D.—No. 6D.

PAPERS

RELATING TO

THE CONSTRUCTION OF RAILWAYS.

V. HON. J. VOGEL'S LETTER ON AMERICAN RAILWAYS, AND CORRESPONDENCE CONNECTED THEREWITH.

PRESENTED TO BOTH HOUSES OF THE GENERAL ASSEMBLY, BY COMMAND OF HIS EXCELLENCY.

WELLINGTON.

—

1871.

AMERICAN RAILWAYS AND CORRESPONDENCE CONNECTED THEREWITH.

No. 1.

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

SIR,— New York, March 7th, 1871.

I have the honor to submit to you a few observations respecting American railways; and to make a few suggestions which may be useful in New Zealand. Of course, I do not pretend that the suggestions have the value of those coming from an expert; or that they are anything more than might occur to any person travelling through the American continent, and who bore in mind that we are proposing to initiate in New Zealand the construction of a thorough system of railways.

There is a remarkable contrast between the estimation in which railways are held in this country and that in which they are held in New Zealand, or, as far as I am aware, in the Australian Colonies or in Great Britain. Just as we in New Zealand should think of constructing a road and metalling it completely, or metalling but a portion of the centre, or even being content with surface formation at first, according to the probable extent of the traffic, so, in America is the freest discretion used in the construction of railways, which work, is thought no more of than, if so much as, is thought of ordinary road work in the colonies. Consequently, railways in every stage of completeness are to be seen here—from the roughest and slightest style of construction, suited only for light traffic, and low rates of speed, to strong and perfect lines suited for much heavy traffic and high rates of speed.

One of the most remarkable and probably useful consequences of the popularity of railways in this country appears to me to be the absence of all necessity for carefully shutting them off from the approach of all other kinds of traffic. It seems to be regarded as wholly unnecessary to fence or guard railway lines from the approach of human beings. The sole object of fencing seems to be to keep off animals. Thus through a great deal of country where animals might stray or wander upon the lines, some sort of protection is provided; but wherever road lines, highways, or streets have to be crossed, it appears to be a matter of course that the lines shall pass without any attempt being made to guard against accidents. In thinly peopled districts, and even in towns, one constantly sees boards stuck up, with the words "Look out for the locomotive"; but this even is not considered necessary where railways pass through towns, the ringing of a bell upon the engine being regarded as sufficient warning of the approach of each train. Through the most populous portion of some populous towns, the trains pass constantly; and as you glide by you see men, women and children, horses and carts, and other vehicles, waiting at each crossing until the street line shall be clear. Along some streets in Chicago, goods trains are drawn to and fro, for the purpose of shunting or picking up particular waggons; and although there is consequently often a delay of several minutes before the line can be crossed, the pedestrians and the drivers or riders who are stopped, accept the delay as a natural and proper one. One night, on waking and looking out of the window of my berth in a sleeping car, I was amazed to find that we we were running through almost the centre of a large town, (Pittsburgh, as I afterwards learned).

In Baltimore, an exceedingly populous city, and where the traffic is very great and the streets are narrow, there is a distance of something like a mile and a half between the station which one reaches on the way from Washington, and that which is the station for booking, on for New York; but instead of the passengers leaving the cars, or a heavy expense being incurred in constructing a viaduct, or anything of the kind, rails are laid in the most direct line through the streets of the town, and long trains are drawn from one station to the other by four or five horses attached to each carriage. When it is considered that the two lines thus separated are amongst those which have the largest traffic in the country, that many fast trains are run over them, and that it would be practicable to construct a complete connection, though the cost would be considerable, an idea of the "railway policy," as it may be called, of the United States, can be gathered—that policy being to save heavy expenditure by whatever seems to be the most convenient and ready method of doing so, and of dealing with each case upon its merits, without thought of precedent or rule. Further instances of this are afforded by the facts, that out of New York, and out of San Francisco, the railway systems have to be approached by means of ferry-boats. I am not able to suggest what would be the probable amount of the cost of overcoming the natural difficulties in the way of continuous railway transit in either of these cases. Probably, in the case of New York, the cost of a bridge would be very great indeed. But this I am able to say, that the use of the ferry boats is productive of no inconvenience. The arrangements in connection with the ferry are such, as regards baggage, &c., that as little inconvenience is felt as if passengers at once entered the railway cars.

I am not setting down these isolated facts without an object. You must, of course, accept them for what they are worth, and understand that the observations are those of one merely passing through the country, without leisure to study the question, or special knowledge to enable him to do so thoroughly. But I think that the observations will suggest this at least:—

Now that we are commencing the construction of railways in New Zealand, we should resolve to construct them upon a basis not dissimilar to that adopted in this country; that is to say, we should lay down as rules (1.) That railway lines shall be constructed on precisely that scale which is suited to meet the probable present traffic demands of the parts of the country in which the lines are to be constructed; and (2) That the people of the Colony will be sufficiently intelligent to protect themselves against accidents without continuous fencing of the lines, or the necessity for costly crossings where the street lines or roads are intersected.

If I recollect rightly, on the Otago Southern Trunk Railway, from Dunedin to the Clutha, there is intended to be, even yet, some heavy expenditure, for the sake of avoiding level crossings; and that where such crossings are contemplated, it is proposed to go to the expense of constructing gates and paying gate-keepers. This appears to me to be an imitation of the English system, without the excuse for it which is afforded by difficulties existing in England. For example, in passing a railway bill through Parliament, enormous expense has generally to be incurred, and concessions in the direction of what is supposed to be for the protection of the public are readily granted, rather than that there should be discussion. In fact, costly road crossings are constantly adopted for fear that some individuals might raise more costly objections, that the lines proposed would be hindrances to traffic. Again, railways in England are mostly constructed for rapid traffic; whereas in New Zealand, as in America, I anticipate that the average rate of speed will not very much, if at all, exceed twenty miles an hour, and that there the same care can be exercised in driving trains as is exercised here; constantly, where curves are sharp, or gradients steep, or roads or streets have to be crossed, there are small boards stuck up with figures indicating the speed at which the trains are to pass.

If it be decided, as I think it should be, that people in New Zealand are to be familiarised with railways, and that they are quite as capable as any other people of protecting themselves against accidents from passing trains, it seems to me that costly crossings may be avoided. We may also follow the example of America in having the most simple style of stations; and, further, we may decide that where great difficulties exist in crossing any river, or approaching any town, there, for a time at least, until the traffic warrants the incurring of heavy expenditure, such expedients shall be resorted to as, while not entailing a large amount of inconvenience, will save a very considerable amount of expense.

I have, &c.,
JULIUS VOGEL.

No. 2.

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

Colonial Secretary's Office,
7th June, 1871.

SIR,—

I do myself the honor to acknowledge the receipt of your letter dated from New York on 7th March last, in which you submit some suggestions for the guidance of the Government—the result of your observation of the railroad system adopted in America.

In thanking you for this valuable letter which the Government have read with much interest, I take the opportunity of stating that copies have been sent to the Superintendents of the Provinces, and the Chairman of the County Council of Westland, for the information of their respective Governments.

I have, &c.,
W. GISBORNE.

The Hon. Julius Vogel.

No. 3.

MEMORANDUM by Dr. HECTOR.

24th April, 1871.

I QUITE agree that level crossings might be safely adopted without gate keepers in most cases. Mr. Blair, of Otago, has suggested to me a very ingenious method of closing the break in single fencing lines of properties which is made by the passage of a railway. The gap is occupied by a pit that is bridged over by beams carrying the rails. I would advise that he be requested to communicate a working plan of this to the department for distribution to the other engineers. It is particularly adapted to Canterbury.

Mr. Vogel's suggestion that the station arrangements should be of the most inexpensive character, is deserving of great attention. In the case of Government lines, the collection of fares, except on short lines, should be effected by the conductors, or stamped tickets could be sold in any shop at per mile.

Any station arrangements beyond a landing stage might be erected by and at the expense of the local community, such as goods sheds, waiting rooms, refreshment rooms, &c. These should hardly be general charges against a Government line.

I have, &c.,
J. HECTOR.

The Hon. the Minister for Public Works.

No. 4.

Mr. BLACKETT to Mr. KNOWLES.

(Telegram).

Dunedin, 28th April, 1871.

SIR,—

Dr. Hector's memorandum on Mr. Blair's suggested fence. Mr. Blair does not suggest it as new; it is in use on the Invercargill line where I examined it. We are adopting it in places on the

Clutha line. I will send tracing, and mean to extend its use where practicable. The trenches rejoice in the name of cow-pits.

JOHN BLACKETT,
Acting Engineer-in-Chief.

No. 5.

CIRCULAR to SUPERINTENDENTS and CHAIRMAN of the COUNTY COUNCIL.

Colonial Secretary's Office,
Wellington, 5th May, 1871.

SIR,—

I have the honor to transmit for your information the enclosed copy of a letter from Mr. Vogel on the subject of railways in America, which may be found interesting, and perhaps useful and applicable in the construction of railways in this country.

The Government would be glad to receive any remarks which may suggest themselves to your Honor upon the subjects alluded to by Mr. Vogel.

I have, &c.,
W. GISBORNE.

His Honor the Superintendent, Auckland.

NOTE.—Similar letter sent to all the Superintendents of Provinces, and the Chairman of the County Council.

No. 6.

His Honor J. MACANDREW to the Hon. W. GISBORNE.

Superintendent's Office,
Dunedin, 16th May, 1871.

SIR,—

I have the honor to acknowledge the receipt of your letter of the 5th May, and to thank you for the copy of Mr. Vogel's letter, on the subject of railways in America.

I have, &c.,
J. MACANDREW,
Superintendent.

The Hon. the Colonial Secretary, Wellington.

No. 7.

His Honor T. B. GILLIES to the Hon. W. GISBORNE.

Superintendent's Office,
Auckland, 17th May, 1871.

SIR,—

I have the honor to acknowledge, with thanks, the receipt of a copy of a letter from Mr. Vogel, on the subject of railways in America, enclosed in a circular from your office, dated the 5th instant, wherein you state that the Government will be glad to receive any remarks which may suggest themselves to me upon the subjects alluded to by Mr. Vogel.

As requested, I beg to remark that I entirely coincide with the views expressed by Mr. Vogel, and that it it on these very principles that the Provincial Government were proceeding in the matter of the Kaipara railway. I trust that the views of Mr Vogel will have sufficient weight to counterbalance in future such objections as led to the disallowance of the Kaipara Railway Bill.

I have, &c.,
THOMAS B. GILLIES,
Superintendent.

The Hon. the Colonial Secretary, Wellington.

No. 8.

The Hon. Mr. GISBORNE to His Honor T. B. GILLIES.

Colonial Secretary's Office,
Welllngton, 9th June, 1871.

SIR,—

I have the honor to acknowledge the receipt of your letter of the 17th ultimo, on the subject of Railways in America, and, in reply, to inform your Honor that however admirable the general system of railroads for the United States may be, I understand that United States Railway Acts make some provisions for public convenience and safety in respect of roads, crossings, and other matters, provisions which were altogether absent from the Kaipara Railway Act.

I have, &c.,
W. GISBORNE.

His Honor the Superintendent, Auckland.

No. 9.

His Honor F. A. CARRINGTON to the Hon. W. GISBORNE.

Superintendent's Office,
New Plymouth, 1st June, 1871.

SIR,—

I have the honor to acknowledge the receipt of your circular of the 5th instant, transmitting for my information the copy of a letter from the Hon. Julius Vogel, on the subject of Railways in America, which I have perused with much interest.

From my own observation in various parts of America, I must say that I fully concur in many of the points he has brought under notice.

I shall lay the letter before the Provincial Council.

I have, &c.,

FRED. A. CARRINGTON,
Superintendent.

The Hon. the Colonial Secretary.

No. 10.

His Honor W. ROLLESTON to the Hon. W. GISBORNE.

Superintendent's Office,
Christchurch, 20th July, 1871.

SIR,—

Referring to your circular letter 21, dated 5th May, 1871, transmitting copy of a letter from Mr. Vogel, on the subject of Railways in America, I have the honor herewith to enclose a memorandum by Mr. Marshman, containing some remarks upon Mr. Vogel's letter.

I have, &c.,

W. ROLLESTON,
Superintendent.

The Hon. the Colonial Secretary.

Enclosure in No. 10.

MEMORANDUM by Mr. MARSHMAN on Mr. VOGEL'S Letter on Railways in America.

RAILWAYS on the Canterbury plains cost now about £5,000 a mile for a full power line, metals say 70 lbs. to the yard, and bridges and stations included; considering the labor here is three times as expensive as in England, and materials (iron) costs 20 per cent. more here than it does there, this sum can scarcely be considered excessive, nor does it leave room for any material dimunition. The Government may, if they please, use somewhat lighter metals than are now used and so lessen the present cost per mile (and lessen of course the life of the metal correspondingly), but with that exception I do not see how it is possible to lessen it materially, that is if the lines are to be "Railways" and capable of carrying traffic at the rate of say 20 or 25 miles an hour, any trunk here ought to be good enough for that at least. Branch lines may be tramways worked by horse power and may cost anything from £300 to £400 a mile for a wooden rail, to £1,000 a mile for a light iron one. I do not think it would be expedient to omit fencing for the railways; the horse tramways would of course not require it. In the peopled districts, where the lines are carried across fields and enclosures, it would unquestionably be indispensable, and it can hardly be dispensed with in the pastoral country outside unless the Legislative chooses to say that the railway shall not be liable for the value of cattle or sheep that might be run over, or the damage that may accrue to travellers through running over them.

Mr. Vogel's observations about ferries do not apply here, because there is scarcely a river on which a ferry could be worked. I agree that more is done now than is necessary in the matter of level crossings. People would, if they were let alone, take care of themselves when crossing a railway, as they do when crossing a street. I believe that the present elaborate arrangement of gates across the line, and the like, are wholly unnecessary as far as the safety of the public are concerned, and it is certainly very objectionable as respects the working of the traffic. At one of the level crossings on the south line, about 10 miles from Christchurch, a couple of pits were put in across the line, about two years ago, one on each side of the public road, and in about six months I had the same thing done at the crossing next beyond Addington. This last is on a road leading to Riccarton sale yards, and cattle and sheep are driven along it frequently. It answers perfectly. The sketch annexed explains the two modes. No. 1., the form of the present crossing, and No. 2., the form adopted in these two instances, and recommended to be used generally. In No. 1, the present mode, the gates are shut across the railway, except when a train is passing, and then they are shut across the public road, as shown by the dotted lines. The normal condition of the railway is "blocked" as a special train cannot be sent over the line unless previous intimation of its coming has been first made to the gate-keeper. In No. 2., the proposed mode, the gates are closed across the public road when a train is passing. That is if there is a gate-keeper living there, and opened outwards at all other times, as shown by the dotted lines. The normal condition of the railway is "clear." The pit on each side of the crossing about 9 feet wide, and 6 feet deep, or thereabouts, serves to prevent animals from straying on to the line. If the gate-keeper should omit to close the gate, there can be no harm done, unless some person or some animal persists on the line regardless of the whistle of engine, and getting run over. I do not think gate-houses and gate-keepers could be in all cases dispensed with at those crossings; but they need not be in constant attendance as they are now, and would, therefore, be paid less than at present.

14th June, 1871.

JOHN MARSHMAN.

No. 11.

Mr. LAHMAN to the Hon. W. GISBORNE.

SIR,— County Chairman's Office, Hokitika, 5th August, 1871.

Referring to your circular No. 21, of 5th May, 1871, forwarding a copy of a letter from Mr. Vogel on the subject of railways in America, which I read with great interest, I have the honor to inform you that I directed the late County Engineer, Mr. O'Connor, to report upon it, and beg to forward herewith a copy of his report.

I have, &c.,
H. H. LAHMAN,
Chairman of County Council.

The Hon. the Colonial Secretary, Wellington.

Enclosure in No. 11.

Mr. O'CONNOR to Mr. LAHMAN.

Re Mr. Vogel's Letter on American Railways.

SIR,— County Engineer's Office, Hokitika, 18th May, 1871.

I have the honor to acknowledge receipt of your letter directing me to note, from an engineering point of view, and as affecting the County of Westland, the subjects treated of in Mr. Vogel's paper on American railways.

The facts given respecting these railways come most opportunely, and supply just that confirmation and support which engineers here require, before initiating on railway lines the simple forms of construction which their Colonial experience has already led them to adopt on roads, &c.

I may perhaps be permitted to mention another fact opposed to the incurring of prospective expenditure, which has come to my knowledge during five years' experience on railway making in Ireland, namely, that on 150 miles of single line railway, with which I was connected, an expenditure averaging £300 per mile was incurred, solely with a view of providing for the second track.

The average date of this expenditure would be about the year 1859, and the lines remain single to the present time. It will thus be seen that £45,000 (a sum which corrected for the relative rates of wages, would be equivalent to at least £225,000 in New Zealand) has been sunk, for say twelve years to no purpose.

Although only able to speak with confidence about the 150 miles, or so stated on margin,* I think it would be found that, for the last twelve years, upwards of 1,500 miles of railways have existed in Ireland under the conditions above described; and if we assume that a like prospective expenditure was incurred on each of them, it would appear that a sum of £450,000 (equivalent to £2,250,000 in New Zealand) has been sunk to provide for a contingency that has never arisen.

There is another question, however, which it is necessary to consider before condemning this expenditure, namely, the relative cost of the work thus done as a part of the original construction, and the same work if it had to be done now. In Britain the value of doing this work, if it had to be done now for the first time, including the cost of undoing some of the original structure, would be about one and a half what it has cost. The same estimate would probably hold for twelve years hence. Taking then the value of money at 5 per cent. compound interest, it would appear that even if the lines were doubled to-day, a loss of 30 per cent. of the invested capital has been entailed, while if postponed for twelve years more, the loss would reach 170 per cent.

If such conditions as these exist in Britain, it is patent that in New Zealand it would be still more disadvantageous to provide for merely problematical traffic. From the decreasing rate of wages in this country, the construction, if postponed for twelve years, would, even allowing for the extra work involved, be cheaper than if done at first; so that the accumulated interest on the money invested would be a dead loss; and if, as may very possibly be the case, the bridges are built of perishable materials, the money invested itself would probably be lost also.

A deduction might be drawn from these facts, regarding the mistakes of the Irish railway system, very nearly according with that drawn by Mr. Vogel from the existing condition of American railways, and given by him in Rule 1; namely, "That railway lines shall be constructed on precisely that scale which is suited to meet the probable present traffic demands of the parts of the country in which the lines are to be constructed."

The principle, however, involved in this rule is so broad, that it might be held to apply not only to railways, but to all the public works of a young Colony. In fact it presents a question of financial policy rather than any technical or local one. Viewing it as relating to railways alone, I think one engineering element might be introduced into it—namely, that while practising rigid economy in the superstructure (rails, gauge, bridges, &c.), the lines should be constructed with such curves and gradients as would admit of their being afterwards developed into really good railways.

The second rule given, "That the people of the Colony will be sufficiently intelligent to protect themselves against accidents, without continuous fencing of the lines or the necessity of costly crossings where the street lines or roads are intersected," is less general than the first, and may be discussed locally, socially, and geographically. Perhaps the best way of comprehending its bearings is to trace it to its source, given in the second page of Mr. Vogel's letter, nineteenth and following lines.

It would appear from this, that railways in America are popular, while, from the different conditions under which they exist in Britain, we may fairly assume that there they are comparatively unpopular. I think the causes of these existing conditions lie deeper than the mere fancy of the people.

Without pretending to understand the social and geographical condition of the American continent, something like a right understanding of the reason why railways are popular there can, I think, be

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* Waterford to Tipperary, 55 miles; Limerick to Castleconnell, 7 miles; Castleconnell to Roscrea, 37 miles; Waterford to Kilkenny, 32 miles; Baganalstown to Ballywilliam, 18 miles; total, 149 miles.

arrived at, from the mere knowledge given by the map of the vast extent over which its people are distributed. In a country so great, possessing inland resources situated at immense distances from the points of export, no other form of communication than railways could possibly provide for the traffic which exists. I believe in many inland districts, they were the first and only means of thorough communication provided by the State. Thus, railways to America are indispensable; and her patriotic people, seeing that this is so, are content to put up with great personal inconvenience to secure the welfare of the nation.

In Britain, the first railways were commenced under very different auspices. There, with a maximum distance of 80 miles from the interior to the sea, an almost perfect network of roads existed before railways came into operation, and the people saw in them only a more rapid means for the conveyance of the traffic, which, up to that time at any rate, had been efficiently carried without them. It was also known that, once established, railways would possess a monopoly, so, while securing the luxury they promised to confer, care was taken to prevent their becoming a nuisance.

In New Zealand, it is true, no such network of roads exist as were in Britain at the period of the first railways; but our geographical condition, namely, the maximum distance which produce has to be carried, is somewhat similar, and the question arises whether the Legislature would be justified, or the people hereafter be satisfied, in the adoption of a form of structure for a small locality which involved any impediment to the ordinary traffic.

Westland presents perhaps the most striking example of any local traffic which exists in New Zealand. Here the greatest distance from the foot of the main ranges to the sea does not exceed 20 miles, and the greatest distance which produce would have to be carried to a port is only 35 miles. With the exception of one main line of railway from the Brunner Coal Mines, following the sea beach southwards, all the internal traffic could readily be carried by drays; and I believe that the establishment of railway lines from the ranges to the sea would scarcely even be remunerative, and would even be unpopular if they caused delay and danger by level crossings, or frequent intersections of the road lines.

I fear, Sir, that I have gone beyond my proper sphere while commenting upon these subjects, but it was almost impossible for my remarks to be purely professional, the subject itself being so general.

I have, &c.,

H. H. Lahman, Esq., County Chairman, &c. CHARLES Y. O'CONNOR, C.E.