1873.

NEW ZEALAND.

THE BULLER COAL FIELDS,

(REPORTS RELATIVE TO).

Return to an Order of the House of Representatives, dated 16th July, 1873,
"That there be laid upon the Table copies of correspondence and reports relative to the Buller Coal Field."—(*Mr. O'Conor.*)

MOUNT ROCHFORT.

No. 1.

Dr. HECTOR to Mr. KNOWLES.

MEMO. for the UNDER SECRETARY, Public Works.

I BEG to recommend that authority be given to expend a sum not exceeding £300 from the Public Works Coal Field Exploration Fund, in the practical development of the coal seam at Ngakawau River, with the view of tracing the seam on to the Mount Rochfort Plateau in the manner suggested in my report of 22nd June last (Parl. Papers, D. 3, p. 13).

I have arranged with Mr. A. Dobson, District Engineer, to have the work commenced at once, in the event of the authority being granted, and I propose inspecting the work myself when it is advanced.

16th October, 1872. JAMES HECTOR.

No. 2.

Mr. KNOWLES to Dr. HECTOR.

SIR,— Wellington, 29th October, 1872.

In reply to your Memorandum of the 16th inst., in which you recommend that authority be given to expend a sum not exceeding £300 in the practical development of the coal seam at Ngakawau River, I am instructed by the Hon. the Minister for Public Works to inform you that authority will be given to the amount asked for, to be expended under your direction.

I have, &c.,
JOHN KNOWLES,
Under Secretary.

Dr. Hector, Museum.

No. 3.

Mr. W. LLOYD to the Hon. the MINISTER for PUBLIC WORKS.

SIR,— Westport, 28th January, 1873.

I have the honor to transmit for your perusal the enclosed memorial from residents in the town of Westport, praying that you will take early steps to have the railway from Westport to the coal fields of Mount Rochfort and the Ngakawau surveyed and constructed as soon as possible. Late discoveries, added to those already known, have placed far beyond doubt the question of the sources of supply being equal to the requirements of a large export trade at Westport and the Ngakawau. The memorialists, therefore, are desirous of learning that steps are being taken in order that this district and the Colony at large may profit from the immense beds of mineral lying on the very threshold of the town.

I have, &c.,
W. LLOYD.

The Hon. the Minister of Public Works, Wellington.

Enclosure in No. 3.

Messrs. Bailie, Humphrey, and others, to the Hon. the Minister for Public Works.

Sir,—

We, the undersigned, residents in Westport, have the honor to call your attention to the under-mentioned facts:—

1. That the Joint Committee on Colonial Industries have reported on the Mount Rochfort and Ngakawau Coal Mines as follows:—"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 as the place of export."

2. That surveyors recently engaged in cutting lines have reported the discovery on the south branch of Mine Creek (a tributary of the Ngakawau) of a horizontal seam of coal 5 feet thick; thirty chains further up the same creek they discovered another of similar thickness; half a mile beyond this seam, on the main south branch of the creek, they found a seam 20 feet thick; this seam also extends a considerable distance, and thousands of tons may be got by stripping off about nine inches of soil from the surface, in many places the coal lying bare. On the south branch of the Ngakawau, under Mount Frederick, seven distinct faces of coal were counted, each from 15 to 20 feet in thickness. Two miles south of the Ngakawau, on an unnamed creek 60 chains from the coast, another seam was found dipping seaward, from 10 to 15 feet thick. All the coal thus found is the true black coal, as existing in the Mount Rochfort measures.

3. That recently, on two occasions, the s.s. "Waipara" came up from Hokitika for the purpose of taking coal from the Ngakawau Mine, but owing to the shallow state of the bar of that river she could not enter, and therefore returned without cargo.

4. That daily experience proves the Ngakawau River unsuited as a port of export for the coal, there neither being sufficient water on the bar nor available accommodation for vessels when inside.

5. That a sum of money has been placed on the Estimates for the purpose of constructing a railway from Westport to these coal fields.

We therefore respectfully request you to use your best endeavours in having a line of railway surveyed and constructed as early as possible, in order that this district and the Colony at large may reap those great and lasting advantages which offer themselves in connection with the carrying out of such a reproductive undertaking.

We have, &c.,

Bailie and Humphrey, and 167 others.

The Hon. the Minister for Public Works, Wellington.

No. 4.

Mr. Thomas Field to the Hon. the Minister for Public Works.

Sir,— Westport, 28th January, 1873.

A petition having been got up by the inhabitants of Westport and forwarded to you by this day's post, requesting that you will take early steps with the money voted in past sessions of the General Assembly to make a railway from Mount Rochfort to this port, the petitioners request that the money so voted be used to make a railway from the Ngakawau River to Westport (some eighteen miles distance, over a level country), the recent discoveries there (Ngakawau) being without doubt a continuation of the Mount Rochfort Coal Field, only much more easily available, the pit mouth of the mine now working being only some 40 feet above the Ngakawau River, and the coal wharf and shoot under a chain distant from it. The gentleman who drafted your petition, and seven-eighths of those who signed it, never saw the Ngakawau or the present working, on which about £1,000 has been expended by us in developing the mine, a seam of about 20 feet thick and of excellent quality (see Dr. Hector's analysis and report thereon); yet those persons do not hesitate to make statements which are not founded on fact, by saying that there is no shelter in the river during freshets, which on the contrary affords good shelter in floods for a number of vessels, in a large deep basin, several chains in length by 140 feet wide, with a general depth of 10 feet at low water all over it; there are two other places where shelter from floods could be obtained. They also speak of the inability of the s.s. "Waipara" to enter the river, owing to the shallowness of the bar. The "Waipara" has been once up to the mine, last May (when prospecting first commenced), and latterly on the occasions spoken of by the petitioners; in one of these instances the sea was too rough to enter safely, and in the other there were 7 feet shown by the signalman (being neap tides); and although the "Waipara" only drew 5 feet, yet the master declined to enter the river, as he feared getting bar-bound, the barometer being low, and having the mail-steamer to tender at Hokitika. The steamer "Result" went in and loaded, coming out same tide with over 7 feet water (an hour after high water).

We, the original prospectors, and now the lessees of the Ngakawau Mine, do not wish you to infer from the foregoing that the entrance to the Ngakawau River is excellent, but it has sometimes 10 feet and over at high water (spring tides) and perfectly straight also, particularly after floods; and it is the opinion of the Provincial Engineer and of Dr. Hector, as well as several other persons, that with a comparatively small expenditure the Ngakawau River could be made safe for vessels to enter or leave at high water drawing 10 to 11 feet water. There is but little doubt that an extensive coal field exists in this district; the seams already known number twenty-two, from 5 to 24 feet in thickness, and of the finest quality. No doubt the Government may find it necessary to make the railway to Westport, as well as the harbour at Ngakawau for a smaller class of vessels. Before closing, we may state that our only reason for troubling you is that we have at a great expense opened up and proved this mine and

district (as yet without any pecuniary assistance), and to correct statements made at random by individuals who have never seen or have the remotest idea of the neighbourhood in question, or of the difficulties connected with an undertaking of this nature, but who are always ready to seize anything good, always provided it costs them nothing.

We hope the Government will soon send the Engineer-in-Chief, or other competent person, to inspect the harbour.

Apologising for troubling you with this lengthy epistle,

I have, &c.,
THOMAS FIELD,
(for the Lessees of the Ngakawau Coal Mine).

The Hon. the Minister of Public Works, Wellington.

No. 5.

The Hon. G. M. WATERHORSE to Dr. HECTOR.

FORWARDED to Dr. Hector, who is requested to report the steps in his opinion best to be taken with a view to the development of the coal fields, and also whether he deems it desirable that the Government should proceed with the survey of the line of rail to Westport, as suggested by the petitioners.

10th February, 1873. G. M. WATERHOUSE.

No. 6.

The Hon. the COLONIAL SECRETARY to His Honor the SUPERINTENDENT of NELSON.

SIR,— Colonial Secretary's Office, Wellington, 20th February, 1873.

Herewith I do myself the honor of forwarding to your Honor the copy of a report I have received from Dr. Hector on the subject of memorials which have been sent in to the Government, with a view to promoting the development of the Westport Coal Fields.

Before taking any further action, or incurring the expenditure recommended by Dr. Hector, the Government is desirous of ascertaining what is the true position of these coal reserves; how far they have passed from the charge of the Provincial Government; and what steps the Provincial Government of Nelson purpose taking to facilitate their working.

Any information on these or any points connected therewith, calculated to guide this Government to a correct decision, that your Honor can give, will be highly appreciated.

I have, &c.,

His Honor the Superintendent, Nelson. G. M. WATERHOUSE.

Enclosure in No. 6.

MEMORANDUM for the Hon. the COLONIAL SECRETARY.

THERE is no longer any doubt that the Ngakawau will be the outlet from the coal field on the Mount Rochfort plateau, and that coal exists in large quantities in positions only accessible from that quarter. I think it therefore very desirable that a railway line should at once be surveyed from Westport northwards to the Ngakawau, and that an estimate should at the same time be obtained of the cost of erecting and maintaining sufficient wharfage in the Buller River. An engineer should also report on the Ngakawau River, as perhaps a small expenditure would render it immediately available for shipping coal in small quantities during the long period that must elapse before the railway line can be finished. I have just received the enclosed letter from Mr. Dobson, who has at my request inspected the recently discovered outcrops. He reports that, though the plateau coal has not yet been traced lower than 749 feet above the sea level, there is an area, as proved, that he estimates will yield twenty millions of tons of good bright hard coal by very easy mining.

A large block of this coal from the mine now being worked at Ngakawau has just been received at the Museum, and shows that the coal has greatly improved in quality and firmness as it has been followed in from the outcrop. The main drive is near on to 220 feet, and the seam has thickened from 16 to 20 feet, and is also less steeply inclined.

19th February, 1873. JAMES HECTOR.

Sub-Enclosure to Enclosure in No. 6.

Mr. A. D. DOBSON to Dr. HECTOR.

SIR,— Westport, 13th February, 1873.

Yesterday I went on the Ngakawau field to look at the outcrops Rome found; these were much higher than by his description I had expected. The first two seams I went to were on Mine Creek, about one mile and a half from the mine, 749 feet above sea level, the lowest dipping to the north and west about 20°; about 4 feet of good coal. The higher of the two was 973 feet above sea level, dipping in the same way; about 3 feet 6 inches of good coal. As you remember, when we came down together the day we went up Mine Creek, we crossed a swampy grass flat just before we left the open ground for the last time; these two seams are showing in the creek just below that flat. The next seam I saw was 1,738 feet above sea. I could not see the bottom of the seam the creek cut right through, the creek bottom being coal. I measured one face 17 feet high, good hard bright black coal. This seam is a little beyond where you and I turned back from. From a point above this

spot two faces of coal are visible a little further up the hill. I then went due west to within half a mile of the seaward face of the mountain, and in the main branch of a creek (which flows into the lagoon a little to the southward of the Mantoria Rocks) examined two other outcrops; the highest was 1,603 feet above sea, and the other 1,355. In both cases the creek had cut through and exposed the seam for several chains. The top of the coal was covered, so I could not ascertain its thickness, but I measured 9 feet of good hard coal. The seams here lay close upon the granite and slates. In crossing the slopes going westward, every creek contained drift coal. The two last-mentioned seams were dipping to the north and west; one appears dipping slightly to the eastward, but that must have been, I think, only local. I returned to the beach following down the creek to the lagoon, passing over sandstone and shale most of the way. I should not be surprised if the coal was found very much lower down; in fact, with a few faults intervening, I think it will probably be traced from the mine right up the mountain.

There is nothing new about what has been found, but it has proved beyond all doubt what you always said about the Mount Frederick seams.

It rained nearly all the day I was on the mountain, so I was unable to make a sketch map of the northern slopes, as I had intended.

With the bush lines that are now cut, in ten hours one can see everything worth seeing. I think the seams are fairly continuous on the plateau at the head of Mine Creek; a drift coal abounds in every stream. I reckon (or estimate) this plateau to be about a mile in extent, and that it would supply at least twenty million tons without any trouble to get at it. From the dip of the seams in Granite Creek (the creek south of Mantoria), I think the outcrop should be found on the seaward face about 1,000 feet above sea level.

I have, &c.,

Dr. Hector. A. Dudley Dobson.

No. 7.

Mr. R. C. Chambers to the Hon. the Minister for Public Works.

Sir,— Wellington, 8th March, 1873.

I take the liberty to address you, to call your attention to the advisability of early action being taken to assist in opening up the extensive coal field near the Buller, Province of Nelson, either by constructing a tramway to Westport or by harbour works at Ngakawau, and respectfully request an early inspection of the district, in order to decide the most advisable course to pursue.

I have been informed that a sum of money has been appropriated for the purpose of making a railway between Mount Rochfort and the Buller (subject to the coal not being found in a more accessible position). The proposed line to Mount Rochfort would only allow the working of a small portion of the upper part of the coal field, and would render the working of the coal to the dip an expensive operation, whereas by continuing the line along the coast to Ngakawau, thence up Mine Creek to the plateau, a large area will be opened up at comparatively small expense. I would respectfully submit to your Honor's attention the great importance of early action being taken on this subject, seeing that a sum of £100,000 is annually sent out of the Colony for a supply of coal inferior in quality for steam purposes to that proved to exist in abundance between the Ngakawau and Mount Rochfort. It therefore becomes a matter of national importance that no time be lost in utilizing the coal deposits, which have been placed at command in such quantities as to allow, not only supplying the wants of New Zealand, but also to admit the Colony to become a large exporter to California and Victoria. In order to compete with New South Wales in these markets, large vessels of the screw-collier class will be required, and the only port on the West Coast where such vessels can be accommodated is the Buller, where a comparatively small outlay will make the harbour available for vessels specially constructed for the coal trade of 1,000 tons burden.

As an example of what can be done in river improvement, I would respectfully refer you to the present state of the Tyne compared to what it was eighteen years ago; and I have no hesitation in saying that with the same spirit of enterprise, and judicious expenditure, the Buller would become the Tyne of New Zealand.

Your Honor and the Government have now an opportunity (which only occurs at rare intervals), by judicious assistance, of giving such an impetus to the coal trade of the Colony as will benefit all classes of the community.

Pleading the importance of the subject for thus addressing you,

I have, &c.,

R. C. Chambers,

(for the Shareholders of the Ngakawau Coal Mining Company, Westport).

The Hon. the Minister for Public Works.

No. 8.

The Hon. the Colonial Secretary to His Honor the Superintendent of Nelson.

Sir,— Colonial Secretary's Office, Wellington, 13th March, 1873.

I have the honor to inform you that application has been made to the Minister for Public Works by a Mr. Chambers, representing the Ngakawau Coal Mining Company, to expend the whole or portion of the money appropriated by Parliament for the purpose of constructing a railway to the Mount Rochfort Coal Fields.

Mr. Chambers has also furnished the Minister for Public Works with copy of letter from the Provincial Secretary of Nelson, dated 9th December last, defining the terms on which it is proposed to grant the above Company a lease of 400 acres.

Before the Government can go any further in this matter, it is necessary that they should be informed of the real position of the Mount Rochfort Coal Reserve.

As your Honor is aware, the Government is going to considerable expense in exploring the above reserves, and they view with surprise the proposal of your Government to grant a lease on such terms as those now submitted to them, as it would appear from the last information now in the hands of the General Government, the portion of land proposed to be leased is the key to the whole of this valuable coal field. Soliciting your early attention to this subject,

I have, &c.,

His Honor the Superintendent of Nelson.

Enclosure 1 in No. 8.

Mr. R. C. CHAMBERS to the Hon. the MINISTER for PUBLIC WORKS.

SIR,— Wellington, 10th March, 1873.

In compliance with request contained in yours of this date, I have the honor to enclose a copy of letter received from the Provincial Secretary, Nelson, *re* the granting of lease to the Ngakawau Coal Mining Company.

I may state our Company has already been at considerable expense in proving the value of the coal seam at Ngakawau, which was condemned in most of the reports on that coal field, and it was only after considerable labour and expense that we have been able to demonstrate the value of this seam. Our perseverance and success have led to a more thorough examination of this coal field, and the result has been the proving of an extensive area of first-class coal in several separate seams.

From the appearance of the seam in our lease we must at an early date either erect machinery or put in a tunnel for some distance on the east side of Mine Creek, in unproductive rocks, to reach the coal-level free. Either arrangement will necessitate a further outlay of £1,500 or £2,000, so that your Honor will see the necessity of treating our Company in a liberal manner, seeing we are the pioneers of this coal field, and also, as soon as a tramway is made to Westport, sufficient mines may be opened up to supply a large export trade.

I have, &c.,
R. C. CHAMBERS.

Enclosure 2 in No. 8.

The PROVINCIAL SECRETARY, Nelson, to Messrs. THOMAS FIELD and Others.

GENTLEMEN,— Superintendent's Office, Nelson, 9th December, 1872.

Referring to the telegram from this office dated 6th December instant, wherein you were informed that Dr. Hector having waived his objections, a lease of 400 acres would be granted to you at Ngakawau, I have now to inform you of the special conditions upon which the lease will be granted, which are as follows, viz.,—

1. The term of lease shall be twenty-one years.
2. The rent shall be 1s. per acre for the first year, and 4s. per acre per annum for the remainder of the term.
3. The lessees shall raise during the first year not less than 5,000 tons of coal; during the second, third, fourth, and fifth years of the said term not less than 10,000 tons each year; during the sixth, seventh, eighth, ninth, and tenth years of the said term not less than 15,000 tons each year; and during the remainder of the said term not less than 20,000 tons each year.
4. That the block to be leased shall be subject to the approval of the Superintendent, and shall not be within two chains of the River Ngakawau.

In addition to the above special conditions, the conditions as to royalty required by "The Waste Lands Act, 1863," and those usually inserted in coal leases, will be imposed in the lease to be granted to you.

I have, &c.,
ALFRED GREENFIELD,
Provincial Secretary.

P.S.—The object of reserving one or two chains on the bank of the river is to prevent any monopoly of facilities for shipping by any one Company, whether for coal mining or other purposes.—A. G.

No. 9.

His Honor the SUPERINTENDENT of NELSON to the Hon. the COLONIAL SECRETARY.

SIR,— Wellington, 22nd May, 1873.

I have the honor to forward herewith a copy of a resolution passed unanimously by the Provincial Council of Nelson relative to the late discoveries of coal at Ngakawau and Waimangaroa, and to the urgent importance of the immediate construction of a railway to convey the proceeds of the mines to the port of Westport.

As I have already on several occasions recently pressed this matter on the attention of the Government, I need now only express my entire concurrence with the resolution, and my earnest hope that the Government will lose no time in coming to a decision upon a question of so great interest to the Colony as well as to the Province of Nelson.

I have, &c.,
OSWALD CURTIS,
Superintendent of Nelson.

Enclosure in No. 9.

Copy of a RESOLUTION passed unanimously by the PROVINCIAL COUNCIL of NELSON on the 19th May, 1873.

"THAT, in the opinion of this Council, the late discoveries of coal of high quality and in large quantities at the Ngakawau and Waimangaroa render the construction of a railway suitable for coal traffic, from the Ngakawau to Westport, a matter of urgent importance, and the Council trust that the Colonial Government will proceed with the work without delay, under the authority of 'The Railways Act, 1872,' from funds therein appropriated for Mount Rochfort Coal Railway."

No. 10.

Dr. HECTOR to the Hon. the MINISTER for PUBLIC WORKS.

MR. FISHER, of Westport, telegraphs that the contractors who are putting in the drift to cut the coal seam on the north side of the Waimangaroa River have struck the crossing at 113 feet. This is 13 feet further than I expected, and proves that the coal is not dipping so steeply, or the strike has changed in direction. The contract was only for 15s. a foot, so that the authority for £100 will cover expenses up to 130 feet. I have therefore telegraphed to go on cutting through the coal seam to determine its thickness.

24th May, 1873. JAMES HECTOR.

No. 11.

MEMORANDUM by Dr. HECTOR relative to MOUNT ROCHFORT DISTRICT.

THIS coal field, the general features of which were explained in my report of last year, includes a large area extending parallel with the coast from the Buller to West Wanganui, and is about eight miles in breadth. It is probably the most important coal field in New Zealand, on account of the large extent of coal of fine quality which it contains, in addition to which many seams of coal of inferior quality are found in the district. As a general rule, which applies not only to this field but to all others on the West Coast of the South Island, the coal that is at a high level above the sea or which lies at a steeply inclined angle is of the best quality, the low lying coal being usually of the inferior varieties.

It must not be thought, however, that the coal is continuous throughout the above area, as it occupies detached basins and trough-like depressions on the undulating surface of older rocks. Computations of the amount of coal available are therefore not to be depended upon, unless the extension of the seam can be absolutely traced, particularly in the more broken parts of the district, where large areas of the coal formation have been removed by the denudation of the valleys, which generally are cut right through the coal-bearing strata into the underlying rock.

During the past year additional information has been obtained—(1.) By the works in progress at the Ngakawau Mine; (2.) by exploration undertaken by the Department; and (3.) by chance discoveries.

1. *The Ngakawau Mine.*

As no facilities exist for shipping the coal at the Ngakawau River at the present time, nor for conveying it to the Buller River, the workings are still restricted to supply small shipments by the little steamer "Result," which plies to the Buller when the weather and bar are favourable. So far they completely bear out my former estimate of the value of this coal seam. The main drive has been carried forward 230 feet with a height of 18 feet, and the coal has decidedly improved in quality; only one small drop of 4 feet has been encountered in the roof, and the seam is less steeply inclined than it was at the face where first opened. The thickness has also increased to 20 feet.

Besides the main drive, an air shaft has been carried up at an angle of 40 degrees to the outcrop of the seam, and it has been proposed to work the mine by a horse-whim from this incline.

The present level of the mine, if carried forward, would cut out into Mine Creek, so that it would be necessary to sink to a lower level to enable the coal to be followed under the creek, and from there rise into the block of coal formation that has now been proved to rise on the east side of the valley, as I shall afterwards describe. To reach the lower level thus required, it has been suggested that the steep incline from the outcrop should be carried down in the coal to the necessary depth, and a level drift then set off under the creek. This will, however, involve much handling and hauling of the coal, and I would recommend that instead of this method of working, a gentle incline be carried from the mouth of the present drive at such an angle that horses will be able to drag the waggons out to the shoots direct from the face. This drive, when it passes under the creek, should be made as small as possible, with a good coal roof; and as Mine Creek, where the coal crosses it, is considerably above the level of the main river, this deep drive will be easily drained by a water level carried out also in the coal to the river below the shoots, as shown in plan and section.

The only other work that has been done by the Company towards proving the extent of the mine has been the tracing of the outcrop of the seam on the east side of Mine Creek, at the height of about 200 feet; and the direction obtained shows that the coal measures are remarkably steady for at least that distance.

As observations of the changes which take place at the outlet of a river may be useful in considering the erection of improvements, I may state that, at the time of my last visit on 11th April, the width of the channel at high water was considerably decreased from that shown on the plan attached to my report of last year; and at low water, where it crosses the beach, the channel of the stream was turned more to the north than formerly.

The bank which used to be exposed at low water on the north side had disappeared, but these changes appear to be due rather to rearrangement of the material than to any fresh accumulation. The inside channel, leading up to the mine, has been to a great extent cleared of the boulders that formerly obstructed it; but, probably in consequence of this, a considerable scour had taken place on the south bank, where it is formed of fine shingle.

2. *Exploration.*

Lines have been cut through the bush from the sea across Mine Creek, and up out of the level of the plateau; and several fresh outcrops of the coal have been discovered by this means, which have already been reported in my memorandum of 19th February, and in the enclosed letter from Mr. Dobson, under whose direction the work was performed.

The position of these lines and outcrops is shown on the attached Plan *

The area explored extends for five miles south of Mine Creek with a width of three miles between granite of Mount Frederick on the west, and a wooded range on the east that divides the south branch of the Ngakawau River from the Valley of the Orakaka. This ridge is probably slate, but this has not been determined.

The area may be divided into—(1.) The Lower Mine Creek, which is a steep declivity on the east side of the valley, the west side being formed by long ridges of argillaceous sandstone overlying the coal measures. The whole of this portion is included in the Coal Company's leasehold. (2.) The Terraces, which are a succession of steps lying east and west, by which the ground rises from 1,000 to 1,800 feet above the sea level. (3.) The Plateau, which is from 1,800 to 2,500 feet above the sea level.

I have not been able to satisfy myself that there are several distinct coal seams, as has been reported, but rather that the coal varies in the thickness from 3 feet on the eastern boundary to 20 feet in the middle, decreasing to 16 feet in the west, where it is cut off on the slopes of Mount Frederick. This is also the character of the seams at Coalbrookdale and on Mount William, which favours the view that the seam is continuous from that direction.

Coal has not yet been found between the vicinity of the Coal Mine and the edge of the first step of the plateau, where the east branch of Mine Creek commences to fall rapidly into the valley; but this is only due to the absence of natural sections; and as this part of the coal is included in the Company's leasehold, and will be worked as part of the present mine, I did not think it advisable to incur the great expense that would be necessary to prove the seam in this part of the field. Indications of two faults are visible in following the boundary of the formation in a south-easterly direction from Mine Creek. They both bring the granite to the surface, as shown approximately on the plan, and will interfere with the continuity of the coal workings, but will not materially diminish the area of available coal. The altitude at which the next outcrop has been found (marked A on plan) is at 750 feet above sea level. The seam is exposed in the bed of the east branch of Mine Creek, and can be traced in the bank for some distance, with a dip of 20° to N.W., and a thickness of 3′ 6″ of clean bright coal, with a roof of hard sandy shale, and a floor of dark gray sandstone. Following up the creek to the south-east, the floor of the stream is formed by the strata beneath the coal for 15 chains, which are here coarse grits and sandstones, the ledges forming falls.

Several small faults are distinctly seen running S. 30° E., and dropping the strata 4 to 10 feet to the west. These are only mentioned as they serve to indicate the manner in which the coal measures are bent over the edge of the plateau, on which they are comparatively level, and acquire the high angle of dip which they have in Mine Creek. At the point marked B, the bed of the stream has again risen into the cover of the coal, and the seam is exposed on the face of a waterfall, showing 3 feet of coal, with a dip of 15° W. This outcrop is 980 feet above the sea, and is situated about the extreme S.E. corner of the leasehold that has been granted. At this elevation the open rolling country of the plateau commences, the bush and scrub being chiefly confined to the gullies. Terrace-like steps stretch to the westward until they are cut off by the scarf of Mount Frederick, leading down to the sea, as shown in sections AB and CD.

Evidence of the extension of the coal seams throughout this part of the field is found in the occurrence of the two outcrops discovered by Mr. Dobson in Granity Creek, at 1,350 and 1,600 feet altitude. I examined the lower of them, marked C on the plan, and found the coal is very imperfectly exposed in the bottom of a deep ravine, but it appears to be at least 10 feet thick.

A short distance above this coal, a spur of the granite from Mount Frederick is at the surface, forming a wooded hill, and at the upper or eastern boundary of this the true high level of the plateau commences with an average altitude of 2,000 feet, the surface of which, though undulating, is never abrupt except in the ravines, and is formed of the sandstone grits and interbedded shales of the coal measures, which dip at moderate angles, and are much less disturbed than in the part of the field above described. The ravines, which are from 50 to 100 feet deep, frequently expose good sections of the strata, and near the source of the east branch of Mine Creek the coal can be traced for about twenty chains with tolerable regularity.

At D on the plan this seam is seen to great advantage on both sides of a precipitous gorge, where it forms vertical cliffs of hard black coal, that appear to resist the action of the weather. As the floor of the creek is also coal, the full thickness of the seam was not ascertained, but about 22 feet is exposed in the section. The coal is laminated with a bright fracture, and closely resembles the coal that was mined at Coalbrookdale, which differs from the Ngakawau coal only in its greater coherence and lustre, and in the larger proportion of gaseous matter which it contains.

The seam is easily traced in the bank of the river to the north-east, as shown on the plan; but in that direction it thins rapidly, and is cut by a succession of small faults.

In the opposite direction the outcrop is obscured by scrub for some distance, but it is again exposed in a landslip in a slight excavation. It is then seen crossing the bed of the next highest branch of the creek at D, which is the last exposure in that direction.

* Not printed.

In a southerly direction the seam underlies the area marked "Plateau coal" for the distance of a mile, as what must be the same coal again appears in the ravine of the south branch of the Ngakawau River, at the point marked E.

This is the largest block of coal which has yet in this district been defined with tolerable accuracy, and by a moderate estimate is computed to contain 7,000,000 tons. Coal has been seen in many of the ravines between this point and Coalbrookdale, which is distant eight miles to the south, so that it is very probable that the coal is continuous for that distance; but until there is a map of the country on which these can be accurately laid down, any reference to them might only tend to mislead in estimating the extent of coal which they indicate.

The chief difficulty in working this coal will arise from its inaccessible position, and the absence at that altitude in the mountain of any timber suitable for mining purposes. While the coal is obtained with such facility and economy of capital at the Ngakawau Mine, the coal in Granity Creek is therefore not likely to be worked—not at least till a large trade is created; and as during the interval the district will become better understood, it is unnecessary at present to discuss the manner in which access can be obtained to that part of the field.

I am, however, confirmed in the opinion formerly expressed, that the natural outlet will be to the Ngakawau or its immediate vicinity, so that any works undertaken for the conveyance of the coal from there will serve ultimately for the whole field. It is true that a very direct but steep line might be found by following the west side of Granity Creek, but this would still bring the coal to within a mile of the Ngakawau River. No coal has yet been discovered in the course of Granity Creek except that already mentioned as occurring near its source; but there is reason to think a seam may be found at a low altitude, and under circumstances almost as favourable for being worked as at the existing mine. For a mile back from the sea the stream is in a deep gorge, and flows over the same dark marly sandstones as those overlying the coal further north. A vertical fall of 200 feet then occurs, the upper part of which is over coal grits and sandstones, like those overlying the coal on the plateau. This cliff is continued to the eastward, forming the edge of the terraced area between the plateau and Mine Creek; and the only difference between the section here exposed and that at the coal mine is, that the grits below the coal appear to have thinned out against the granite of Evans Cliff. If this view is correct, the outcrop of the coal should occur in the gorge of Granity Creek, below the fall, as indicated on the plan.

Waimangaroa.

A party of gold miners, when tunnelling under the drift in the side of the valley, following the surface of the old bed, discovered a seam of coal interstratified with gritty sandstone. The position is on the opposite side of the valley and in the line of strike with the then seam, which I saw in 1866, when the miners were in the habit of using it for sharpening their tools, so that it is probably the same seam which is described in my former report as the 16-inch seam that has been found at intervals along the seaward face of Mount Rochfort. As it appears to be thicker at this place, and the quality to be somewhat different, being in fact identical with the coal from the Ngakawau seam, a drive has been put in for the purpose of cutting the coal in the solid part of the hill. It was expected that the coal should be cut at about 110 feet, and about that distance a shale parting was met with, but no clean coal has yet been struck, although the drive has been extended to 130 feet. The locality is about thirty chains up the gorge of the Waimangaroa, and in a very convenient situation for a coal mine.

The formation containing the coal seam forms a long spur from the south end of Mount Frederick. The strike is N. 10° E., with a dip of 60° to the west; and as the direction of the strike is across this spur, which is less than a mile wide, with an altitude of about 800 feet, in the cross section at that part the extent of the seam above water level would probably be such as would yield about 100,000 tons of coal for each yard of thickness of seam.

The exploration at this place is still in progress; and until more definite proof is attained of the existence of a third workable seam, the Waimangaroa must not be counted on as feeder to the proposed railway along the coast.

The other coal seam which is frequently referred to as occurring higher up the Waimangaroa Valley is only the outcrop of the Coalbrookdale seam, and being at an elevation of 1,800 feet, is not easily accessible in this direction.

25th May, 1873. JAMES HECTOR.

No. 12.

Dr. HECTOR to the UNDER SECRETARY.

MEMORANDUM for the UNDER COLONIAL SECRETARY.

CASCADE CREEK, referred to in the attached telegram, is a tributary of the Buller River, rising on the south slope of Mount Rochfort, and joining the Buller at fifteen miles from the sea. I think this is only the Mount Rochfort seam that has been struck, by following up the creek to the position marked on the attached sheet map. The altitude is not stated, but at five miles up I should judge the creek to be 2,000 feet above the sea. If so, it is quite as inaccessible as the Mount Rochfort seams already known, and could not be reached with economy from the south side. This discovery should not divert attention from the Ngakawau seams.

15th March, 1873. JAMES HECTOR.

Enclosure in No. 12.

Mr. A. D. DOBSON to Dr. HECTOR.

(Telegram.) Westport, 15th March, 1873.

GREENWOOD reports 8 feet seam coal five miles up Cascade Creek. Specimens very good.

A. DUDLEY DOBSON.

No. 13.

Mr. Leech to Dr. Hector.

Sir,— Harbour Office, Westport, 11th June, 1872.

I have the honor to inform you that, agreeably with your request, I took the soundings outside the River Ngakawau. With the largest rock bearing south, we steered north until the river's mouth bore east; we then kept away and entered the river (three and a half hours' flood), carrying 6 feet over the bar.

The soundings were first four fathoms immediately after getting the rocks on the proper bearing; depth nearly the same until past rocks, then three and a half fathoms, shoaling gradually to three fathoms; the river then bore about east; steering in for the bar still three fathoms, then two and a half for four casts, then two fathoms, then one and a half twice, then eight feet, 8, 7, (6½, 6, 6, bar) (7, 8, 8, 9, 9, inside). Outside, when sounding, brought up some of the bottom each cast, which proved to be dark sand in all cases; no indications of a rocky or hard bottom being visible. Next time I go, if an opportunity offers, I shall try again closer inshore.

I have been obliged to go since to Ngakawau (overland), and beacon off the channel right up to the deep basin. The least water found at high-water spring tides, with the beacons any way near in a line, was 8 feet. The bar I found a little deeper than on my first visit, and, as you observed, found it straighter than before. This I attribute to the late floods. In fact, both those good features are caused by the same agency.

The "Luna" can swing in the bay below the shallow place, but she must not be sent until that cluster of snags immediately below the point opposite the wharf are cleared away. Two of the largest are dangerously near the fairway, and lie on the edge of the deepest water. I estimate the cost of their removal at £50.

It being spring tides when I passed the rocks going to Ngakawau the other day, I had a fine opportunity of seeing the large shingle bank you spoke of. That large rock close inshore appears to stop nearly all the coast drift coming from the southward, and certainly does shelter the bay beautifully.

The stones in the shallowest parts of the river are pretty well cleared away. It wants a barge to do it properly. The water is too cold for men to remain long in it at a time just now.

I have, &c.,
S. A. Leech,
Harbour Master.

Dr. Hector.

No. 14.

Mr. Leech to Dr. Hector.

Sir,— Harbour Office, Westport, 19th July, 1872.

The mouth of the river was very narrow when I was up there, owing to the effects of a westerly gale that had been blowing for two days prior to my going there on the 10th inst. The bar still retained its original depth, only the north spit extended to the southward, narrowing the channel to some 50 feet wide. Very little shingle had come from the southward; I presume owing to its interception by the rocks to the southward of the mouth. The soundings from outside the rocks were the same as before; no indications of a rocky bottom—nothing but sand, dark and gray, coming up on lead. I went up in the "Lyttelton" from Westport.

The snags are being removed; the "Luna" cannot come yet.

A party has come to-day from Ngakawau, and reports the entrance again wide and straight, owing to a late flood.

I have, &c.,
S. A. Leech,
Harbour Master.

No. 15.

Mr. Leech to His Honor the Superintendent of Nelson.

Sir,— Harbour Office, Westport, 9th June, 1873.

I have the honor to inform you that, in pursuance of instructions from you, I proceeded to examine the Wanganui River some thirty miles N.N.E. of Westport, as to its navigable capabilities, &c.

Leaving here on the 7th at 10 p.m. in the steamer "Result," we arrived safely next morning, and anchored off the river, which we entered about 8 a.m., high water; depth on bar, 10 feet; proceeded up the river some two miles, when the steamer grounded on one of the spits, backed off, and anchored in the channel.

After breakfast I proceeded up the river, between two and three miles further, in the boat; found it rather crooked but not rapid, the general depth being about 4 feet: at that time two hours' ebb and four days before full moon (spring tides).

At low water springs there would only be about a foot of water at low tide, or just what the river discharges, although at high water it looks a fair-sized little river.

The sea water at low tide only backs up to the head of the first reach, or about 20 chains inside the bar. The maximum depth found here at low water was 12 feet, close to the rocky south shore, and the minimum depth, which was on the bar, was 4 feet. The north side is sandy, and, of course, shoals gradually. At low water springs there would be about 3 feet on the bar; at high water 12 to 14 feet would be obtained.

At high-water ordinary tides, vessels drawing 6 feet could go a mile up the river with safety; at high-water spring tides they could go two miles up, but this would be unnecessary except a large trade was doing. There is a site for a wharf about half a mile or so inside. Vessels would lie aground; but the bottom is soft—chiefly small whitish gravel. The wharf side could be easily extended by removing some small stones and a few snags.

The river banks two miles from the mouth show no signs of strong floods, nor does the river appear to overflow its banks as far as I went up, although scum was apparent in the bends, where the river impinges strongly when flooded.

The river up to the wharf site is comparatively free from snags; above that they increase as the river is ascended, but are not dangerously numerous for the first two miles or so.

The entrance to the river is perfectly straight, and is likely to remain so, owing, as already stated, to its being rock-bound on the south side, terminating in a steep bluff several hundred feet in height, and from which a reef 6 to 10 chains long, and partially covered at high water, extends in a northerly direction, quite sheltering the bar from the south-west (see sketch enclosed), and giving this river an immediate advantage over all the others lying between the Buller and Rocks Point. Of course it is exposed to all winds from W. to N.N.W.; so are all the other rivers in this bight. The north side, as already mentioned, is a sandy beach; and although it curves to the southward, running half-way across the mouth (as shown), still it is stopped from closing the entrance by the strong current sweeping past the steep rocks immediately opposite, and which maintain a depth, as you will observe, of 4 feet on the bar at low water. This is the narrowest part of the channel, being only some 45 or 50 feet wide at low water; just inside it widens to 120 feet, and a little further in an average width of 2 chains is obtained, until the creek running to the S.E. is reached, where it narrows to about a chain at the head of the reach. These distances are at low water; at high water it shows a fine wide channel, bearing by compass E.S.E. for entering, and W.N.W. for leaving the river.

The water deepens quickly outside the bar, and with the outer end of the reef bearing south by compass a depth of 4 fathoms was obtained. We left the river on the 8th at 6·30 p.m., two hours before high water, depth on bar 9 feet. This was very good, seeing it will not be spring tides before the 11th.

In conclusion, I may state that I am much pleased with the Wanganui River, as in the event of its ever being required as a port, it could be worked much more safely than its sister rivers, Ngakawau, Mokitinui, Karamea, or, I presume, the Heaphy; I have never seen the latter. The goodness of the entrance is entirely owing to the long reef, which forms a breakwater and protects from the prevailing S.W. wind and sea, so prevalent on this part of the coast.

I have, &c.,
S. A. LEECH,
Harbour Master.

His Honor the Superintendent, Nelson.

By Authority; GEORGE DIDSBURY, Government Printer, Wellington.—1873.

Price 9d.]