacal soap in different states of purity. The particular sample marked adipocere wax consists of fatty acids combined with ammonia, but part of the ammonia has been driven off and replaced by hydrogen through the action of hot water or steam. By this process the whole of the ammonia might be removed, and the product would be nearly pure stearine, like that used in Price's patent candles. The adipocere in this as in all other cases appears to have been formed from the fatty matters intermixed with the muscular tissue in which there is an excess of nitrogenous element to form the ammonia. I have, &c.,

JAMES HECTOR.

The Chairman of Joint Committee on Colonial Industries.

No. 17.

SIR,— Colonial Secretary's Office, Wellington, 2nd August, 1870.

I have the honor to transmit the enclosed letters from Dr. Hector, of the numbers and dates noted in the margin, for the consideration of the Colonial Industries Committee, in connection with the development of the resources of the Colony, and to state that I have no doubt, if Dr. Hector were examined on this subject, his evidence would be valuable in showing how practical effect could be given to this proposal, so as to benefit the whole Colony and stimulate scientific education.

No. $\frac{13}{70}$, 26th May, 1870.

No. $\frac{18}{70}$, 26th July, 1870.

I have, &c.,

The Chairman of the Industries Committee, Wellington. W. GISBORNE.

Enclosure No. 1.

SIR,— New Zealand Institute, Wellington, 26th May, 1870.

Having at a meeting of the Board of Governors of the New Zealand Institute, held on the 20th instant, mentioned that it is the desire of Government to see the Institute assume a more direct educational character in connection with various departments of physical and natural science, I am directed by the Board to state that they highly approve of the suggestion, and that if they receive from Government an indication of the nature of the course of instruction desired, and of the extent to which the Government will be prepared to appropriate funds towards it, they will give the subject the most careful consideration, with the view of reporting upon the best means of carrying it into practical effect.

I have, &c.,

The Hon. the Colonial Secretary. JAMES HECTOR.

MINUTE by the Hon. Mr. VOGEL.

THE Government are decidedly of opinion that it is desirable that direct educational advantages should be offered, in connection with the Institute, in the geological department. In the first instance, it would be well to commence on a small scale. Fees should be charged for all assays, analyses, and reports made for private individuals. The Institute, from the knowledge and experience possessed by its members, should be in a better position to propound a plan to be adopted than the Government, and the Government will be willing to give favourable consideration to proposals having for their object the initiation of a system of scientific education.

It would be desirable, in order to ultimate extension, that the system of instruction should be so determined that teachers could acquire it and impart it in its rudimentary stage in the public schools throughout the Colony. The pupils displaying aptitude should then be able to acquire advanced information.

JULIUS VOGEL.

Enclosure No. 2.

SIR,— New Zealand Institute, Wellington, 26th July, 1870.

I have the honor to inform you that I placed before the Board of Governors, at their meeting

on the 21st instant, the Hon. Mr. Vogel's Memorandum conveying the "decided opinion of the Government that it is desirable that direct educational advantages should be offered in connection with the Institute and geological department," indicating the direction in which arrangements should be made for effecting this object, and inviting the assistance of the Governors of the Institute in preparing a plan for the institution of a system of scientific education.

Keeping in view the practical suggestions conveyed in Mr. Vogel's Memorandum, the Board of Governors have authorized me to make the following recommendations for the favourable consideration of Government:—

1st. That a series of lectures should be instituted in connection with the Museum, to be delivered during the winter months of the year.

2nd. That the subjects should be divided into two courses, the lectures being given on alternate days, or otherwise, as found most convenient.

3rd. The first course should comprise lectures on Natural History, or the principles of classification as illustrated by the elementary study of Zoology and Botany, and the application of these to Physical Geography and Geology.

4th. The second course should be devoted to the elements of Experimental Science, Physics, Chemistry, and Mineralogy.

5th. The practical course should be limited to Mineralogy and Chemistry.

For carrying into effect these proposals it will be necessary, First, that additional accommodation should be afforded; Second, that the requisite apparatus should be obtained from England; Third, that lecturers should be provided.

In the meantime, until the scheme is established, the Governors are of opinion that the working of it might be left to the Staff of the Geological Survey.

I further conveyed to the Governors of the Institute an assurance that, if my doing so met with the views of Government, I would be willing to undertake at least one of the proposed courses of lectures, and that I considered that the work of one or more of my geological assistants might be so arranged that they might be employed usefully in the field during the summer months, and in the winter assist in the course of instruction.

By this means, without materially increasing the present establishment, the scheme might be initiated, and the valuable educational resources of the Museum and Laboratory devoted to supply the deficiency of scientific and technical instruction which is much felt in this Colony.

The fees would be sufficient to pay the working expenses, and, by a judicious system of small endowments for scholarships in the various public schools, other parts of the Colony would share in the benefits of the course.

In the event of the Government favourably entertaining this scheme, I am prepared to submit further recommendations as to the best mode of providing the required extra accommodation, and also lists of the apparatus which it will be necessary to order from Europe.

I have, &c.,

The Hon. the Colonial Secretary. JAMES HECTOR.