PAPERS

Relating to the protection from overflow of the Fraser River.

By Command.
THEODORE DAVIE,
Attorney-General.

Attorney-General's Office,
27th November, 1894.

Copy of a Report of a Committee of the Honourable the Executive Council, approved by His Honour the Lieutenant-Governor on the 15th day of October, 1894.

The Committee of Council having had under consideration the situation in the Fraser Valley as affected by the periodic overflowing of the Fraser River, and the loss effected by abnormal inundations, and having taken into consideration the conditions out of which such circumstances arise, and the possibility of adopting some comprehensive system of protection or prevention for the safety of the general interests involved:

The Committee observe that their attention was called to the more serious aspects of the occurrence of these floods by the unusual volume of water in the Fraser and its tributaries in the early part of the summer of the present year, and the loss then occasioned by an overflow which proved to be unprecedented in the history of this Province so far as may be determined by authentic and recorded observations. While prompt action was taken for the protection of life and property and the temporary relief of all requiring aid and in distress, preliminary steps were also taken with a view to an investigation of the future requirements of the localities affected by the flood so as to safeguard their respective interests.

At the same time, the Committee also observe, suggestions were made by various persons in the press, discussions arose in the Boards of Trade of the Province, and the matter became more or less one of general interest.

The following is an extract from a letter bearing date June 11th, 1894, from the Honourable Theodore Davie, Attorney-General and Premier of the Province, to the Right Honourable Sir John Thompson, Prime Minister of Canada, calling his attention to the serious state of affairs occasioned by the flood:—

"We have had several steamers at work and have succeeded in providing shelter and food for all, animals as well as men. We are now arranging for a supply of seed, so that when the floods subside the farmers may be in a position to renew as far as possible the crops destroyed. So far, therefore, while the people of this Province appreciate the spirit which prompted the offer of generous aid, not only on behalf of your Government, but on the part of the people of Eastern Canada generally, it is not considered desirable to appeal for such assistance, considerable as the loss is.

"The most serious and important aspect of the case affects the future. Bridges have been washed away, roads and trails obliterated, dyke walls broken down, and a large area of district covered with débris which will involve great labour and expense to remove. To restore all the facilities of communication, to remove the débris, and provide greater protection in the future, are matters involving extraordinary outlay.

"What is plainly the lesson of the floods is the necessity of a comprehensive system of dyking which will include the whole inundated area of the Fraser Valley. The magnitude of the task places it beyond, more particularly at the present time, the ability of private enterprise, and makes it clearly the duty of the State to undertake. While we may not have such floods again, as we have not had before, for many years, yet the danger exists and they are liable to occur at any time. As a State duty, and as affecting a district in which the Dominion Government owns a very large amount of public land, I would suggest that your Government co-operate with us in carrying it out, either in the way of conveying to the Province for its benefit unalienated lands within the district, or acting conjointly with the Province, or both. Of course without further consideration I am not prepared to state the exact lines upon which such agreement should be based, but that some effective and comprehensive scheme is necessary

to be undertaken has been decided upon, and to what extent the Dominion Government should, if willing, co-operate, would be a matter for arrangement. The undertaking is one which has a most important bearing upon the interests of this Province for all time to come, and must be faced sooner or later. We propose to act with as little delay as possible.

"There is another matter which has been previously and frequently brought to the attention of your Government, and that is the necessity of protecting the banks of the Fraser from erosion by the current, which in the course of years has carried away much valuable land, and which even threatens during some extraordinary freshet to entirely divert the course of the Fraser by providing a new outlet. I feel the necessity of urging most strongly that your Government should begin at once a comprehensive survey of the Fraser, with a view to permanent protection of the banks.

"There is still another matter to which I would beg to direct your attention. I refer to the establishment of meteorological stations at convenient points in the interior, from which conditions such as have produced the present disaster could be observed in time to give the Government and the people information in advance. Approximately, by this means it would be possible each year to foretell the volume of water that might be expected in the Fraser a week or two ahead, and in case of an inundation such as we have had, and which came entirely without warning, preparations could be made whereby much of the loss suffered would be avoided. This is a matter which might be mutually arranged. With instruments supplied, the Provincial Government Agents or other officials could act as agents of the meteorological service, and apart altogether from the purpose to which I now refer, their reports would be useful in a variety of ways and very valuable.

"I have, since commencing this letter, received a telegram from Revelstoke pointing out an alarming state of things there. Revelstoke is, as you are aware, situate on the Columbia River. The matter of protection works at Revelstoke has been already urged by this Government. It is stated in the telegram that an expenditure of from $5,000 to $10,000 would be sufficient for the purpose, and operate to save the town from destruction.

"Trusting that these matters will have, at an early date, your careful and favourable consideration, I have the honour to remain,

"Yours very truly,
(Signed) "THEODORE DAVIE."

"OTTAWA, June 21st, 1894.

"DEAR MR. DAVIE,—I have just received your letter of the 11th, and am much obliged for the information it contains in reference to the unfortunate Fraser inundation. The prompt manner in which your Government have come to the assistance of the settlers is highly creditable. As to the suggestions which you make regarding co-operation to prevent future trouble of this kind, I shall bring your views to the attention of my colleagues, in order that they may be very carefully considered.

"Believe me,
"Yours sincerely,
"JNO. S. D. THOMPSON."

In the "Colonist" of June 1st, 1894, the following letter appeared, signed "R. W.:"—

"TO THE EDITOR :—The floods that have been pouring in over the Fraser River lands during the past few days, causing destruction to property and even to life itself, while bringing loss and misery to many unfortunate settlers on the flooded lands, cannot but be regarded as a general calamity of a most serious character.

"For many years the farmers in Matsqui, Chilliwhack, and other parts affected, have patiently plodded along under the most trying difficulties, chiefly owing to the ever existing danger of floods.

"It is, of course, well known that various schemes for dyking and reclaiming the affected lands have been tried, and (alas, too often) found wanting. Absolute ruin to many, disheartening and discouraging to others, sufficient to deter them from making any further efforts to accomplish a task which can now only be looked upon as hopeless, a very grave matter is thus presented to the country. It goes without saying that our agricultural lands, so far as developed, are quite inadequate to the requirements of an increasing population.

"Large tracts of land in the flooded districts can only be effectually brought into cultivation by a thorough and complete system of dyking, not 'tinkering,' but upon a scheme well defined by the most competent experts. The cost of such work, even if considerable,

would in time prove a sound investment for the Province, and my object in calling attention to it is to suggest that an opportunity has now arrived whereby a large and important section of the country can be materially benefitted.

"Legislation, no doubt, would be necessary to deal with the existing laws pertaining to dyking, but the Government, recognizing a serious responsibility, might safely consider a scheme for dealing generally with the large sections of land affected by the floods; and to enable it to carry it out, could readily borrow its requirements on easy terms, recouping itself by special tax upon the districts benefitted by the imposition of a tax for interest and sinking fund.

"While fully realizing the fact that the consummation of such a scheme could only be attained by the consent of the property owners and subsequent legislation, I feel confident that if the matter were taken up and dealt with in a broad and liberal spirit, with that object in view, the benefits to the Province, and particularly to the sections interested, would be incalculable. I am confident, therefore, the country would hail with satisfaction an intimation that early action in this important matter is in contemplation by the Government of the Province.

(Sgd.) "R. W.

"*Victoria, May 31st, 1894.*"

The "Colonist," discussing the foregoing letter, said :—

"The above letter of our highly esteemed correspondent contains a timely and very valuable suggestion. He does not waste time in deploring the loss to property and life which the floods are causing. With the courage and the enterprise characteristic of the true Briton, he, before the waters have ceased their destructive work, looks about him to see if anything can be done to prevent a recurrence of the misfortune. He fears that private enterprise will not readily undertake to reclaim the flooded lands and build new barriers against the future invasions of the river. He considers that the work can be done most speedily and most effectively by Government, and that, too, without materially adding to the burdens to be borne by the people of the Province. The flooded lands, if properly drained and made safe from inundation by scientifically constructed dykes, would be very valuable indeed, and could soon be made to pay the full cost of all improvements. This appears to us a feasible scheme. As the object of the work is not only too add to the cultivatible land of the Province, but to preserve property and life from threatened danger and from destruction, it should, we think, be done by the Government, or under the direct supervision of the Government.

"It is evident that all dykes built to keep out the waters of the Fraser should be built as strong and as well as the skill of man can build them. Those engaged in their construction should not be exposed to the temptation of making money by slighting the work. Capacity to resist the pressure of the water when the river is at its highest point and rushing with the greatest force should be made the only object of the constructors of future dykes. Every part of the work should not only be designed by the highest skill, but constructed with the greatest possible care. This can only be done by men who have no commercial interest in the work. It seems to us that such work can be done in such a way by none but the very best men that the Government can employ. It must be borne in mind that this mode of building dykes is not only the best as far as strength and durability are concerned, but the most economical. In view of the damage now being done, the intelligent reader must see that it would have been good economy to have paid a great deal more for building dykes of greater resisting power at Matsqui than was paid for those that have just given way.

"We believe that a very large majority of the people of the Province, when they think the matter over, will be of opinion that the construction of new dykes as barriers against the encroachments of the Fraser should be undertaken by the Government. And we believe, too, that if the right men are returned to the next Legislative Assembly—men of intelligence, of enlightened views, of enterprise, and of experience in carrying out great undertakings—the dyking of the Fraser will be made a public undertaking, and will be carried out in such a way as will ensure to the future inhabitants of the Valley of the Fraser River safety both of life and property."

At a meeting of the Council of the British Columbia Board of Trade held in Victoria June 5th, 1894, the subject of a comprehensive scheme of protection was discussed and favourably considered. The part of the published report in the "Colonist" relating to it is as follows :—

"The Fraser floods were brought up by Mr. Renouf, who thought that the dyking of the Fraser should be under direct supervision of the Government. He did not mean to say that the Province should take up the dyking, but the Government should insist upon the dykes being built up to a certain standard, which would have the effect of better dykes being constructed than at present.

"Mr. Ward did not think the unfortunate settlers had the means of recovering from their present misfortune. The question simmered down to the basis that either the land must be abandoned or the Government must see that a thorough system of dyking is inaugurated. The Dominion Government itself was largely interested in lands in the Fraser Valley, and should take its share with the Provincial Government. The expense would be heavy, no doubt, but the dykes should be built under the very best expert advice possible."

At a subsequent meeting of the Council, held on June 11th, the following resolution was passed unanimously :—

"Moved by Mr. Ward, seconded by Joshua Davies, and resolved—

"'That in the opinion of this Board a scheme for the permanent reclamation of the low lands of the Fraser Valley is most desirable, but being one of great magnitude can only be devised by the most skilled experts obtainable, and that the arrangement of such a scheme should devolve upon the Provincial and Dominion Governments, and that the Provincial Government be asked to take up the question in conjunction with the Government of the Dominion.'"

At a meeting of the Board of Trade of New Westminster on June 6th, the following resolution carried without dissent :—

"Moved by G. D. Brymner, seconded by C. G. Major, that the President, Vice-President, Secretary, and Messrs. John Hendry, A. J. McColl, C. G. Major, and the mover be a Committee to secure the co-operation of the other Provincial Boards of Trade and Municipal authorities and the Provincial Members in the Dominion Parliament to procure some joint action on the part of the Federal and Provincial Governments towards some scheme for permanently dyking the low lands of the Fraser Valley."

The "Columbian" of the 7th of June, adverting to the matter editorially, said, among other things :—

"Both the City Council and the Board of Trade, it will be seen, held meetings last night, which were well attended and representative. As a starter for the temporary relief fund, the Council voted $500, and appointed a well selected committee of prominent citizens to act as a relief committee, to receive and distribute aid. A resolution was also passed, urging upon the Dominion Government, through Mr. Corbould, the desirability of taking the necessary steps, in conjunction with the Provincial Government, to effectually dyke the low lands of the Fraser Valley. The Board of Trade passed a resolution heartily concurring in and proposing to co-operate with the action taken by the Council in the matter of temporary relief, and a further resolution appointing a committee of leading members of the Board to take steps in the important matter of the proposed permanent relief work.

"Both of these committees, being composed of business men, will, undoubtedly, lose no time in getting to work, and it is safe to say they will have the hearty co-operation of the citizens generally in the work of raising such a temporary relief fund as may be found necessary, and their as hearty support and endorsation in any steps that may be taken towards formulating a comprehensive and much needed scheme of permanent reclamation and conservancy works, and urging the claims of such a scheme upon the Dominion and Provincial Governments."

A joint meeting of representatives of the Boards of Trade was held in Westminster on June 12th, for the purpose of considering the organization of a relief scheme, at which the proposal to consider some general scheme of protection was discussed at length and cordially endorsed, and the following resolution passed :—

"Whereas the present overflow of the Fraser River has inundated a large area of the agricultural lands of the Fraser River, and caused great loss and suffering to the settlers upon them ;

"And whereas a large quantity of land within the area is owned by the Dominion Government ;

"And whereas the preservation of the proper channel of the river will require a thorough system of dyking under control of the Federal or Provincial Government, or of both combined;

"And whereas the jurisdiction over the Fraser River belongs to the Dominion Government and not to the Provincial Government;

"Therefore, it is the opinion of this meeting that the Dominion Government should undertake the establishing of a thorough and permanent system of dyking the said lands at the earliest possible time, with such assistance as the Provincial Government may be able to afford."

In its issue of June 5th, the "Columbian," New Westminster, had the following in an editorial article:—

"The Dominion Government should be urged, as we believe it is the intention of the Board of Trade (which ought to be backed by every representative body in the country) to do, to undertake, with as little delay as possible, a comprehensive scheme of conservancy works on the Fraser (including some dyking) which ought to have been undertaken long ago, the interests at stake being so large. By these self-respecting, practical, and sensible means of affording relief, what is, undoubtedly, a calamity, may be turned, ere long, into a blessing to the whole country."

On June 9th the "Columbian" concluded an article on the flood relief as follows:—

"While these incidental circumstances, growing directly out of the disaster, and in their nature hardly matters for congratulation, will, undoubtedly, be the means of furnishing considerable after relief to the settlers of the submerged districts, no effort should be relaxed to press upon the Dominion authorities the obligation that rests upon them, in conjunction with the Province, to inaugurate, at a very early date, such conservancy and reclamation works as will fully restore confidence and stimulate enterprise, by making such deplorable disasters practically impossible in the future."

W. M. McKinnon, C. E., Vancouver, writing to the "World" in its issue of June 6th, said:—

"EDITOR WORLD:—In view of the widespread distress and loss consequent on the overflow of the Fraser, it may be well to consider the means which can be taken to prevent such floods in the future. To protect riparian lands, two systems are in general use: (1) The improvement of the course and channel of the river to promote a more rapid discharge; (2) The confinement of the channel between embankments. Another system, applicable only in particular cases where the contour of the country is favourable, is the use of existing lakes, or of artificial reservoirs, to impound the flood waters for a time, and so ease the river channel. As regards the application of the two first methods: In cases where the river channel can be made capable of carrying away the floods, the use of the first system is to be preferred. The objection to the second is that the flood level is raised as compared with that due to a corresponding discharge with the river unembanked, and as the bed of the river invariably silts up and so still raises the flood level, this necessitates continually adding to the height and strength of the embankment. This system has been followed on the rivers Theiss and Po, in Europe, with disastrous results. Devastating floods have occurred on both these rivers, and on the Po it has been decided to discontinue heightening the embankments, lest the consequent raising of the flood level may be followed by still greater disasters. In Japan the river beds are nearly all at a higher level than the surrounding country, owing to the continued silting up of the channels, followed by the further raising of the embankments. The rivers in China have been treated in the same way, the resulting floods causing enormous loss of life and property. In 1887 the Yellow River burst through its banks and flooded 4,800,000 acres and destroyed hundreds of villages. One river simply left its bed and flowed across the plains, ultimately discharging itself into the Yellow Sea, 200 miles south of its former outlet. As my partner, J. C. Fergusson, was in China for several years, and was engaged by the Governors of Shantung to report upon the best means of controlling the floods in the Yellow River, he is able to speak from practical experience of embankments and river works on the largest scale, and can endorse what I have said as to the evil results which inevitably come from the system of attempting to control large rivers by means of embankments alone. As it is improbable that the Lower Fraser can be made capable of discharging the maximum flood by simply increasing the capacity of the channel, a combination of all three systems would possibly prove to be the best way out of the difficulty. The two outlets of the river, it may be, could be made capable of discharging a much larger quantity of water than they do at

present, by enlarging and training the channels and carrying them out to deep water, care being taken to protect them from the effects of littoral currents and the influence of storms.

"In addition, the channel of the river passing through the low-lying country could doubtless be much improved by straightening its course, and by the removal of all obstacles, such as shoals and rocks. The improved channel would require constant attention to maintain its efficiency. It may also be that engineering surveys would disclose the fact that the outlets of many of the large lakes draining into the Fraser could be dammed, and so made into large reservoirs, by means of which the flood discharge could be regulated. The question of the control of floods in the Lower Fraser Valley is one which ought to be studied as a whole, and as no other body is able to bear the expense, the subject might well form the immediate care of not only the Provincial Government, but the Dominion Government as well, having regard to the improvement of the navigable part of the river, over which, I believe, the Dominion Government has control. Hitherto the embanking of lands along the Fraser has been treated as a local economic question, rather than an engineering problem. As the first point to which an engineer would direct his attention in devising means to prevent floods, would be to arrive at an approximation to the maximum flood discharge, and as in the absence of observations at different points during the height of the flood, he would have to fall back on flood-marks to enable him to arrive at that approximation, steps should be at once taken to establish permanent records of the extreme height of flood at different points, from the lower end of the cañon down to the sea. Evidence on this point is sure to be very conflicting, after the lapse of even a short interval of time. In view of the benefit to be derived by the large population which the Lower Fraser Valley is capable of supporting, it may be taken for granted that the Government would be justified in entering upon the undertaking of obtaining the requisite information to enable an engineer to formulate a scheme for the protection of the Lower Fraser Valley as a whole.

(Signed) "W. M. MACKINNON,
"*Assoc. M. Inst. C. E.*"

N. M. Palmer, Esq., C. E., at the Farmers' Convention, Agassiz, read a paper of considerable length, and ably dealing with the subject of dyking on a comprehensive basis.

On June 12th the "News-Advertiser," in the editorial column, dealt with the subject as follows:—

"A consideration of the state of things which now exists for many miles along both banks of the Fraser River, as a result of the overflowing of the waters, can only lead to one opinion—that the work to be done must be thoroughly comprehensive and on a scale of great magnitude. Both economy in carrying the work out and its efficiency when completed, make it imperative that the dyking scheme should be carried out on a large and general scale, and not, as in the past, by means of numerous little and separate schemes, each independent of another, and without any view to the accomplishment of one general purpose. * * *

"In a matter of this kind it is, of course, impossible to decide on and adopt instantly the best method to be followed. Indeed, a hasty step without careful consideration might not merely involve large expenditures without commensurate results, but actually frustrate the accomplishment of what is aimed at. The first step is to formulate a general plan of action and to give assurance to those most directly concerned that the problem will be completely solved, and the protection of the large areas of land liable to overflow be as thoroughly assured as is the case in other countries, the people of which have had to deal with similar questions. The joint action of the Dominion and Provincial Governments, wisely directed, with the means and appliances at their command, can easily carry out the undertaking; and while the owners of the lands thus reclaimed may reasonably be expected to contribute to the cost, the burden on them will be far less than it has been in the case of such enterprises carried out on the system that has been in vogue in the Province in the past."

The Committee observe that the undertaking of any comprehensive scheme, such as has been indicated in a general way, involves considerations regarding which only competent engineering knowledge and thorough investigation can fully and definitely determine. It involves too, they further point out, a careful consideration of and enquiry into the various corporate interests affected, and a business-like understanding of the extent to which co-operation would be possible.

The conditions which produce the freshets are in an indefinite way generally understood. The causes, however, are more or less remote, and the practicability of overcoming the physical

difficulties which may present themselves is extremely uncertain, if not entirely an unknown quantity. The main body of the Fraser and its numerous tributaries extend far into the interior, including within the basin drained a great variety and extent of country. They all have their source of supply in the mountain streams fed by melting snows, the waters of which, ever augmenting, enter the main stream at various points, and are finally embouched in the sea in great volume and with great force. On account of the heavy snowfall in the mountains in the winter of 1893-94, and the long late season ensuing before spring opened, and the sudden advent of fine weather and a powerful sun, the melting of snow was unusually rapid, and the great quantity of waters suddenly let loose precipitated the unparalled freshet experienced. It has been suggested as an engineering possibility to regulate the down-flow of water by constructing, at points determined to be most suitable, immense mountain reservoirs to be emptied as safety dictates, thus avoiding the sudden rush of waters into the main channel. To this has been added the suggestion of the utilization of these reservoirs at other seasons for the economic purposes of producing motive power for the generation of electricity for mining uses and for irrigation.

Regarding these matters the Committee observe, as before alluded to, that they require investigation in all their details by specially trained and experienced engineers before any opinion can be formed, or any recommendation as to action or undertaking can be made, and for the purpose of such a preliminary examination ample time and a considerable appropriation are necessary.

The Committee remark that what seems to be necessary in the first instance is the appointment of engineers of good standing and experienced in such work to make a complete and thorough examination of the basin of the Fraser River, taking levels, ascertaining areas of available lands to be benefitted and protected, making rough estimate of cost, acquiring meteorological information, and generally obtaining all physical and other data necessary upon which to found conclusions; and in the second instance to refer the notes, maps, and all data collected and compiled by these commissioners to some eminent engineer, especially an authority upon works of such character, for report.

The Committee therefore recommend that the Dominion Government be invited to join in the appointment of a commission to examine, ascertain, and report upon the following particulars:—

1. The area of country necessary to be protected, or that would be affected in any way by floods, and the length of dyking to be carried out in each locality; and also the extent of country in which irrigation would be possible by means of mountain reservoirs; and further, to ascertain the facilities for and the practicability of this means of protection and irrigation.

2. All physical data available regarding the various localities immediately concerned, or having a bearing generally on all matters connected with dyking and irrigation in the Fraser, Thompson, and other river basins where improvements are desirable to be carried out.

3. Particulars of snow and rainfalls, ranges of temperature, maximum and minimum, available throughout each drainage basin, and particularly of the upper portions of the same, or in any other localities that may have a bearing on the improvements under consideration; and generally all meteorological data available having a relation to the rising and falling of the Fraser, and more particularly relating to the freshet of 1894.

4. Highest known flood levels, rate of rising of waters, and duration of maximum flood level, so far as is available, along the main streams and principal tributaries of the Fraser.

5. Notes on the physical character of the lands affected and present values, etc.

6. An approximate estimate of carrying out the work as a whole.

7. Plans and maps necessary to show fully the mechanical operations involved.

8. And, generally, all data of whatsoever nature and from whatsoever source that may be required for thoroughly comprehending the nature of the undertaking.

The Committee also recommend urging upon the Dominion Government the great desirability of carrying out the suggestion contained in Mr. Davie's letter to Sir John Thompson in regard to the establishment of meteorological stations throughout the interior of British Columbia.

The Committee submit the foregoing for Your Honour's approval, and they advise that a copy of this Minute, if approved, be forwarded to the Honourable the Secretary of State for Canada.

Certified.

A. CAMPBELL REDDIE,
Deputy Clerk, Executive Council.

DEPARTMENT OF THE SECRETARY OF STATE,
OTTAWA, 10th November, 1894.

SIR,—I have the honour, by direction, to transmit to you herewith, for the information of your Government, copy of an Order in Council passed on the subject of the periodical overflowing of the Fraser River referred to in a certified copy of an approved Report of a Committee of your Executive Council, which accompanied your despatch (No. 99 of 1894) of the 19th ultimo.

I have, etc.,
(Signed) L. A. CATELLIER,
Under Secretary of State.

His Honour the Lieutenant-Governor of British Columbia, Victoria, B.C.

Extract from a Report of the Committee of the Honourable the Privy Council, approved by His Excellency on the 3rd November, 1894.

The Committee of the Privy Council have had under consideration a despatch, hereto attached, dated 19th October, 1894, from the Lieutenant-Governor of British Columbia, transmitting a Report of the Executive Council of that Province, having reference to the situation in the Fraser Valley as affected by the periodical overflowing of the Fraser River, the loss effected by abnormal inundations, and the possibility of adopting some comprehensive system of protection or prevention for the safety of the general interests involved.

The Minister of Public Works, to whom the matter was referred, observes that the Report in question reviews at some length, and quotes the several opinions expressed since the recurrence of the floods on the Fraser River by various bodies and persons of British Columbia, all having reference to the best possible means to be taken for the prevention of said floods, those proposals having all in view the dyking or embanking of the lands along the Fraser, and the necessity that exists to do the work as quickly and as permanently as it is possible.

The Minister adds that the Committee of the Executive Council, in that Report, express the opinion that an investigation by trained and experienced engineers is necessary before any definite conclusions can be formed, and that such engineers should be appointed to make a complete and thorough examination of the basin of the Fraser River, taking levels, and generally acquiring all physical and other data necessary to found conclusions as regards the cost of such works, their nature, and the best mode of constructing them.

The Committee of the Executive Council further recommends that the Dominion Government be invited to join in the appointment of a Commission to examine, ascertain, and report on the following points:—

1. Giving area of country necessary to be protected, length of dyking to be built in each locality, extent of country where irrigation would be possible, and facilities for such protection and irrigation.
2. All physical data bearing on matters connected with dyking and irrigation in the Fraser, Thompson and other river basins, where improvements are desirable.
3. Particulars of snow and rain falls, temperature and meteorological data relating to the rising and falling of the Fraser, especially during the freshet of 1894.
4. Ascertaining of highest flood level, rate of rising of waters, and duration of maximum flood level.
5. Notes on character of lands affected, values, &c.
6. Approximate estimate of cost.
7. Plans and maps showing mechanical operations involved.

The Minister concurs in the opinion expressed in the said Report, and he recommends that the Government of Canada do send one or more engineers of the Department of Public Works to act in conjunction with any officers of the British Columbia Government, in making the proposed investigation, and further, that the Dominion Government do defray one-half of the cost of the operations of the said Commission, the total expenses not to exceed the sum of fifty thousand dollars.

The Committee submit the foregoing for Your Excellency's approval.

JOHN J. MCGEE,
Clerk of the Privy Council.

His Honour the Lieutenant-Governor, Province of British Columbia.