MEMORANDUM

OF

ACTION TAKEN IN ACCORDANCE WITH RESOLUTIONS

OF THE

JOINT COMMITTEE ON COLONIAL INDUSTRIES,

ADOPTED ON THE 10TH SEPTEMBER, 1870.

PRESENTED TO BOTH HOUSES OF THE GENERAL ASSEMBLY, AND ORDERED TO BE PRINTED, 8TH SEPTEMBER, 1871.

WELLINGTON.

1871.

MEMORANDUM OF ACTION TAKEN IN ACCORDANCE WITH RESOLUTIONS OF THE JOINT COMMITTEE ON COLONIAL INDUSTRIES.

No. 1.

MEMORANDUM of action taken in accordance with Resolutions of the Joint Committee on Colonial Industries, 1870.

THE following resolution of the House of Representatives was passed on 10th September, 1870, but owing to the late period of the Session the supply was not taken:—

Resolution.

"That a respectful address be presented to His Excellency requesting that he will cause to be placed on the Supplementary Estimates such sum as may be necessary for the purpose of giving effect to the recommendation of the said Committee."

Ministers were therefore limited to action that required only such small expenditure as might be defrayed from "General Contingencies."

RESOLUTION I.—*Water Supply.*

Each district for which a water supply in connection with the gold fields is required has been surveyed, and the necessary plans and sections have been obtained by the Public Works Department.

Papers relative to these proposed schemes have been laid before Parliament.

In the event of any legislative action being undertaken, the appended memorandum by the Hon. the Minister of Justice is suggestive.

RESOLUTIONS II., III., AND IV.—*Gold Fields Law.*

The recommendations in these resolutions admit of no action without legislation, and the evidence obtained by the Committee, on some points at least, does not appear to have been conclusive.

RESOLUTION V.—*Rewards for Mines.*

The difficulty of defining when a "Mine" of tin or other ore is to be considered not only remunerative to the discoverers but of importance to the interests of the country, prevented any practical effect being given to this resolution, as it would involve the promise of a very considerable sum of money on terms that are not clearly set forth.

RESOLUTION VI.—*Development of Coal Fields.*

The best line for a railway for the purpose of connecting the Grey River Coal Mines with a port has been made the subject of careful inquiry, and the views in the report on the subject which has been laid before Parliament have been adopted by Government.

Reports on the extent and value of the Coal Mines on the West Coast and in other parts of the Colony have been prepared by the Geological Department.

RESOLUTION VII.—*Planting of Forest Trees.*

The recommendations in this resolution have been dealt with by the Provincial Governments of Canterbury and Otago; and as the Council of the former Province has passed a resolution undertaking to pay a proportion of the expense of procuring the seed of valuable trees from California, measures have been taken to secure a large supply. Reports have also been requested as to the success which has attended the introduction of the seeds during last year.

RESOLUTION VIII.—*Sericulture.*

The recommendation in this resolution has been given effect to—Mr. Batchelor having fulfilled the conditions of planting five acres with mulberry trees, which will be used hereafter for distribution.

RESOLUTION IX.—*Sericiculture.*

Rewards were offered in the terms of this resolution. (See *Gazette*, No. 8, p. 8, 1871.)

RESOLUTION X.—*Bonus on Manufactures.*

This resolution is of a character that can only be dealt with by legislation.

RESOLUTION XI.

Practical effect was given to those suggestions in this resolution on which the Government possessed sufficient information, by the offering of reward for certain articles. (See *Gazette*, No. 8, p. 80, 1871.)

Respecting the other suggestions, further inquiries were instituted, as shown in the reports and correspondence attached, and also in the Report of the Flax Commissioners.

MEMORANDUM OF ACTION TAKEN IN ACCORDANCE WITH

RESOLUTION XIII.—*Docks.*

Definite information required.

RESOLUTION XIV.—*Scab.*

Requires legislation.

RESOLUTION XV.—*Technical Education.*

The recommendations in this resolution necessitate by their nature a large outlay, for which special provision is required. So far as any alteration of the Colonial Museum and Laboratory has been made during the past year, the adoption of the proposed scheme has been kept in view, and there is now accommodation for ten pupils in the branch of practical chemistry. Apparatus, a lecture-room, and further Museum accommodation are however required, before the proposed scheme of instruction can be carried out.

W. GISBORNE.

SECTION I.—WATER RIGHTS.

No. 2.

MEMORANDUM by the Hon. Mr. SEWELL.

I WISH to draw attention to a subject incidentally referred to in the Report of the Committee upon Colonial Industries, and Dr. Hector's minute thereon—namely, the utilization of Inland Waters.

The object to which the report particularly refers is the application of water to Races for Mining purposes; but it is obvious that this is only one of a variety of uses to which water may be applied, and for which continued recourse is had to legislation in order to obtain the requisite legal powers for adapting it. Having in the course of my professional experience had opportunities of considering this subject, I have long come to the conclusion that the English law relating to it is extremely defective. It is based on certain main principles at variance with the requirements of modern improvements. One (which governs navigable streams) is, that the ownership both of navigable rivers and their beds is in the Crown; another (relating to minor streams) is that the ownership "is vested in the proprietors of the lands through which they flow, or, when a stream divides the lands of distinct proprietors, in such proprietors respectively, *usque ad filum aquæ.*" As regards natural reservoirs and sources, such as springs, wells, lakes, ponds, &c., the ownership follows the ownership of the land where they exist. These individual rights of property in waters, which in their nature should be for public and common use, are universally found to be obstructive to their application to various uses required for the public service. I enumerate some of the principal ones:—

1. Navigation, in the natural form of rivers,—or artificial, as canals.
2. Irrigation.
3. Water races for mining purposes.
4. Mill powers.
5. Supply of towns, and domestic purposes.
6. Drainage and sanitary purposes.
7. Extinction of fires.

For these and other cognate objects, inland waters, in all their forms, should be regarded by the State as objects to be governed by special laws and regulations framed on considerations of public policy, and provision should be made by law accordingly.

Broadly, in my opinion, the principle should be established that inland waters, in all their forms, are a subject of property, distinct from the land, and to be regulated by a special code, which should carefully provide for the various concurrent interests of the public and of private persons. It will be easier to make such provision by law now, in the early stage of the Colony, than after private rights have grown up which will be obstructive of improvement.

28th November, 1870. HENRY SEWELL.

APPENDIX II.—RIGHTS OF GOLD PROSPECTORS.

No. 3.

The Hon. Mr. CHAMBERLIN, M.L.C., to the Hon. Mr. GISBORNE.

SIR,— Auckland, 24th May, 1871.

In referring to the Report of the Joint Committee on Colonial Industries, F. 1., September 5th, 1870, amongst the suggestions agreed to by the Committee, I beg to draw the attention of the Government to No. 4, for the purpose of knowing if it is their intention to take any action upon it, because, so soon as there is no uncertainty as to the right of owners of the soil to the precious metals, I purpose to prosecute a further search for gold upon my property at Drury, near Auckland, having found very encouraging indications, although no gold at present. Further, I shall feel obliged if the Government will inform me, if, when gold is found upon private property, they have the power to proclaim it a public gold field against the desire of the owner; if so, I would urge upon the Government to annul that power, as being very detrimental to the mining interests of the Colony. I am in possession of a Crown grant of 1854 for my Drury property, without reservations.

I have, &c.,

The Hon. the Colonial Secretary. HENRY CHAMBERLIN, M.L.C.

No. 4.

The Hon. W. GISBORNE to the Hon. Mr. CHAMBERLIN, M.L.C.

SIR,— Colonial Secretary's Office, Wellington, 6th June, 1871.

I have the honor to acknowledge the receipt of your letter of the 24th ultimo, in reference to

the Report of the Joint Committee on Colonial Industries, F. 1., September 5th, 1870, and drawing attention to No. 4 of the Report, for the purpose of knowing if the Government intend to take any action on it, as on your property at Drury there have been found indications of the presence of gold. In reply, I have to state that the Government are advised that gold has been worked on private land, without objection on the part of Government, at various places, and there is no power to proclaim such land a gold field without the consent of the owners.

I have, &c.,

The Hon. Henry Chamberlin, M.L.C., Auckland. W. GISBORNE.

APPENDIX III.—PLANTING OF TIMBER TREES.

No. 5.

Mr. GRAY to Dr. HECTOR.

SIR,— General Post Office, Wellington, 9th May, 1871.

When leaving for San Francisco, in January last, the Government furnished me with a list of Californian seeds and plants, with instructions to procure a quantity of each, with a view to their distribution throughout the Colony, as was done with the seeds which I brought with me on my first trip, in July last. On making inquiries at the various seed shops and nurseries in and around San Francisco, I found that the season, just then closed, had been extremely unfavourable for collecting seeds of trees and plants, and that the seedsmen declined to guarantee as sound the stock they held of many of the sorts mentioned in the list. I purchased, therefore, only such seeds as they agreed to warrant as pure and good, which I beg to hand over to you for distribution. Attached is a schedule of their names, and quantities of each.

With respect to the mulberry plants, I may mention that, on my arrival in Auckland, to save time, I gave a bundle of 200 plants to the Acclimatization Society there. I could have brought a very much larger quantity, but the season was too far advanced to risk it. The months of January and February would be the best adapted for safely transmitting the mulberry plant.

I have, &c.,

J. Hector, Esq., M.D., &c., Museum. W. GRAY.

SCHEDULE.

2 lbs. Pinus Lambertiana.
1 „ „ Sabiniana.
2 „ „ Torreyana.
1 „ „ Insignis.
1 „ Sequoia Sempervirens.
2 „ Cupressus Macrocarpa.
1 „ „ Lawsoniana.
1 „ „ McNabiana.
600 plants of the white mulberry.

No. 6.

MEMORANDUM for Mr. COOPER by Dr. HECTOR.

Colonial Museum, Wellington, 19th June, 1871.

THE seeds and mulberry trees, as per list attached brought by Mr. W. Gray from California, in May last, have been officially distributed as follows; and acknowledgments are herewith enclosed for Mr. Gisborne's information:—

Mulberry Trees.

200 To Acclimatization Society, Auckland (handed over direct by Mr. Gray).
150 „ Botanic Gardens, Wellington
50 „ Superintendent of Otago, for Botanic Gardens.
50 „ Mayor of Queenstown, Otago (for the interior).
50 „ Superintendent of Canterbury, for Botanic Gardens.
100 „ Superintendent of Nelson (to be handed over to Mr. Batchelor).

Seeds.

Acclimatization Society, Auckland.
Acclimatization Society, Christchurch.
Acclimatization Society, Wanganui.
Botanic Gardens, Dunedin.
Botanic Gardens, Wellington.
Superintendent of Nelson.
Superintendent of Taranaki.
Chairman, County Council, Westland.
Mr. Ludlam, Wellington. Hon. Mr. Stafford.
Mr. Harding, Napier. Hon. Mr. Hall.
Mr. Potts.

JAMES HECTOR.

No. 7.

Dr. Hector to Professor Kellog.

Sir,— Colonial Museum, 5th August, 1871.

In consequence of the interest which you have taken in procuring seeds for Mr. Gray, and also on the recommendation of Mr. Richardson, of Christchurch in this country, by desire of the Hon. the Colonial Secretary, I venture to ask your assistance in carrying out the recommendation which is contained in section 7 of the enclosed Report of a Committee of the Legislature on Colonial Industries.

At page 9 of the evidence attached to the report, you will find further reference to the subject, and from which you will learn that the object desired by Government is not so much the introduction of a great variety of forest trees, as to be able to supply the seeds of those kinds that are most likely to be raised successfully in large quantities. Arrangements have been made to have the seeds raised in local nurseries, in the districts where the young trees are to be distributed, and Government has authorized an expenditure not exceeding £200 in the first instance, for the purpose of procuring the seed. Feeling persuaded that you are much better able than we can here be to select the trees that will be most advantageous, I enclose a list, only with the idea of suggesting the species that we find to be most suitable to the climate, but do not in any way, wish to limit you to the list, or to require that all those mentioned should be sent.

I am led to understand from Mr Gray, that you organize parties for the collection of the Pine seeds every season, and all that I venture on behalf of the Government to request is, that you will arrange that the expense of one or more of any expedition you send out this autumn may be defrayed in part out of the above sum of £200, so far as it is available, and in return an equivalent share of the proceeds of the expedition be forwarded to New Zealand.

I think, in the absence of more accurate information on the subject, it is better to leave all the details to you; but the Government Agent who accompanies the mail this trip has instructions to wait on you with this, and to afford any further particulars you may require. He is also empowered to make any payment on account that you suggest as necessary.

It is hardly necessary to remind you that, owing to the circumstances that the seeds will have to journey through the tropics, and owing to the change of hemisphere, unless they are forwarded early enough to catch our spring, namely November, they may require to be held over for twelve months.

On this subject, and also on the not less important subject of the manner of packing the seeds, Mr. Richardson informs me that he that he has written to you fully, giving his experience; and as few in this Colony are better able to form an opinion, I may safely recommend you to adopt his suggestions.

I have, &c.,
J. Hector.

Professor Kellog.

Californian Firs.

Abies Douglassi	Abies Hookeriana
„ Mertensiana	„ Menziesii

Silver Firs.

„ Picea Bracteata	„ Picea Amabilis
„ „ Nobilis	„ „ Grandis
„ „ Balsama	„ „ Fraseri

Pines.

Pinus Muricata	Pinus Radiata
„ Benthamiana	„ Contorta
„ Fremontiana	„ Sabiniana
„ Insignis	„ Tubercalata
„ Jeffreyi	„ Lambertiana
„ Coulteri	„ Monticola
„ Ponderosa	

American Firs.

Abies Alba	Abies Rubra
„ Nigra	„ Canadensis

Pines.

Pinus Inops	Pinus Australis
„ Mitis	„ Rigida
„ Resinosa	„ Tœda

Mexican Firs (Silver).

„ Llaveana	Pinus Patula

Californian.

Cupressus Macrocarpa	Sequoia Sempervirens
„ Lawsoniana	Redwood of California
Wellingtonia Gigantea	Juniperus Californica
Thuja Gigantea	Thuja Lobbi

APPENDIX IV.—SILK INDUSTRY.

No. 8.

Mr. Batchelor to the Hon. W. Gisborne.

Sir,— Nelson, 27th September, 1870.

Having received a copy of Mr. Baldwin's report on Sericulture, induced me at once to plan

two acres with mulberry trees without delay, as I felt satisfied that the Government and the House of Representatives would, after reading so valuable a report, render me some pecuniary aid and thereby give me the much wished for opportunity of testing the commercial value of sericulture as an industry in New Zealand.

In the report presented to the House of Representatives by the Joint Committee of both Houses on Native Industry, it states that I am to receive £50 for each acre planted with mulberry trees up to five acres. I therefore beg to say that I have planted two acres of land with 800 mulberry trees as a plantation, and that I shall be prepared by next year to complete the five acres.

I have received from Europe a number of mulberry trees, consisting of five different sorts, some of which are recommended for steep hill-sides, producing a large amount of foliage, valuable for silk culture, or reclaiming poor land.

I am glad to state that I have good reason to believe that sericulture will be warmly taken up by our German settlers, as I have received several applications respecting the procuring of trees, eggs, &c. As far as trees are required, my having partly agreed for a large supply next season, that want will, I hope, be met. His Honor the Superintendent informed me that the General Government had sent to California for a supply of eggs. I should be glad to hear more on this point. In the meantime the Provincial Government have sent to Sydney for some eggs from silkworms recently imported from Europe.

Sincerely thanking the General Government for their liberal views on native industry, and sericulture in particular,

I have, &c.,

The Hon. the Colonial Secretary, Wellington. T. C. BATCHELOR.

No. 9.

Mr. COOPER to Mr. BATCHELOR.

SIR,— Colonial Secretary's Office, Wellington, 31st October, 1870.

I am directed by Mr. Gisborne to acknowledge the receipt of your letter of the 27th ultimo, and to state that, in pursuance of the recommendation of the Colonial Industries Committee, and in consideration of the special efforts made by you in the promotion of sericulture, the Government will, on the certificate produced by you, of the Provincial Secretary at Nelson, that you have planted two acres with about 800 mulberry (*multicaulis*) trees, at once grant you as aid in the prosecution of your advancement of that industry the sum of £100. For the next three acres similarly planted by you, the Government will give you three-fourths of the vote of £50 per acre when the planting is completed, and the remaining one-fourth of that rate per acre at the end of two years from the date of such planting, during which the plantation is to be kept under good cultivation.

You will be good enough to furnish to the Government a full report showing the expense incurred in every step of the experiment, its progress, and the results obtained. The Government also rely on you to give the Acclimatization Societies in the different Provinces every information and aid in your power to secure the cultivation of the proper kind of mulberry tree, and otherwise to promote the silk industry.

Mr. Gisborne has authorized the further payment to you of £5, in part defrayal of the expense which you have incurred in your visit to Wellington for the purpose of personally representing to the members of the Government what you had already done in this matter, and of laying before them your suggestions and advice in respect of it.

I have, &c.,

T. C. Batchelor, Esq. G. S. COOPER.

No. 10.

Dr. HECTOR to Mr. BATCHELOR.

SIR,— Colonial Museum, Wellington, 20th January, 1871.

By direction of the Hon. the Colonial Secretary, I beg to forward to you by this day's mail a case containing eight cards of four choice varieties of silkworm eggs, such as are not usually sold to foreigners, which have been received through the courtesy of the Acclimatization Society of New South Wales, from Sir Henry Parkes, Her Majesty's Ambassador to Japan. You will be good enough to report if these eggs reach you in good order, and use your best endeavours to rear them successfully, preserving specimens of the cocoons forwarded, for comparison and valuation. It is very desirable that the production of eggs should be tested from this consignment, not only for distribution in this Colony, but also for the purpose of trying even on a limited scale, the experiment of transmitting eggs from this country to Europe. By taking advantage of the alternation of the seasons, I think that eggs sent by the San Francisco mail, at the close of our summer, say in March, would arrive in time for the European mulberry season, and so escape the long period of dormancy; but whether this will have a beneficial effect or the reverse, requires to be tested by experiments.

I have, &c.,

Mr. Batchelor, Nelson. JAMES HECTOR.

No. 11.

Mr. BATCHELOR to the Hon. W. GISBORNE.

SIR,— Nelson, 14th July, 1871.

I beg to inform you that I have completed the planting of three acres with 1,260 mulberry trees this present season, including the two acres of 800 trees planted last season, making the five

acres of land as voted by the House of Representatives last Session, making in all 2,060 mulberry trees now planted. The trees planted last season have been carefully tended and have made good progress. It will require another year before any leaves can be taken from those first planted, unless the ensuing summer is more favourable than the past one. I have been keeping account of the cost of planting one acre with mulberry trees; and unless the trees can be purchased at a lower rate than has been charged this season, £50 is not more than will cover the expenses. I received applications for more than I have planted, but had none to sell. There are now planted, with this present season, about 1,500 trees in excess of mine, owned by some nine or ten persons. The great drawback is the want of trees. Our gardeners will grow as many as possible, but they have no stock to start from. The healthfulness of the silkworms and the superior quality of the cocoons of last season have induced many persons to give sericulture a trial that looked on in doubt hitherto.

I have, &c.,

The Hon. the Colonial Secretary. T. C. Batchelor.

No. 12.

Mr. Greenfield to the Hon. W. Gisborne.

Sir,— Superintendent's Office, Nelson, 18th July, 1871.

I have the honor to report for your information, that I have, at the request of Mr. Batchelor, again visited his mulberry plantations at Wakapuaka, and I find that since my last report he has planted about three acres, with about 1,200 mulberry trees. They are planted on the side of a low range of hills, in very fair soil; the ground has not been dug all over, but small round places have been dug, about 2 feet across, and the trees planted therein. The trees are small, and have been cut back to about 1 foot from the surface.

Those planted last year do not appear to have done well; this is probably owing to transplanting, and perhaps in some degree to the sourness of the ground—these trees have also been cut back like the others.

I have, &c.,

Alfred Greenfield,

The Hon. the Colonial Secretary, Wellington. Provincial Secretary.

No. 13.

Mr. Batchelor to the Hon. W. Gisborne.

Sir,— Nelson, 12th July, 1871.

I beg to inform you that in January last I received eight cards of silkworm eggs from you of considerable value owing to the difficulty of foreigners being able to procure good eggs from Japan. You likewise request me to use my best endeavours to reproduce in cocoons and eggs for distribution throughout the Colony, and for comparison.

Having completed my season's work some days, and a good supply of leaves, with great pleasure I set to work to carry out your views. For more than four weeks I tried to rear some, but with no success. There was not the least difficulty in hatching the worms, but the question was how to keep them alive. In from three to four days they shrivelled up and died. Thinking that they required a different kind of mulberry, I tried a few with several kinds of mulberry leaves, but with no better results. I carefully examined some of the worms under a powerful glass, and found that they had not strength to bite the leaf, and only subsisted for a short time by the sap from the cut edge of the leaves, which did not form sufficient nourishment, and caused them to perish. I attribute the failure so far to the lateness of the season, coupled with an extreme dryness of the weather that prevailed at this time. For as soon as a change took place in the weather, those that were freshed hatched were much stronger and thrived. It now being the end of February, it was hopeless to expect food sufficient to raise a large quantity. I took small portions of the cards (the remainder I had kept under 50° Fahr.), and succeeded in raising some of the green and some of the white, also some eggs, enough to start with next season. I have examined the cards that I have put by, and they have every appearance of being in good condition, and will turn to a good account this next season. In the letter accompanying the eggs, Dr. Hector lays much stress on the value to be derived from transmitting eggs to Europe. A short time since I received a letter and circulars from a Silk Broker in England stating that eggs of first-class quality from Australia realized twenty-five shillings per ounce last year. New Zealand is every bit as well situated to raise eggs in time to suit the mulberry as Australia for the European market. To persons carrying on sericulture it is of the utmost importance to have a market for the sale of eggs. For one pound of cocoons, worth say five shillings, will produce more than one ounce of eggs, worth say twenty shillings. Further, it is extremely doubtful if silk of a first class can be raised before the mulberry trees are at least five years old.

In reading Captain Baldwin's valuable report, it is by him considered doubtful as to the *Morus alba* growing from cuttings. I tried a number last year, and they grew freely.

I have, &c.,

The Hon. W. Gisborne, Colonial Secretary. T. C. Batchelor.

No. 14.

Mr. Batchelor to the Hon. W. Gisborne.

Sir,— Nelson, 14th July, 1871.

In your last despatch you requested me to render to the Government, for the benefit of the Colony, any information and particulars respecting my proceedings in sericulture that may be of value or interest. As such I beg to submit the following:—

Wishing to further test the practicability of retarding the too spontaneous hatching of silkworm eggs, I divided 20,000 eggs into two parts respectively, Nos. 1 and 2, of 10,000 each. No. 1 I proceeded with as soon as the mulberry tree put forth leaves (early in September); by the second week in December they had formed cocoons. The 1st of November I proceeded with No. 2, by the end of January they had formed cocoons—thus proving that a given number of trees will supply double the quantity of silkworms by extending the time from three months (the ordinary time) to five months, and thereby double the yield of silk or eggs, without in the least injuring the trees, as ample time is given them to get full foliage before the winter. The eggs referred to were part of my previous year's stock.

In the early part of November I received from the Provincial Government some silkworm eggs, named "Lombardy Buffs." I took great care with them; the silkworm measured over 3 inches in length and eleven-eighths in girth; the cocoons are the largest that have been raised in New Zealand, and greatly admired by all persons who have seen them. The silk is of a beautiful texture, and experts say it is equal to the best Italian. I have raised all the eggs possible of this valuable stock; 350 cocoons weighed one pound, and I have no doubt of improving them in the following year or two, when they get thoroughly acclimatized. I had sent from Europe some cocoons, dark green and white (very large), as specimens to guide me, and descriptions of a variety of silkworms that feed on the oak, cherry tree, English holly, and several other trees.

The correspondence that has been carried on between the General Government and myself has been partly published in England, and has attracted the notice of persons who are largely interested in the production of silk in the British Possessions, and has resulted in my receiving letters containing most important and valuable information of uses for silk that I little thought of, in which are demands that all New Zealand would be required to supply—a manner of utilizing the silkworm, entirely doing away with reeling the silk or raising the cocoon. It is my intention to lay before the Government the details for allowing the plan to be carried out—the doubt as to sericulture answering would be set at rest.

I have, &c.,

The Hon. the Colonial Secretary. T. C. Batchelor.

No. 15.

Memorandum for the Under Secretary by Dr. Hector.

1. I have seen Mr. Batchelor on the subject of the silkworm arrangements. Mr. Batchelor produces certificate of the Provincial Secretary of Nelson, that the second instalment of three acres has been properly planted, in addition to the two acres for which he has already received £100; 75 per cent. of £150 is therefore now due to him, 25 per cent. being reserved for two years, according to the arrangement.

2. He states that the planting cost £35 per acre; and as he intends to plant at least two and a half acres more this year, he is anxious that the conditions should be modified, and that he be either allowed the full amount of £50 per acre, or that additional assistance be granted to him on similar terms as before towards planting an additional area of say three acres.

3. In consideration of such assistance, he is willing to make terms for furnishing trees so as to recoup Government.

4. He exhibits specimens that prove satisfactorily—

(1.) That the leaves of *Morus alba* are inferior in size and quality to those of *M. multicaulis.*

(2.) That the leaves of the latter, when grown on hill-sides, are thicker and, though smaller, are more valuable than those from trees grown on level ground.

(3.) That *Morus alba* grows as freely from cuttings as *M. multicaulis.*

(4.) That the seed from four successions will produce cocoons of equal quality with the original, therefore disproving any necessity of degeneration, an hypothesis that has been put forth to account for the low price of the silk grown in Australia.

(5.) That he has raised successfully the Lombardy Buff and Japanese Cocoons, both of which are highly esteemed.

(6.) That he can successfully delay the hatching so as to produce two broods in the year, the latest commencing in November.

(7.) That the silk he has produced can be wound, and equals in quality that produced elsewhere.

5. He is of opinion that the *M. Japonica* should be introduced.

6. From his experience of the young trees lately imported from California, he thinks that the roots should be kept moist and covered with oilcloth during transit, the mere packing in hay not being sufficient to prevent desiccation of the rootlets.

7. He states that there are over 11,000 mulberry trees now distributed in Nelson, chiefly under two years old, all from his nursery.

8. That until the trees are five years old the leaves produced from them will not produce marketable silk of the finest quality, so that previously to their reaching that age the only hope of a return is from the rearing of eggs, which are worth about 25s. an ounce.

9. Another purpose to which the leaves of immature trees may be applied is the production of "catgut," a large quantity of which, it appears, from a letter received by Mr Batchelor, is annually required for fishing-tackle, pianoforte and other instrument strings. The gut is prepared by taking the worms when they are about to spin, and forcibly extending them to the proper extent for the fineness of the thread required.

28th July, 1871. James Hector.

MEMORANDUM by the UNDER SECRETARY.

BY direction of Government the sum of £150 was ordered to be paid to Mr Batchelor, and he was informed that any further grant must be approved by Parliament.

29th July, G. S. COOPER.

APPENDIX V.—MANUFACTURES.

No. 16.

MEMORANDUM by the Hon. J. VOGEL to Dr. HECTOR.

Sorghum.

FROM all I can learn, it is very doubtful how far the Beet-sugar cultivation has been a success here; but everybody seems to agree that the cultivation of Sorghum has been a success—that for cattle-feeding the thing is unequalled; and that from two varieties you can, with proper management, be sure of obtaining sugar. Machines for utilizing Sorghum can be obtained cheaply. I enclose you, herewith, some pamphlets on the subject, with a price-list of the machines, a long catalogue of plants, seeds, &c., and also a very interesting memorandum by Mr. Fox, containing the information he took down during a conversation with Mr. Blymyer, a gentleman connected with several large firms who have—to use a very favourite expression in the country—"made a specialty" of Sorghum machines, seed, &c.

If it is desired that I should, on my way back, do anything towards the introduction of Sorghum into New Zealand, you should address me on the subject, stating the views of the Government, and sending the letter to London or to New York. I expect to leave England in June, so you will be yourself the best judge whether you should address me in England or in America. Any letters addressed to me "to the care of W. H. Webb, Esq., New York" or "Bank of California, San Francisco," will reach me.

I enclose a slip cut from a Sacramento paper, showing the advertisements as to mulberry trees that can be procured there. I think it would be well worth while to carry over several thousand of the young plants. I believe that Mr Gray is going to take some, and, if it is desired, I could also bring some with me. I enclose you a letter addressed to Dr Pollen, and which was handed to me just before I left Auckland. If the Government resolves—as I think they might very properly do—to meet the request of the writer, some communication should be made to him, as I had no opportunity of answering his letter; and if it is desired that I should bring plants for him, I can do so.

Write me very fully, if there is any information I can obtain for you.

I have not forgotten your request about blankets; but I have not had opportunities of making any inquiries on the subject. Staying only a day or two in each place, and having a great deal to do, there is great difficulty even in ascertaining exactly the people from whom any information can be obtained. J. VOGEL.

26th February, 1871.

No. 17.

MEMORANDUM by the Hon. J. VOGEL.

Cultivation of Sorghum, and Production of Syrup and Sugar.

THE accompanying numbers of "The Sorgo Journal," together with printed descriptions of patent machines for the production of syrup and sugar from the Sorgo cane, were obtained from Mr. Blymyer, of Blymyer, Fearing, and Co., corner of Beach and Sebor Streets, Chicago. The complete "Sorgo Journal" can be purchased in Cincinnati, if necessary; but Mr. Blymyer says that the numbers selected by him, and now forwarded, contain really all the information needed by any one who desires to cultivate the plant practically.

What follows represents the substance of a conversation with Mr. Blymyer:—Sorgo grows "best" on a "sandy loam," but such a sort is not necessary for successful culture. It grows "best" wherever corn grows well; but the term "corn," is used not as including all cereals, but only such as Indian corn and maize, and excluding wheat, oats, and barley.

In Illinois and neighbouring States, Sorgo has been cultivated for ten or eleven years, it having been first introduced experimentally about thirteen years ago. During the late war, the cultivation of this cane had more than a "spurt" given to it, from the fact that the supply of sugar and syrup from the South could not be relied upon; but now in the strictly Northern States, this kind of crop is being again neglected, as it is not possible to compete with Southern sugar and syrup. The necessity for making something of the Sorghum during the war led to the commencement of the improved process now used. At present, Mr. Blymyer says, in Illinois, Iowa, although Sorghum is very extensively grown, very little of the syrup or sugar becomes an article of commerce. The farmers find that it pays them well, as a crop grown to supply their own wants, or to supply the wants of farming districts, the manufacture being conducted by farmers who can afford to invest in machinery, and who are paid in proportion to the yield from the cane—one-third is the proportion stated in the printed papers.

It is admitted that crude Sorghum syrup has a taste which is offensive to most persons at first; a "raw, new, earthy sort of taste," is Mr. Blymyer's description of it—a description differing somewhat from that in the printed papers. But that taste can be wholly destroyed; and the refined Sorghum syrup, if it could be obtained in quantity to make commercial dealing with it a thing to attract, would at present "fetch as good a price as any syrup ever made from the best Southern cane." Except with one or two kinds of the Sorgo plant specified in the papers, the attempt to make sugar does not seem to be approved. The syrup, except in the cases indicated, is not found to granulate well—certainly not so well as with the majority of beets. But when sugar is made from Sorgo plants, it is wholly free from any unpleasant taste, and is in fact of excellent taste. To produce granulation so long as that which causes the unpleasant taste of the syrup remains, is not possible—

and to get rid of the objectionable element is said to be easy with the improved processes. Some Sorghum sugar is not of good colour.

Mr. Blymyer says that in Illinois and the neighbouring States, all attempts to grow beet profitably have been "dead failures," because of the cost and the expense involved in the culture. But he also says that no fairly-conducted experiment with any kind of the Sorgo has been other than profitable in the States named.

During the last ten years 30,000 of the Cook Evaporator and the Victor Mill have been sold by the firm or firms with which Mr. Blymyer is connected; the sale price amounting to 3,000,000 dollars.

As the growers of Sorghum so largely consume the products, no reliable estimate of the quantities of Sorghum syrup and sugar at present produced can be given; but Mr. Blymyer says that the culture of the plant is very general indeed.

At the establishment of Messrs. Hovey and Co., I was told that last year enough of Sorghum could not be obtained to meet the demands for seed; the sort next in favour being the Imphee.

It is claimed that syrup from the Sorgo is not only as pleasant to the taste as any Southern cane syrup, but that it is much more heathful as an article of ordinary household use.

A general catalogue of implements by Messrs. Blymyer, Norton, and Co., is with the printed papers. Would any of the "Power" machines be of value in New Zealand agricultural districts?

8th March, 1871. J. VOGEL.

No. 18.

MEMORANDUM on the Hon. J. VOGEL'S Report (Sorghum), by Dr. HECTOR.

I FORWARD for Mr. Gisborne's information, a report received by last mail from Mr. Vogel on the subject of the introduction of the manufacture of Sugar from Sorghum into this Colony, together with enclosed printed documents.

Mr. Vogel wishes to be informed by a letter to meet him in the United States, whether Government are disposed to empower him to do anything towards effecting the introduction of this manufacture.

Sorghum is extensively grown in Queensland for the manufacture of sugar, and grows freely in the northern part of New Zealand; but whether it has in this Colony valuable sugar-producing qualities has not been determined, so far as I am aware.

I would recommend that Mr. Vogel should procure say a few bushels of the best quality of seed for distribution to settlers in the districts of Kaipara, Tauranga, and Waikato, so that this question of the growth of the plant might be solved practically. I observe from the printed reports that the quality of the seed is a point of very material importance to the successful production of sugar from this plant. This should be impressed on Mr. Vogel as an important element in the success of the experiment.

For the present I do not think it advisable that any expensive machinery for crushing and refining should be introduced at Government expense.

23rd May, 1871. JAMES HECTOR.

No. 19.

The Hon. W. GISBORNE to the Hon. J. VOGEL.

SIR,— Colonial Secretary's Office, Wellington, 31st May, 1871.

Dr. Hector has handed to the Government a Memorandum from you upon the subject of the cultivation of Sorghum and the manufacture of sugar and syrup therefrom, together with a number of printed agricultural papers and price catalogues, which you were kind enough to procure for the benefit of the Colony.

It is unnecessary that I should offer you the thanks of your colleagues for the trouble you have taken, or for this additional proof of your interest in everything that may tend to further the prosperity of New Zealand.

You will hear from Dr. Hector by the mail which brings you this letter of the delay in the delivery of your packet to him, by which he was prevented from communicating with you by return of the "Nevada."

Should this letter reach you in time, we should be very much obliged if you would procure a few bushels of seed of the best kinds of Sorghum for distribution to settlers in the districts of Kaipara, Tauranga, and Waikato, where it is believed that the question of the value of its sugar-producing qualities in this country can best be tested. The quality of the seed appears, from the papers sent by you, to be a point of very material importance to the successful production of sugar from this plant, and it will be well to bear this in mind in procuring the seed. It will not be worth while for the present to incur the expense of purchasing crushing and refining machinery, until the question of the adaptability of the soil and climate of New Zealand to its growth shall have been further experimented upon.

The Hon. J. Vogel. W. GISBORNE.

No. 20.

MEMORANDUM by Mr. KRULL.

I HAVE been for some time engaged in the interesting study of the culture of the beet plant in Germany, and the manufacture of sugar from the saccharine contained in the root. I am astonished at the rapid

progress and present magnitude of the industry; and its having proved such an almost inexhaustible source of national wealth to Germany, convinces me that it would be wise policy to naturalize it in New Zealand, if circumstances were favourable to the growth of the plant.

In 1867, for instance, the duty on sugar imported into Germany amounted to only £73,000, whereas on inland manufactured sugar it amounted to nearly £2,000,000.

There are now 296 beetroot sugar manufacturers at work on the Zollverein. The beetroot sugar now pays a duty equal to 10s. per cent.: but it is by no means protected; on the contrary, the duty is in favour of unrefined sugar imported from the Colonies, in as much as the residue syrup from that sugar is considerably higher in value than that left from the beetroot.

Steadily and surely has this industry increased; until it is now one of the most productive the States possesses; and not only does it yield a revenue of £2,000,000, but it creates a demand for labour to the same amount, and returns to the soil as nearly as possible an equivalent in manure and stock-carrying capacity. Besides it has imparted to land, before almost unproductive, an immense value; and opened up a field for the profitable employment of a very large capital.

During the years 1836 to 1840 no duty was levied on sugar; in 1840 to 1841 a duty was levied at the rate of sixpence per ton of 20 cwt. of clean washed beetroot. It gradually increased until 1858 to 1859, when it was raised to fifteen shillings per ton; and since 1st September, 1869, it has been raised to sixteen shillings per ton of beetroot.

Levying the duty on the beetroot and not on the sugar has necessarily resulted in the beetroot being brought as nearly as possible to perfection for the required purpose. Whereas formerly, from the imperfect acquaintance of the growers with the laws by which the valuable substance secreted in the root is regulated, it required about 18 cwt. of beet to yield 1 cwt. of sugar, now the average is 12½ cwt., which brings the actual duty as nearly as is required for comparison to ten shillings per cent., or equal to that of New Zealand.

The cost of producing the loaf-sugar from beetroot is about thirty shillings per cwt. Labour is essentially cheaper than in our Colonies; but on the other hand, land fit for the cultivation of beetroot pays a yearly rent of forty-five shillings per acre, and in some instances even eighty-six shillings. The average crop is from twelve to fourteen tons per acre. If, therefore, it could be ascertained, by experiment, that the beetroot grown here would contain enough saccharine (and I may mention that I have written to Germany for seed of the three now recognized species, which, on arrival, I shall have much pleasure in handing over to you), I have no hesitation in saying that the cultivation of the plant would not only be highly profitable to those embarking in it, but would, in a very few years be able to contribute to the revenue—and not only directly, but, as soon as the industry got more developed, it would give employment to a greater number of hands than any other that could be established in New Zealand; and it is self-evident that the labour employed must be an indirect source of revenue, from its consumption of commodities that pay duty.

I fully believe that beetroot sugar, after being fairly introduced, will be able to pay a gradual duty up to £4 or £5 per ton; and the difference, as compared with the present duty, will be more than compensated by the many economical advantages incidental to the manufacture. I have already corresponded on the subject with friends and experienced persons at home; and I am justified in saying that, if the conditions existing in New Zealand were proved favourable for the growth of the plant, that a company could easily be formed in Germany, who would come out to the Colony, bringing with them their own workmen and their own machinery, if the New Zealand Government would meet them in a liberal spirit. Such a company would require to get on reasonable terms, a block of from 3,000 to 4,000 acres of good land, within convenient distance from a suitable shipping place; and would also require protection for a limited number of years, until the industry had fairly established itself.

A company to produce 500 tons of sugar in a year, would require a capital of about £35,000, and land to the extent of from 3,000 to 4,000 acres. It would give employment to a very great number of people; and yet the ground would produce so abundantly as not only to yield a fair return to the capitalist, but also a good living to all the labourers employed. It would also, after a few years, as already pointed out, become a source of direct and indirect revenue to the State.

Contrast this with the large tracts of country fenced in by the New Zealand runholders, which, though undoubtedly affording nourishment to many thousand sheep and cattle, are of little benefit to human beings and comparatively useless to the Colony.

In the manufacture of beetroot sugar everything is profit to the State, and thousands of pounds are saved which would otherwise pass out of the country.

That the French consider the cultivation of the beet in Germany superior to their own is shown in the "Revue de Deux Mondes," vol. lxxi., fol. 51, in an article by Emile de Grovelege, upon "Les progrés recus de l'agriculture en Prusse."

Should any other information be desired on the subject, it will afford me much pleasure to answer any questions that may be put to me, as I think I am well versed in all connected with the industry.

Wellington, 19th August, 1871. F. A. KRULL.

Enclosure in No. 20.

English Beet Sugar Culture.

AT the Society of Arts recently an interesting paper on this subject was read by Dr. Voelcker, F.R.S. The chairman, Mr. Caird, in summing up the discussion that followed, referred to the growing importance of the subject. The use of sugar in this country, he said, is constantly increasing, and its consumption is greater than that of any other country. It had risen from 44 lbs. per head of the population in 1869 to 47 lbs. in 1870. The imports of last year exceeded 700,000 tons, and the consumption 643,000. This is equal to one-eighth in weight of the consumption of wheat, and to more than one-fourth in weight of the annual imports of that grain. Unlike wheat, it may be said at present to be entirely a foreign product. It is important, therefore, to consider the sources of supply of an article becoming to us one of prime necessity. A few years ago Cuba furnished nearly one-half of all

the sugar produced; but as slave labour may cease in that island at any moment, and in that case for a time there would be a serious diminution in the crop, and as in most tropical countries the cane crop is dependent on hired Coolie labour, the supply of which is becoming both more costly and more uncertain, the growing increase of beet sugar is a matter not only of great interest, but of great moment. The countries in which it has made most progress are France, Germany, Austria, Russia, Belgium, and Holland. It is in those parts of these countries which most resemble our south-eastern counties in climate that it has best succeeded. The middle and south of France are too hot for it. In the last four years the progress in these countries has been as follows, in tons:—

	1867.	1868.	1869.	1870.
France	224,767	213,904	285,146	300,000
Germany	165,014	208,140	215,407	250,000
Austria	124,068	101,601	152,205	175,000
Russia and Poland ...	112,500	87,500	132,500	135,000
Belgium	31,039	37,078	43,552	50,000
Holland, Sweden, and Italy	7,500	10,000	12,500	15,000
Totals ...	664,888	658,223	841,310	925,000

The first three columns give the ascertained produce; the fourth, that of last year, is the estimated produce, the actual produce not yet having been ascertained. Of the total produce of 1870 nearly one-twelfth was imported into the United Kingdom. Is there any reason why we should not grow sugar in this country? It is clear, from the rapid and extensive production of beet sugar on the Continent, that it can successfully compete with cane sugar. Is there anything, then, in our climate or the cost of production, that should prevent a large portion of England from growing sugar with the same success as France or Germany? The first consideration is climate. Can the root, in an average of seasons, be depended on for an equal yield of sugar with that of the Continent? The analysis of English roots given by Professor Voelcker shows that it can; and the experience of Mr. Duncan at Lavenham, in Suffolk, in the manufacture of 4,500 tons of beet last year, has proved it a commercial success. This was the third year's trial, and each year considerable improvements were made both in machinery and processes, and errors of inexperience in the details of working were carefully corrected. One great difficulty is the want of trained managers in this country, which time and experience alone can supply. It is not enough to have sufficient capital and an abundant supply of roots of good quality. There must be the adequate chymical and mechanical skills to treat the roots so as to extract the sugar without waste, and the business knowledge to carry on with economy the labour of unskilled people. The climate of Suffolk and the soil of Lavenham have in the last three years given a beet as rich in sugar as the continental average. That essential point being settled, what are the respective costs of production? Coal is a large item in the cost; 900 tons were used last season at Lavenham. They are cheaper here than on the Continent. Labour is about the same; certainly no dearer in England. Land in Suffolk is cheaper, both to buy and to rent. Roots are, however, about one-tenth dearer. So much for the costs; let us look at the value of the produce. Sugar is dearer here, and so are meat and milk, the result of the "pulp" with which fattening cattle or milch cows are fed. There is, therefore, no doubt that in those English and south-eastern Irish counties where the climate and soil are like that of Lavenham in Suffolk, beet sugar may be cultivated with profit. It seems very doubtful whether it will answer in the moister parts of the country, the roots from Devonshire having hitherto proved very poor in sugar. But, as its progress must necessarily be gradual, experience will show in what quarters this new industry may with safety be extended.

Whether sugar beet can be grown with advantage in Ireland is a question of some importance. The experiment has been tried during the last two years by Mr. Agar Ellis on various farms, on Viscount Clifden's estate, in the County Kilkenny, upon deep heavy soils on limestone or marl. The average amount of crystallized sugar yielded by analysis from nine specimens grown in 1869 was 7·5 per cent. In 1870, the average of ten specimens gave 12·8 per cent. In 1869, the best gave 10·9, the worst 5·3; in 1870, the best gave 14·8, the worst 9·8. It would seem clear, therefore, that 1870 was a much better sugar year than 1869, though the difference is not due entirely to season, as the farmers in 1869 tried to grow the roots as big as they could, and roots beyond a certain size are seldom rich in sugar. The climate of Kilkenny and the adjacent counties is much drier than the average of Ireland, and therefore in that quarter success may more certainly be anticipated. He had said nothing about the distillation of the root for the production of spirits, but it might be advisable in the erection of factories in that part of the country to make provision for this, as in years when the yield of sugar was small the beet could then be converted into spirits, a yield of sugar-beet sufficient to pay a profit in spirits being sometimes too small to give any profit as sugar. The kind of soil most suitable is a deep, good soil, not peaty, all the better if on chalk; deep, and inclining to heavy, and thus possessing resources of potash. It is necessary to be close to a railway, as roots will not bear the cost of carriage beyond a very few miles. The factory should be placed in the centre of a sufficient supply of roots, close to a village population, and it must possess the command of a water supply of 100 gallons a minute. The capital required for the smallest factory that will pay is £9,000. There must be the means of converting the syrup into sugar, as the syrup is not always advantageously saleable. £12,000 to £15,000 and £20,000 may be found necessary if the supply of roots is good, the profit increasing to a certain point with the size of the factory. If a factory making 6,000 tons yields a profit of 6s. a ton, a factory of 7,000 tons should give a profit of 7s., and a factory of 8,000 a profit of 8s. This, of course, will soon reach its limit, as the carriage beyond a certain distance becomes unremunerative to the farmer. To overcome this, a plan has been successfully tried in France of extracting the juice on the farms where the beet is grown, and then conveying it by iron pipes to a central factory. It is very possible that this system, which exactly resembles the principle of cheese factories, may gradually supersede that of many small factories, there being so obvious an advantage in concentrating at one point that part of the process where skill and delicacy of management are most wanted, while at the same time getting rid of the carriage beyond the farm where they are grown of the roots and pulp.

There are three classes directly interested in this question—the capitalist manufacturer, the farmer, and, through him, the landowner, and the labourer. He would briefly consider the matter as it affects them. First, the manufacturer of the sugar, Mr. Duncan, at Lavenham, realized last year, on a capital of £12,000, a clear return of 15 per cent., besides writing off an equal sum for interest and depreciation. His factory was capable of converting a much larger quantity of roots, and the net return would have have been greater if the supply of roots had been adequate to his power. The yield of sugar last season was, however, probably above an average. He feels entire confidence, after three years' experience, in the quality of the roots produced in that part of the country being quite equal to the average of the Continent, and that the conversion of such roots into sugar will prove a successful operation if conducted with the requisite economy and skill. As to the farmer who grows the roots: The average produce of clean roots in 1870, at Lavenham, was from twelve to fourteen tons an acre, which at 20s. a ton did not leave a great profit. The crop was a light one. The sugar-beet is somewhat more difficult to grow than mangel, and more costly to harvest. While the Lavenham farmers are, therefore, not enthusiastic about their net returns from it, they have all agreed to contract at the same price to furnish future supplies to the factory. They receive back the squeezed pulp for feeding their live stock at 12s. a ton; and if Professor Voelcker's estimate of the value of that substance for feeding is fairly accurate —viz., that one ton of pulp is equal to one and a half of beet, they bring back upon the farmer, at a cost of 12s., an article equal in feeding and manure-making to the roots which they sell to the factory for 30s. The question that interests both farmer and landowner is whether the land can bear, for any lengthened period, the removal of this root crop. Potato-farming, without some extraneous supply of manure, is a very exhausting system, for the whole crop is carried away. But sugar-beet makes no such demand on the soil. A quantity of pulp, equal to nearly one-third in feeding value of the whole crop, is returned for consumption on the farm, and there is no difficulty now in making good the two-thirds by purchased corn, cake, and manures. The fact of the rapid progress of beet-sugar farming on the Continent, the increasing quantity of wheat and fat cattle produced in the districts where it has been introduced, the rise in the value of land and the wages of labour, all attest the prosperity of the system. The time may come when the price of meat may be so enhanced as to render sugar-farming in this country less remunerative than using directly the same roots for the fattening of cattle, but the probability is that the double produce of sugar and fat cattle will best serve the purposes of all concerned.

Finally, let them consider the labourer. A great variety of employment is brought into requisition by the sugar factory which would have no existence if the same quantity of roots were consumed on the farm by cattle. A factory of 6,000 tons will give employment for 100 days, and distribute during that time in wages about £1,900 chiefly to labourers, but partly also to foremen and clerks, engineers, and firemen. £1,000 will go in coal and coke, and the labour attending them; £400 in oil, tallow, gas, charcoal, bags, &c.; about £500 in railway transport, a considerable sum in repairs and maintenance, a contribution to local rates, and a large item to the public revenue. The advantage of providing a new market for the labour of agricultural parishes in the south of England during the slack time between autumn and spring needs no comment to those who know the circumstances of such country parishes. An expenditure at that time of £1,900 in additional labour among the population of each village where a factory is established must commend itself to all who are interested in the welfare of their poorer neighbours, whether landowner, clergyman, or farmer. He saw no reason to doubt that, with great advantage to all parties concerned, we may hope by a gradual introduction of sugar-beet growing into the eastern, the south-eastern, and south midland counties to become profitable growers of a large portion of our consumption of sugar, without any injurious displacement, possibly even with an addition, to our other agricultural produce.

No. 21.

Extract from Memorandum enclosed with Instructions for the Agent-General.

"The services of a special Agent in England are required for carrying out the recommendations of the Joint Committee on Colonial Industries, and it is very important that the person to be so appointed should have scientific position, intimate local knowledge of this country and its wants, and a lively interest in the success of the inquiry.

"The following are a few of the subjects that should be referred to such an Agent for personal investigation:—

"1. *Silk Industry.*—The information available in this Colony as to the exact wants of the Silk trade is very imperfect. Accurate, practical directions are required for the guidance of those who propose to attempt sericulture in this Colony; and it will be necessary to interest persons in the trade at home who will be able to give precise information as to the modes of rearing, packing, shipping, and other matters of detail. Thus, it is not even determined whether it will be more profitable to rear eggs or cocoons, or even whether there is any method of packing the cocoons so that they will carry without deterioration. Information on these points can only be obtained by a person on the spot—actively engaged in seeking it.

"2. *Manufactures.*—The Committee in their twelfth resolution, direct attention to the encouragement of such manufactures as can be established on a small scale, as a sphere of labour for colonists of small means. The information necessary for giving practical effect to the recommendation of the Committee can only be gathered in the more remote parts of Great Britain, where the condition of society is somewhat analogous to that of the outlying districts of this Colony. Information is required as to the cost of starting the following manufactures, viz.:—Tweeds, cloths, coarse woollen goods, especially blankets, rope and cordage, soap, starch, leather, malt, beetroot-sugar, and other similar commodities, especially with regard to the peculiar requirements of this Colony.

"3. *Technical Education.*—This subject has occupied a great deal of attention of late years in England, and several distinct systems of scientific instruction have now been in operation for a number of years. It is highly desirable that a report should be obtained on the practical working of each of these

systems, with a view to determining which of them is best adapted to the circumstances of this Colony. The procuring of such further information was evidently contemplated by the Committee, when they recommended that immediate steps for the introduction of technical and scientific education in this Colony should be only of a tentative character. It should, moreover, be the duty of such Agent to arrange for procuring educational appliances, and Natural History collections, by way of exchange or gift for the use of the educational institutions of the Colony. Such collections would be willingly given by many of the overcrowded museums at home, if there were a competent Agent on the spot to select those that would be acceptable in the Colony, and to undertake the trouble of packing and transmitting them.

"4. *Acclimatization.*—In addition to the above duties, the Agent might do good service in the interests of the Colony, by collecting information as to what means, if any, can be adopted to check the progress of the various insect pests that are so alarmingly destructive to almost every industry in this Colony; and in other ways to assist the efforts of the various local Acclimatization Societies, by personal communication with the best authorities at home."

No. 22.

Mr. E. Fox to the Hon. J. Vogel.

Sir,— General Government Offices, Wellington, 5th September, 1871.

I have the honor to hand to you estimates of the cost of machinery of various kinds, respecting which you instructed me, when in England recently, to make inquiry.

I have appended to the Memorandum of the Hon. the Colonial Secretary as to cloth-dressing machinery a statement why estimates for such machinery are not included amongst those now handed to you.

I have, &c.,

Hon. J. Vogel, &c. E. Fox.

Enclosure in No. 22.

Memorandum by the Hon. the Colonial Secretary for the Hon. J. Vogel.

It has been stated that the chief reason why the finer kinds of cloth and other woollen fabrics are not manufactured in this Colony is, from the absence of proper finishing machinery which is required to "dress" the manufactured article so that it will take in the market, but which process does not add to the durability of the fabric; further, that the expensive nature of such machinery precludes its use except for very large operations, and that no small local manufacturer could afford to employ it. It is desirable, therefore, that inquiry should be made on this subject in England, and, if the above information is found to be correct, it should be ascertained whether a manufacturer could be induced by a subsidy in form of a bonus or guarantee to undertake the establishment of such machinery in the Colony, to which local producers could send the unfinished material—of course, no subsidy could be offered without the previous sanction of the General Assembly.

By this means a local market would be created, especially for hand-made fabrics of good quality, which are only excluded from the market on account of their inferior appearance and finish to imported articles. This would afford a useful and profitable employment to a large class of persons who are not fitted for the more active life of colonists.

The advantages in favour of the establishment of such Colonial industries are found in the abundance and cheap supply of the raw material, the cheapness of food, and the great natural command of water-power. The disadvantages are the want of skilled labour and the dislike of persons in a new colony to settle down to the steady work of a mill. Necessity is however gradually overcoming this prejudice in the larger centres of population; and judging from the success which has already attended the establishment of mills and other manufacturing works in Melbourne, there is good reason for hoping that in a few years, with proper management at the start, a very large number of those who are at present almost useless to the Colony would be profitably employed as producers.

W. Gisborne,

Wellington, 2nd February, 1871. Colonial Secretary.

As to not obtaining Estimates for Cloth-dressing Machinery.

With a view to my obtaining information on the subject of the preceding memorandum, Mr. L. Lawson, of Leeds, introduced me to Mr. T. Robinson and Messrs. Wm. Kempe and Sons, of that city. Mr. Robinson is, I was told, the largest "dresser" in Leeds; and Messrs. Kempe, are practically the only firm in the district who make cloth-dressing machinery.

In each case a promise to supply me with estimates on or before 26th June was made, but was not performed, although I wrote to Mr. Robinson and to Messrs. Kempe, recalling the promise. I hope that the incoming mail will bring the estimates, as, at my request, Mr. John Morrison undertook to communicate, if necessary, with the gentlemen named, in time to allow of their answers being forwarded by the July mail.

The appended copy of a letter to Mr. Robinson will explain what passed during my interview with that gentleman, except as to the samples of wool spoken of in the first paragraph. During the interview Mr. Robinson several times said that no one could fairly decide what kind of machinery would be required, without knowing the precise qualities of wool to be manufactured; and I accordingly promised to send him average samples of New Zealand wools, procured from brokers in London.

"Dear Sir,— "Charing Cross Hotel, London, 15th June 1871.

"I have at length obtained samples of New Zealand wools, such as those for which you asked when I had the pleasure of seeing you in Leeds; and I have to-day forwarded them to your address, per Great Northern Railway.

"The Hon. Mr. Vogel will be much obliged if you will prepare an estimate for cloth-dressing (or finishing) machinery, such as you promised me, in time to allow of his receiving it here not later than Saturday, the 24th instant, as he leaves London for New Zealand early on the 26th.

"During our conversation, you said that you might be disposed to make an offer to send out the necessary machinery for dressing New Zealand made cloth, upon terms with the Government, in the shape of a guarantee or bonus.

"I am authorized by Mr. Vogel to repeat that the Government will be happy to receive and will favourably consider any reasonable offer you may be able to make, involving the payment of an amount per cent. per annum for a specified period on the cost of completing a Cloth-dressing Mill in New Zealand, or the payment to you of one fixed sum as a bonus in aid of that cost, leaving you to conduct the business and to receive all profits, but subject to an agreement as to the maximum charge per piece for dressing cloth sent to and taken from the mill at the manufacturer's cost and risk. It would be desirable that the charge for dressing should not exceed, or should very little exceed, that made by the best English dressers.

"I am also authorized to state that, in case of an agreement with you, the Government would provide free passages to the Colony for the workpeople necessary to set up and start the machinery.

"I am not able to give you an estimate of the number of pieces of cloth that would probably be sent per year to be dressed during the first few years. Any calculation for a guarantee or bonus should be based upon the fact that the manufacture of cloth is in its infancy in New Zealand, and the certainty that it would grow rapidly if there existed such a dressing-mill as that which the Government desire to see established.

"As I told you during our conversation, water-power is abundant in all parts of New Zealand; and men and girls fit to undertake the ordinary work could be easily obtained.

"I have, &c.,

"T. Robinson, Esq., Millgarth Mill, Leeds." "E. Fox.

ESTIMATE of MACHINERY by FAIRBURN, KENNEDY, and NAYLOR, Leeds, to the Hon. J. VOGEL.

MACHINERY for Manufacturing Sacking, &c., from jute, flax tow, or hemp tow. Spinning Machinery to produce from 1½ to 2 tons of yarn per day of ten hours.

WARPS.

1	Shell Breaker Card, 4 ft. by 6 ft. cylinder, with covering complete ...	£1,474	12	0
1	Circular Finisher Card, 4 ft. by 6 ft. cylinder, with four pairs of rollers, two doffers, and covering complete			
1	Patent Circular Gill, first drawing frame, two bosses, 17 in. width of gill...			
1	Second Spiral Drawing Frame, two heads, four bosses per head, 6 in. width of gill, leather pressing			
1	Regulating Spiral Roving Frame, forty-eight spindles, 10 by 5 in. bobbin, leather pressing			
3	Double Dry Spinning Frames, 124 spindles, each 4 in. pitch, 4 in. traverse double cylinders			

WEFTS.

1	Shell Breaker Card, 4 ft. by 6 ft. cylinder, with covering complete ...	£1,224	0	0
1	Shell Finisher Card, 4 ft. by 6 ft. cylinder, one doffer and covering complete			
1	Patent Circular Gill, first drawing frame, two bosses, 17 in. width of gill...			
1	Patent Circular Gill, second drawing frame, four bosses, 8 in. width of gill...			
1	Regulating Rotary Roving Frame, forty-eight spindles, 10 by 5 in. bobbin, leather pressing			
2	Double Dry Spinning Frames, 100 spindles each, 5 in. pitch, 5 in. traverse double cylinders			

Approximate cost of Twenty Sacking Power-Looms.

	Looms, 42 in. reed space, with 3-foot twilling motions, fitted with all the latest improvements, and ten extra yarn beams	£672	0	0

Preparing Machinery for the above Looms, consisting of—

1	Patent Cop Winding Machine, thirty-six spindles	£453	12	0
1	Warp Winding Machine, thirty-six spindles			
1	Beaming Machine with banks complete			
60	Shuttles, 60 pairs of pickers, 10 gross of warping bobbins			
1	Three-Bowled Calendering Machine, with two rollers of paper and one of iron			

Packed and delivered f.o.b. Liverpool or London.

Payment—one-third when the order is given in cash bills on London, net; and two-thirds when the machines are ready for delivery, also in cash bills on London, net.

Leeds, 6th June, 1871.

The power required to drive the foregoing machines will be about 90 indicated H.P.

The workpeople necessary for the foregoing machines will be about sixty girls and women, about six or eight little girls and boys, and six or eight men.

ESTIMATE of MACHINERY by FAIRBURN, KENNEDY and NAYLOR, Leeds, to the Hon. J. VOGEL. MACHINERY to prepare and spin about 14 cwt. per day of Rope Yarn, average No. 20, from Hemp, Manilla, or New Zealand Flax.

1 Combined Spreader and Drawing Frame, two bosses, 66 in. reach, 16 in. width of gill, wood pressing rollers	£1,170 0 0
1 Second Drawing Frame, one head, four bosses, 52 in. to 58 in. reach, 8 in. width of gill, wood pressing rollers	
2 Spinning Frames, twelve spindles each, 10 in. x 5 in. bobbin, 41 in. to 45 in. reach, patent leather pressing rollers	
1 Manilla Lapper, 6 ft. diameter of drum, complete, with covering ...	

Packed and delivered f.o.b., Liverpool or London.

Payment:—one-third when the order is given, in cash bills on London, net; and two-thirds when the machines are ready for delivery, also in cash bills on London, net.

Leeds, 5th June, 1871.

The power required to drive the foregoing machinery will be about 15 indicated horse power.

The workpeople necessary for the foregoing machinery will be about 7 girls, 3 boys, and 2 men.

"20's Yarn" means yarn of which twenty being used for a strand, three such strands would make a 3-in. (circumference) rope.

"Manilla Lapper" is specified—precisely the same machine would be made if New Zealand flax is to be the material operated on.

Machinery for making the strands and then ropes, would cost about £2,000 or £2,500.

The firm always send a man to erect their machinery—selected with a view to fitness to act as manager of the works.

PAPER.

GENERAL ESTIMATE of Cost for all requisites for a small Mill, such as has been sent to Victoria, supplied by Messrs. BENTLEY and Co., Lodge Bank Works, Bury, Lancashire.

MACHINERY for making about 12 tons Paper per week:—	£
1 Chopper	50
1 Willow	55
1 Duster	25
4 Boiling Pans	200
1 10-cwt. Washing, &c., Engine	230
2 Batting Engines	300
1 Paper-making Machine, wire part, first and second presses, seven drying cylinders, calenderers, felt rolls, reeling apparatus, knotters or strainers, stuff pump, back-water pump, stuff chest, and steam-engine	1,200
Cutting Machine and Steam-engine	165
Teagle, without woodwork	25
Gearing, steam pipes, and valves	200
2 Steam-boilers, 7 feet diameter, 24 feet long, with 10 Galloway tubes ...	500
1 Engine 42-inch stroke, 20-inch cylinder, with fly-wheel, to turn from 40 to 50 horse-power	350
Wires, felts, straps, hot-water cisterns, &c., for about twelve months work (less stock on hand should not be kept)	300

An ordinary water-wheel or turbine, of equal power, might be substituted for the last specified engine—in which case, one of the specified boilers (cost £250) would be dispensed with.

Hands required:—One steam-engine tenter, two or three hands in the sorting room, who would also attend to the chopper and willow; one for washing machine, &c.; one for the batting-engine; one for paper-making machine; two girls for the cutting machine; three hands for the finishing room.

A thoroughly competent manager for such a mill would be paid in England from £3 to £4 per week.

The wires and felts are the most expensive portions of the apparatus that require renewing. A competent manager would, while his wires, &c., were not much worn, keep producing (as far possible) only good qualities of paper, and when the wires, &c., were worn, he would use them for coarser papers, for which they would then be quite as good as if new.

London, 22nd June, 1871. E. FOX.

BLANKET MACHINERY.

ESTIMATE by Mr. JOHN TATHAM, Moss Lane Works, and Milnrow Road Works, Rochdale. (A plant, such as that estimated for, has recently been sent by Mr. Tatham to the Cape of Good Hope.)

12 Looms.	1 Soaker.
2 Double Carding Engines, with condenser.	1 Beaming Frame.
2 Mules.	1 Twining Mill.
1 Teazle.	

Cost of the above, with the necessary cards, which would be procured by Mr. Tatham, about £1,400.

Power—10-horse, nominal.

Hands, 14.

Estimated consumption of wool, one pack (240 lbs.) per day.
Good weavers would produce 40 yards per week per loom.
Apparatus for scouring, &c., would probably cost over £100.

E. Fox.

London, 22nd June, 1871.

ROPE YARN.

ESTIMATE, by Messrs. TAYLOR, WORDSWORTH, and Co., Water Lane, Leeds, for Machinery calculated to produce from 15 cwt. to one ton of Yarn per day of ten hours.

4 Lappers,	... ...	each	£108
3 Drawing Frames,	... ...	„	285
6 Spinning Frames	... ...	„	175
100 Iron Bobbins	... ...		30

Power required, about 15 horse. Hands—15 in all, five or six of them being men, and the rest boys or girls.

Rope-making Machinery, for consuming the before stated quantity of yarn, assuming that the yarn is not tarred, and only a little oil used—Probably £600.

London, 22nd June, 1871. E. Fox.