REPORT

OF

THE JOINT COMMITTEE

ON

COLONIAL INDUSTRIES.

REPORT BROUGHT UP 19TH OCTOBER, 1872, AND ORDERED TO BE PRINTED.

WELLINGTON.

1872.

ORDERS OF REFERENCE.

Extracts from the Journals of the House of Representatives.

WEDNESDAY, THE 24TH DAY OF JULY, 1872.

Ordered, That a 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 a separate report; the Committee to have power to call for persons and papers; three to be a quorum. Such Committee to consist of the following Members:—Mr. Creighton, Mr. Bathgate, Mr. Seymour, Mr. McLean, Mr. Sheehan, Mr. E. Richardson, Mr. Peacock, Mr. Pearce, Mr. Taiaroa, Mr. Steward, Mr. J. Shephard, Mr. O'Conor, and the Mover.

THURSDAY, THE 8TH DAY OF AUGUST, 1872.

Ordered, That Mr. Steward be discharged from further attendance on the Colonial Industries Committee.

Extracts from the Journals of the Legislative Council.

TUESDAY, THE 30TH JULY, 1872.

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; such Committee to have power to conduct their proceedings in conjunction with any Committee of the House of Representatives appointed for a similar purpose, and to make either a joint or separate report; the Committee to have power to call for persons, papers, and records. The Committee to consist of the Hon. Captain Fraser, the Hon. Mr. Stokes, the Hon. Mr. Holmes, the Hon. Mr. Edwards, the Hon. Colonel Whitmore, the Hon. Colonel Kenny, the Hon. Mr. Mantell, and the Mover. To report in a month.

TUESDAY, THE 6TH DAY OF AUGUST, 1872.

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

REPORT OF THE JOINT COMMITTEE ON COLONIAL INDUSTRIES.

THE Joint Committee appointed to consider what steps, if any, should be taken to ascertain and develop the producing and manufacturing resources of the Colony, report that they have mainly confined their inquiries to the following subjects:—

Development of Coal Fields of the Colony.
Iron Deposits.
Beetroot Sugar.
Woollen Manufactures.
Paper Manufacture.
Sericulture.
Flax.
Timber.
Vienna Exhibition.
Geological Department.

Coal Fields.

Your Committee have taken a large amount of evidence on the present condition and prospects of the various known coal fields of the Colony, more particularly the Kawa Kawa, the Brunner, the Mount Rochfort and Ngakawau, and the Waikato Coal Fields. They find, with reference to the Kawa Kawa Mine, that the working of this mine has been suspended for two reasons,—the occurrence of a fault and the flooding of the present workings, and the fact that the construction of the proposed railway has been suspended till it is ascertained reliably that the profitable production can be continued on a large scale over a number of years.

The Committee recommend that a moderate amount of assistance should be afforded in the shape of a money grant to procure practical evidence on the subject above alluded to by boring.

The Brunner Mine.—Your Committee find that until the railway is made to the port of shipment, this mine must continue in the unsatisfactory state it is now in, and they recommend that the earliest steps should be taken to construct the proposed railway, and also that further exploration should be made to ascertain the amount of coal that is likely can be carried over this railway at a profit.

The Mount Rochfort and Ngakawau Mine.—Your Committee have satisfactory evidence that the coal in this district is fully equal in quality to that of the Brunner. They recommend that in this case also further explorations be made before any considerable expenditure is incurred in improving means of shipment, as it appears at present doubtful whether it would be expedient to adopt Westport or the Ngakawau River as the place of export.

With regard to other coal fields, your Committee recommend generally that wherever there is reason to believe that good coal seams exist, practical exploration as to the value and extent of these seams should be made as soon as the Government find it possible. The evidence taken by your Committee on this subject leads them to the belief that New Zealand ought, in a very short time, to supply its own wants and also become an exporter of coal.

Iron.

Your Committee have received sufficient evidence to convince them that payable iron stone and ore exists in various parts of the Colony; and in view of the great increase of price of manufactured iron in Europe, and the prospect of high prices, together with a constantly increasing demand continuing, they consider that they are fully justified in recommending that a bonus be offered of £5,000 on the production of 1,000 tons of pig iron of marketable quality, in quantities of not less than 100 tons, and under such regulations as may appear necessary to the Government to insure the permanent establishment of the industry.

The Committee also recommend that the bonus which the Committee of last year proposed of £1,000 for the production of the first 100 tons of steel from the Taranaki iron sand should be continued.

Beetroot Sugar.

Your Committee, whilst recognizing the valuable efforts made by Mr. Krull, the Consul of the German Empire, towards the establishment of a company to manufacture beetroot sugar in this Colony, regret to find that there is no probability of such a company being established at an early date; but they repeat the recommendation of the Joint Committee of last year, that a bonus of £2,000 be offered for the production of the first 250 tons of sugar produced from beetroot manufactured within the Colony.

In compliance with the recommendation of the Committee of last year, a quantity of seed of the best varieties of sugar beet has been procured from Germany, through Mr. Krull, and distributed in different districts of the Colony, with a view of testing the capability of those districts to grow beetroot of a quality sufficiently good to enable the production of sugar from this root to be profitably carried on.

Manufacture of Woollen Goods.

Your Committee have had their attention drawn to the several samples of manufactured woollen goods from the manufactory recently established at Mossgiel, Otago, by Messrs. Burns and Company, and consider it a source of much congratulation to the Colony that this industry is now thoroughly established. They think it right to draw attention to the fact that, in the case of Otago, this success

is in a measure owing to the judicious application of the system of bonuses by the Provincial authorities.

Paper Manufacture.

The Committee recommend that the bonus at present offered for the manufacture of paper should be continued, as they feel convinced that within a short time advantage will be taken of the bonus, looking especially to the great demand for paper, and the increasing scarcity of raw material in Europe for paper-making.

Sericulture.

The Committee of last Session recommended that the further sum of £100 should be applied to assist in the cultivation of mulberry trees. This sum has been expended by a Committee, consisting of the Hon. Dr. Renwick, Mr. Curtis, and Mr. Lightband, and resulted in an arrangement with Mr. Batchelor to supply 2,000 trees at 1s. each. The greater part of these have already been distributed, and the balance can be had on application next season. The introduction of this industry must be gradual, but the Committee have reason to believe that the possibility of producing silk is thoroughly established.

The best means of producing this valuable industry appears to your Committee to be the encouragement of the general growth of mulberry trees. They have no doubt that when this growth has become general throughout the Colony, the cultivation of silk will be entered upon by a considerable part of the population, to whom it is likely to afford useful and profitable employment.

Fish Curing.

Your Committee are glad to find that the offering of bonuses, as recommended by the Committee of last year, has led to this industry being successfully initiated, and recommend that provision be made for meeting all claims for the bounty of 4s. per cwt. on all exported fish cured in accordance with the recommendation made last year.

The Committee also consider that efforts should be made to obtain such data as will enable the Legislature clearly to define the description of nets which should be used, and also the season of the year during which their use should be allowed.

Flax.

Your Committee find that the Flax Commission has virtually expired, and that all the work connected with this subject is being performed by Dr. Hector, who was chairman of the Flax Commission.

Your Committee point out the necessity for providing funds to complete the investigations now being carried on by Dr. Church, of the Royal Agricultural College of Cirencester, England; also that a sufficient sum be provided to insure the success of a competitive exhibition of flax-dressing machines to be held during the next twelve months within the Colony. That such conditions be insisted upon as will render it certain that the prizes will be given for such machines only as combine the capability of dressing the largest quantity of flax within a given time, of best quality, and at the lowest cost of production.

Your Committee recommend that the experiment concerning the growth of cultivated flax be continued in Wellington and Taranaki, and that a small grant be made to meet part of the expense. Systematic experiments are now being carried on in this direction, free of cost to the Colony, by the Canterbury Flax Association in Christchurch, and with very successful results.

Your Committee deplore the wholesale destruction, by burning, of flax growing on the Crown lands of the Colony, and are of opinion that such destruction should be prevented, if necessary, by legislation. They also recommend that official approximate estimates should be procured of flax land in various parts of the Colony, and suggest that this may easily be done through the Survey Department; such statistics would be of very great value.

Timber.

Your Committee regret to find that so little really useful information is procurable as to the strength and durability of the various descriptions of timber growing in the Colony, and recommend that the experiments which have been initiated be continued. The want of accurate knowledge on this subject cannot fail to lead to very serious results in connection with the large public works now being undertaken throughout the Colony, and your Committee consider that any moderate amount of money spent in this direction will be of the greatest advantage to the public interest.

Mineral Paints.

Your Committee have had before them the subject of the manufacture of hematite paints, by a firm in Nelson, and have every reason to believe that this industry is deserving of encouragement.

Vienna Exhibition.

Your Committee are glad to find that the Colonial Government have availed themselves of the opportunity afforded by the proposed Exhibition at Vienna next year to exhibit various productions of New Zealand, and hope that the public in all parts of the Colony will exert themselves to assist the General Government in gathering together such a collection of exhibits to be forwarded to Vienna as will insure the Colony being fully represented there.

The preliminary Exhibition now being arranged in Christchurch will afford an excellent opportunity of selecting the best specimens of Colonial produce; and if the other parts of New Zealand respond to the invitation of the Committee of the Canterbury Exhibition, there is little doubt that a most useful collection will be sent to Vienna.

Your Committee beg to call attention to the valuable correspondence and evidence attached to this Report, and, in particular, to communications from Captain McIntyre as to the possibility of establishing a remunerative line of screw colliers to work the West Coast bar harbours; also to that of Mr. Krull in reference to Beetroot Sugar; and that of Mr. Tatton, of Nelson, on the subject of Mineral Productions of the Province of Nelson.

EDWARD RICHARDSON,
Chairman.

19th October, 1872.

MINUTES OF PROCEEDINGS.

TUESDAY, 6TH AUGUST, 1872.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Edwards,	Mr. Bathgate,
Hon. Captain Fraser,	Mr. O'Conor,
Hon. Mr. Hall,	Mr. Murray,
Hon. Mr. Holmes,	Mr. Peacock,
Hon. Mr. Mantell,	Mr. Sheehan,
Hon. Mr. Stokes,	Mr. J. Shephard,
Hon. Mr. Williamson.	Mr. Steward,
	Mr. Taiaroa.

Hon. Colonel Whitmore in the Chair.

On the motion of the Hon. Mr. Hall, *Resolved*, That copies of reports and other documents showing what information has already been collected on the subject referred to the Committee, be obtained and laid before the Committee; also, information as to what has been done by the Government during the recess, in pursuance of the recommendation of former Committees.

On the motion of Mr. Steward, *Resolved*, That the question of the growth of sugar beet and manufacture of sugar therefrom, be taken into consideration on Thursday next, and that of the coal resources on Friday.

It was *Resolved*, That Mr. Krull be requested to attend the Committee on Thursday next, at 11 o'clock, for the purpose of giving evidence.

The Committee then adjourned until Thursday next, at 11 o'clock.

THURSDAY, 8TH AUGUST, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Edwards,	Mr. Bathgate,
Hon. Mr. Holmes,	Mr. Murray,
Hon. Mr. Mantell,	Mr. O'Conor,
Hon. Mr. Stokes,	Mr. Peacock,
Hon. Mr. Williamson.	Mr. T. Shephard,
	Mr. Taiaroa.

Hon. Colonel Whitmore in the Chair.

Order of reference of the 6th August read.

Minutes of the previous meeting read and confirmed.

Mr. Krull, Consul for the German Empire, attended before the Committee, and informed the Chairman that he would send in a written statement of his evidence.

The Hon. Robert Campbell was examined.

Resolved, That Mr. Kebbell be requested to be in attendance to-morrow, at 11 o'clock.

Committee adjourned until 11 o'clock to-morrow.

FRIDAY, 9TH AUGUST, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Edwards,	Mr. Murray,
Hon. Mr. Holmes,	Mr. O'Conor,
Hon. Colonel Kenny,	Mr. Peacock,
Hon. Mr. Mantell,	Mr. E. Richardson,
Hon. Mr. Stokes,	Mr. Seymour.
Hon. Mr. Williamson.	Mr. Sheehan,
	Mr. J. Shephard,

Hon. Colonel Whitmore in the Chair.

Order of reference of the 8th August read.

Mr. Kebbell attended before the Committee, and gave evidence relative to Colonial coal.

Hon. Mr. Williamson laid before the Committee a Report of "The Bay of Islands Coal Company, Limited," for the year ending 30th April, 1872. The Report was read by the Chairman. The Hon. Mr. Williamson also gave evidence relative to Colonial coal.

On the motion of Mr. Murray it was *Resolved*, That the Chairman be asked to ascertain from the Government what is being done by the Kawa Kawa Coal Company to have a railway from the mine constructed.

The Committee adjourned until Wednesday next, at 10.30.

WEDNESDAY, 14TH AUGUST, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Edwards,	Mr. Murray,
Hon. Mr. Holmes,	Mr. O'Conor,
Hon. Colonel Kenny,	Mr. E. Richardson,
Hon. Mr. Williamson.	Mr. Seymour,
	Mr. Sheehan,
	Mr. J. Shephard,
	Mr. Taiaroa.

Hon. Colonel Whitmore in the Chair.

Minutes of the previous meeting read and confirmed.

Mr. Krull's written evidence on beetroot was laid before the Committee, and read by the Chairman.

Dr. Hector attended before the Committee, and gave evidence relative to Colonial coal.

Committee adjourned until Friday, at 10.30.

FRIDAY, 16TH AUGUST, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Holmes,	Mr. Bathgate,
Hon. Colonel Kenny,	Mr. Murray,
Hon. Mr. Mantell,	Mr. O'Conor,
Hon. Mr. Stokes,	Mr. Peacock,
Hon. Mr. Williamson.	Mr. E. Richardson,
	Mr. J. Shephard.

Hon. Colonel Whitmore in the Chair.

Minutes of the previous meeting read and confirmed.

A telegram from J. W. Humphrey, Chairman of the Provisional Directory "Westport Coal Mining and Steam Navigation Company, Limited," to E. J. O'Conor, Esq., M.H.R., called for at the request of Chairman, relative to the encouragement of the whale fishery at Otago, was laid before the Committee and read by the Chairman.

Resolved, That the Chairman should communicate with Mr. Taiaroa on the subject.

Dr. Hector was in attendance, and examination resumed.

O. Curtis, Esq., M.H.R., attended and gave evidence before the Committee relative to Colonial coal, and laid before the Committee two reports relative to the Brunner Coal Mine.

Committee adjourned until Tuesday, at 10.30.

TUESDAY, 20TH AUGUST, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Mantell,	Mr. O'Conor,
Hon. Mr. Stokes,	Mr. Murray,
Hon. Mr. Williamson.	Mr. E. Richardson,
	Mr. J. Shephard.

Hon. Colonel Whitmore in the Chair.

Minutes of the previous meeting read and confirmed.

Mr. Nancarrow, Inspector of Steam Boats, attended before the Committee and gave evidence.

The Chairman laid before the Committee several letters and papers.

It was *Resolved*, That Mr. Blackett should be requested to attend before the Committee on Friday next.

Committee adjourned until Thursday next, at 10.30.

FRIDAY, 23RD AUGUST, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Mantell,	Mr. Murray.
Hon. Mr. Stokes,	
Hon. Mr. Williamson,	
Hon. Colonel Whitmore.	

In consequence of there not being a quorum, the meeting was adjourned until Tuesday next, at 11 o'clock.

TUESDAY, 27TH AUGUST, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Colonel Kenny,	Mr. Bathgate,
Hon. Mr. Stokes,	Mr. Clark,
Hon. Mr. Williamson.	Mr. McLeod,
	Mr. Murray,
	Mr. O'Conor.

Hon. Colonel Whitmore in the Chair.

Minutes of the previous meetings read and confirmed.

Lieut.-Colonel Gorton, Inspector of Stores, attended before the Committee, and gave information relative to the samples of woollen manufactures exhibited to the Committee, and laid before them the invoice of the different articles.

Mr. Blackett, Assistant Engineer, attended before the Committee, and gave evidence relative to the harbours of the West Coast.

Mr. John William Tatton, of Nelson, was in attendance before the Committee, and gave information relative to the mineral production of the Province of Nelson.

The Committee adjourned to the Colonial Museum to view the various specimens.

The Committee adjourned until Tuesday next, at 11 o'clock.

TUESDAY, 3RD SEPTEMBER, 1872.

PRESENT:

Legislative Council.

Hon. Colonel Kenny,	Hon. Mr. Stokes.
Hon. Colonel Whitmore,	

In consequence of there not being a quorum, the meeting was adjourned until Friday next, at 11 o'clock.

FRIDAY, 6TH SEPTEMBER, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.

Hon. Colonel Kenny,	Hon. Mr. Stokes.

In consequence of there being no quorum, the meeting stood adjourned.

TUESDAY, 17TH SEPTEMBER, 1872.

Committee met pursuant to notice.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Stokes,	Mr. O'Conor.
Hon. Colonel Whitmore,	
Hon. Mr. Williamson.	

In consequence of there being no quorum, the meeting stood adjourned.

FRIDAY, 20TH SEPTEMBER, 1872.

Committee met pursuant to notice.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Stokes,	Mr. Bathgate,
Hon. Colonel Whitmore,	Mr. Murray,
Hon. Mr. Williamson,	Mr. O'Conor,
Hon. Mr. Hall.	Mr. Peacock,
	Mr. E. Richardson,
	Mr. Taiaroa.

On the motion of Mr. Murray, it was *Resolved*, That in consequence of the absence of the Hon. Colonel Whitmore during the remainder of the Session, the Hon. Mr. Hall be elected Chairman.

On the motion of the Hon. Mr. Stokes, it was *Resolved*, That the Chairman be requested to communicate with the Government, to ascertain their intentions with regard to an Exhibition of Colonial Produce to be held at Christchurch during the current year, preparatory to the Vienna Exhibition.

On the motion of the Hon. Colonel Whitmore, it was *Resolved*, That it is desirable, for the better development of the resources and industries of the Colony, that a branch of the Geological Department, consisting of a competent staff, should be constantly employed in geological explorations throughout the Colony.

Committee adjourned until Tuesday next, at 11 o'clock.

TUESDAY, 24TH SEPTEMBER, 1872.

Committee met pursuant to adjournment.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Mantell,	Mr. Bathgate,
Hon. Mr. Stokes.	Mr. Murray,
	Mr. Peacock,
	Mr. E. Richardson,
	Mr. J. Shephard.

Hon. Mr. Hall in the Chair.

Minutes of the previous meeting read and confirmed.

Letter dated 8th August, 1872, from Mr. T. A. Bird, Secretary to Canterbury Flax Association, asking Government for a donation of £200 towards an Exhibition of Flax-dressing Machines, to be held in Christchurch in December, 1872, was laid before the Committee by the Chairman, and read.

Letter dated 23rd September, 1872, from Mr. Krull, Consul to the German Empire, on the subject of beetroot sugar, was laid before the Committee by the Chairman and read.

The subject of an addition to the staff of the Geological Survey, with a view to the further exploration of the geological resources of the Colony being further considered, on the motion of the Hon. Mr. Mantell, it was *Resolved*, That, prior to the adoption of any report touching the Geological Survey Department, or any addition thereto, it is expedient that evidence as to the number and efficiency of the officers required should be taken.

The Chairman reported that, in accordance with the directions, he had caused inquiry to be addressed to the Colonial Secretary on the subject of the proposed Exhibition at Christchurch, but had not received any answer. He had, however, ascertained through Dr. Hector, that £200 had been promised by the Government towards the expenses of such Exhibition, and that it was to comprise exhibits of wool, flax, timber, grain, tallow, preserved meats, and other Colonial raw produce, and that the best specimens of these exhibits were to be selected for transmission to the Exhibition at Vienna.

The *New Zealand Gazette* dated 23rd September, 1872, containing a letter from the Agent-General relative to the representation of New Zealand at the Exhibition in question, and a Government notice on the above subject, were laid before the Committee, and read.

On the motion of the Hon. Mr. Stokes, it was *Resolved*, That it is desirable that steps should be taken to have the Colony of New Zealand properly represented at the Vienna Exhibition in June next; and that, as it is proposed to hold a Competitive Exhibition of Colonial Produce at Christchurch in December, it is expedient that advantage should be taken of this Exhibition for the purpose of obtaining specimens of Colonial produce to be sent to Vienna, that a fair and reasonable contribution should be made by the Colony for the necessary expenses of the Exhibition at Christchurch.

J. Shephard, Esq., M.H.R., laid on the table, for the inspection of the Committee, the following specimens obtained at Collingwood:—Two sorts of hematite paint; hematite iron ore; prepared black lead, or plumbago; crude graphite, or plumbago.

Resolved, That Dr. Hector be requested to attend the Committee on Thursday next.

Committee adjourned until Thursday next, at 10·30 a.m.

MONDAY, 30TH SEPTEMBER, 1872.

Committee met pursuant to notice.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Captain Fraser,	Mr. Bathgate,
Hon. Mr. Mantell,	Mr. Creighton,
Hon. Mr. Stokes.	Mr. Murray,
	Mr. O'Conor,
	Mr. J. Shephard,
	Mr. Taiaroa.

Hon. J. Hall in the Chair.

Minutes of the previous meeting read and confirmed.

Dr. Hector attended before the Committee and gave evidence.

Committee adjourned until further notice.

FRIDAY, 4TH OCTOBER, 1872.

Committee met pursuant to notice.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Colonel Kenny,	Mr. Murray,
Hon. Mr. Stokes.	Mr. Peacock,
	Mr. E. Richardson.

Hon. Mr. Hall in the Chair.

Minutes of the previous meeting read and confirmed.

Captain McIntyre attended before the Committee and gave evidence.

Letter dated the 2nd of October, 1872, from Mr. J. W. Tatton, of Nelson, laid before the Committee and read by the Chairman. Also, a descriptive Map of the Province of Nelson, exhibiting the mineral characteristics of the various districts.

Committee adjourned until further notice.

WEDNESDAY, 10TH OCTOBER, 1872.

Committee met pursuant to notice.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Edwards,	Mr. Murray,
Hon. Captain Fraser,	Mr. Taiaroa.
Hon. Mr. Hall,	Mr. E. Richardson.
Hon. Mr. Mantell.	

The Hon. Mr. Hall stated that in consequence of pressure of other business matters which at present fully occupied his time, he was reluctantly compelled to resign the Chairmanship of the Committee.

Moved by the Hon. Mr. Mantell, That Mr. Richardson do take the Chair.

Carried.

Minutes of the previous meeting read and confirmed.

A letter from Mr. Tatton, of 10th October, 1872, was ordered to be attached to the evidence.

The Chairman laid before the Committee notes for a Report which had been previously circulated among the members of the Committee.

It was moved by the Hon. Mr. Hall, That a Report in accordance with the recommendations contained in the above notes be prepared by the Chairman.

Carried.

The Committee then adjourned.

SATURDAY, 19TH OCTOBER, 1872.

Committee met pursuant to notice.

PRESENT:

Legislative Council.	*House of Representatives.*
Hon. Mr. Hall,	Mr. Murray,
Hon. Colonel Kenny,	Mr. J. Shephard.
Hon. Mr. Mantell.	

Mr. E. Richardson in the Chair.

Minutes of the previous meeting read and confirmed.

The Report was laid before the Committee, and read. On the motion of the Hon. Mr. Hall, *Resolved*, That the Report now read be adopted, and signed by the Chairman for presentation to both Houses.

The Committee then adjourned.

MINUTES OF EVIDENCE.

THURSDAY, 8TH AUGUST, 1872.

The Hon. Mr. CAMPBELL attended the Committee, and stated as follows:—

Hon. Mr. Campbell. 8th Aug., 1872.

1. A sugar factory capable of producing 800 tons of sugar per annum would cost for the first outlay about £15,000. It could only be worked to advantage about four months in the year; because the roots out of the ground lose their saccharine matter by evaporation, and after being four months in store, are not worth working at all. In France the sugar factories are worked from September to January. The crops should be sown in rotation, and the roots taken up before the frosts set in, as the frosts destroy the saccharine matter. The best seed is to be obtained in Germany, for in Germany the duty is fixed by the weight of the root; in France by the result obtained in sugar, so that it is to the interest of the producer in Germany to produce plants which yield a high percentage of sugar. I saw in France a factory, but it was not working at the time. In France the roots produce from 8 to 10½ per cent. of sugar, and in Germany from 12 to 14 per cent. I consider that £5,000 should be offered as a bonus for the first 800 tons of sugar produced in New Zealand. Of course skilled labour would be required, and the services of a first-class chemist would be also, whose salary would probably be about £700 per annum. About one hundred hands would be required to work the factory. The factory must be situated where labour would be easily obtainable. The portion of the root of the beet which is in the ground gives a much larger proportion of sugar than that above the ground. In Germany beet is worth at the factory about 25s. per ton. One acre will yield about 1 ton of sugar. Twenty gallons of proof alcohol can be obtained from one ton of beet. Alcohol would pay much better than sugar if protected. The sugar from beet is equal to the best cane sugar. In England it is worth £45 per ton, and molasses about £30. The pulp might be used for making paper, and the spirit distilled from the beet is worth about 2s. per gallon in bond in London.

Mr. KRULL, Consul for the German Empire, in attendance.

Mr. Krull. 8th Aug., 1872.

2. Witness stated that he had forwarded to the Berlin Government in February, a memorandum showing what action the Joint Committee for Colonial Industries had taken in regard to beetroot, and stating that the Government of New Zealand were prepared to carry out the recommendation arrived at by the Committee. That the receipt of his despatch had been acknowledged, and a further communication on the subject promised.

3. Mr. Krull further stated that he had written at the same time to two mercantile firms, one in Berlin, and the other in Hamburg, and had been advised that the papers had been forwarded to the Magdeburg and Halberstadt districts, where the culture of sugar beet is brought to its greatest perfection. No definite answer had arrived, but he xepected to hear fuller particulars by the next mail, when he would immediately communicate with the Chairman of the Committee.

4. Mr. Krull also informed the Committee that a parcel of seed from the three recognized best kinds of beetroot, ordered by direction of the Committee, had just been landed, and that he would forward it to Dr. Hector this day for distribution.

FRIDAY, 9TH AUGUST, 1872.

Mr. KEBBELL in attendance, and examined.

Mr. Kebbell. 9th Aug., 1872.

5. In answer to questions, Mr. Kebbell stated that all he knew on the subject of coal was already reported at a previous Session of Parliament. He had, at the same time, given all the information he was possessed of in regard to flax; about beetroot sugar he did not know anything.

Hon. Mr. WILLIAMSON examined.

Hon. Mr. Williamson. 9th Aug., 1872.

6. Witness stated, in reference to the coal mines, that the quantity now being delivered from the mine was not at all equal to the demand. They were not in a position, owing to natural obstacles, to deliver the quantity required. Touching what Mr. Kebbell said of the New Zealand coals burning furnace bars, he was of opinion that that arose from an imperfect knowledge of the best mode of using the coal. He had found that light firing, with close bars, prevented anything of the kind—at least that was the experience of those who used it in Auckland; and it would be wholly used there if they could get it in sufficient quantity. The average price in Auckland was from 21s. to 24s., and about the same at the Thames; at the pit it would be about 8s. per ton less. The price of the slack was only 8s. at the pit. Most of the steamers along the coast use the coal; some, from the absence of a constant or regular supply, object to alter their furnace bars to suit the coal. The steamers running to the Thames always use the coal when they can get it. Some of the stationary engines on the gold fields use the slack, and the flour mills use nothing else.

7. *The Chairman.*] Have you any idea of the price and quantity of Newcastle coal imported?—The price of Newcastle coal in Auckland has been very much reduced from the effects of competition with the local mines. For some years previous to the opening of the mine in Auckand, coals averaged 37s. 6d. to 40s. per ton; since then the average cost has been 30s. The general price of Newcastle coal is about 26s. to 27s. I believe the Province of Auckland has saved more than £50,000 since the Kawa Kawa Mine was opened in the difference between the price now paid and that formerly paid for imported coal.

8. *Mr. Murray.*] Do you think sea-going steamers generally will use it?—I cannot say that they would, but all our own steamers would.

9. *Hon. Colonel Kenny.*] Is there not some difficulty in the matter of stowage?—I have heard it spoken of; the general opinion is that it would occupy 2½ to 5 per cent. more space.

Hon. Mr. Williamson. 9th Aug., 1872.

10. Does this coal not pulverize when exposed to the atmosphere?—To some extent it does. The Company's report reads that the coal is improving as they go deeper; and it is just possible that when Mr. Kebbell used the coal it was being mixed with casing that caused the burning of the furnace bars he complains of. I know that Mr. Firth can produce more from the slack or refuse than from ordinary Newcastle coal, and would recommend that he be communicated with and asked to give his evidence.

11. Can you give any information as to the use of Kawa Kawa coal for gas purposes?—I cannot give that information; I am not aware of its qualities for producing gas. We have another coal mine in the north, called the Waikato Mine, but it is in such a position at the present time that it is only useful in the locality. It was working during the war, and since then is used in the steamers on the Waikato and for household purposes along the river. The quality is not so good as the Kawa Kawa coal, but it is an excellent household coal, is easily reached, and seems to be unlimited in quantity. I think Dr. Hector's report says there is some 800,000,000 tons of coal in that district.

12 Have you heard anything of a coal field in Drury?—Yes; it is lighter than the Waikato coal, and inferior in quality.

13. Have you heard of ironstone being found there?—I have not heard of ironstone in the vicinity of the Drury coal; I have heard of it at or near the Wangarei Mine. There was another coal-field in the North which was worked for a time, but it is now closed because it was not paying. The coal is not equal to the Kawa Kawa. The high price at the Kawa Kawa pits is on account of the want of proper plant in working them. I do not see how it should cost more put on board than in Newcastle. If the coal was carried from the mine by rail at the same price, the advantage to the consumer should be in the cost of freight along the coast as compared with the freight from Australia.

14. On what terms is the field held?—The company have a lease of twenty-one years, and they pay a royalty to the Government of sixpence per ton over all. I do not recollect the quantity of ground they have, but they were negotiating for an increase.

15. Is the mine paying?—No; it is some £6,000 in debt. To work it on a large scale would require a different class of plant, and they do not wish to go to that expense till they get a railway to the water. As soon as that is done, a much larger engine would be required, but that would cost little more in working than a small one, because at a coal pit there is always plenty of waste to work it with. If they had better power, they could deliver in Auckland with the greatest ease 50,000 tons a year.

16. Do you think they could compete with the supply from other quarters?—Supposing they were not attempting to compete in the Christchurch and Dunedin Markets, they would have ample field in Auckland and the North. The mines in the South could not compete with mines in the North for the supply of the North. Her Majesty's ships had used this coal, and reported favourably upon it on the whole. There was one unfavourable report. One captain had said that he would rather use it than Newcastle coal, because there was less trouble with it. The only thing is to fire light and frequently.

17. What price could this be delivered at?—If the railway was made, it could be delivered free on board at 8s. a ton. When I saw it it was not a hard coal to work, but I have not seen it for two or three years. I think they are now at the third level; in the deep levels a pump would have to be always kept going. There is a large swamp in the neighbourhood which possibly supplies the water.

WEDNESDAY, 14TH AUGUST, 1872.

Dr. HECTOR, F.R.S., in attendance, and examined.

Dr. Hector. 14th Aug., 1872.

18. *Dr. Hector* stated:—The Kaiou coal seam, near Wangaroa Harbour, belongs to the same formation which is found at Kawa Kawa. This is mentioned in my recent report, and a description of it will be found on page 25, letter D. No. 3, of this year's Parliamentary papers. There is a continuance of what I take to be the Kawa Kawa coal, about thirty-seven miles south of that place, and it is continued south to even a greater extent. The seam at the Kaiou is now being opened up under my direction, and a Committee has been formed in the district to superintend the working. The Government has given £200 to discover if it can be made available for the shipping in Wangaroa Harbour. The report explains the nature of the coal. The extent of the Kawa Kawa coal is being tested as described in Captain Hutton's report, page 5 of papers quoted. Since then I have received a further report, and now produce the original plan of the field which I made in 1866. (The dip &c. of the coal, and where it was worked, explained on the map.) The result of boring down 277 feet was, that they had found only a five-foot seam of coal. Supposing that to be the main seam which they have hitherto been working, it shows that the coal soon thins. The borings are done by the company, which, of course, has the advice of the Geological Department when they wish it. The company has made about three and a half miles of railway, which is the least expensive piece of the proposed railway work, as the remainder of the line is carried round the spurs of the hills. The Wangaroa seam is the same coal formation. I cannot say that it is the same seam. From near Mongonui right down to Matakana, outcrops of coal have been found at intervals.

19. Can you state if there is any difference between the Kawa Kawa coal and the Newcastle coal?—It has a greater heating power than the Newcastle, but it sometimes contains 5 per cent. of sulphur, frequently in nodulated masses of pyrites, which are apt to combine with the furnace bars. This is not exactly the form of pyrites which some coal miners call brass, and which is often found in the Newcastle coal; but the reason why the sulphur does more damage in the Kawa Kawa coal is because of the latter being a tender, caking coal, so that it keeps dripping through the furnace bars, catches fire beneath, and keeps the bars red hot. If the bars were kept clean and not allowed to clog, they would not be so liable to be burned.

20. Can this defect be remedied in any way?—Yes, it can be obviated by proper stoking. If the coal was used in sea-going vessels, where they would not be always able to replace furnace bars, great care would be required in firing, so that it should not choke the bars.

Dr. Hector.
14th Aug., 1872.

21. Is there any difference between it and the Grey coal?—Yes, there is. The latter makes excellent coke, and as a gas-producing coal gives an immense volume, but at the same time it contains sulphuretted hydrogen gas; and if this gas is allowed to pass over a red-hot coke, you will have it in part converted into bisulphide of carbon. The smell observed about the Government Buildings a few days ago I attribute to the accidental formation of this gas on one occasion. As a gas-making coal, that of Kawa Kawa is valuable, though I am not prepared to say that it is equal to Newcastle. The best gas coal from Newcastle is better than it and more profitable to use, as it has not the same deleterious gas in its composition, and as a steam-developing coal it ranks about half a pound better than the Kawa Kawa. That is the average of all the samples examined. Of course, if you take a coal sent into the market, you do not get it all of one kind or in one condition, which may give a different result from specimens selected at the pit. The best steam coal of the Kawa Kawa is nearly equal to Newcastle. As regards stowage, I think there is very little difference between it and the Newcastle, but I would point out that though a ton of this coal may occupy more bulk, you get more out of it, as there is less ash. If large masses of pyrites are left in the coal, it will be dangerous for seagoing purposes. The "brass" in the home-country coals is pyrites in thin films, and it is less liable to fire than the other. As to the Kawa Kawa Mine, the result of the boring referred to in Mr. Hutton's report reached me to-day. The seam apparently diminishes on the east side of the fault, but to what extent cannot be ascertained without further boring. The opinion I expressed on the prospects of this mine in 1866 are given in my instructions to Captain Hutton, page 4, D. 3. Since that was written, a local market has been opened for the coal at the Thames Gold Fields. I would not consider it advisable to begin railway construction till the ground has been more thoroughly tested by boring. It would be useless, because a railway will not warrant the Company in going on till they see whether it will pay them to sink a shaft, and erect machinery.

22. Then if a railway were made, its only security would be the mining plant, which would be useless if there was no coal?—The position of the proposed line would be of service to the country, independent of the coal. It would connect with a good harbour the interior district, and would open a large amount of level country. Still, if the Coal Company, after testing the ground, found it would not pay, it would be unfortunate if a railway had been proceeded with. As to Wangarei, since my previous evidence there is nothing new, save that Mr. Beddlington is engaged in boring for a new coal seam, which, from its position, would be extremely useful in relation to the fine harbour there. Mr. Walton went to great expense in erecting wharves, sheds, and otherwise. The coal is inferior to the Kawa Kawa coal, which was opened up at the same time. I think there is every reason to believe they might strike some better in quality. I think the Government, in these and such cases, might assist local efforts.

23. Do you find the quality of coal alter for better or worse as you go deeper?—The depth has nothing to do with it beyond this: that outcrop coal generally is full of the roots of plants, and is inferior. The Coromandel coal has been long known in small seams. It is only recently that a good seam was found, and traced to the hill, but I have no precise information about it. It is a kind which would be moderately valuable for steam vessels; but as yet I have no correct information as to the thickness of the seam. I have nothing to add to the evidence at page 9, D. 3, on the Brunner and other Nelson Coal Fields.

24. Have you any other information on the subject you could give; for instance, the shipping engaged in the coal trade?—I think there is a good deal of misapprehension about the size of vessels in the New Zealand trade with Newcastle. I do not consider it advisable to have very large ships. Into the Grey, for instance, a vessel such as those I understand were constructed for the Hunter River could go quite well. I have been informed that there are several places on the Australian Coast where the difficulties are quite as great as any to be met with on the West Coast, and they have been overcome by contrivances of various kinds. If the Committee could get information of what has been done in such places there, it would be most useful for the country. For instance, I should say, that at moderate expense the Grey bar might be improved very materially, so that a large amount of coal could be taken out of it. I have seen a vessel drawing six or seven feet going in; and one built specially for the purpose would carry a sufficient amount of coal to pay. I have seen one vessel of about 290 tons enter; but the great difficulty in the Grey is, that after floods the bar overlaps, so that a ship runs a risk from broadside seas. If certain improvements were made on it, a vessel might go in and out straight. It would be expensive, but not so great as schemes I have heard of, such as making a railway for taking the coal to Nelson or Lyttelton.

25. Are you aware of anything the Provincial Government is doing to make a tramway on the other side of the river?—I only know of it from report—from Mr. Curtis—that they were going on with it in the meantime, to supply the market till the railway would be available.

26. Do you think that a practicable way of bringing coal to the port?—It will be a much less expensive than the present way.

27. Have you compared the different coal mines on the West Coast, so as to ascertain where the best port was?—There are only two mines at present, the Grey, and the one at Ngakawau, eighteen miles north of Westport. The latter has only been worked since May last. The survey of the upper or plateau coal field in that district is not completed. I mean to proceed with the geological survey of it as soon as the season permits: at present it is covered with snow. Land surveys do not come under my department. I mean to open on the hill face. In the event of the coal extending to the plateau, I would recommend an engineer's opinion being taken as to the cost of harbour works, so as to make the river available. My report on the Reeftown coal shows it to be one of an intermediate character between the Grey and the other coals. I think there is very little difference in general in these coals. They are all of the lower tertiary or upper secondary formation. I have had two sample bags of the Ngakawau coal sent me. The analysis of this coal is not yet included in the Table, but has been reported on in a letter to the Colonial Secretary, forwarding reports from Captain Leach on the state of the bar at that place. The coal is exceedingly promising, and, except being more friable and drossy, is not otherwise inferior to the Grey.

28. Do you think screw coaling vessels could be employed with advantage?—I cannot say; I think more definite information should be got from Australia.

Dr. Hector.
14th Aug., 1872.

29. In answer to other questions, witness said: The Collingwood Mine yields a good gas coal, and, taken altogether, it is perhaps the most valuable we have. The cost of a tunnel, recommended in page 27 of the report, would be, I think, about £1,000. There is a tramway to the point of embarkation, and, in the event of the seams turning out extensive, there would be no difficulty in loading ships of any size with proper arrangements.

30. What thickness of seam is necessary for profitable working?—A good deal would depend on other circumstances. Four-foot seams are worked profitably in Scotland and in Belgium, but you would require practical miners for the purpose. The Collingwood Company have only discontinued because they have worked out all they can get at with the present system of working. I have already reported fully on that subject. The West Wanganui coal is better, if anything, than the Drury, though it has the same characteristics. It burns well, but leaves a heavy ash. I have not satisfied myself that coal will be found near the Wairoa Gorge, or on the flank of the hills towards the Top House, although certain indications of it have been discovered.

16th Aug., 1872.

FRIDAY, 16TH AUGUST, 1872.

Dr. HECTOR, F.R.S., in attendance, and further examined.

31. *The Chairman.*] Can you give us any further information about the Ngakawau mine?—There is about 10 feet of water on the bar, and the present improvements going on, to which I have alluded in the printed report, will give safe access to vessels drawing 7 feet of water, in fine weather. The improvements contemplated will not affect the bar, but further improvements could be made to do so. There is a fair anchorage-ground outside the bar, but no shelter to it. There is no harbour near: vessels must come into the river. The nearest harbour is Westport. With reference to the Malvern Hill coal, it is of two kinds: where it has been altered by volcanic action it is good, but otherwise it is inferior. It seems to be of considerable extent. I would draw your attention to a letter (page 34) which I wrote in consequence of a shaft having been sunk there by Mr. Hill, with the result of finding a soft brown coal instead of altered coal, as expected. There is, however, a very considerable quantity of good steam coal, and mines are being opened now, at the expense of private individuals. All the assistance wanted would be, I believe, a tramway. I do not know if it is all on private property. There are three mines opened: one on Hawkin's River; another is Hart's mine, on the Selwyn River, which is very good coal, but in very thin seams. That was what was burned in the "House" last year. There is also the coal opened up by Mr. Hill, where he expected to find a coal of the same kind and value as Hart's. It is found in shafting, at 130 feet from the surface, to be a soft coal, containing, when first extracted, about 28 per cent. of water. I would draw attention to Dr. Haast's report on pages 34 and 14, and especially to the report on page 16.

32. What is the Oamaru seam composed of?—It is the same coal formation as that in the Malvern Hills. Of course, those places mentioned in the report are from where we have obtained samples. The coal near Hokitika, in Westland, is a continuation of the Greymouth formation. The seams, where opened out, are all rather highly inclined, or in faulted ground. They run from three to four feet in thickness. There is a full account of them in page 35.

33. At what angle is it possible to work these mines?—Where you get level-free workings in the face of a hill, then you may work at any angle. With a dipping seam you cannot work so cheaply, because of the water. The steepest men can stand at is from 30 to 35 degrees of dip; but I have no actual knowledge of such a mine. It would be very difficult to get the coal to the shaft, and be expensive to work in many ways. The best inclination for working coal is 1 in 12. The Greymouth pit is that. The coal in Westland is described in page 35 as being quite on edge—from 70 to 90 degrees at the Kanieri workings. Referring to Otago, I may say the Shag Point coal has been worked for ten years. There is a report from Dr. Haast on the present state of the mine at page 22, D. 3 The coal is found on a promontory, and has hitherto been taken off in boats when weather permits, and sold in Dunedin. It is very good—a superior kind of brown pitch coal, better than the Green Island. The best place to ship it from would be Moeraki. Dr. Haast suggests the propriety of being at some expense in removing rocks in the way of the present shipping place, and I believe an engineer's report is being obtained on the subject. The thickness of the seam is fully described in the report. The Green Island and Saddle Hill seams are described in page 38 of the report. I would specially call attention to the conclusion of that report, and the remarks on the appearance and nature of the coal in page 39.

34. Is this coal of any value?—Unless it can be artificially improved, as has been done in Italy, it is of no use for marine steam purposes. I suggested its artificial improvement in 1863. The Clutha and Tokomairiro are much the same in quality. They are separate portions of the same formation, which extends, with intervals, from Dunedin to Preservation Inlet. You cannot go ten miles without getting coal of some kind in that district; in some cases of good quality, but it is all of the brown coal formation. With regard to Southland, there is an older formation, which I have described in evidence given before the Committee last year. In Preservation Inlet you will find two qualities, but the only good seam is very much disturbed and broken.

35. From your explorations throughout New Zealand, could you mention any particular direction to explore for coal in the North or South Islands?—Only those places I have recommended in the memorandum on page 3.

36. In answer to questions:—There is coal in the Wanganui District: it is mentioned in the Table, page 42 of the report. I believe the coal seam at Mokau will go right through and join the Wanganui coal.

37. Can you give us any information about petroleum?—There are two or three places where it is supposed to be found in payable quantity, as at East Cape and elsewhere in the North Island. I could not satisfy myself as to the probable quantity. I have had specimens of rock oil from Taranaki, which is very good lubricating oil, equal to any oil used for that purpose at home. It is obtained by collecting the leakage from cracks or fissures in the rocks. I have not known of more than two casks

Dr. Hector.
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or so being obtained. As to the other places where petroleum has been found, I have nothing to add to what I stated last year.

38. Can you give us any information on the subject of iron?—I have very little to add to what has been already given. The only new iron ore of consequence is found at Collingwood.

39. This is hematite; can nothing be done with it except as a pigment?—Yes; but the difficulty with it is to get rid of the stones mixed with the ore, with which it forms a conglomerate.

40. Do you know of any ironstone?—Yes; where you get good brown coal, you will always get more or less ironstone. But this branch has been dealt with in my previous evidence. Wherever you get a coal formation fairly developed, you always get some indication of ironstone.

Mr. Curtis.
16th Aug., 1872.

O. CURTIS, Esq., M.H.R., in attendance, and examined.

41. *The Chairman.*] Can you give us any information as to mining?—I presume Dr. Hector has given you all information as to the character of the mine at the Grey. It is some distance from the mine to the port, say six or seven miles, and the obstacles experienced in working it are the difficulty and cost of transport there. The Government have undertaken to make a railway to Greymouth; but it may be some time before it is done. In the meantime it was desired by the Provincial Government to lay a tramway of wood, to carry on the trade till the railway could be finished. For this purpose, application has been made to the Government for an advance of £5,000, under the provisions of the coal-mining clauses of the Railways Act. There has been no answer to that. If the proposed tramway were made, the supply of coal would be largely increased. In reference to the port itself, there is sometimes a depth of 16 feet at high water; at other times it is as low as 6 feet or less, and occasionally, even when there is sufficient water on the bar, owing to the roughness of the sea outside, no vessel can cross. The difficulty is this: they can only reckon on the minimum quantity of water. Dr. Hector speaks of having vessels built specially for the purpose, but my opinion is that would not pay as a commercial speculation, and the only way in which any trade of importance could be done is by supplying all seeking vessels with a cargo of coal. There has been a suggestion that the port might be improved, but that is an engineering question into which I cannot enter. From all that I could learn, it would cost more than the Colony would go to, and possibly, when done, it might be of only temporary benefit. As to the quantity of coal available. I can only rely on Dr. Hector's reports. It is a very satisfactory coal, equal to the average of the North of England coal, and from 10 to 15 per cent. better than the best Australian coal. The railway proposed to be made by Government is not entirely for the purpose of shipping this coal; it is supposed to be part of a main line that will go down to Hokitika. The tramway proposed would be intended simply as a temporary work. It would cost between £4,000 and £5,000, and, according to calculations made, the whole cost would be recouped within two years, and I have no doubt but that the trade would be immediately developed. I may state that many of these facts were brought before the Minister for Public Works three weeks ago, but no answer as to the intention of Government has been received.

42. Would it be desirable to build wharves for facilitating the shipment of the coal?—No, I think not; it would be delivered from trucks direct to the ship. It is so tender that any knocking about reduces it to dust. I have not seen the North of England coal ports, but I understand that is the way it is done. In the present case, there would be no difficulty in running a stage into deep water, from which coals could be shipped.

43. *Mr. O'Conor.*] You stated that the money advanced would be recouped in two years: could you furnish us with a copy of your calculations?—I am not sure if I have them here.

44. You have not said at what price the making of the tramway would enable you to deliver coals at Greymouth?—I have not got the figures here, but if required I will get them from Nelson.

45. Have you any idea of what the demand may be at Greymouth?—No further than that there is delivered at Greymouth from 12,000 to 15,000 tons a year, and there is a demand for more.

46. What are the prices obtained?—The price at which coal is sold at Greymouth, under the present arrangement is, at the mine, 10s., and at Greymouth it varies from 16s. to 26s. The price of 10s. per ton at the mine arises from the men working the mine not getting constant employment, and consequently higher wages have to be paid than there would be were there constant work. This is caused by the difficulty in transport to the port. A tramway would lead to constant employment, and therefore reduce the price of the coal. A new line of tramway laid out on the north side would not be so liable to damage as that on the south. I have here a report on the subject, which I will read. [Report read.]

47. *The Chairman.*] Who owns the ground?—The Provincial Government is proprietor of the mine, and it is worked on their account. They offered to give the General Government security in land, besides that of the mine itself, if the money was advanced for the tramway. The mine itself is to be given in security for the railway to be made. I have here reports from the Provincial Engineer on the merits of a tramway, which I will lay before you.

48. Is there any timber near suitable for a wooden tramway?—There is plenty of black birch in the district.

49. How about floods?—I consider there is no danger of the line being flooded, except at Coal Creek; and then it would not be liable to sweep the tramway. In this, however, I am speaking from hearsay. I understood Mr. Dobson to say that.

50. In reference to the Ngakawaho I know very little, save what appears in the reports of Dr. Hector. I simply understand from them that the coal there is equal to the Grey. There is no lease granted for it. An application was sent in, so far as my recollection goes, and they were told that they had better apply for a prospecting license. They did so, and obtained two square miles for either three or six months, I am not certain which, when it was intimated that a lease would not be granted for more than 20 or 30 acres. I consulted with Dr. Hector about having that grant, so that it would not be locking up the coal field. I am sure every care will be taken in this respect. I am told that wharves have been constructed, but the parties have no prescriptive right to them. A prospecting license

locked up land till those who held it fixed on the portion they wanted. This had not been done. An available water frontage was taken up already. Judging from Dr. Hector's report, I have every reason to think that there is a very large quantity of coal available, sufficient to justify the expense of improving the harbour. The improvement of the Ngakawaho Harbour is a question of funds. I would certainly desire to see it done, but it might be well to see whether it was necessary, and the probable expense. If it is not going to cost more than £400 or £500, I consider it would be desirable to do it at once.

Mr. Curtis.
16th Aug., 1872.

TUESDAY, 20TH AUGUST, 1872.

Mr. NANCARROW, Inspector of Steam Boats, in attendance, and examined.

Mr. Nancarrow.
20th Aug., 1872.

51. Witness stated:—Grey coal is the coal I know most about. It is well suited for steam purposes, so far as it has yet been proved. It has been tried ten years, and is 20 per cent. better coal than the New South Wales for lasting as well as in other respects. For household and gas purposes it is also superior to New South Wales coal. The Kawa Kawa coal is adapted for steam purposes, especially with steamboats carrying locomotive boilers. It is well suited for land boilers, but is not equal to the New South Wales coal for general purposes. Waikato coal is well suited for boilers in mills, and for steamboats with locomotive boilers. It is of a light quality, and the consumption will be 20 per cent. more than the average New South Wales coal. The Molyneux coal is not quite so good as the Waikato: it is of a lighter quality, and the consumption will possibly be 10 per cent. more than the Waikato coal. The Collingwood coal I know little about. I have never been at sea with it, and know little from my own knowledge. The Ngahuhu coal I saw burning at the Buller last month, and ascertained from an engineer of a small steamer there, fitted with a portable boiler, that it answered well on board that steamer. Another steamer, the "Lyttelton," brought a load from Ngahuhu to Nelson,—about eighty tons. The engineer complained that the coal burned the bars, and it contained also a large percentage of sulphur. As far as I have seen of it, I think it the next best to the Grey coal in quality. I speak from my own knowledge of the Grey, the Kawa Kawa, Waikato, and the Molyneux. The Grey coal pulverizes the least from exposure to the air. At the port of Westport, vessels drawing from 9 to 11 feet of water can enter. Steam colliers carrying 400 tons could be built to trade to Westport, or even 500 tons. The bar at the Buller could be easily improved by dredging, for vessels carrying 500 tons, but I consider the improvement would only last a few months,—it would not be permanent. Steam colliers are the vessels we want most. The Buller roadstead is certainly the best anchorage on that coast, and is safe except in N.W. weather. It is sheltered by Cape Foulwind in S.W. weather, which is the prevailing wind throughout the greater portion of the year.—The Grey Harbour: This bar has an average draft of water at high water of 10 feet on the bar. It is a difficult channel to navigate. A steam collier could trade there carrying 350 tons, and the insurance of vessels would be about 16 per cent. at least, trading to these ports. I think steam colliers would certainly be the best for the trade; and I believe, from my knowledge of the subject, that they would pay. I think steam colliers could deliver coal at Nelson, Wellington, Canterbury, and Otago, at an average of 12s. per ton freight. The coal could be put on board at the Grey at 12s., when the railway is made. A steam collier to carry 400 tons would cost about £10,000, and she should be about 30 horse-power nominal. The lowest price of coal at Lyttelton is 30s. a ton; at Wellington, 26s.; Otago, 26s. These have been the lowest prices. I think that the Kawa Kawa coal is greatly improved since it was first used in steamboats.

52. *Hon. Mr. Williamson.*]—Which of the two ports, Kawa Kawa or the Grey, would a collier trading prefer to go to?—The Kawa Kawa, because much larger vessels could go there; but steam colliers adapted for the port would prefer to go to Greymouth in consequence of obtaining freight both ways. Sailing colliers would not do for the West Coast, but would do for the Bay of Islands.

TUESDAY, 27TH AUGUST, 1872.

Lieut.-Colonel GORTON, Inspector of Stores, in attendance, and examined.

Lt.-Col. Gorton.
27th Aug., 1872.

53. *The Chairman.*] Will you give the Committee any information as to the cost or any other particulars regarding the articles on the table?—I have here an invoice of the prices of the different woollen articles placed before the Committee, sent up by Messrs. Burns and Co., from Dunedin. With reference to the plaiding marked "F 99," it can be sold at 2s. 10d. per yard, and if it could be produced of a stronger texture, and dyed a blue colour, at an advance of 1s. per yard, it would be suitable for the use of the Constabulary, and preferable to the serge obtained at the present time in the Colony. The samples before you are good but they are high priced, and the men would not take them unless they could be sold cheaper. If competition outside sold under our price, even though we sold them without any profit, we could not get quit of them. Of course, if there is no particular necessity for the colour of the Constabulary uniform being blue, that could be changed. The grey cloth shown would be very suitable for Volunteers: it is the same as they already have. 250 yards of the pattern shown, No. 1,183, has been obtained from Messrs. Burns and Co., Dunedin. The price of this is: for not less than 250 yards, 5s. 6d. per yard; for not less than 500 yards, 5s. 3d. per yard; for not less than 3,000 yards, 5s. 2d. per yard. I produce, also, a sample of Nelson cloth, of which about 7,000 yards have already been obtained. The price at which it is now procured is 5s. per yard: it has been as low as 4s. 9d. per yard. I consider it superior to the sample of Messrs. Burns and Co., being thicker and stronger. The socks shown are good; but, owing to the high price, I am afraid the Colonial troops would not be disposed to take them. The drawers are good, and cheap at the money; but I do not think the troops would wear them, except, perhaps, in Taupo. I, however, see no objection to trying a small supply of each in the stores, and then the men could judge for themselves. After wearing them, finding the articles of superior quality, they might be disposed to take them, even if they were a little more expensive than the shop prices. It might also be advisable to send patterns of what is wanted to all the factories in the Colony, and ascertain what they could be supplied for. I would let them know at what rate they were being issued from the store, and it would be then seen if

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they could do it cheaper. I have never been able, except in one instance, to purchase really good English serge in the Colony, and then we had to pay 9s. per yard for it, double width. Speaking of the uniform, I may state that blue is the colour most difficult to get. I would therefore suggest whether, such being the case, it would not be advisable to consider if a colour more easily obtainable could not be adopted. The only profit we put upon articles purchased in the Colony is 5 per cent., and that to cover the cost of intercolonial transit. We have tried all over the Colony, but failed to get iron targets equal to those supplied from England. They have been manufactured in Auckland, Wellington, Temuka, Wanganui, and Otago, but are not equal to the home article. They do not stand the firing;—they bend, and the bullets shake and drive out the rivets. For instance, some targets made recently at Temuka were used at the last Colonial prize firing, and I have received a report that they are now in bad order. The target used by the Imperial troops is very expensive, costing £8 14s. per leaf, delivered to them at home on a large scale; it would be about £10 to us, so we were obliged to order the old pattern some time ago discarded by the Imperial authorities, but which are far superior to those at present made in the Colony, and less in price. As to accoutrements, these we hope, in time, to manufacture for ourselves. An accoutrement maker recently arrived here from England,—a foreman from one of the largest manufactories in London, who took a contract for 5,000 sets of harness during the Crimean war, and delivered them all within twenty-one days, and made large quantities of accoutrements. He is here now, and is making 200 sets of Cadet accoutrements, of English leather he brought out with him, which he will deliver at 6s. 6d. per set, the lowest rate I have yet been able to obtain such articles. Tools,—consisting of axes, picks, spades, and shovels,—got from the Imperial Government, are very bad, being of old and obsolete patterns. We will never obtain them again. We always buy our own tools now, using the American, as supplied in the shops. Those obtained originally from the Imperial stores are dear at any price. Our cloth caps are not all imported, some being made in the Colony. The men pay for their clothing: that for the Armed Constabulary is made up by the tailors at Mount Cook. I do not know what they charge. I should like very much to be able to make up our own Snider ammunition,—it would be a great saving. At present, it costs 10s. 2d. per 100 rounds landed here, the cases alone costing 10s. each. That, in a million rounds, comes to a heavy item. There is this advantage in the Snider cartridge: after discharge, the metal case can be used again; and we have got, I dare say, about twenty tons of bullets, which could be utilized. I directed the armourer here, some time ago, to make up two cartridges, which I can produce to the Committee, but it appeared then to come dearer than importing them; but I do not see why boys should not be taught to make them, at payable rates. The difficulty with this ammunition is in fitting the case to the bullet exactly: it must be done to a nicety, or the arm may be injured, and rendered unserviceable. The Armed Constabulary pay for all ammunition used beyond a certain quantity, the same as the Volunteers. Ammunition is a large item of annual expenditure. Enfield ammunition is also expensive, being now 6s. 9d. per 100 rounds. The last supply of this ammunition cost 6s. 8d. per 100 rounds landed here, owing to its having to be collected from the magazine at Chester and elsewhere, and we having to pay for that expense.

Mr. Blackett. 27th Aug., 1872.

JOHN BLACKETT, Esq., Assistant Engineer, in attendance, and examined.

54. *The Chairman.*] Do you know anything about the harbours on the West Coast?—I know a little about the Buller, the Grey, and other Southern ports.

55. Have you any suggestion or information to give, so as to make these harbours available, or the coal in their neighbourhood accessible?—I have already expressed my opinions on the Buller and Grey, in a general way. I do not profess to be able to give details. These are the two I have had most to deal with, and I have previously stated, both verbally and in writing, that both could be made available for shipping coal. The expense though, I am afraid, would be considerable. It would require a special survey to find out the extent of the expense. As to making Westport Harbour available for vessels of 400 or 500 tons, I could not say what should be done. It would require a very careful survey, owing to the changes which have taken place.

56. Would it be better to make a port at the Buller than at Greymouth?—I think a larger class of vessels would get in there, but I am not in a position to say what works would be necessary without examination. I know them both in a general way, having been there weeks and months at a time. A vessel of 400 tons, drawing 12 feet of water, has been in the Buller more than once; but the bars of all the rivers there alter from time to time. After a heavy flood, vessels get a good bar and a good entrance, but the prevalence of south-westerly winds and currents drifts up the bar again, so that it gets into the same condition as before. That is the usual action on these coasts. There is a tradition, I have heard, that the Grey bar could be almost walked across after a long spell of dry weather.

57. What of the railway works?—I have already reported on the nature of the railway works at Westport, and given the probable cost.

58. What is your opinion of a temporary tramway at the Grey?—It appears to be almost a waste of money, in the prospect of making a railway. It seems that it is stated it can be made for from £3,000 to £3,500, but, from what I know of the place, it will be found that is a very small figure for the work. It is six or seven miles long.

59. How long would it take to complete a railway?—I should say about twelve months.

60. Would the necessary works at the Grey be more expensive than at the Buller?—That would depend on how you took the railway to the Buller. There are several places where coal is available, but it is not always to be got at. For instance, it would take from £80,000 to £100,000 to make a railway from the coal seams behind Mount Rochfort. From the base of the mountains the coast is generally level to the Buller; the difficulty would be in crossing the rivers. There are not many large rivers, only two, I think, from Mount Rochfort, but the difficulty is in getting the coal from the mountain. I should say, make the Grey Railway first, because it would be almost immediately available. From my experience of the Grey, taking the average seasons of a number of years, you can generally get ships out and in very well. At times the bar is bad, and unless protective and harbour works are made, you cannot depend on keeping it always open.

Mr. Blackett.
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61. What class of vessels do you think are best adapted for it?—I should not like to answer that positively. I should say that screw vessels of light draught, or strong tug-boats, would be best. A deeper draught of water would be required for sailing vessels.

62. What is the estimated cost of the railway works at the Grey?—I have already given a detailed statement on that: I think I made it £24,000 or £25,000. There is a great deal of expensive work to be done; but I think we may look forward to coal being worked on the south side of the Grey as well as the north side, which would make two chances for the railway. I recommended it being placed there because there is deep water on that side at the port, and it might be better extended up the country on that side. Wherever you put the railway, you would require expenditure to give shipping facilities, whether it be at the Buller or the Grey.

63. Is the Ngakawau far distant?—I think it is about twenty to twenty-five miles from the Buller. I have no knowledge of what size of vessels would enter there. I fancy it is not so big as the Grey, and that only such vessels as now navigate the West Coast might go in; but I have no particular knowledge of it, except what I have seen printed. In my own opinion, which I give off-hand, the Grey would be the most available place for economy, because we know that there is coal there in large quantities. The difficulty in the way of the Buller is, that we do not yet know the best place to get coal from.

64. What is the distance from the field to the port?—The Nakawau is about twenty to twenty-five miles, as against six and a half, or so, from the Grey. There is no really good harbour on the West Coast, yet it is astonishing the amount of trade that is done there. There was a considerable loss of vessels at first, but now, when the harbours are getting known, there are very few.

65. Could the railway carriages or trucks be made in the Colony?—I see nothing to prevent it. Of course, the larger ironwork would have to be imported,—the wheels and axles,—but all the rest might be made here. I do not think we could trust to having the wheels made here.

66. Would there be any difference in the price?—The experiment was tried in Christchurch as to waggons, and it was found there was a saving on them. The wheels and ironwork were imported. The saving was about £5 or £6 on a waggon. We have the necessary workshops in the Colony, but it is the price of labour that makes the difference in the cost. The locomotives I do not think we could make here with economy.

MONDAY, 30TH SEPTEMBER, 1872.

Dr. HECTOR, F.R.S., in attendance, and examined.

Dr. Hector.
30th Sept., 1872.

67. *The Chairman* called the attention of the witness to a minute of Committee passed on the 24th instant, which was read as follows:—"On the motion of the Hon. Mr. Mantell, it was resolved, that prior to the adoption of any report touching the Geological Survey Department, or any addition thereto, it is expedient that evidence as to the number and efficiency of the officers required should be taken." The Chairman continued to say: You will see, from that, that the object of the Committee is to ascertain if any modification of existing arrangements, or whether existing arrangements are the best that could be made for furthering the object now stated? We want to know about the working of the department,—how the duties of the staff are regulated.

68. *Mr. Bathgate.*] If there are any regular surveyors, and generally, how the duties of the staff are distributed?—I am generally, for a large portion of the year, engaged in field exploration. I have no geological assistant constantly on the staff but Captain Hutton, and besides performing his field duties, he assists in the Museum work also. To overtake the field work last year, I found it was necessary to procure some extra assistance, and accordingly Dr. Haast, of Canterbury, was engaged during four months of that year in doing field work. He is paid for his actual surveys in the field, and 25 per cent. more for the preparation of the plans and reports. Besides assisting in the Geological Department, he is also employed in the Christchurch Museum. His time is likewise a good deal occupied in preparing and arranging an account of the result of his field labours for publication. In the preparation and copying of these reports he is not unfrequently occupied a much longer time than he is actually engaged upon the field work itself. In the home country, and, in fact, in most other countries, the geological field work is performed by a distinct staff from that of the Museum; the duties of classification and arranging of the specimens being done by a Paleontologist and assistants. Six months out of the year can be spent by Captain Hutton in the field work, the remainder of the time being devoted to office work; but last year he was rather less time in the field, as he was engaged in preparing catalogues, for which work he is highly qualified, that kind of work being his speciality. During the past year several field surveys have been executed, as will be seen from a reference to "Papers relating to the Development of Coal Mines," (D. No. 3). The geological survey has hitherto, with few exceptions, been of a general character, more with the view of ascertaining the order and distributions of the various formations, than for the purpose of accurately defining their boundaries, or of determining exactly the available quantities of coal seams and other contents of the rock masses which have an economic value. It has, in fact, been of a nature of a reconnaissance survey, and, as such, has been extended as rapidly as possible to nearly every part of the Islands. This preliminary survey has had the effect of narrowing the field in which a detailed and much more expensive kind of examination is necessary. It has been found that, during the winter months, it really is not worth while keeping men out in the field, and these parties can, during the winter months, be profitably employed finishing up their work. I have already said that they can be engaged arranging collections in the Museum, and in the preparation of these collections for publication, which involves much office work.

69. *Mr. Bathgate.*] Would it not be better, do you think, for the Museum to be in a centre of population?—In order to make it attractive it is very necessary that it should be kept before the public, but as far as it is a necessary appendage to the Government Survey, it must of course be at the seat of Government.

70. *The Chairman.*] Could the labours of the department not be remodelled, or some additions made to the staff?—At the present time a variety of duties are imposed upon the department. In the first place, there is the Geological Survey, upon which a large portion of the time at our disposal is

Dr. Hector.
30th Sept., 1872.

spent. Then there is the superintendence of the Museum; also the Laboratory; also the Meteorological Department; together with the work of the New Zealand Institute and the Botanical Gardens. The subject upon which the most time was bestowed last year—the survey of the coal fields—is by far the most important of our investigations for practical purposes, and one of considerable difficulty. Reports of what has been already done in the matter have been laid before Parliament, and I am able to state that, so far as the investigation has gone, a fair amount of progress has been made.

71. How is the vote for the Geological Department divided?—Of the sum voted by Parliament, £1,150 is appropriated for the Geological Survey, £900 for the Museum and for the expense of preparing and illustrating reports and papers for publication; £350 for the Laboratory. The £500 for the meteorological observations is paid to Observers all over the Colony, and is not part of the expense of the Geological Department. The charge existed before the institution of the Geological Department, and was transferred to it for convenience of management. It is a branch of the expenditure for statistics. In the same way, the £500 for the New Zealand Institute is merely a special application of a vote for printing.

72. Do you believe that there would be any advantage gained by separating the Geological Survey from that of the Museum? I mean, to make them into two separate establishments?—I am afraid not. There would be a difficulty in maintaining the Museum apart from the Geological Department.

73. Suppose that funds were voted for the purpose?—I do not think that the Museum would derive the same advantage if it were altogether separated from the Geological Department. One effect of the change would be, that another set of scientific officers would be required.

74. *Mr. Bathgate.*] Is Mr. Haast not fully employed on the staff?—He has a permanent employment under the Canterbury Government, but his services, during the time he can spare, are lent when the work of my department requires them.

75. *Captain Fraser.*] Is there any person employed in Otago? The work there, I understand, has fallen very much into arrear?—Captain Hutton was down there last season.

76. I mean one man for Otago exclusively? There is a great deal of work to be done in Otago in connection with the mining?—No appointment has been made specially for that Province. Sufficient has been done towards completing the geological survey, to guide general inquiry upon the subject; but work has still to be done to enable us to determine the exact extent of the coal fields and other formations.

77. *Mr. Bathgate.*] Would it not be a great matter if a map of these coal fields were to be made out for general information?—That is being done. Maps showing the situation of some of these coal fields have been printed, and issued along with the papers on the subject.

78. *The Chairman.*] I observe that the allocation of the loan for the development of coal mines amounts to £10,000. Will you state how much of this amount has been spent?—Only about £500 has been yet spent in explorations, chiefly in connection with the discovery of coal fields. Thus, at Collingwood, assistance is to be given towards exploring the seams, by assisting in putting in a tunnel that will cost £1,000. Work done towards actual development of the mines, and not mere survey, will be charged against this appropriation. It has also been arranged to put down a bore at the Nightcap Hills, in the District of Southland, when the proper season arrives. The further practical exploration of the Mount Rochfort Coal Field from the Ngakawau, as suggested in my report, will also be charged against this sum.

79. *Captain Fraser.*]—Has there been any further exploration done at Kaitangata?—No; there is no doubt whatever about the existence of the coal in the place. The only question is, about the best arrangement to be made for connecting it with the line of railway, and this is under consideration.

80. *The Chairman.*] Would matters not be accelerated by the employment of more hands, seeing that you have got this money to spend?—The expenditure for the above purpose will be for extra assistance temporarily employed.

81. *Mr. Bathgate.*] Has boring been carried on to any great extent in the Oamaru District?—There has been no boring there that I am aware of, nor discoveries that require it.

82. What indications of coal have been found in the Oamaru District?—Only those of the brown coal.

83. *The Chairman.*] Could not the exploration or development of these coal mines be accelerated?—Some expenditure will be required upon the Greymouth side of the River Grey, in order to test that mine. I propose recommending a sum to be spent upon that in boring. At the present time, the line will only connect with the one mine; but when the field has been more fully opened up, other mines will be worked. Besides, if several mines are in work in connection with the same line of railway, it will have the effect of keeping down the price of coal in New Zealand, and put the whole thing in much better working order.

84. *Captain Fraser.*] Has anything further been done at Preservation Inlet?—No; nothing. It is a very difficult place to get at.

85. Would it be worth while spending any money testing the Kowai coal seam?—The report upon it is good, and some money might be profitably spent exploring it.

86. What sort of a seam is it?—It is an "edge" seam. It has apparently been altered and improved in quality by a volcanic dyke. I allude to the place situated in Canterbury, on the West Coast Road.

87. *The Chairman.*] Can you suggest any means for developing the resources of the Colony in iron?—There is a bonus already offered for its manufacture.

88. Have any discoveries been made during the past twelve months?—I have already stated the discoveries made since giving my evidence on that subject to a previous Committee, and within the last few days another very valuable one has been sent in by Mr. Whitaker, from the Gulf of Thames. If it is found in quantities, the discovery will be a valuable one.

89. *Captain Fraser.*] Has mercury been found in any other part of the Colony besides Tokomairiro?—Yes; it has been found at Pakaraka, near the Bay of Islands.

90. *Mr. Bathgate.*] Have you any suggestions to make in reference to the exploration of the Carrick Range?—No special suggestions.

91. *Captain Fraser.*] Have you made an examination of that range?—No; not since the opening of the quartz reefs or the alluvial diggings, excepting along the river.

92. Would you advise a re-survey of the Carrick Range to be made?—A further geological survey would be very satisfactory; but for the mining interests the collection of statistics of the work done in the different claims, and reports on them by Mining Surveyors, is of first importance, and would greatly facilitate a geological survey by affording data respecting the relative position and other details of mines, the obtaining of which is not the work of a Geological Surveyor. No doubt, a further scientific examination of Otago, with the assistance of such data, would not only result in more definite information being afforded, but in all probability some important discoveries might be made.

93. Are you aware that silver has been discovered on the Carrick Range?—No.

94. *Mr. Bathgate.*] Antimony has also been discovered. That would add something to the value of these discoveries?—Yes, it would. As an article of commerce, however, antimony varies greatly. Although a few months ago it was worth some £60 or £70 per ton, yet a small quantity put into the market very soon gluts it, and so its value becomes reduced.

95. *Captain Fraser.*] What is it chiefly used for?—It is chiefly used in the manufacture of types.

96. About the tin reported to have been discovered on the West Coast, I spent some money in assisting to fit out an expedition to go round and test it. Dr. Hector now reports that he knew of the existence of the lode nine years ago?—I knew of the locality referred to, and discovered the vein in 1863, but I never supposed that it contained tin ore. I have reported on it frequently. I could not refer to it in connection with tin, as it contains none. Had I foreseen that it was afterwards to be mistaken for tin ore I might have done so. It is of no value, only containing garnet, titanium, and iron.

97. *The Chairman.*] What is the present position of the Flax Commission?—Since the Commission of which I was Chairman sent in their report last year, I have laid a further report before Parliament, but the Commission has lapsed, I presume.

98. *Mr. Bathgate.*] Has the attention of the public been directed to the report?—The information has been very widely diffused, 1,400 copies have been issued. I sent it also to all the mill-owners among others, in the form of a pamphlet, recently published.

99. Have you any additional recommendations to make in the matter?—My opinion is that the most important thing that can be done is to protect the growing of flax. In London the market price for flax continues high, and I am assured that it is likely to continue so. The supply is very short, and, when we consider that the raw material takes at least three years to reach maturity, it is a matter of great importance that it should not only be protected but also that its growth should be encouraged.

100. *Captain Fraser.*] Are you aware that, during the last year or so, a very large proportion of the accidents to persons have arisen in connection with flax machinery?—I only know of that fact from the reports which appear in the newspapers. I think, however, it is desirable that the attention of the Legislature should be drawn to the subject, and that the inspection of the steam boilers used in flax and other mills should become a portion of the duties of an Inspector, just as marine boilers are surveyed.

101. *The Chairman.*] Would you suggest any further steps more than have been taken, for promoting the flax industry?—I think it is necessary that a little more money should be invested in investigating the chemical processes for improving the method of cleaning the fibre, so as to enable them to mix it with Riga flax. Also, to continue some experiments in improving certain machines, and specially to give assistance to one being made by Mr. Kelly, of Taranaki. It is only by modifying and adapting such machines that a really efficient one can be produced.

102. What sum of money will be required for that purpose?—I think about from £200 to £300. Last year a vote of £500 was passed, something under £200 of which was spent; the remainder went to meet liabilities incurred under a vote for the previous year, a large balance of which had lapsed.

103. *Captain Fraser.*] Are you aware that flax at a high altitude is considered superior to that grown in lower altitudes? The Hawhea Lake, at which I live, and which is a very high altitude, I am told is as good a flax-producing district as is to be found in Otago?—I understand that at the higher altitudes the flax is, as a rule, of inferior quality; but in Otago, the climate and conditions of the sea coast are in a great measure repeated about the Lake district.

104. *The Chairman.*] Have you any connection with the proposed exhibition of flax machinery to be held in Christchurch?—I take a great interest in it, but I am not officially connected with it.

105. Has the Government made any contributions to it?—Not that I am aware of.

106. *Captain Fraser.*] With reference to the discovery of moa caves, do you think it desirable that the bones found in them should be prevented from leaving the country?—It would be as well that they should be examined and reported on. I do not, however, think that the bones should be prevented from leaving the country. The subject has created so much interest at home, that the bones might be turned to good account, in the way of exchange for articles valuable for adapting our Museums to educational purposes.

APPENDIX.

COAL.

Mr. J. Dent to His Honor O. Curtis, Esq.

Sir,— Brunner Coal Mine, 26th May, 1872.

The miners are getting into debt at the Brunner Coal Mine, for want of employment occasioned by the continually flooded state of the river, and have stated that they will have to seek employment elsewhere in order to procure a livelihood, unless more constant work is afforded them. The alteration in the river caused by the great flood has made such a difference in the falls, that it is seldom in a workable state for full loads, and even when it is so, the coal boatmen will not exert themselves to supply the demand for coal. In the first place, they are not allowed to stack any coal on the wharves; secondly, they are short of boats, and will not build any more (although several have been lost); and thirdly, they can often find other employment equally remunerative, there being a great demand for boatmen to convey goods up the country. This is causing the shipping to leave Greymouth without coal, and to procure it at other ports.

I therefore propose to lay down a cheap wooden tramway from the mine to Cobden; to erect four shoots at Cobden, quite apart from the wharf, to hold about 200 tons of coal, and thereby to keep the demand for coal fully supplied; also, save all the trade that is now lost, and keep the mine constantly at work. Attached hereto will be found an estimate of cost, which, for the whole, will be about £3,500, and I am perfectly convinced that the Government would be at no loss, should they expend the amount, at the end of the first year after its completion.

Knowing Mr. Dobson is fully employed, I can do the whole work myself, with Mr. Dartnall's assistance to make the survey and take the necessary levels. Moreover, the miners would bear a reduction of 1s. per ton from present prices for cutting coal, besides a small amount per ton for trucking. The whole of the goods required at the mine, for which 40s. per ton freight is now paid, would come free. The whole of the difference between selling price of coal at the mine, 10s., and price at Cobden, say 18s. (but really now 20s.), would be secured to the mine; and further, a good bridle road would be provided for travellers to the mine, accessible in all states of the river. 12,000 tons of coal per annum are now sold. It is therefore reasonable to suppose that at least 16,000 tons would be the immediate result of the alteration.

The amount of carriage to Cobden thus secured would be 16,000 tons of coal (at 8s., £6,400), to which the working expenses would bear a very small proportion.

The whole work could be completed in about four months: the benefit would therefore stand thus:—

	£	s.	d.
Freight on 16,000 tons coal, at 8s.	6,400	0	0
Deduction of 1s. per ton from miners	800	0	0
	£7,200	0	0
Less working expenses per annum £750 0 0			
Improvements, wear and tear £750 0 0			
	£1,500	0	0
Leaving a balance to good of	£5,700	0	0

This amount would clearly leave a good margin to repay the outlay with interest.

Estimate of Tramway six miles long. 6×3 rails.

	£	s.	d.
95,040 feet, 10s.	475	4	0
Sleepers, 3 feet apart, 10,560, 50s. per hundred	264	0	0
Freight and expenses, delivering timber, at 2s. 6d. per hundred	118	16	0
Laying 480 chains of tramway, 20s.	480	0	0
Expenses, bridging creeks, &c.	200	0	0
Erecting four shoots at Cobden	750	0	0
Felling bush, cutting and clearing over 480 chains, averaged 10s. Amount estimated "laying tramway"	240	0	0
Cutting round Cobden Hill at base, 30 chains, at £10	300	0	0
Purchase of four horses, £40	160	0	0
Harness, &c., for same	30	0	0
Stables, &c., for same	50	0	0
Sundry expenses, surveying, &c.	132	0	0
Erecting 20 trucks, and gear for same, £15	300	0	0
	£3,500	0	0

The above calculations can be depended upon, as a firm here, owning a steam mill, has offered to lay the whole tramway for £5 per chain (480 chains, £2,400), which includes everything but shoots, horses, &c. The quantity of coal sold for the month is only 484 tons. Only one load has been sold this last seven days, and the mens' earnings for the last month will not average £6 per man.

I shall feel obliged with an early reply, as the men are really anxious to know what to do, having many opportunities to obtain employment on the roads and other public works which are now being carried on in the district.

I have, &c.,

His Honor the Superintendent, Nelson. James Dent.

Mr. A. D. Dobson to the Provincial Secretary, Nelson.

Report on Wooden Tramway from Brunner Mine to Cobden, and estimate.

Sir,—

I have the honor to forward you the following report upon the advantages likely to be obtained by constructing a wooden tramway between the Brunner Mine and Cobden, and the approximate cost of such work:—

1. On a well-laid wooden tramway, an average horse should be able to draw about two tons. By working a team of three horses, with one driver, and making one trip only per day, thirty-six tons a week would be brought down. Taking the horses' keep at £1 per week each, and the driver's wages at £3, we get 3s. 4d. per ton as the cost of haulage, which is about half the sum the boats bring down coal for. There would be also the advantage of a continual supply being maintained, and consequently a corresponding reduction in the price of getting the coal out.

2. To construct the tramway on the cheapest possible scale, the existing road should be adhered to as much as possible, and the line should follow the natural surface wherever practicable. I believe it is possible to set out a line so as to have no ascending gradients between the mine and Cobden. I would recommend making the descending gradients as steep as safety would permit, to save expense in the first cost, being of opinion that they could be lowered without stopping the traffic in the event of the line being required for a locomotive, and there are only two places where it would be necessary to make steep grades, namely, at the saw-mill terrace, and at the coal-mine terrace: all the rest of the road would be practically a flat.

3. In the following estimate, I have calculated for a 3-feet guage, but if it was thought advisable to have it 3 feet 6 inches, it would make but little difference in cost. In clause 1, where I reckon haulage at 3s. 4d., I have not taken into account up-keep or percentage on cost of horses and harness, &c. I did this intentionally, wishing to show the net cost only, leaving the other items to be provided for out of the profit on the coal.

Estimate.	£	s.	d.
Six miles sixty chains 6+3 rails, at 10s. per 100	534	10	0
Six miles sixty chains sleepers, 22 per chain, at 1s. each	594	0	0
Ditto, keying, gravelling, 8 keys, £2 per chain...	1,080	0	0
Six miles forty chains formation, at £3 per chain	1,560	0	0
Twenty chains rock side cutting, at £20	400	0	0
Loading, stages, turntable, &c.	600	0	0
Contingencies, at 10 per cent.	476	17	0
Total cost of construction	£5,245	7	0

4. In this estimate, the item £3 per chain for formation may seem high, as I would propose laying the line on the existing road wherever practicable; but some very rough ground has to be passed near the mine, requiring a number of small bridges, which would be costly, and counterbalance the saving on the other portions of the line. Taken altogether, I consider this an exceedingly low estimate, and it would be out of the question doing it for any less. The rock cutting is very low, £400. Besides the cost of construction, before work could be commenced, horses and rolling stock would be required. Taking my former estimate, that a horse would bring two tons per day in, say, two-ton waggons, it would require twenty-five waggons and horses to get down fifty tons per day. Rough waggons would cost, say, £30 each, and average the horses and harness each at same figure, gives £1,500 as the cost of rolling stock. The figures might, perhaps, be materially lessened by using large waggons and making the horses go more trips than I have estimated for; but in any case, the cost would be over a thousand pounds.

5. On the completion of a working survey, it might be found that the cost might be lessened in places; and also, for the present, it might be found that it would do to deliver the coal at the mouth of Coal Creek. Steamers could easily get there when the river is not in flood, and the cost of the rock side cutting avoided for the present. To render the work less costly, the West Coast prisoners might all be sent to Cobden and kept at the rock work.

6. Failing an iron line, I conceive a wooden one to be the best the Government could adopt, and have no doubt that it would prove a great boon to all connected with the coal trade. I think there would be no difficulty in completing the work in six months, as there will be numbers of men seeking work as soon as the General Government roads are finished.

I have, &c.,
A. Dudley Dobson,
Provincial Engineer.

The Provincial Secretary, Nelson.

(Extract from private letter from Provincial Engineer to Provincial Secretary, Nelson.)

I find that in my first estimate of the amount a horse would draw, I was a long way out. They say here (Greymouth) that the horses draw four tons on the lines here, which have steep inclines to ascend in places. Now, the Brunner tramway would be practically a dead level, so that Dent's estimate of six tons will not be out of the way.

Memorandum for the Chairman, Colonial Industries Committee.

Sir,— Wellington, N.Z., 15th October, 1872.

In reply to your memorandum of the 4th instant, in reference to the West Coast harbours, and other points, I have pleasure in stating that I know the character of harbours of the West Coast of the Middle Island of New Zealand, and I am of opinion that iron vessels, propelled by twin screws of the following dimensions, are best adapted for navigating those and bar harbours generally:—Say, gross

tonnage, 300; horse-power, 60; maximum draft, 8 feet; length, 150 feet; rig, three lower masts (only), with fore-and-aft sails; fitted with tanks for water ballast.

I consider that a vessel of this class, plainly fitted, would cost about £7,000; working expenses, about £4,000 per annum, including coal; and capable of delivering throughout the Colony of New Zealand about 8,000 tons coal per annum. To this might be added 3,000 tons return cargoes, which would make a total of 11,000, say, at 10s. per ton would be £5,500; estimated profit, £1,500. The profits, however, could be considerably increased by giving the vessels despatch in loading and discharging.

In the event of a Company being formed for the purchase of vessels for the coal trade, such as those described, I would suggest that such Company be subsidized by the Government for a few years, binding the Company at the same time to retain such vessels in the trade as would keep the mine constantly at work. Liberality on the part of the Government at the commencement of such an undertaking, cannot fail to prove profitable to the Colony in a very few years.

I have, &c.,
D. McIntyre,
Master Mariner.

P.S. If required, I will gladly afford the Committee all further information I can on the subject.—D. McI.

SERICULTURE.

Mr. T. C. Batchelor to the Colonial Industries Committee.

Gentlemen,— Nelson, 20th July, 1872.

The interest taken by you in sericulture, and your repeated visits during the past summer, has induced me to submit to you the following remarks, as they may be of interest to those persons who have not had the opportunity of seeing for themselves. It was not my intention of raising any silkworms last season, but rather to more fully attend to the culture of the trees. On the other hand, a number of persons recommended me to proceed as far as I reasonably could, for many were anxious to learn as to the simplifying of the process of the silkworm when about forming its cocoon. I accordingly procured a quantity of thin lath trays, 20 inches by 16 inches, covered with sheets of perforated paper, upon which I fed the silkworms until such time as they were nearly ready to spin their cocoon. Then I procured dry, brushy manuka, of about 2 feet lengths, and placed them on end on each side of the tray, bending and loosely tying the ends in the centre, thus forming a kind of arch over each tray. The plan answered admirably. The silkworms ascended and formed their cocoons without the least trouble, or touching with the hands. I had a number of trays covered with the manuka arches close together, loaded with cocoons, forming a most pretty and interesting sight, somewhat resembling large bunches of Portugal grapes.

With much pleasure I received a visit from a gentleman, a native of Modena, who had been brought up from childhood to rearing and tending silkworms. After he had carefully examined all that was connected with the question, he expressed himself to me, and afterwards in one of our local papers, that he was thoroughly satisfied with the kind of food used and the method of treatment that was being carried out. He further suggested that it would be worth while to import a family accustomed to sericulture, not only for the purpose of silk growing, but as a sure means of inducing others to follow, and by such means insure the stability of so valuable an industry in New Zealand. Should you consider it worth while to recommend the Government to procure a family as above stated, I would gladly render all the assistance, as to food for the silkworms, that may be required, and otherwise.

I have, &c.,
T. C. Batchelor.

BEETROOT SUGAR.

Mr. F. A. Krull to the Chairman, Colonial Industries Committee.

Sir,— Consulate of the German Empire, Wellington, 23rd September, 1872.

By the last mail I received advices from the mercantile firms in Berlin and Hamburg, in regard to the formation of a Beetroot Sugar Company in New Zealand. Contrary to their expectations, both firms have received, beyond an assurance of the lively interest taken in the subject, and the expression of a hope that at some future time the scheme may become practicable, very little encouragement from the sugar manufacturing districts, Magdeburg and Halberstadt, to which the necessary papers, and the recommendation of the Government of New Zealand, had been forwarded.

The present appears to be a very unfavourable time for launching such an undertaking on the German money market.

Since the late war all industries have been in such a flourishing condition, and characterized by so much activity, that capital finds immediate and remunerative employment at home, and in no branch more than in the beetroot sugar manufacture.

Another great difficulty seems to be to find a properly qualified person to undertake the management of such a Company, as such individuals are a *desideratum* even in Germany, and, in consequence of the special knowledge required, receive very high salaries.

Taking all these circumstances in consideration, I fear that the necessary capital, at any rate the greater part of it, will have to be found in New Zealand, in order to naturalize this most important industry.

I have, &c.,
F. Aug. Krull,
Consul for the German Empire.

The Chairman of the Committee
of Colonial Industries.

TOBACCO CULTURE.

Mr. E. W. Gotch to His Honor T. B. Gillies, Esq.

Dear Sir,— Papakura, 16th September, 1872.

I received your letter dated the 7th instant, yesterday. I sowed four different kinds of seed, viz.: Havana, Columbian, Virginian, and German seeds, in August, and the plants appeared in due time, growing healthy and vigorous; but to my dismay I discovered that cabbages had been grown in the same ground previously, and innumerable slugs made their appearance and committed great havoc among the plants, just as I was congratulating myself on being able to transplant an ample quantity of healthy plants. I used every remedy I knew to destroy the slugs, but with very little or no success. The whole of the Havana plants were destroyed, and most of the Columbian, and I was obliged eventually to sow a fresh quantity of seed; but, unfortunately, I had no Havana seed left, and very little of Columbian, but had plenty of Virginian and German seed. This caused a delay of nearly two months. The transplanting should have taken place in the latter part of October, but in consequence of the delay, I was unable to commence to do so until the 4th December, and did not accomplish it until the latter part of the same month, in consequence of the great drought during that time, and which continued for some time afterwards, as doubtless you may recollect. I was compelled to cut most of the crop before it was properly ripe, because of the advancement of the season, and a great deal of weight in the tobacco was lost in consequence, as the weight increases as the leaf ripens. I was also unable to obtain a second crop, which is usual in the cultivation of tobacco, making, of course, a considerable difference in the yield. The curing was necessarily delayed to a time when the weather became changeable and cool, the thermometer being down as low as 47 on one occasion. The disasters of last year are, however, not likely to occur this season, as I have taken every precaution to prevent the encroachment of slugs and other detriments to the growth and advancement of the plants. I have all my seed in, and a great number of healthy-looking plants are appearing, and all promises well. I expect about eight acres of tobacco planted this season, chiefly by different settlers in this district, as preliminary experiments previous to their entering into the growth on a larger scale next season. I have every confidence in its ultimate success, and of its being a profitable source of cultivation.

You requested, in your letter, to be informed of some particulars concerning the price and quantity of the tobacco manufactured into cigars; and of the growth of tobacco and cost of same. In answer, I may state that the price of the cigars I am now manufacturing is £4 per 1,000; the quantity made has been 5,600, out of which I have 1,200 on hand. The quantity of tobacco leaf I obtained from a little over two acres was eleven hundred weight, three hundred weight of which is Columbian and German leaf, suitable for cigars, and the remainder of the leaf, being Virginian, is suitable for the manufacture of plug tobacco only. This is what I obtained in spite of all the obstructions to last year's growth and curing. The amount I calculate that can be grown to the acre is from 10 cwt. to 13 cwt. of cured leaf, which will be worth from 1s. per lb. upwards, according to quality.

The following is my calculation of the cost of cultivating one acre of tobacco, according to rate of wages here:—

	£	s.	d.
Forming and sowing seed beds	1	10	0
Two ploughings and harrowing	2	0	0
Manure	3	10	0
Forming furrows for hillocks	0	10	0
Forming hillocks with hand hoe	1	4	0
Transplanting	2	10	0
Three scarifyings	1	2	6
Grubbing, general working, and attending plants until ripe (man's labour)	6	0	0
A mere boy, however, is sufficient for the last-mentioned kind of work, gathering in crop, and curing	5	0	0
	£23	6	6

The cost of cultivating on a larger scale would be much less in proportion.

I have, &c.,

T. B. Gillies, Esq. E. W. Gotch.

MINERALS.

Mr. J. W. Tatton to the Chairman, Colonial Industries Committee.

Gentlemen,— Wellington, Mulgrave Street, 2nd October, 1872.

I have much pleasure in acceding to your request that I should lend you my descriptive map of the Province of Nelson, exhibiting the mineral characteristics of the various districts, with the exception of iron, which abounds throughout.

Secondly, with reference to your expressed desire that I should suggest some plan by which Government might aid the development of industries, and more especially that of the mineral resources of Nelson, I proceed to give my opinion on the subject. My idea is, that Government should offer subsidies in the usual way (as lately with glass, paper, and woollen manufactories), towards the working of silver, copper, iron, chrome, lead, zinc, antimony, or their chemical compounds, and also towards the utilization of animal refuse, such as horns, hoofs, and dried blood, all of which can be profitably used in working the above, to produce colours, dyeing materials, &c.; such subsidy to bear a certain proportion to the export value of the manufactured articles.

I have in a former paper pointed out how large an opening exists for the profitable undertaking of these works. I may add that it would have the additional advantage of throwing open a wide field of

remunerative employment to the large number of immigrants now being introduced into the Colony under the Government scheme.

I have, &c.,
J. W. TATTON.

The Committee of Colonial Industries.

Mr. J. W. TATTON, to the CHAIRMAN, Colonial Industries Committee.

GENTLEMEN,— Wellington, 10th October, 1872.

At the request of one of your members, I give my ideas relative to the working of iron. Hitherto I have not ventured beyond what I considered necessary to introduce to your notice local industries and the development of our mineral resources, leaving the question of the best mode of working in your hands.

I immediately applied to the Patent Office for copies of my papers submitted to you, showing that I opposed the patent of Mr. Charles Martin for the monopoly of working iron sands throughout New Zealand, wherein you will see I prove my working iron sands from our different localities, by analysis, precisely the same as those of Taranaki. Two of the names appended as witnesses are residents of Taranaki, and one was the first who worked the iron sand, and brought it before notice of the public. I had worked them before the dates of my papers, and given considerable attention since, and in combination with other irons, such as grey, specular, black band, and hæmatite.

The heavy expense attending the working of iron sand, precludes the utilization by itself, except for fine purposes. Besides considerable labour, it requires from fifteen to eighteen tons of coal to produce one ton of iron. I have worked it many ways—by different constructions of furnaces, plain, in compost, and by cementation; and, with all, there are difficulties to surmount. As the matter is now under your consideration, I will suggest that the hæmatitic iron is the most practical to work; for general purposes, equal to Swedish iron, and well suited for railway purposes. I refer you to the quotation in my paper from the *Engineer*. If a superior quality be required for fine work, the hæmatite, with a percentage of iron sand, could be worked. The latter we have in Collingwood and elsewhere, as is shown in my paper; the former we have extending from the coal measure, through the Para Para, a distance of several miles. We have it at the Croixelles, Dun Mountain, Aniseed Valley, Wangapeka, and along the line to the Western Coast. I recommend Collingwood, it being a settled district, for manufacture, with the following advantages:—

1st. Having abundance of raw material, and facilities for shipment of the manufactured material.
2nd. Fuel being on the ground in abundance.
3rd. Having good fire-clay, sand, and lime, which would materially lessen the working expenses in furnaces.
4th. Its central position.

I suggest that the Government should place on the estimates the sum of £500 for the purpose of erecting a furnace, and examining extent of ground in that locality, and reporting upon the same; also for the smelting of some, for the purpose of proving its value in the market, such trial furnace to be erected in Nelson and to be the property of Government, and would be available for practical tests for New Zealand. If the Government require my services to report on the locality, and attend to the working of the furnace, I should not object to undertake the duties. I also recommend that a reverberatory hearth be erected at the same time, for general tests of minerals, so that they might be worked practically, beyond the laboratory tests, for the whole of New Zealand. One reason I propose the latter is, to encourage the immediate development of our resources practically, as they present themselves when the ground is taken up by private Companies. A scale of charges should be made, according to the tests required, towards supporting expenses of plant and working thereof. I would further suggest having a laboratory for practical tests. That charges be allowed to be made, under the cognizance of Government, as should be the case under the Geological Department, for private parties only.

I instance, as an example, the Perseverance Mine, Collingwood, having struck and proved to a considerable extent a leader or lode of galena, silver, and zinc blende. The laboratory tests have been made at the Government Geological Department and by myself (some of the specimens which I laid before you). The Company, when applied to by its shareholders, were afraid to venture on account of the long delay that would ensue, and the indefinite expense attached thereto. This is one instance of many. A shareholder, in this case, agreed with the Company to raise a certain number of tons on his own account to forward to England for practical tests. This is an exceptional case in mining interests generally. Now the delay suspends the working, whereas, if there had been furnaces erected, I have not the slightest doubt the Company would have paid for the tests, and would have been working at the present time to profit; and many similar cases have collapsed in consequence.

By having the furnaces at command, with the use of my laboratory and a few extras, if permitted, I might establish the basis of a School of Mines similar to those of Germany, in the Hartz Mountains, Saxony, in Silesia, and in England. This would tend to give permanence to what is at present an ephemeral branch of industry, besides aiding those who are desirous of investing capital, by the speedy determination of the value of mines *in situ*.

If a sum be granted for working minerals and their compounds, Government should select the most useful, such as iron, chrome, silver, copper, lead, zinc, antimony. Each should have a separate subsidy for a given time, extending over five or six years. If several works commence within a specified time, the amount should be divided in proportion to seniority. If only one should be in operation, the whole amount allotted to that branch should be given to it at the termination of a specified period. Apart from Nelson's central position in New Zealand, I consider that her future depends entirely upon her minerals. Nelson may be termed the Cornwall and Staffordshire of the Southern Hemisphere; and as the interior of the country is opened up by roads or railways, we may anticipate extensive preparations throughout the country for utilizing what nature has given us, all

being carried to one important centre, Nelson, for the purpose of shipment, to supply other countries, besides manufactories for our own requirements.

I recommend that a subsidy be offered for the production of metals manufactured, or their compounds, for exportation, feeling assured that such a project would be conducive to the employment of labour, and would add lasting wealth to the Colony. I also suggest that all letters and papers relative to local industries received by your Committee, be printed for information, and that invitation be given to all parts of New Zealand to co-operate in the immediate development of their resources.

I have, &c.,
J. W. Tatton.

The Chairman, Colonial Industries Committee.

Enclosure 1.

Mr. J. W. Tatton to Dr. Knight.

Dear Sir,— Nelson, 17th November, 1862.

In reference to a notice which appeared in the *Nelson Examiner* newspaper of 15th November, 1862, relative to an application being made (without date) by Mr. Charles Martin, for letters patent to grant him the exclusive right to manufacture an alloy or alloys of titanium and iron, I hereby state that alloy or alloys of the above metals have been manufactured in New Zealand prior to the publication of the notice referred to.

During the years 1860 and 1861, I was working a series of experiments with the before-mentioned alloy or alloys.

In the year 1861, my own furnace being out of working order, through the kindness of Mr. Charles Balme, of Soho Foundry, Nelson, I was enabled to follow out my experiments in the presence of himself and his men, who can testify to the same. I therefore object to a patent or exclusive right to manufacture the above-named alloy or alloys, as it might restrict private enterprise, and thus be prejudicial to the Colony.

I have, &c.,
J. W. Tatton.

Dr. Charles Knight.

Enclosure 2.

Sir,— Nelson, 15th November, 1862.

In reference to a notice of application for letters patent which appeared in the *Nelson Examiner* of this day's date, made by Charles Martin, "for the exclusive right of manufacturing iron with alloy or alloys of titanium," or, as worded, "alloy or alloys of titanium and iron," we the undersigned beg to certify that, to our personal knowledge, Mr. John William Tatton, mineralogical chemist, of Nelson, applied himself to the above combinations in connection with the iron sands from the different localities in our Province during last year (1861), which will show just cause for his objections to the granting of a patent for the exclusive right above mentioned unto the said Charles Martin.

Charles Balme,
of Soho Foundry, Nelson,
(Proprietor).
Thomas Bedford,
Soho Foundry.
J. M. Hill.
John Thornton.
George Sheppard.
W. Hough.
T. C. Batchelor.
T. B. Louisson.
Thomas Oxley.
Edwin Harris.
J. M. Nation.
John Perry.
Aug. Weyergang.

Charles Knight, Esq.

Enclosure 3.

Mr. J. W. Tatton to Dr. Knight.

Sir,— Nelson, 16th March, 1863.

I wrote you on the 17th November, 1862, stating my objections to the granting of letters patent to Mr. Charles Martin for the manufacture of iron with titanium, in reply to an advertisement which appeared in the *Nelson Examiner* of 15th November of the same year.

As the advertisement still appears in the paper, may I beg you will reply, stating whether you received the same.

I have, &c.,
J. W. Tatton.

C. Knight, Esq., M.D.

Mr. Tatton's Statement relative to the Mineral Productions of the Province of Nelson.

Silver.

We find silver, to a more or less extent, with our gold; also, with galena and copper in different parts of our Province. The samples I submitted to notice are chiefly prepared from Wangapeka and Collingwood. The ores I have met with during the last twelve years vary from five to thirty-seven ounces to the ton. The process for procuring the metal depends entirely upon the minerals associated with it, and would require a more lengthy description than can here be given. The works are similar to those required for the extraction of other metals, as regards furnaces. The places I have received samples from extend over more than 200 miles.

Copper.

Copper is found here in various forms: to enumerate their precise number, or the many localities it is reported to be taken from, would occupy too much time and space. Those I can substantiate mostly are marked upon my map, showing a large extent of country in which we may meet with extensive lodes in some future period. The samples placed before you are prepared from ores extending over 200 miles of country. The ores met with here are generally of good quality, realizing from 20 to 75 per cent. of copper, and could readily be worked, having advantages at our command. The current price is £112 per ton for commercial copper in pigs; and in two forms I present in my samples, I have often known it to realize from 6s. to 8s. per pound, for particular purposes in chemistry and arts.

Chrome.

Without going into the history of chrome, I will mention briefly some of its useful applications. From the salts, we derive a variety of compounds. First, dyes of various hues, as brown, fawn, drab, straw, lemon, yellow, amber, orange, red, blue black, black, rich yellow brown, bottle green, invisible green, rich green, olive purple, the whole of which can be varied by scientific manipulation. They are fast and permanent colours. Their use is not confined to dyeing alone, but extends to many branches of art, as colouring of tinsel and tinfoil, and emblazoning in varnishes for decorative purposes, glass staining, and pigments in water and oil for the artist and painter. The commercial colours are principally lemon, yellow, and orange; but in my series, I introduce greens and reds, not that they are new, but for the purpose of showing that we have greater advantages in preparing them than in England,—one of these, well known to be essential in the manipulation of colours, being better light, and, again, cheapness. Chromic salts are also largely used in bleaching oils and fatty substances.

Our supply of chrome is inexhaustible. In taking the south of our Province, we find the jade, so highly prized by the Maoris as greenstone, stained with the oxide of chromium; also, the chromic iron sand in the different eddies between Collingwood and Rewaka. We find the ore at Croixelle's, Dun Mountain, and Aniseed Valley; at the latter place, large quantities of disintegrated, showing the presence of chromium over an extent of more than 200 miles.

The articles required for manufacturing the chromes are wood ash, lime, acid, and lead.

The wood ash can be prepared almost in all parts of our Province, from the abundance of timber and scrub at command. In clearing of ground, it might be made a profitable branch of industry alone. The smaller branches of trees and scrub yield the largest amount of material for working chrome.

The acid can be produced from black birch, and other hard woods, by burning it in a rudely constructed oven, having a pipe leading therefrom,—thus the charcoal would remain for the market, and the acid would be ready to be refined for sale, or to be used for forming the acetate of lead.

The crude acetate of lead is prepared from common lead, or the oxide from the smelting furnace, by boiling with the crude acid. In this state it is ready for the dyers or the preparation of chrome. It can also be refined, for higher branches of art.

Lime we have abundance of near Collingwood, Motupipi, and Dun Mountain, &c., &c.

The working plant will comprise:—1st, a crushing machine; 2nd, a reverberatory hearth; 3rd, iron tanks for boiling (such as are brought out by vessels for holding water); and 4th, common tubs for crystalization. After crystalization, crystals are ready for the market, and the supernatant liquor, mixed with the acetate of lead, forms, when dry, the beautiful pigments for the painter.

It must be especially noted that the refuse ash used as fuel in boiling down the liquors of chrome, acetate of lead, destructive distillation of acid, and the fire of the reverberatory hearth, are utilized for the material therein contained.

The reverberatory hearth can be constructed at the mine, against the side of the hill, and puddled with fireclay and sand from Collingwood or the Grey. A trench made up the side of the hill, and covered with stones and earth, would give a column for draught and carry off the fumes. With the above appliances, and rude sheds, all would be ready for operation, and the manufactured chrome would be brought down in a perfected state ready for exportation.

The price of ash in England is £39 in bulk; chromate of iron, £10 per ton. Both are imported.

The proportions required for working are four parts of chromic ore, two parts of ash, and one of lime; that is:—

	£	s.	d.
4 tons of ore, £10	40	0	0
2 „ ash, £39	78	0	0
1 „ lime, say £1	1	0	0
Incidental expenses of haulage, fuel, &c.	2	10	0
	£121	10	0

Again must be added the interest annually on the heavy outlay for plant, buildings, &c., designated as "chemical works," under the Act.

The value when manufactured would be about £240. The whole of this sum, including profit, labour, and cost of raw material, would thus be kept in the Province; whereas in England the division would present itself thus:—

	£	s.	d.
Value of manufactured article	240	0	0
Cost of raw material	121	10	0
Net result retained in England for profit and labour only	£118	10	0

This will show a balance in favour of Nelson works of more than 50 per cent, which would much more than compensate for any excess in the price of labour. And this excess is rapidly becoming more apparent than real, in consequence of the great advance taking place in England, in the wages of skilled workmen.

Iron.

This should cause special attention, considering that it is now becoming scarce in England, and the price is rapidly advancing. It must be remembered that iron, wherever it has been worked, has raised the people in the standard of civilization.

We have abundance of iron, in various forms, over a vast extent of our Province. With our coals and charcoal that could be made available, the attention of the country should be elicited towards this industry of smelting, as well as the products in my series, formed by the combination of the metal.

I will take hæmatite as my first example, as it exists in large quantities at the Croixelle's, Dun Mountain, and Collingwood, suitable for smelting or pigment. The latter, great praise is due to the energies of a small Company, which has recently commenced its manufacture, under the name of "The Imperial Hæmatite Company, Nelson." The ore is raised in Collingwood, and conveyed to Nelson, where it is manufactured into pigments. Its properties are becoming so well known as an anticorrosive coating for iron, and as a protective groundwork for wood, that the commercial demands for it must necessarily increase. The samples submitted to me by this Company in bulk are excellent; better in quality than some recently imported, and equal to the sample submitted to you prepared by myself.

The bisulphides of iron, so widely diffused, with alum from the neighbourhood of Port Hardy, could be worked for the double salt, protosulphate of iron, and the sulphate of alumina of commerce.

I now come to an important branch that would effect a saving in commodities hitherto thrown away, namely, refuse woollen material, scraps of hide, hoofs, horns, and dried blood. It must be remembered that these materials are all bought up at high prices in England, and are utilized. If the progress of boiling down, in this and the neighbouring colonies, be continued, it will so far affect the English manufacturers, that they will be obliged to increase their imports of such necessaries. On the other hand, we can but regret the present waste of material that would bring in thousands of pounds per annum to the Colony, and would add to the profits of every sheep-farmer, grazier, and butcher, if their offal were saved and supplied to a chemical works for utilization. This would employ labour, and the labourers are consumers; thus an impetus would be given to the Province, and, further, to the whole of the Colony. These cyanides referred to in the preceding, in combination with iron, have a wide application in chemistry and arts, as dyes, pigments, &c., producing the most beautiful blues, from Prussian blue to the lightest shades.

We have also the titaniferous iron sands, which would require hæmatite for smelting.

Hæmatite (iron) for smelting, coarse, £1 17s. 6d. per ton. Iron (pig) is £11 per ton.

Lead (Galena).

Lead is found about thirty miles north of the Buller, Wangapeka, Collingwood, &c., &c., showing more than 200 miles of country where it presents itself. At Collingwood, a great surface has been laid bare by means of shafts and drives, thus proving a most valuable property, not only containing lead, but silver, zinc, cadmium, and gold.

This branch demands much attention to conduct the operation effectively. The operator requires great practice, and even then cannot always be certain of success, owing to the different behaviour of the galena under the different influences of high temperature, and according to its association with other metals.

In my series are, 1st. Carbonate, commonly known as white lead, the quality of which is worth £40 per ton in England, which can be reduced with foreign material (that is, adulteration) to meet the quotations, even below the English price. 2nd. Protoxide of lead. 3rd. Acetates of lead, as mentioned in the section "Chromium;" and others, down to the pure metal.

The furnace or reverberatory hearth required in this process is similar to those required for working chrome and copper.

Lead (in pigs) is quoted at £21 10s. per ton. White lead, £27 per ton.

Zinc and cadmium I alluded to as being found at Collingwood, at the same time showing you the various preparations, down to the pure metal. The present quotation for zinc is £26 per ton.

Arsenic is found here in various forms, and could be manufactured to a profit.

Antimony ore can be obtained at Queen Charlotte Sound in large quantities. It is used in type, Britannia metal, bearings of machinery, and for a variety of purposes. The current price of antimony ore in England is from £10 to £14 per ton, according to its richness; and the metallic antimony from £38 to £50 per ton.

Graphite, or plumbago, is one of the forms of carbon associated with iron. It is found in the neighbourhood of Karamea, Pakawa, and Collingwood. It is useful for machinery, polishing stoves, crucibles, carbon blocks for electric batteries, &c. This is worthy of consideration on part of our telegraphy, and the number of crucibles that are used on the gold fields. In addition, we have the material for Hessian crucibles in the same neighbourhood.

Coal.

Our Provincial coal has been so well brought into notice by analysis and various practical testimony to its efficiency for steam and gas purposes, that it requires but little comment from me. Unfortunately, although possessing these advantages, we have to import largely from New South Wales; and, owing to the recent misunderstanding with collier vessels and employés, we have had to submit to a want of supply of the needed fuel of late.

The samples examined by you are from the mines supposed to be at work:—1. Grey coal. 2. Collingwood coal; good steam coal. 3. Ngakawaho, house coal.

Steatite, or Soapstone.

Steatite, commonly called French chalk, is found in large quantities at Collingwood, in the serpentine series. Its uses are many: for removing grease from fabrics, also as a polishing powder and for sharpening instruments, and in the manufacture of meerschaum pipes, and for carving a variety of ornaments. The powder is used for boots and gloves, but the most important branch is that of facing paper,

imparting that beautiful finish and smoothness to wall and other papers of the best quality, which shows such great improvements in the modern age.

Home quotations for this article, in its crude state, is £50 per ton.

Asbestos.

This article has but limited demand. It is generally used for gas stoves.

The home price is 2s. 6d. per lb.

Mica.

Mica is found widely distributed in our Province in granite, gneiss, and mica slate. Its usefulness, when found in large laminated plates, as a substitute for glass, or for the front of stoves. It is also used in the preparation of scaglioli, or imitation marbles, and in other works of art.

Having given an outline of the series of my exhibits, and I have shown what exceptional resources and facilities Nelson possesses for the development of these branches of trade, and now that new openings, both for capital and labour, are so urgently needed, I hope advantage will be taken, and to see both mining and other works taking their proper places as the leading local industries.

I feel that this paper on Nelson copper as an industry, would be incomplete without some mention of the Dun Mountain Mines, from which so much was expected, and in which so much capital was sunk. It is not my intention to animadvert upon the management of those mines; but when I allude to copper mining as a probable source of profitable industry here, I am compelled to state the reason why, hitherto, it has proved a failure. In the first place, the ground was never thoroughly explored. Shafts were sunk, varying from a few inches to about 30 feet at the most, and on this very insufficient examination, all was pronounced barren. Now, elsewhere, in copper mines, it is no unusual thing for shafts to be sunk to a depth of 500 feet, and even more. Ultimately, the error was discovered, but by that time the Company's capital was exhausted, and the works were necessarily discontinued. Hence, we have, within the last few weeks, seen the tramway from which so much was hoped, taken up; and even the very rails are being exported elsewhere. Thus the Dun Mountain failure must not be taken as any proof that Nelson copper mining is a delusion and a snare: rather that it should be used as a valuable lesson in future experience. That payable copper lodes exist can be proved beyond all possible doubt.

I will offer remarks which my experience suggest, on the very objectionable system obtaining in the formation and management of mining companies, to which their frequent failure is mainly owing. It is one great mistake in starting these companies, that persons are appointed amongst themselves to view and report upon the mine, whose usual avocations are in no way connected with mining. This is a serious error, when even the most practical mining surveyors and geologists, at times, are not correct in their estimation; much less, then, are likely to be reliable, persons practically ignorant of the matter. In mining, the unfortunate fatality hitherto attendant upon nearly all the public companies raised in New Zealand generally seems still to attend with its malignant influence. Mining industries have been, up to the present time, peculiarly unfortunate in most respects; and that the system is wrong which brings such invariable failure in so thoroughly legitimate a branch of industry, if properly conducted, as quartz and other mining, none can question. And should the few remarks here made induce more careful inquiry, the cause of failure will become apparent, and a remedy is easy to be found. I have stated quartz and other mining to be a legitimate investment, and under proper management, in most cases a very profitable one.

The system, as a rule, pursued to bring them under the notice of the public, is, in using the mildest term I can find, extremely reprehensible. The custom of handing over half the mine to the finders, and then paying them besides out of the funds of the company, is actually holding out a premium for imposition. The usual practice amongst the miners is either to put in a drive or to sink a shaft, and as soon as stone is struck containing gold or other metal (or even before, sometimes), a few specimens are taken and tested; all work suspended; protection applied for, and in most cases granted. An agent is appointed to endeavour to form a company; a glaring prospectus is issued, usually containing statements of a most absurd and exaggerated character, especially with regard to the crushing of a few pounds of exceptionally rich stone. The statements in the prospectus are generally believed, and after a most superficial inquiry, and in the majority of cases without any inquiry at all, the public subscribe their money liberally. Expensive machinery is bought and taken to the claim, often at an immense outlay of money, and when erected and made ready for work, in most cases we find the unfortunate shareholders astonished at the result and the extreme regularity of the calls; and, disgusted with the absence of dividends, loudly and justly proclaim mining a peculation. As a proof, I quote the statement of a prospectus which I hold:—

1. It states that the claim has yielded 900 ounces of specimen gold to one party.

2. It speaks of a well-defined reef, 12 feet thick, the gold being equally distributed throughout the stone. The mine can be worked at a comparatively trifling cost, one man, as has been proved, being able to excavate about five tons per day.

3. Three testimonials accompanying, gives evidence of the equal distribution of gold throughout the stone, at the rate of 4oz. 13dwt. 8gr. per ton.

Now, if one man has been proved able to excavate five tons per day, or to obtain the stone containing 23oz. 8dwt. 18gr. of gold, at 75s. per ounce, as given on the coast, the value of that man's labour would be £87 17s. 9d. per day.

4. The holders require, by this prospectus, £1,200 cash for work done: that is, making a tunnel of forty feet. To excavate five tons per day,—120 cubic feet,—would require ten days to put in the tunnel. The price quoted is £1,200 cash, or at the rate of £120 per day, which certainly is slightly above the average rate of wages in New Zealand at the present time. With these absurdities, the company is raised and registered. This is one example (and many similar I could give) as the cause of failure in mining companies.

Mining enterprise, especially when undertaken by diggers labouring under every conceivable disadvantage, should be liberally encouraged, and every possible facility should be afforded in roads,

levels, and surveys, and, above all, by the establishment of a School of Mines similar to those of Germany, in the Hartz Mountains, Saxony, in Silesia, and in England. This would tend to give permanence to what is at present an ephemeral branch of industry, by throwing the light of science and experience upon it, and would greatly tend to elevate the moral status of those employed in it by doing away with their present nomadic tendencies. I suggest, for the future guidance of companies, that, as the working shareholders hold half the claim, an estimate should be formed of the probable expense of working, and that the working shareholders be paid half wages until they have raised sufficient material to pay all expenses in connection with proving the mine. That the stone be tested from time to time; if payable, then the company will be fully justified in procuring machinery, and not before. And further, when such gross misstatements are made with regard to the probable expense of getting water, the promoters' interest should be made accountable for part of such extra expense as may prove necessary. These precautions, and others that readily present themselves, would tend to make mining a sure and profitable investment, instead of the wild, gambling speculation that, in too many cases at present, it must be deemed. That element has been looked upon as the royal road to wealth, rather than in the more substantial ones—as coal, copper, chrome, iron, lead, silver, zinc, &c.

In developing our resources we require nothing to import. Besides the material, we have fuel, and the compost for our furnaces, &c. The whole proceeds would be retained in profit and employing labour. Labourers are consumers; and this, in my opinion, would bring a tide of immigration, who would settle down amongst us, without expense to the country.

I will quote an article on hæmatite (iron), from the *Engineer*, dated 28th July, 1871. It states:—

"Now, the whole of this so important district, with its portentously sudden growth, has increased some twenty-five fold within the last ten years: with the fabulous fortunes, in some instances incomes of from forty to fifty thousands pounds per annum, that have already resulted to the fortunate original lords of the mines, &c."

This is the kind of prosperity we should endeavour to secure. Such industries would insure not only good opportunities for the safe investment of capital, but also what is, perhaps, even more important: openings for the employment of the rising generation, whose prospects at present are far from encouraging.

In conclusion, having confidence in your political and commercial abilities, my paper may necessarily suggest to you the many advantages to be derived from the development of our mineral resources; remembering that a country can only become great by reproducing, and the reproduction affects the whole Colony in which we reside.

I have, &c.,
J. W. Tatton.

The Committee have also received the following letters:—

Letter from Mr. William Smallen to T. Kelly, Esq., dated New Plymouth, 23rd May, 1872, asking aid from Government towards planting land with mulberry trees.

Letter from Mr. T. A. Bird, Secretary to Canterbury Flax Association, dated Christchurch, 8th August, 1872, asking Government for a donation of £200 towards an exhibition of flax dressing machines to be held in Christchurch in December, 1872.

Letter from the Superintendent of Otago to Mr. Murray, dated 25th April, 1872, relative to coal at Preservation Inlet, and the advantage of a wharf.

Letter from Messrs. Eliott and Brodrick to the Hon. Colonel Whitmore, relative to the coal field at Preservation Inlet; dated Dunedin, 7th August, 1872.

Letter from Dr. Hector to Mr. Murray, dated Wellington, 21st February, 1872, respecting the New Zealand Coals.

Letter from Mr. Every McLean to Hon. Colonel Whitmore, dated Bleak House, 13th August, 1872, relative to the growth of beetroot for sugar.

Letter from Mr. Murray to the Chairman of Industries Committee, dated Wellington, 29th July, 1872, relative to tussock-grass, glass, hops, powder, kelp, coal, &c.

Letter from Mr. Hori Kerei Taiaroa to the Chairman, dated Wellington, 13th August, 1872, relative to the encouragement of the whale fishery in the Province of Otago.