Twentieth Annual Report

of the

Commissioners for the Queen Victoria Niagara Falls Park

1905

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1906

20th February, 1906

THE HON. W. J. HANNA, K.C., M.P.P.

Provincial Secretary Province of Ontario,

Parliament Buildings, Toronto.

SIR,—I have the honor to transmit herewith, for presentation to the Legislature of Ontario, the Twentieth Annual Report of the Commissioners for the Queen Victoria Niagara Falls Park, (being for the year ended 31st December, 1905) togéther wtth the appendices thereunto attached.

I have the honor to be,

Sir,

Your obedient servant,

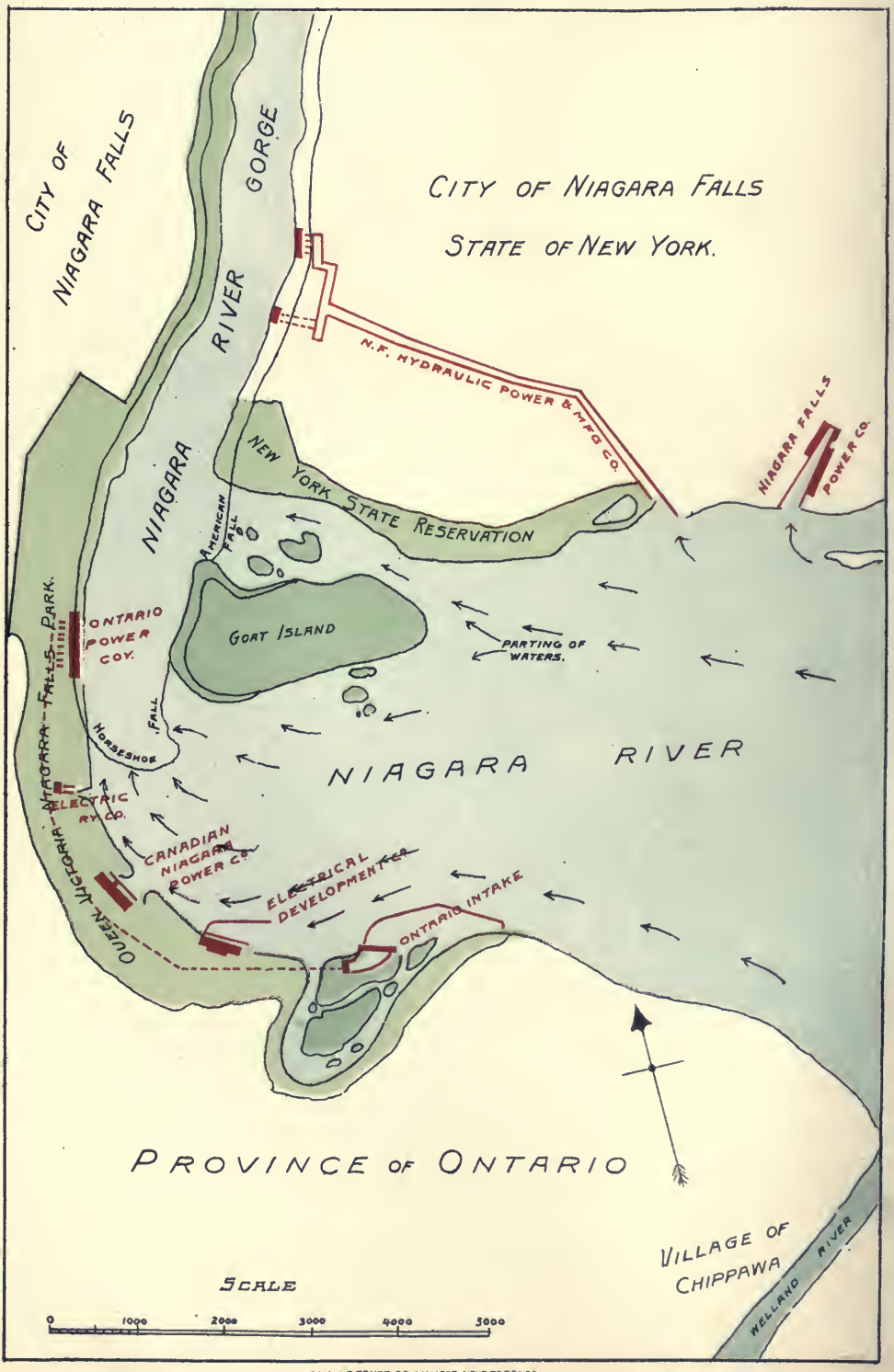
JOHN W. LANGMUIR,

Chairman.

QUEEN VICTORIA NIAGARA FALLS PARK

MAP SHOWING LOCATION OF POWER WORKS AT NIAGARA FALLS.

TO ACCOMPANY TWENTIETH ANNUAL REPORT OF COMMISSIONERS.



E.M. HAMCOURT CO, LIMITED LITHO TORONTO.

NIAGARA FALLS,
JANUARY 1906.

JAMES WILSON,
SUPERINTENDENT.

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COMMISSIONERS OF THE QUEEN VICTORIA NIAGARA FALLS PARK.

J. W. Langmuir, *Chairman*.
George H. Wilkes.
Robert Jaffray.
P. W. Ellis.
L. Clarke Raymond.

Superintendent: James Wilson.

Chief Gardener: Roderic Cameron.

Twentieth Annual Report of the Commissioners for the Queen Victoria Niagara Falls Park.

To the Honourable W. Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario:

May it Please Your Honour:

The Commissioners for the Queen Victoria Niagara Falls Park beg to submit their twentieth annual report (being for the year 1905), together with the usual statement of receipts and expenditures, the report of the superintendent on the works of improvement and maintenance which have been carried on in the various portions of the park system during the year, and also in connection with the works for the development of electrical power. There is also appended the text of memoranda and official documents to which reference is made in the report.

Since the last annual report several changes have taken place in the personnel of the Board. Commissioners James Bampfield, of Niagara Falls, and A. W. Campbell, of Toronto, resigned, after a service on the Commission of over eight years and six years respectively. The vacancies thus caused were filled in June last by the appointment by Order in Council of Mr. P. W. Ellis, of Toronto, and Colonel L. Clark Raymond, of Welland.

Before entering upon a general review of the various matters which have engaged their attention during the year, the Commissioners desire to make reference to certain adverse criticisms which have appeared in newspapers and magazines both in Canada and the United States respecting the utilization of the waters of the Niagara River at the Falls for commercial purposes.

Without doubt much of the wide spread interest taken in the matter was created by the strenuous efforts made at the last Session of the Legislature for the State of New York by a corporation known as the Niagara, Lockport and Ontario Power Company, to procure the passage of legislation conferring on that company the right to take from the Niagara River a sufficient quantity of water to generate four hundred thousand electrical horse power. It was estimated by the State officials that such a grant would involve the continuous withdrawal of over thirty-six thousand cubic feet of water per second, a quantity equal to about one-sixth of the total volume of outflow from Lake Erie at mean water level. The New York State Legislature actually passed the Bill, but it was vetoed by the Lieutenant-Governor, and thus failed to become law.

The magnitude of the proposition, and the strong efforts put forth in the State Legislature, both for and against the measure, had the effect of creating a wide spread public sentiment against such enormous withdrawals of Niagara water for power purposes. This sentiment was greatly strengthened by the appearance of certain magazine articles calling upon the public to petition the government against such grants, and suggesting at the same time that international action be taken to prevent the exploitation of such schemes in the future.

One of the results of this public agitation has been a disposition on the part of some to adversely criticise the policy of the Commissioners of the Queen Victoria Niagara Falls Park in recommending the Government to grant corporate franchises for the development of power on the Canadian side of the river, more particularly as the works were to be located within the grounds set apart for a public park. The Commissioners, therefore, desire to clearly state all the facts and circumstances which led them to make the recommendations in question.

It will not be disputed that the great works of the Creator were primarily and chiefly intended for the service of man, and that each succeeding generation witnesses some new achievement in the scientific adaptation of nature's forces, which is everywhere eagerly seized upon and utilized for the convenience, comfort and advancement of the race. It was only to be expected, therefore, that the gigantic forces of nature which have for countless ages been engaged in cutting the channel of the Niagara River through the limestone formation from Queenston Heights to the present location of the great cataract, and the lavish display of power there witnessed should have been made the subject of scientific investigation with a view to its adaptation for some economical use.

It is, however, only within the last twenty years that the marvelous developments which have been made in the science of creating and transmitting electricity have opened up a practical method for the economical adaptation of the Titanic forces at work at Niagara Falls for the advancement of industrial operations by the supply of electrical power on the large scale demanded by the newly discovered electrolitic processes of metallurgy, and for its transmission to all points within a radius of hundreds of miles of the cataract. These scientific discoveries were promptly availed of by capitalists, and hydro-electric works upon a large scale were undertaken on the American side of the river in 1889, when several charters were granted for the use of Niagara River water for this purpose.

The Park Commissioners on the Canadian side to whom had been entrusted the administration of the water power within the park conceived it to be their duty in the public interest, and apart altogether from questions of revenue, to secure similar advantages for the advancement of Canadian industries, and to that end recommended the Government of Ontario to grant franchises, by which, under certain restrictions, the waters of the Niagara River might be taken on the Canadian side for the generation of electricity for general commercial purposes. These recommendations were all concurred in by the Government, and given effect to by the Provincial Legislature from time to time.

The sources of the Niagara River, reaching out as they do into no less than seven States of the Union, in addition to the Province of Ontario, and as the Niagara River forms the boundary line between the Province of Ontario and the State of New York, it will generally be admitted that any questions relating to the extensive use of its waters should come within the scope of international jurisdiction; and, as the relative drainage area in each country into the great lakes and through the Niagara River is approximately the same, the withdrawals of water on each side of the line should in theory be approximately equal. When, however, physical conditions and local features are taken into account we find that throughout the entire course of the upper river the deep channel is on the Canadian side; and from the very commencement of the rapids above the Falls, the whole trend of the water in the main channel is towards the Canadian shore, resulting in the flow over the Canadian Falls being equal to about ninety per cent. of the entire waters of the river.

The average outflow from Lake Erie through the Niagara River has been determined by United States engineers to be 222,400 cubic feet per second, which under the difference in elevation found between the summit of the upper rapids and the base of the Falls (about 210 feet) will produce a theoretical energy equivalent to about 5,300,000 horse power. In practice, however, it is necessary to make substantial reductions from the theoretical power of a water fall owing to the impossibility of utilizing the full head of water, and also because of the energy lost in hydraulic and electric machinery. It is, therefore, only under most favorable circumstances that even two-thirds of the nominal power may be obtained for power purposes.

The water supply to the Erie Canal on the American side, and to the Welland Canal on the Canadian side was not included in the measurement of volume of flow made by the United States engineers referred to, but the quantities taken are about equal in each case.

In deciding what would be an equitable International distribution of the water flowing over Niagara Falls, it should be kept in mind that the works which have been constructed at Chicago for the drainage of the sewers of that city into the Mississippi River, and the creation of a hydro-electric plant in connection therewith, involving the withdrawal from the lake system of 60,000 cubic feet per minute, or 10,000 cubic feet per second, practically lessens the flow over the falls to that extent.

In estimating the cubic feet of water per second required to operate to their full capacity the various power companies now exercising their franchises on both sides of the river, regard must be had to the actual heads that each company works under. A comparative statement of this is shown in the following summary, viz:

American Side.

Chicago Drainage Canal	32 feet
Niagara Falls Power Company	136 "
Niagara Falls Hydraulic and Manufacturing Company	210 "

Canadian Side.

Canadian Niagara Power Company	136 feet
Electrical Development Company	136 "
Ontario Power Company	180 "

It will thus be seen that the Niagara Falls Hydraulic Power and Manufacturing Company, which takes its supply from an open canal carried from the river above the rapids through the City of Niagara Falls to the edge of the cliff, and discharges its spent water into the gorge immediately below, is the only one at Niagara Falls which uses anything like the full available head. The Ontario Power Company comes next, operating under about 86 per cent. of the total head; the works of the remaining three companies, one on the American side and two in the Queen Victoria Park, use only about two-thirds of the full head, requiring, therefore, a much greater quantity of water to produce an equivalent amount of electric power. Under these varying conditions the companies now exercising their franchises will probably require for the ultimate operation of their works the following quantities of water, viz.:

American Side.

	Electrical Horse Power.	Approximate water required Cu. ft. per sec.
Chicago Drainage Canal	27,000	10,000
Niagara Falls Power Company	200,000	17,200
Niagara Falls Hydraulic and Manufacturing Co.	100,000	5,600

Canadian Side.

Canadian Niagara Power Company	100,000	8,600
Electrical Development Company	125,000	10,750
Ontario Power Company	180,000	11,700

These figures show that when these various power works are in full operation, the water required on the American side will amount to 32,800 cubic feet and on the Canadian side of the river 31,050, making a total of 63,850 cubic feet of water per second that may be withdrawn from the Niagara River for electrical power purposes, in addition to the water required for the general manufacturing purposes now carried on in connection with the Niagara Falls Hydraulic and Manufacturing Company's canal.

The Chicago Drainage Canal is now taking about 5,000 cubic feet of water per second; the two power companies on the American side at Niagara Falls about 9,000, and on the Canadian side about 3,000, or a present aggregate withdrawal equal to about one-fourth of the total ultimate requirements of the works under construction. It will thus be seen that the volume of water now flowing over the crest of the two falls has already been reduced from 222,400 to about 205,000 cubic feet per second, or about seven per cent. less than the mean or average flow extending over a long term of years. This small reduction has, of course, had no appreciable effect upon the falls. When, however, the full compliment of water is taken by each of the companies referred to, the flow over the falls will then be only about 77 per cent. of the present volume. In other words, the total amount of water required for the full operation of the hydro-electric works already completed or in process of construction will necessitate the withdrawal of 23 per cent. of the present flow over the Canadian and the American Falls.

As the quantity of water required for the operation of these works will vary from time to time, according to the amount of electricity which the several companies may be enabled to market it will in all probability be many years before the total quantity of water thus indicated will be required, and in any case the withdrawals up to the maximum requirements will be very gradually made.

Just what the ultimate effect the abstraction from the river above the falls of such a large percentage of its water will have upon the appearance of the two falls is, of course, a matter affording room for a wide divergence of opinion. The volume of flow will, of course, be greatly reduced, but on the other hand the width of the Horse Shoe Falls at the crest line has been considerably narrowed in on the Canadian side, and the force of the current will be diminished. On the whole the Commissioners are of the opinion that the resultant effect will not seriously detract from the scenic beauty of the twin cataract to any great degree.

It must, however, be pointed out that the franchises now in operation are not the only companies that have been granted statutory authority to take water from the Niagara River, or from its source of supply, for the pur-

poses of developing power. In addition to the several companies already referred to, whose works of development are in a more or less advanced state, there are no fewer than six charters on the American, and four on the Canadian side of the boundary, in respect of which work has not yet been commenced. It is important, therefore, that all rights granted for prospective operation, and which, if not forfeited or annulled, may be proceeded with at any time, should be kept in view. The following memorandum has, therefore, been prepared giving in condensed form the charters granted on each side of the river as far as the Commissioners have been able to ascertain, viz.:

On the American Side.

Name.	Date of authorization.	Cubic feet per second.
1. The Niagara Falls Hydraulic Power and Manufacturing Company	1879	Not defined.*
2. Lockport Water Supply Company	1886	Unlimited.
3. Lewiston Water Supply Company	1888	Unlimited.
4. Niagara Falls Power Company	1889	Approx. 17,200.
5. Buffalo and Niagara Power and Drainage Co...	1889	Unlimited.
6. Chicago Sanitary District	1889	10,000.
7. Niagara County Irrigation and Water Supply Company	1891	Unlimited.
8. Niagara Power and Development Company....	1894	Unlimited.
9. Niagara, Lockport and Ontario Power Company	1894	Unlimited.

In addition to these franchises, the International Paper Company at Niagara Falls and the Niagara Falls Water Works Company each use considerable quantities of water.

On the Canadian Side.

Under agreement with the Queen Victoria Niagara Falls Park Commissioners.

Name.	Date of authorization.	Cubic feet per second.
1. Canadian Niagara Power Company	1892	Approx. 8,600.
2. The Ontario Power Company	1900	Approx. 11,700.
3. Electrical Development Company	1903	Approx. 10,750.

The Ontario Power Company has a franchise for taking water from the Welland River, in addition to its Niagara River rights.

Chartered by the Dominion of Canada.

4. The Niagara-Welland Power Company	1894	Unlimited.
5. The Jordan Light, Heat and Power Co.	1895	Unlimited.
6. Erie Ontario Power Company	1903	Unlimited.

In addition the Cataract Power Company at DeCews Falls obtains a comparatively small supply from the water of the Welland Canal and the

*This Company claims the right to take from 8,000 to 10,000 cubic ft. per second for all purposes.

Niagara Falls Park and River Branch of the International Rilway Company the water necessary to operate its road.

From this summary it will be seen that of the ten non-developing companies that have been granted authority to use Niagara water on both sides of the river, none are in any way limited in respect to the quantity which may be taken for development purposes. Should all of these companies exercise the privileges conferred, and should their undertakings be carried out upon anything like the scale adopted by the companies whose works are now in course of construction, there can be no question but that the Falls of Niagara as a scenic spectacle would be most seriously impaired, if not entirely destroyed.

It is obvious. therefore, that the public agitation for restriction in the further abstraction of Niagara River water is well founded, and that it is absolutely essential for the preservation of Niagara Falls that the Governments territorially interested should cause a full investigation to be made without further delay, in order that the great cataracts may be saved from irreparable spoliation.

It may be here pointed out in respect to the three companies operating on the Canadian side, that all the water withdrawn from the river will be returned to it immediately below the Horse Shoe Falls, and that the two companies operating on the American side will deliver their waste water a very short distance below the American Falls, so that the volume of water in the lower river and rapids will not in the slightest degree be diminished by the operations of these companies.

The Commissioners have frequently drawn attention in their reports, to the possibility of economically developing large blocks of power from the lower rapids by taking advantage of the fall in the river both above and below the whirlpool. Should it be decided by the Governments interested to place restrictions on the further use of the water above the falls, doubtless the attention of capitalists will be drawn to the great possibilities for power development here presented. This second use of the water for commercial purposes could be accomplished without in any way injuriously affecting the grand scenic features of the lower river.

Having shown the volume and capacity of the flow of water in the Niagara River, and the relative extent to which the granting of charters for power production has been carried on in the United States and Canada, the Commissioners now desire to give the reasons which influenced them in recommending the granting of franchises for the development of electric power in the Queen Victoria Niagara Falls Park.

As Canada possessed at least an equal right with the United States in the use of Niagara waters, and as a strong public sentiment demanded that the Province of Ontario should equally share in the great advantages that will result from the electrical development of part of the enormous hydraulic power of the Falls, the Commissioners, in the performance of the duties cast upon them, gave very careful consideration to an application which was made in 1889 for water privileges within the Park.

At that date, no less than five charters had been granted by the New York State Legislature for the use of Niagara water for power purposes on the American side, two of which, namely, the Niagara Falls Hydraulic Power and Manufacturing Company, and the Niagara Falls Power Company, were actively engaged in the construction of their works. The Commissioners, therefore, decided that in order to protect Canadian interests it was necessary that franchises for the development of power should be granted on the Canadian side, but that these privileges should not be granted without a fair compensation by way of yearly rental being made. As the

physical conditions in the Park were found to be particularly favorable for the carrying out of such works, an interim agreement was entered into with eminent English capitalists, by which, in consideration of a large forfeitable deposit, time was granted to organize a company for the carrying out of the work. Owing, however, to a long continued depression in the money market, the promotors were obliged to abandon the project.

Application was then made for the privilege by American capitalists engaged in developing electrical power on the American side, conditioned, however, that they should have the exclusive right to operate within the Park. After prolonged negotiations and endeavors to free the application from exclusive rights, having failed, an agreement was entered into in 1892 with the Canadian Niagara Power Company, under which it was granted exclusive authority to develop the water power of the Falls in the Park for the generation of electric or pneumatic power. This agreement was approved by the Government, and afterwards confirmed by the Legislature of Ontario by special Act, 55 Vict., Chap. 8.

In making this agreement, the Commissioners required that a substantial money payment should be made by way of annual rental for the privileges granted, and also stipulated that one-half of all the power generated should be available for Canadian consumers at rates not to exceed those charged upon the American side for similar quantities of electric power.

After several years' delay, chiefly owing to the inability of the company to secure the large capital necessary for the carrying out of the undertaking, the rights which had been granted were on the recommendation of the Commissioners annulled by the Legislature, and the payments of rental which had been made were forfeited. A second agreement was, however, entered into with the same company in 1899, granting restricted powers, an amended scale of rentals, and abolishing entirely the exclusive rights before enjoyed. In the meantime additional water power charters had been granted by the State of New York and also by the Government of Canada, differing, however, from the charters negotiated by the Park Commissioners, inasmuch as not in a single instance were any restrictions made in respect to the quantity of water which might be taken or in obtaining payment for the valuable privileges conceded, except in the case of the Cataract Power Company, which takes its supply from the Welland Canal.

During the period that the Canadian Niagara Power Company had exclusive privileges for generating power in the Park, the Ontario Power Company, which had received a charter from the Dominion of Canada for the same purpose, made an application to the Commissioners to be allowed to proceed with their works, which application could not be granted on account of the exclusive privileges given to the Canadian Niagara Power Company. As soon, however, as these exclusive rights were annulled, the application was renewed, and in the year 1900 an agreement was arrived at. This agreement did not contemplate the taking of water within the Park limits, but from the Welland River, which flows into the Niagara about a mile up stream from the southerly boundary of the Park. The franchise granted contained similar provisions and restrictions as to works, rentals and the reservation of power for Canadian consumers as were made in respect to the Canadian Niagara Power Company. Owing to physical difficulties encountered in using water brought from the Welland River, the Ontario Power Company made a further application for the right to take water from the Niagara River, which, after due consideration, was granted, and an agreement entered into in 1902, under the terms of which the company, in consideration of an increased payment, was authorized to tap the Niagara River at the Dufferin Islands, and by means of underground constructions

develop electricity in a power house situated in the Gorge immediately below the Falls.

The Canadian Niagara and the Ontario Power Companies prosecuted their respective undertakings with great energy, and each of them have now ready for commercial use about thirty thousand horse power of electric energy, only a small proportion of which, hoewever, has as yet found a market in Canada.

It may here be noted that of the companies operating on the American side, the Niagara Falls Hydraulic Power and Manufacturing Company has at present an output capacity of 34,000 horse power, all of which is marketed in Niagara Falls, N.Y.; and the Niagara Falls Power Company, which has machinery installed for 100,000 electrical horse power, of which quantity 45,000 is now furnished to industries at Niagara Falls, N.Y., and 30,000 electrical horse power is transmitted to consumers in Tonawanda, Lockport and Buffalo.

Up to the time of granting the second franchise to the Ontario Power Company, in 1902, public sentiment in Canada appeared to be entirely in favor of the course pursued by the Commissioners respecting the development of power on the Canadian side of the river. A short time after this, however, application was made on behalf of a very strong combination of Canadian capitalists for a third site in the Park for the development of electricity upon a large scale, and the plea was advanced that as the companies then holding franchises within the Park limits were almost wholly controlled by foreign capital, it would be most unjust to refuse Canadians an opportunity of demonstrating their ability to execute such important works upon equal terms with the American companies.

This application met with considerable opposition on the part of rival interests and portions of the press, chiefly upon the American side, severely criticising the principle of granting charters which would be exercised in a public park. Before the Commissioners took the application into consideration, the chairman prepared a memorandum setting forth all the conditions, hydraulic, scenic, International and economic which were in any degree affected by the proposal, and submitted the same for the consideration of the Government, with a request that all questions of policy and expediency should be determined by the Government, and recommending that in respect to the hydraulic features of the case independent expert engineering opinion should be obtained.

After the hearing given by the Government to all parties interested, and an examination made of the reports made by the expert engineers engaged to investigate the hydraulic questions involved, the Government decided that the application should be granted, and accordingly an agreement was entered into in January, 1903, for the carrying out of this important undertaking.

Having thus given a brief outline of the circumstances and conditions which led the Commissioners to recommend that franchises should be given to the Canadian Niagara Power Company, the Ontario Power Company and the Electrical Development Company of Ontario for utilizing the waters of the Niagara River within the Park, and only in respect of which are the Commissioners in any way responsible, reference may now be made to the financial considerations, and which by some are considered only of secondary importance, which were made an indispensable condition to the granting of every franchise.

In their previous reports the Commissioners have stated that when the Government of Ontario decided to create a Park system at Niagara Falls, it was upon the distinct understanding that the undertaking should be made

self-sustaining, and that it should not become a permanent financial burden upon the Province. The necessity therefore was laid upon the Commissioners to devise measures whereby the large sums annually required to police, maintain and improve the property, and in addition to obtain the means of paying the interest on the debentures issued for the acquirement of the territory included in the Park domain, should be provided.

As the means first adopted for this purpose proved entirely insufficient, the Commissioners were in a measure, apart from the duties laid upon them to keep pace with the industrial development on the American side of the river, obliged to take advantage of the opportunity afforded by the granting of water power privileges to add to their income, with the result that in every instance in which rights have been granted it has been made a *sine-qua-non* that equitable compensation should be made therefor. Of all the franchises which have been hitherto granted on either side of the river, only from those negotiated and chosen by the Commissioners has a yearly rental been exacted, the amount received from such franchises up to the present time amounts to over $400,000.

Had it not been for these substantial receipts, the Commissioners would long ere this have been obliged to call upon the Provincial exchequer for large annual grants in order that the extensive territory now included in the Park system might be maintained and developed.

It is frequently charged that the Commissioners by authorizing the various works and constructions required for power development to be located within the Park, they have thereby violated the trust imposed on them by permitting more or less desecration of the aesthetic surroundings of the Great Cataract, which it was their special province to preserve. This phase of the subject has been dealt with in previous reports, but as misapprehension still exists, the Commissioners, in defence of their action, must again point out that nearly all the works which will permanently appear upon the surface within the present Park limits are distinctly outside the territory which was originally intended to be appropriated for Park purposes. Fortunately, however, the territory in question was extended so as to take in all the frontage along the river above the Falls as far as the head of the upper rapids. Had this not been done, the whole of this area would undoubtedly have been turned into a manufacturing district, with all kinds of erections over which no control could be exercised by the Board. As it is, no buildings or constructions can be put up until the plans have been submitted to and have received the approval of the Commissioners. The several companies to whom franchises have been granted have invariably met the views of the Commissioners in respect to the character of the works appearing on the surface of the Park in a most liberal manner, and in consequence, the works and buildings already constructed are of a high type of architectural beauty, having all been specially designed by skilled artists with reference to their location in a public park. The design for the power house of the Electrical Development Company and the finish to be given the Spillway building (the only two structures not yet completed) have each received the most careful attention, and the Commissioners feel assured that when all these works and structures are fully completed and the surface surroundings are finished and planted in the manner designed, that they will be entirely acquitted of the charge of violating the trust imposed in connection with the Canadian environment of Niagara Falls. On the contrary, the Commissioners fully believe that when these great electrical works—the greatest of the kind in the world—are in full operation, they will greatly add to the attractiveness of Queen Victoria Niagara Falls Park.

In concluding their references to the present and prospective relations of the power development works to the future of Niagara Falls, and having regard more especially to the serious impairment, if not the practical destruction of the beauty and scenic effects of the Cataract through further diversion of the river waters, the Commissioners desire to offer the following suggestions:—

(1) That the whole subject, involving the further diversion of water from Niagara River for power development in excess of the charters now being exercised be referred to an International Commission, appointed by the Governments directly interested, territorially or otherwise, in order that an agreement may be arrived at between such Governments as to further withdrawals of water on both sides of the river.

(2) That a careful enquiry be made by the Governments indicated respecting the charters already granted, but in regard to which no works whatever have been commenced, with a view to the cancellation of the same.

The Commisioners now desire to refer to the general works which have occupied their attention during the past season, and a brief reference may first be made to the progress of the three power companies whose works have so frequently been referred to.

Canadian Niagara Power Company.

In their last Annual Report the Commissioners referred to the completion by the Canadian Niagara Power Company of the first instalment of power required under the terms of their agreements, and to the inaugural ceremonies held on the 2nd January, 1905, when in the presence of the Commissioners and of the chief officials of the Company two of the ten thousand horse power generators were tested and found to be ready for service. Since that time a third generator of equal capacity has been completed, and work upon two others is now in an advanced state.

It has been a matter of regret to the Commissioners that owing chiefly to delays in the construction of transmission lines, the company have so far been unable to market to any large extent the product of the first two generators. Electricity is, however, now being furnished by this company for the lighting of the City of Niagara Falls and for local industries, but as the total amount of power required for these purposes is alleged to be within the quantity which the company is entitled to use under the provisions of its agreement in respect to the fixed rental, no payments have yet been made on account of such excess over the ten thousand horse power authorized.

The completion of the forebay and intake works of this company enabled the lands reclaimed from the river in front and north of the power house as far as the railway and city intake to be levelled off and surfaced with good soil, when planted this area will become a very attractive addition to the Park.

The Commissioners greatly regret the removal by death of Mr. W. B. Rankine, the First Vice-President and General Manager of this Company, who has from the beginning been actively interested in the various projects connected with power development for commercial purposes at Niagara Falls. The Commissioners desire to place on record their appreciation of the marked ability and unfailing courtesy which characterized Mr. Rankine in all his dealings with the Board, extending over a period of more than thirteen years, and their extreme regret that he should have been taken away at the moment when the fruition of his labors was in sight.

Ontario Power Company.

The Ontario Power Company have displayed great energy in the prosecution of their works throughout the year. By mid-summer all the vast works from the intake at Dufferin Islands to the power house below the Falls were sufficiently advanced to permit of the water being turned in and the machinery and appliances tested, and on the 1st day of July last the first generator of ten thousand horse power capacity was placed in commission, and the current sent over the company's temporary transmission line.

Since that date the handsome buildings for the gate and screen houses at the south end of the Park, the first section of the power house in the Gorge, including machinery for the generation and control of 30,000 electrical horse power, have all been completed, and the large area of Park surface which had been torn up by the Company's works has been restored and surfaced with good soil.

The only unfinished work of this Company in the Park is the overflow and regulation chamber at the northern terminus of the pipe line, near the Park pavilion. Owing to the location of these works at the narrowest part of the Park, and the necessity for a considerable elevation above the Park surface in order to ensure a perfect regulation of the flow of water in the main pipe, the plans for the structure and its immediate surroundings at this crucial point have occupied the attention of the Board and the Company at many protracted meetings during the year. As a result of this prolonged consideration, however, the Company have at length submitted plans, which in the opinion of the Board will not only meet with the approval of the public, but will afford increased facilities for viewing the Falls to the greatest advantage from new and artistically constructed view points, at an elevation which will command excellent prospects not only of the Falls but also of the upper and lower river.

When approval was given to the plans of this Company's power house, situate in the Gorge of the river below the Falls, permission was granted for the construction of an electric elevator, by means of which access could be had to the floor of the power house from the street level; as the plans provided for an open steel tower, it was feared that any construction at this point, no matter how artistically designed, would prove objectionable, and might seriously interfere with the view of the Horse Shoe Fall from various points in the Park. The Commissioners, therefore, entered into negotiations with the Company for a change in plan which would do away with the exposed structure, and by means of a tunnel carried into the cliff and a shaft ascending at a point in rear of the railway tracks, afford a means of access to the transformer house on the elevation overlooking the Park. This arrangement was finally made, and the work is now in progress, and when completed the elevator, which was long used for taking visitors behind the "Sheet of Water," will be removed.

Electrical Development Company.

Excellent progress has been made during this year by this Company in the construction of its works. The river structures have been practically completed, and the foundations of the power house carried up to floor level. The wheel-pit and all underground work is about ready for the hydraulic machinery, which is now being delivered.

A large section of the heavy steel framework of the power house has been erected, and the stone-work, which is to form the outer casing of the

building, has nearly all been cut and stored on the ground ready for building operations in the spring.

A large section of the cofferdam, by means of which the river bed was unwatered so that the construction of the water walls and other works might be proceeded with, has been taken away, and the river bed outside the overflow wall is now restored to its former condition.

The agreement entered into with the Company for the utilization of the surplus water found in its forebay, and to which reference was made in last year's report, failed to receive the ratification of the Legislature, and, therefore, did not become operative.

The International Railway Company.

A controversy has arisen with the International Railway Company, as successors to the Niagara Falls Park and River Railway Company, in reference to the interpretation of a clause in the Act under which the Railway Company claims very extensive powers in respect to the generation of electricity in their power house in the Park. The subject is referred to at some length in a memorandum appended to this report, but may be briefly summarized as follows:

In the original agreement made in 1891, the Company were authorized to take water from the river for the purpose of *operating and lighting* the railway, and the Ontario Legislature of 1892 incorporated the railway, under the name of the Niagara Falls Park and River Railway Company, and confirmed the agreement entered into with the Commissioners. In 1900 the Buffalo Railway Company, incorporated by the Government of Canada, acquired the franchise and property of the Niagara Falls Park and River Railway Company, and a confirming Act was passed by the Legislature in 1901 (1 Edward VII., Chap. 86), but in this confirming Act the clause limiting the electric power which the Company might generate was changed to read. "the purposes of any Railway Company which purchases the franchise of the Company."

In 1902, both the Parliament of Canada and the Legislature of Ontario, granted authority to substitute the title *International Railway Company*, for the Buffalo Railway Company, but in all these various Acts the jurisdiction and control of the Park Commissioners were specifically reserved.

The company made application in October, 1903, to the Commissioners for approval of plans, showing a system of conduits for carrying electric wires, extending from the Company's Power House, through the Park to the Upper Steel Arch Bridge, the object being to carry electric power, generated in the railway Power House, across to the United States to operate the extensive railway system of the company in that country, and claiming authority under the legislation of 1901 for so doing.

The Commissioners could not see their way clear to accede to the demands of the company, and as the claim of the company opened up important questions of law and policy, in respect of which legal counsel disagreed, the Commissioners referred the whole question to the Government for a decision.

Submerged Dam.

The City of Niagara Falls under an agreement with the Commissioners obtains its water supply from the Niagara River a short distance south of the brink of the Falls. Owing in a large measure to the recession of the Falls, and possibly in some degree to the temporary coffer dams placed in

the river to facilitate the construction of the power works, the level of the water at the joint intake of the city and the railway company was not high enough to secure a full supply of water for driving the hydraulic pumps at seasons of the year when ice is running in the river. In consequence of this it is claimed by the Corporation of Niagara Falls, the water works system has for several years been obliged to shut down in severe winter weather, leaving the city without sufficient water for household purposes, and without fire protection. The city authorities, therefore, applied to the Commissioners to obtain some measure of relief, particularly as they claimed that the low level was caused by the construction works referred to. The Commissioners while not agreeing with the contention of the city authorities, but having regard to the seriousness of the situation and after consultation with Mr. Isham Randolph, the eminent Engineer of Chicago, decided to build a submerged dam opposite the north end of the intake, and thus raise the level of the water a foot or so for the benefit of the city.

As the point in question is only a very short distance from the brink of the Falls, and the current is very swift, it was considered inadvisable to adopt any of the usual methods of constructing a dam. Mr. Randolph, however, designed a concrete column, fifty feet high, divided into sections, and connected together by a chain passing through the centre. This column was built on a high trestle, and when completed was tipped bodily into the river, the trestle floating away and leaving a clear space next the shore for passing ice, the concrete column forming a solid barrier to the passage of the water. Unfortunately in falling, the column rested upon a series of large boulders, which prevented it accomplishing its full purpose, although the water was permanently raised about ten and a half inches.

Outlying Parks.

The outlying park territory at Fort Erie, Niagara Glen, and Queenston Heights, was duly cared for, and sundry improvements carried on during the year, full particulars in respect to which will be found in the Superintendent's report.

At Fort Erie, the Monument which, through the generosity of the Dominion Government, the Commissioners were enabled to erect in honor of the gallant heroes who fell in the many engagements which took place in the War of 1812-14, for the possession of this fortress, has been completed; but as the breaking up of the Military Camp at Niagara took place before completion, it was found impossible to arrange for suitable unveiling ceremonies. The shaft is of Canadian Granite, with bronze inscription tablets, and is a valuable addition to the southern terminus of the park system.

Fairly good progress was made during the season in protecting the shore line of the upper river from further erosion by the use of stone riprap Several additional strips of property were acquired for the purpose of widening the roadway, which runs along the margin of the river. The Commissioners are very anxious to prosecute this work with vigor, but have hitherto been unable to do so owing to the want of sufficient funds.

A broad boulevard along this connecting link, between the Park at Niagara Falls and Fort Erie is most desirable, as it would form a magnificient approach to the Falls from Buffalo and the south.

Reference was made in the last annual report to the main north entrance to the park, in front of the Clifton House; as this road was exceedingly narrow, and dangerous to traffic, the Commissioners have been endeavoring for years to secure a strip from the adjoining proprietors, in order to make a wide and well finished approach to the Park from the City of Niagara

Falls, and also from the Steel Arch Bridge, by which the heavy volume of American and foreign travel has access to the park. Taking advantage of the reconstruction of the Clifton House, the Commissioners have acquired by purchase, a sufficient width to afford a suitable approach, and as soon as the new Clifton House building is completed, the road will be graded, and the entrance to the Park completed.

General Maintenance.

All the ordinary works required for the maintenance of the extensive park property have been carried on throughout the season, a full reference to which will be found in the report of the Superintendent of the park, which is appended hereto. The statement of receipts and expenditures for the year will be found attached, also the report of the Superintendent upon the proposal to construct a dam at the foot of Lake Erie.

All which is respectfully submitted.

Sgd. J. W. Langmuir,
Chairman.
Sgd. George H. Wilkes,
Sgd. Robert Jaffray,
Sgd. L. Clarke Raymond,
Sgd. P. W. Ellis.

QUEEN VICTORIA NIAGARA FALLS PARK.

Financial Statement.

Receipts, 1905.

Ontario Power Company, rental	$30,000 00	
Canadian Niagara Power Company, rental	15,000 00	
International Railway Company, rental	10,000 00	
Electrical Development Company, rental	7,500 00	
Zybach & Company, rental	9,000 00	
Refund from Dominion Government (on account of Fort Erie monument)	3,000 00	
Tolls and sundries	1,188 30	
Wharf privileges	411 00	
		$76,099 30
Overdraft at Imperial Bank, December 30th, 1905		26,734 21
		$102,833 51

Note.—The special deposit of $25,000 made in 1903, for the maintenance of water levels at the intake of Canadian Niagara Power Company, and at joint intake of International Railway Company, and city water supply, now ammounts to $25,099.09; interest credited, amounting to $2,288.41, and $2,189.32 having been paid out on account of overflow dam constructed at city and railway intake.

Expenditures, 1905.

Paid overdraft Imperial Bank, January 1st, 1905	$22,460 50

Capital Account:

Paid wages, permanent works	$5,287 75	
" materials	4,031 62	
" completing refectory building	1,567 48	
" protecting shore and grading, etc., Upper Niagara River	7,325 38	
" acquiring lands to widen Upper Niagara River Road	1,036 54	
" acquiring frontage at Clifton House	5,001 59	
" legal expenses	836 60	
" expert engineering opinion, advice re-water powers	3,465 08	
		$28,552 04

Maintenance Account:

Paid salaries, office and official staff	$3,590 00	
" " constables and gardener	6,263 00	
" wages, laborers and teams	10,012 73	
" for materials	4,730 25	
" office expenses	246 23	
" Commissioners' expenses	729 39	
" miscellaneous	973 09	
		$26,544 69
" Interest on bonds, including bank charges		25,276 28
		$102,833 51

APPENDIX "A".

REPORT OF THE SUPERINTENDENT OF THE PARK.

To the Commissioners of the Queen Victoria Niagara Falls Park:

GENTLEMEN,—The winter of 1904-5 like its predecessor was exceptionally severe and protracted, the cold weather extending well into the spring months and causing great quantities of ice to form in the vicinity of the Falls, thus delaying the commencement of the usual cleaning up works in the park. Notwithstanding the very low temperature, recorded time and again during the winter, the shrubbery and plant life in the Park came through without injury, thus proving the exceptionally favourable conditions here found for the growth of plants of tender habit.

Like the two previous years, last year was a very active one in the park, owing to the great number of men employed in carrying on the works for the development of the water power. Notwithstanding the severity of the winter months, all these operations have been persistently pressed forward throughout the season, and very great progress has been made in each case.

As these works are all of very great importance and interest, not only in respect to their character as the most extensive and advanced mechanical power, producing plants of the present day, but also in relation to their location in the Niagara Falls Park, and the consequent effect, the works will have upon the scenic surroundings of the great cataract, they will be referred to at some length.

Canadian Niagara Power Company.

As was noted in last years report, all the hydraulic and electric works required for the installation of the first two generator units, each of 10,000 electric horse power output, were completed on 1st January, 1905, ready for the formal opening of the works of the company within the time limit fixed by the agreements made by the Commissioners; a vast amount of work, however, remained to be done in order that the three additional electrical generators needed to complete the first one-half of the total installation of electric power contemplated by this company, could be made ready, a great amount or work was also required in connection with the interior embellishment of the power house. Much of this work has been brought to a successful completion during the past season, and the company have now three of their large generators fully equipped, with all the hydraulic and electrical appliances required for the efficient control of no less than 30,000 electrical horse power; while the hydraulic apparatus for the two additional units has been installed and all the multitudinous works required to equip, regulate and control the balance of the electrical machinery is far advanced towards completion, although the generators have not yet been set up in position.

The extension of the wheelpit to the full length designed for the ultimate capacity of the works, which was in progress at last report, was carried down to its proper depth and the several side chambers required for oil, and water pumping machinery, etc., were all excavated early in the season, the interior lining of the wheelpit with brickwork set in cement, has been brought up to the full height and the numerous castings required to be set in these walls for the support of the mechanism have all been put in place. It is not the intention of company to extend the power house over this easterly one-half of the wheelpit at present. A temporary floor will, however, be put over the whole of the area, pending such time as the market for electricity will warrant the installation of additional machinery and the extension of the building being undertaken. In the meantime a temporary timber wall has been put in the portion of the power house at present completed.

Owing to the exceptionally severe weather and the very small quantity of water used by the company in the early part of the winter, ice formed very solidly in the Forebay with the result that several of the ice rack piers were damaged, these were repaired during the season and all the intake and Forebay works of the company are now in good working order.

So far the output of power by the company has been comparatively small owing in a great measure to the difficulties which have arisen in connection with the building of transmission lines by means of which a considerable part of the electric power generated at Niagara Falls will be carried from the power house in the Park, for use at points more or less remote from the Falls. As the difficulties in question relate to the carrying of high voltage copper or aluminum transmission cables have been referred of railway which must be crossed, the matters at issue have been referred to the Board of Railway Commissioners for settlement and as all the companies developing power at Niagara Falls are equally interested in securing a prompt and reasonable determination of this question, it is important that an early decision be made, otherwise the companies will be handicapped in the sale of their power.

South of the railway intake, the rock filling by which the company reclaimed a portion of the river bed has been properly faced with massive stone riprap, and the surface of the made ground has been levelled and cov-

ered over with soil, according to agreement. This work was sufficiently advanced by mid-summer to permit of the area being sown with coarse grasses, and late in the fall, quite a number of maples and elms were planted out. This whole space will be finished off with clumps of shrubbery and turf as soon as the spring opens, and the main park driveway which will be located on this reclaimed territory east of the electric railway tracks will be graded and macadamized ready for the midsummer traffic.

A heavy stone revetment wall has been constructed by the company along the edge of the cliff from the view point which for many years formed the terminus of the front walk at Table Rock, to the present edge of the Falls; the face of this wall was built a few feet back from the edge of the cliff in order to conceal the masonry behind a facing of soil, in which vines and shrubs may be planted so as to give a natural appearance to the bank at this point; the space behind the wall was filled in and brought to a proper level ready for covering over with surface soil.

It is proposed in 1906 to continue the present ornamental stone and iron panelled parapet wall, which now ends near the old elevator formerly used by visitors viewing the Falls from below, all the way to the edge of the cataract, a distance of nearly eight hundred feet, so as to afford a suitable finish to this the most important part of the park front, and at the same time provide a perfectly safe protection to the promenade which will be constructed along the whole extent of and immediately behind the parapet.

Owing to the machinery and material required for the completion of the tunnel operations of the Electrical Development Co., occupying all the space north of the Electric Railway intake, the construction of the new driveway along the river bank, south of Table Rock, which has been provided for in the new layout of the park could not be begun, it is hoped, however, to have this improvement made early in the ensuing season.

As all the heavy material required for the installation of the hydraulic works in connection with the third, fourth and fifth electrical units of this company has until recently occupied the ground west of the power house, and the contractors' plant and material have fully taken up the space to the east and south, it has not been practicable to level off or surface with soil this part of the companies' work.

The Ontario Power Company.

The Ontario Power Company, whose works required a much greater tearing up of the park surface than the combined works of the other two companies, has made splendid progress during the year with all the various and extended operations required in its undertaking, and so successfully was this done that by the end of October, the company had brought to completion nearly all its surface works in connection with its first installation of 60,000 horse power. At the extreme south end of the Park, the very extensive Forebay constructed in the bed of the river, including the intake gates and curtain walls by which the entrance of water into the Forebay is regulated the extensive screens, inner Forebay, foundations of gate house and all the various works required for the admission, regulation and control of the water for the entire requirements of the company's plant were completed in the early part of the season and the Coffer Dam was removed and the water admitted to all the upper works of the company in June last.

The eighteen feet diameter pipe line, which carries the water beneath the park surface from the inner Forebay to north of Table Rock House, was finished last year, but the immense amount of material which has been exca-

vated in order to permit of the construction of this work had not been replaced. Before this was done the exterior of the pipe was encased in concrete, the excavated material was replaced and the surface of the Park brought to the required level, the whole of the disturbed area, together with the extensive additions which had been made to the Dufferin Islands, was then levelled off and covered with good surface soil as required by the Commissioners.

The construction of the Screen House Building was carried on throughout the year and is now practically completed. It is a well designed building of Roman Stone, with wide stair-ways leading up at either end to the broad roof which has been adapted for a promenade; this promenade, which is protected on either side by handsome railings of stone and open metal work panels, will without doubt form one of the most attractive features of the Park, as it affords a broad outlook over the whole width of the river from the broad sweep of the flowing water of the upper river, through the turbulent rapids to the ever ascending column of spray which marks the position of the Horse Shoe Falls. In the immediate foreground a very fine view is afforded of the outer and inner Forebays of the Ontario Power Company, further down stream, the Forebay of the Electrical Development Company and the intake of the Canadian Niagara Power Company are well seen. On the landward side, the course of the several narrow streams which flow about the Dufferin Islands and the foliage of the banks and Islands all combine to afford a most delightful and interesting panorama.

The gate house, which is completed, is a Roman Stone structure of massive but pleasing architecture; the building contains the machinery and appliances used in raising and lowering the heavy stoney gates which control the admission of water to the pipe lines. An underground extension of the gate house at the river end, contains a battery of boilers for warming the interior of the Screen and Gate houses to prevent frazil forming on the iron work of the screens or gates. The boilers are heated by natural gas and consequently are entirely free from the annoyances, caused by smoke or coal dust.

At the northern end of the pipe line very extensive works were required for the subdivision and control of the large volume of water delivered by the eighteen-feet diameter main under a velocity of over fifteen feet per second. Separate down pipes or penstocks are used to conduct the water from this main to operate each of the electrical machines in the power house, and every penstock required a valve by which the supply could be regulated or cut off as might be desired. The penstocks are nine feet in diameter, and as the head and velocity of water are considerable, the valves were of necessity of very massive construction. A large space was therefore necessary for their installation and operation. This was accomplished by providing a long brick-lined valve chamber in the rock beneath the eghteen-feet supply main, and constructing from the surface of the Park to this chamber concrete shafts between each pair of valves in order to facilitate the renewing or repairing of the mechanism from time to time. All this extensive and costly construction has been finished, the large pipes encased in concrete, the filling and surfacing completed, and nothing remains on the surface of the Park to indicate the important works which have been constructed beneath.

In order to guard against the possibility of a sudden stoppage of the flow of water through the main pipe by lightning or otherwise, and the very serious consequences which might result therefrom, it was absolutely necessary to provide in connection with the supply pipe an automatic device which would afford prompt and efficient relief. As all the works are upon a very great scale the means ordinarily used for this purpose could not be adopted. After a

great deal of study a spillway construction was designed as a terminal for the pipe, in the form of an adjustable weir, with a spiral outflow for the waste water terminating at the front of the power house in the lower river. The principal part of this very important and extensive work has been completed, and only the exterior finish of the structure and the restoration of the grounds around the same requires attention.

In connection with the development of the plans for the restoration of the Park adjacent to the spillway, advantage has been taken of a readjustment of the plans for securing access from the Park surfce down to the power house in the lower river and also up to the transformer house and general offices of the company located on the high ground overlooking the Park, whereby the elevator portal and the spillway which are in close proximity are treated as component parts of one structure, with excellent architectural effect.

As these structures are located at the narrowest and possibly the most interesting part of the Park, their completion will remove the last evidence of the very great disturbance of the Park surface necessitated by the operations of this company.

Below the Cliff, the vast amount of work required to provide the foundations for and install the hydraulic and electric machinery for the operation and control of three complete units and the concrete foundations for three additional machines has all been done. Much of the hydraulic and electric machinery required for the fourth unit has also been delivered.

Upon the completion of the first two electrical generators with all the connecting works for the supply and regulation of the water required in their operation, very careful tests were made of the flow in the hydraulic pipes and the efficiency of the water wheels and machinery. These tests indicated that the designs secured a greater delivery of water under a less friction loss than had been assumed, and also that the efficiency of the water wheels was in excess of the requirements. It was therefore decided to increase the size of all additional generators to 12,000 instead of 10,000 electrical horsepower. This enlargement of the mechanical units will of course result in fewer machines being required, and thus reduce the ultimate length required for the power house. The interior of the concrete wall of the power house has all been lined with cream-colored tiles with ornamental relief.

Electrical Development Company.

All the works of this company both above and below the surface of the Park, have been pushed forward with great energy during the year.

The wheelpit, the excavation of which was completed by the first of the year, has been lined throughout with massive brickwork laid in cement, and two tiers of heavily armored concrete arch beams have been thrown across at various elevations to support the vertical shafting which will connect the water wheels in the bottom of the pit with the generators on the floor of the power house. These arched beams are also designed to resist the tendency of the walls of such large excavations to creep inward at certain seasons of the year.

At the top of the pit a continuous concrete arch of great strength has been built on which is carried the concrete foundations for the electric generators, each of 12,500 electric horse power capacity, the largest generators so far designed for commercial purposes. The foundations for the power house, which are of heavy concrete construction and rest upon bed rock, have all been carried up to the floor level and made ready for the superstructure. The two outer rows of arches which are to form the defences of the power station

from floating or field ice have been completed. These are constructed of substantial concrete piers and arches up to a few feet below water level, and surmounted with continuous curtain walls of very heavy masonry up to finished floor level where a broad coping of dressed limestone provides a convenient footway from which sheet ice, if formed in the forebays, may be dislodged and passed on to the river through the sluiceways in the overfall dam.

The outer wall will also be provided with substantial iron railings, and may ultimately be used as a promenade from which visitors can view the beautiful prospect of the forebay and rapids without interruption of any kind.

The deepening of the forebay has been carried on continuously; the greater part of the rock removed is being crushed for use in concrete, the balance being used for filling up to finished grade the lands reclaimed from the river and in readjusting the finished surface of the Park in the vicinity of the power house.

As early in the season as the works permitted, a beginning was made in removing the coffer-dam, constructed in the river bed to unwater the forebay and site of power station, and by the end of the year all that portion which was below the cascades had been taken away. The removal of this great coffer dam is necessarily a very slow work, as all the stone filling of the outer and inner cribs and the clay puddle between has to be recovered by dredging, and the timbers taken apart and removed from the water. The stone is of course very useful for crushing into concrete or for filling purposes, while the clay answers well for topping off the stone used in the fills. It will not be practicable to remove the coffer dam above the end of the overfall dam until the excavation of the forebay has been entirely completed and the tracks removed.

The main discharge tunnel has been completed with the exception of the concrete rings which form the lining at the portal under the Falls. This tunnel, said to be the largest in cross-section which has heretofore been constructed, is a very fine example of high-class engineering and mechanical work, and excites the admiration of visitors. The two branch tunnels, one on either side of the wheelpit, which are to receive the spent water discharged through the draft tubes after operating the water wheels, and deliver it to the main tunnel a short distance from the lower end of he wheelpit, are also practically complete and most of the corkscrew draft tubes have been put in place. All this work will be ready for the installation of the hydraulic machinery early in the spring.

Late in the autumn the heavy steel skeleton framework for the power house was begun, and already nearly two-thirds of this work has been riveted up in place, and the track laid for the electric traveller by which the machinery required in the work will all be handled. This traveller is on the ground ready to be put together.

The Indiana limestone, of which the walls of the power house will be constructed, is all on the ground for the first section of the building—about two-thirds of the ultimate length—and most of it has been cut and made ready to be built into the work when spring opens. The stone is of very fine quality, and well adapted for high class work, the carving on the capitals of the colonnade and of the entablature of the main portico, has all been done and the stones marked and piled ready for building operations.

Owing to the continued necessity for handling materials for the tunnel through the shaft near electric railway intake, the removal of the many buildings erected by the contractors near that point, and the tidying up of the grounds has of course been delayed, and it will probably be well on in the summer before the various construction works in connection with the power

house will be far enough advanced to permit of the levelling and surfacing of the Park in that vicinity being undertaken.

Restoration of Park Surface.

Reference has already been made to the levelling and surfacing of the very extensive territory in the Park which had been disturbed by the construction operations of the Ontario Power Company extending from the new Refectory building to the southern extremity of the grounds above Dufferin Islands, and to the changes consequent upon the works of the Canadian Niagara Power Company. As soon as these works were sufficiently advanced to permit of planting operations being undertaken the whole Park force was employed in preparing the newly-made ground and in collecting and setting out a great variety of deciduous trees and shrubs, evergreens and vines, so as to cover as much of the territory as possible before winter set in. When the works for the development of power were commenced, a large collection of suitable stock for this purpose was selected at Font Hill nurseries and set aside for future requirements, and arrangements made whereby the nurserymen should give the best of attention to the care of this stock pending the completion of the works and the restoration of the grounds. Owing to this foresight over two thousand well grown, well rooted and in every way superior trees and shrubs and vines were thus obtained and set out at various places in the Park, chiefly on the newly made additions to the Dufferin Islands, and about a thousand hardy natives were collected from the woods near at hand and at Queenston Heights, and intermixed with the stock obtained from the nurseries.

As the character of the new-made ground, particularly the extensions to the Dufferin Islands, is simply a rock-dumped fill, full of interstices and incapable of holding water, the earth surfacing used was in all cases clay, upon which was spread a good coating of top-soil or sods. Notwithstanding all precautions, however, it will be a difficult matter for a year or two to secure sufficient shade to prevent the ground drying out in hot weather, the planting has therefore been made much thicker than usual, with the expectation of thinning out later on when the soil has silted down into the crevices of the stones and afforded better nourishment for the roots of the plants. A collection of very sturdy elms and maples was also obtained from nearby woods and planted at points where a strong growth was early desired, while many deciduous trees of from twenty to thirty feet in height which were found growing along the bank in rear of the Park and could be spared from their natural location were transplanted with a ball of native soil for immediate landscape effects in the vicinity of buildings and at points where screens of foliage are absolutely required.

Fortunately, the latter part of the season was very mild, which permitted of work in the open being carried on to a much later date than usual. This work of planting should be carried on throughout the coming year with vigor if the upper portion of the Park is to be brought to a finished condition without undue delay.

General Park Works.

In last year's report the necessity for a new and enlarged shelter pavilion in the picnic grounds was referred to. This work was undertaken early in the season and completed in time for the opening of the excursion travel in June. The new structure is of the same general design as the former one, but twice as long and of heavier and more permanent construction. The floor is

of concrete, and provision for the hot and cold water is made in a basement, easy of access from the grounds and equipped with natural gas heaters, thus doing away with the necessity of having a fireman constantly in attendance. The number and size of the excursions visiting the Park in 1905 were, however, more than sufficient to tax the greatly increased accommodation thus afforded, and it will be necessary to erect another building of the same general character in the spring in order to provide for the comfort and convenience of visitors.

The perennial border which extends along the foot of the hill from the picnic grounds to the jolly cut entrance to the Park, has been a source of unending delight to visitors, the constant succession of bloom, the rarity of many of the plants and the great diversity of the species calling forth much praise from all who are in any way interested in flowering plants, and reflecting very great credit on the Chief Gardener, Mr. R. Cameron. Now that the upper portion of the Park has been restored a very favorable opportunity is afforded for extending this work, as the combination of leaf mold soil and spring water there presented will permit of equally favorable results being attained in a much wider botanical field.

The northern portion of the Park was maintained in good condition throughout the season, and notwithstanding a greatly increased volume of both tourist and excursion travel, but little difficulty was experienced in maintaining order at all times. A great many Niagara Falls citizens from both sides of the river take advantage of the Park on moonlight nights to enjoy the wierdly beautiful scenery presented by the Falls, the rapids and the gorge under a subdued light, or to witness the delicate beauty of the lunar bow outlined on the clouds of ascending spray. Many others desire to enjoy the refreshing coolness of the evening atmosphere in the Park, particularly during the hot season, but are prevented from doing so owing to the darkness. It seems to me to be most desirable, therefore, that at least a portion of the Park should be furnished with electric light, say for the present that part which extends from the front entrance opposite the Clifton House southwards as far as the edge of the Falls.

If this were done doubtless very many who are closely engaged all day and have no leisure for recreation during business hours would take advantage of the opportunity for an evening stroll in the Park, and the end for which the Park was created would be fulfilled to a much higher degree.

The Mowat Gate, which is the principal entrance to the Park, was built in 1887, and is constructed entirely of rustic cedar. It is now out of repair and greatly in need of renewal. As the Victoria parkway in front of the new Clifton House has been widened considerably, it would be desirable to make a new carriage entrance nearer to the front of the Park and in a more direct line with the approach from the end of the upper steel arch bridge. By so doing a small piece of new road would be required to connect with the present driveway near the Superintendent's office, and a new gateway substituted for the Mowat Gate. This new entrance need not include a gate house, but preferably should be substantial and ornamental stone posts, two to delimit the roadway and one on either side of these for pedestrian entrances. Should this work be undertaken a new stone and metal panel fence, extending along the whole northern limit of the property on Ferry street, would be a very great improvement over the present wire fence and add greatly to the dignity and character of the Park.

Outlying Parks.

At Queenston Heights Park all the grounds were maintained in good order throughout the year. A very noticeable increase of visitors to this

famous historic ground taxed the facilities provided for their accommodation to the utmost and necessitated additional work in attending to their requirements. Extra seats and tables were provided, new paths have been constructed and a greater area of the grounds about the earthworks behind the Monument was cleared up and made accessible.

A new path was made leading down the heights from the electric railway crossing to the site of the half-moon battery made famous in the battle of October 13th, 1812, as the point from which Major-General Brock first observed the enemy to be in possession of the Heights, and a rustic viewpoint has been constructed near by. The path was continued from the battery to the steps overlooking Front street in the village of Queenston, and a connection path opened up from the same point along the roadbed of the old horse tramway which, prior to 1857, connected Queenston with Chippawa and formed the chief means of carriage for all goods passing up or down the great lakes.

The small parcel of ground about the Monument set by His Majesty the King on the occasion of his visit to Canada in 1860, to mark the spot where General Brock fell, has also been maintained in good order and condition.

At Niagara Glen some additional paths have been made, opening up new features of this very wild and interesting portion of the Park. The number of visitors to the Glen has greatly increased in recent years, and were it not for the fatigue involved in climbing up and down the cliff the numbers would be many times greater. If it were possible to provide an incline railway at this point many who are now debarred might enjoy the unique display of nature's handiwork, both geological and botanical, here displayed and the objections now made by all visitors in warm weather would be removed.

At Fort Erie, the granite shaft erected by the Dominion Government at the solicitation of the Commissioners was completed by the placing of the bronze tablets commemorating the regiments taking part in the siege and the officers who fell in action at this point in the war of 1812-14.

An imposing flagstaff was also erected. It is wholly constructed of galvanized steel, and is 100 feet in height. The ground in rear of the ruins of the Fort were ploughed up in order to remove the unevenness and will be levelled off and sown in good grass in the spring. A beginning was made in providing plantations to relieve the bareness of the grounds and some very fine maples and elms were planted.

Niagara River Boulevard.

The work of protecting the shore of the upper river from the erosive action of the water has been carried on during 1905 and over two miles in the aggregate of the worst spots have now been protected by heavy stone riprap placed along the water line. The high water caused by storms on Lake Erie which have been of requent occurrence the past few months has demonstrated the necessity of urgently prosecuting this work as long reaches of the shore which are not subject to wear at ordinary high water have given away under the abnormal conditions which have recently prevailed and in some places the waves have even surmounted the protection works but without causing much damage. Although this work is costly, owing to the difficulty of obtaining stone in the locality, yet there appears to be no other way of stopping erosion, when once it has begun, which would be as economical and as easily adapted to the requirements.

Several pieces of land have also been acquired during the year to widen out the highway along the edge of the river bank. Altogether additional

width has been secured for about one-fourth of the total distance between Chippawa and Bridgeburg. As practically the whole of the frontage will require to be widened in order to provide a suitable width for the proposed boulevard, it is desirable that this work also should be prosecuted energetically, as without doubt the value of all lands within a reasonable distance of Niagara Falls will be increased by reason of the development of the water power for electrical purposes.

All which is respectfully submitted,

JAMES WILSON,
Superintendent.

APPENDIX "B."

Copy of an Order-in-Council approved by His Honour the Lieutenant-Governor the 14th day of June, A.D. 1905.

The Committee of Council advise that L. Clarke Raymond, of the Town of Welland, Esquire, Barrister-at-Law, and Philip William Ellis, of the City of Toronto, Esquire, be appointed Commissioners for the Queen Victoria Niagara Falls Park in the room and stead of A. W. Campbell and James Bampfield, resigned.

Certified,
(Sgd.) J. LONSDALE CAPREOL,
Clerk, Executive Council.

APPENDIX "C."

QUEEN VICTORIA NIAGARA FALLS PARK.

Memorandum respecting the application of the International Railway Company to increase the output of electric energy at its power house in the Park, and to lay conduits from the power station to the upper steel arch bridge to carry the electricity without the Park.

In 1891 an agreement was entered into with a syndicate of Canadian capitalists for the construction of a line of electric railway through the Park and extending northerly to connect with Lake Ontario navigation at the Village of Queenston, and southerly to the terminus of Lake Erie navigation at Chippawa, in order to provide easy and convenient access to the Park from the larger centres of population within reach of Niagara Falls. By the terms of this agreement authority was granted to procure from the waters above the Falls the power required to operate and light the railway.

In 1892 an Act of the Legislature (55 Victoria, chapter 96) was passed incorporating the company contemplated by the agreement under the title of "The Niagara Falls Park and River Railway Company," under the provision of which Act, in addition to the right to construct an electric railway between the points named authority was granted the company to acquire stock in, or run its cars over, any street car line which might connect with the railway, and to convey the electricity required for working or lighting the railway along the public highways and across any of the waters of the Province, but the electricity so conveyed was not to be used for any other purpose than to work and light the railway.

The Act further provided that the rights granted the company should not be exercised within the limits of the Park without the consent of the Commissioners or the approval of the Lieutenant-Governor in Council. The railway was constructed without delay, and was opened for traffic in the summer of 1892.

In 1900 the Buffalo Railway Company, incorporated under the laws of the State of New York, was granted authority by the Parliament of Canada (63-64 Victoria, chapter 54) to acquire certain railway and bridge company franchises in Canada, including all the property and rights of the Niagara Falls Park and River Railway Company's railway, but the Act specifically preserved to the Commissioners all the jurisdiction and control in respect of the Park and River Railway Company, which was secured to them under the agreement of 4th December, 1891.

This Dominion Act was followed by an Act of the Provincial Legislature in 1901 (1 Edward VII., chapter 86) confirming the Dominion legislation and authorizing the Niagara Falls Park and River Railway Company to sell its franchise and property to the Buffalo Railway Company, but reserving in all respects the control and jurisdiction of the Legislature of Ontario, and of the Commissioners, over the railway, as provided by the Act of Incorporation (55 Victoria, chapter 96).

In this confirming Act, however, the original Act was amended by striking out the words "to work and light the said railway" in subsection 9 of section 4, and substituting therefor the words "the purposes of any railway company which purchases the franchise of the company."

In 1902 authority was obtained from the Parliament of Canada (2 Edward VII., chapter 43) and from the Legislature of Ontario (2 Edward VII., chapter 12, *par.* 30) to substitute the name International Railway Company for the Buffalo Railway Company, in each instance the powers and rights of the Legislature, and the jurisdiction and control of the Park Commissioners, were again specifically reserved.

In October, 1903, the International Railway Company applied to the Commissioners for approval of certain plans showing a line of conduits beneath the surface of the Park in which to carry electric cables from the railway power house to the upper steel arch bridge. Upon enquiry it was ascertained that the conduits were wanted for a two-fold purpose, namely: to protect the wires, carrying electricity for operating the railway, from ice and spray in the vicinity of the Falls; and, secondly, to carry electric power to the American side of the Niagara River to operate in whole or in part the extensive electric railway system of the company in the State of New York.

As the demand of the company to use power generated in its power house in the Park for operating railways outside of Ontario was an entirely new feature of the case to the Commissioners, and as it opened up important questions of policy which would sooner or later require the attention of the Government, the Commissioners obtained opinion of counsel as to the rights possessed by the company under its Act of Incorporation and the amending Acts subsequently passed by the Parliaments of Canada and of Ontario, which differed entirely from the views of the railway company.

A long controversy followed, in which eminent counsel took diverse views of the question at issue, which was further complicated and delayed by the difficulty experienced in securing the consent of the several power companies developing the water power of the Falls for commercial purposes.

After a protracted discussion of the question, in which it was apparent that the conflicting opinions of counsel could not be reconciled, the Government requested the Commissioners to prepare a recommendation which would embody the views of the Board as to a just and reasonable compromise of the

matters in question; after due consideration and consultation with the Premier, the Commissioners, in May, 1904, submitted their recommendation which was in the following terms:

(*a*) That the company shall pay to the Commissioners annually $2,000 in addition to the $10,000 now paid as rental, which payment of $2,000 will allow the company to generate within its power house in the Park for the purpose of supplying any quantity of electric power up to 2,000 h.p., and for every horse power over and above 2,000 horse power the company shall pay to the Commissioners the additional sum of one dollar per electrical horse power per annum.

(*b*) That the power so supplied shall be used exclusively for the purposes of operating and lighting the railway, and for no other purpose whatever.

(*c*) That the company shall be restricted in the generation of power to the present capacity of their forebay, wheelpit and tunnel in the Park, and not in any case to exceed 10,000 electrical horse power.

(*d*) Such grant and concession to the International Railway Company not to be operative unless the consent of the three power companies now located at Niagara Falls, Ontario, be duly obtained.

(*e*) The Commissioners may agree that, at the next Session of the Legislature, or as soon as practicable, they will join the International Railway Company in an application to the said Legislature for any Act to ratify and confirm an agreement to be made pursuant to preceding stipulations, and with proper stipulations to carry out the same."

In making these recommendations the Commissioners assumed that 2,000 electrical horse power would be sufficient for the actual requirements of the railway operated by the company under its agreement with the Commissioners, and that the company should pay a reasonable rental for all excess power substantially on the principle adopted in the several agreements entered into with the companies developing the water power of the Falls for commercial purposes. And as the company claimed they required the power for railway purposes only, it was deemed but just to the commercial power corporations that in any agreement entered into with the railway company the use of the power generated by it should be restricted to the use of the railway.

It was also considered advisable in order to avoid possible disagreement with the power companies that their consent should be obtained to any agreement which might be entered into with the railway company.

As the terms and conditions set forth in this recommendation of the Commissioners were not acceptable to the railway company, objection being made chiefly in respect to clause (*c*) limiting the total output of power to 10,000 electrical horse power, which the Commissioners were advised was the maximum amount of power which could be developed by the company through its present intake, forebay and tunnel. the question remained in abeyance until recently when the company renewed its demand for permission to construct the conduit through the Park to generate additional power for operating its railway in New York State.

Some changes having in the meantime taken place in the personnel of the Commission, all the questions at issue were again examined by the Board, and all the correspondence, reports and papers in connection with the case were submitted to the Attorey-General, who, after due consideration directed the Commissioners to formally notify the company that the application could not be acceded to, which notification was duly served upon the company through its solicitor on 7th October last.

The company have, however, urged a reconsideration of their application before the Government, and, therefore, the Commissioners have been

invited to review all the circumstances of the case and to report fully thereupon for the information of His Honour the Lieutenant-Governor in Council.

After a most careful consideration of every phase of the question, and having regard to the great desirability of coming to an equitable compromise without recourse to litigation, the Commissioners recommend (subject to the settlement of any constitutional questions which may arise) that the terms and conditions submitted by them in May, 1904, be amended to read as follows:

(*a*) The company shall pay to the Commissioners annually, in addition to the sum of $10,000 now paid under their agreement, the sum of $2,000 for which increased payment the company may generate in its power house in the park electric power up to but not exceeding 4,000 horse power.

(*b*) For a further payment of $1.00 per horse power per annum the company may generate and use any quantity of electric power over 4,000 horse power up to but not exceeding ten thousand horse power.

(*c*) Should the railway company, with the approval of the Commissioners, deepen their wheelpit and construct a tunnel at a lower level so as to generate a greater quantity of electric power than 10,000 horse power with the present capacity of their intake by using the water at a greater head, the company shall pay to the Commissioners the sum of seventy-five cents for every horse power so generated and used for railway purposes in excess of 10,000 electric horse power, but under no circumstances shall the railway company be permitted to generate or use more than 20,000 electrical horse power.

(*d*) The company shall obtain the consent under seal of the three power companies now located in the Park, and, as the International Railway Company applied for and obtained permission to have a joint intake with the City of Niagara Falls for its water supply, the consent of the city authorities of Niagara Falls shall also be obtained under seal.

(*e*) That the power so generated shall be used exclusively for the purposes of operating and lighting railways, and for no other purpose whatever.

(Sgd.) J. W. Langmuir,
Chairman.

Toronto, January 4th, 1906.

APPENDIX "D."

Report of the Park Superintendent in the Proposal to Construct a Dam at the Outlet of Lake Erie.

To the Commissioners of the Queen Victoria Niagara Falls Park.

Niagara Falls, 24th August, 1905.

Gentlemen,—The International Waterways Commission, which has been appointed by the Governments of Canada and the United States to examine into and report upon all questions arising out of the joint waterways along the boundary line separating the two countries, has appointed the 13th and 14th of September next for the consideration of the proposal made some years ago to erect a dam across the outlet of Lake Erie between Buffalo and Fort Erie for the purpose of raising the surface of the lake to a fixed stage

of water level, and of constructing regulating sluices in the dam to permit of maintaining this proposed fixed stage at all times during the season of navigation.

As this proposed work, if carried out, would in my judgment have a very important bearing upon the supply of water to the Niagara River, below the dam, and would in all probability materially affect not only the riparian rights of the Commissioners along the bank of the river but also the supply of water to the hydro-electric industries licensed by the Commissioners to use the waters of the river at Niagara Falls for power purposes, I have prepared the following report upon the subject for the consideration of the Board.

Lake Erie is the fourth in the chain of five great inland waters through which the drainage of a large portion of the continent is passed on to the sea, and whose broad surfaces temper the heat of summer and the cold of winter and furnish the moisture required to irrigate a large district of country, the size, drainage, area and run off of these several lakes being approximately as follows:

Name.	Area of water surface sq. miles.	Watershed sq. miles.*	Maximum depth.	Average run off feet per sec.
Lake Superior	32,000	48,600	1,030	72,000
Lake Michigan	22,400	45,700	1,000	
Lake Huron	23,200	52,100	1,000	190,000
Lake Erie	10,000	24,500	84	220,000
Lake Ontario	7,500	25,500	500	250,000

*According to the 1904 report of the Chief of Engineers, U. S. Army, the drainage area of the lake region above Niagara River is 254,708 square miles.

As is shown by the above table, the outflow or runoff from Lake Erie as determined by taking a mean or average for a period of many years is 220,000 cubic feet per second, or 82,500,000 gallons per minute. Owing, however, to several causes this outflow is by no means uniform, the volume varying from hour to hour with the constantly changing elevation of the surface of the lake at the outlet. The causes of this variation are:

1. The precipitation and evaporation over the lake area which uniformly gives high water in mid-summer and low water in mid-winter.

2. A periodic variation which may be traced to a cycle of wet and dry seasons, extending over a period of years, this variation is in harmony with and emphasises the general annual movement.

3. Wind storms upon the lake; while the effect is of short duration the surface of the water may be raised or lowered in a very short time to the extent of several feet, a southwest wind driving the water down the lake and piling it up at the outlet, and a northeast wind forcing the water up the lake and thus lowering the level at the outlet.

So great have been the effects of the wind at times that the surface elevation at Buffalo has been raised as much as 8 feet above the normal, while on other occasions, the level has been lowered from 5 to 5½ feet below mean water level.

Under these circumstances it would appear that if the outflow could be made more uniform it would be highly beneficial to all interests con-

cerned. The problem, however, is one of great magnitude, and requires very careful consideration in order that all the phases of the question may be taken into account. Fortunately, this subject was under consideration in 1900 and a very exhaustive and carefully prepared report was made by a Commission of Engineers for the United States Government upon the subject, in connection with other proposed works for the improvement of the navigation of the upper lakes, and although the present International Waterways Commission are not in any way committed to the plan then devised and which was fully considered and illustrated in the report referred to, yet it furnishes an excellent example of the method and scope which the best engineering opinion of the day would be likely to suggest for a work designed to accomplish the desired end, and therefore will be here referred to in order to ascertain the effect which such a system of regulation would have upon the waters of the river below the site of the works, and consequently upon the levels and supply which would be available for the navigation of the river between the lake and Chippawa as well as for the important industries which have been established at Niagara Falls on both sides of the river for the development of electricity for commercial purposes.

In so far as regulating and maintaining the levels of Lake Erie is concerned, there can be little question respecting the beneficial results which would follow from the construction of the projected works and were this the only question involved the proposal would meet with very general approval. As, however, the project has a wider influence, it will be better to briefly describe the works designed for this point.

The regulating works proposed by the U. S. Deep Waterways Commission in 1900 provided for the construction of a concrete masonry overfall dam running out at right angles to the Canadian shore of the river from a point a little over a mile up stream from the ferry landing in the village of Fort Erie. This dam to extend out into the river for a distance of 1,600 feet from which point a system of masonry piers and moveable steel gates extended a further distance of 1,210 feet, consisting of thirteen openings of 80 feet clear span, separated by piers twelve feet in thickness with grooves for the heavy moveable stoney gates. Steel towers were designed to be erected over each pier to carry the lattice overhead work and machinery for the raising and lowering of the gates. Beyond this regulation system of works, it was proposed to utilize an existing reef of rock of the same elevation as the overflow dam to carry the work to Black Rock harbor, the latter part being at an angle of 35 degrees with the main portion of the work, and 1,200 feet in length.

Under this scheme the free navigation of the river would cease and all vessels would require to use the upper reach of the Erie Canal in order to pass the proposed works, no lock having been provided for the Canadian side.

The top or crest of the overfall dam on the Canadian side and the surface of the reef on the Buffalo side of the regulating gates was fixed at an elevation of 4.5 feet below the present mean water level of the lake. The construction of the works were designed to raise and maintain the mean level of the lake 2.1 feet higher than at present.

At the established normal stage of the lake, or within the range of monthly mean stages, or at any higher water level, the regulation could be made effective and that without changing the flow of the river to any material extent, but as has already been pointed out there are seasons when storms raise or lower the water surface abnormally, and it is at periods when low water prevails that the volume of water passing the works would be reduced to small dimensions, or, possibly if the low water period occurred during the

season of navigation the supply might be cut down to such an extent as to make all use of the river impossible for navigation or in fact for any purpose to compel the closing down of all the works for the generation of electricity, which are located along the course of the Niagara River, until the storm abated and normal conditions were restored.

From an examination of the fluctuations of the lake for a period of years, it appears that the average monthly minimum level of the surface is over two feet below the established mean, while on many occasions the water surface falls much below this, in several instances to five feet and on one occasion to 5.6 feet below the normal.

Doubtless the force of the wind would be felt to quite the same extent upon the regulated level, which would be two feet higher than at present, and a study of the resulting effect upon the outflow after the completion of the proposed works leads to the following general conclusions:

At the mean monthly minimum stage referred to, with all the gates open, the outflow would be about eight-tenths of the established mean flow, and, with the gates all closed, only about four-tenths of the normal flow.

While at times of extreme low water caused by northeast winds, such as occurred in February, 1894 (when the lake at Buffalo fell 5.6 feet below mean level), there would be only one foot of head upon the overfall dam and the length of crest would also be reduced.

Under such conditions, with all the gates open, there would be only about one-third of the normal flow from lake to river pass the works, instead of fully one-half the normal as would be the case under similar conditions of exceptional low water with a free and unobstructed river. Should the gates be all closed, the flow would be restricted to only about one-twentieth of its mean volume. If this minimum elevation should happen at any time during the season of navigation, the shipping interests would of course use every effort to have the gates kept closed in order to secure the restoration of the levels of Buffalo harbor as quickly as possible after the storm abated, and as the shipping interests form a very powerful combination, and are likely to increase in importance, it is altogether likely that the gates would be kept closed, and the Niagara River allowed to run practically dry for the time being.

It is needless to point out that such an interference with the natural condition of affairs should not be permitted under any circumstances, particularly when the whole object of the scheme appears to be to save dredging the harbors on Lake Erie and to facilitate the making of a 21 foot channel from the United States side of the Niagara River to Lake Huron, the cost of which, according to Deep Waterways Commission report before referred to, would be, if the water was raised in Lake Erie, to the extent proposed, about $1,375,000 less than would be required should the conditions be allowed to remain as they now are.

I might be permitted to point out that already, owing to the construction of the Chicago Drainage Canal, the water surface of Lake Erie has been permanently lowered according to the report of the Chief of Engineers, U. S. Army, by about 4½ inches and the volume of the Niagara River has been permanently reduced to the extent of four and a half per cent. of its average yearly flow, and all the waters from Lake Huron via the St. Lawrence to the sea have been likewise despoiled to this extent for the benefit of the City of Chicago alone.

It is now proposed to further sacrifice the waters of the Niagara River and Falls by making them subordinate to the navigation interests on the upper lakes, to cut off the free use of the Niagara River by Canadian shipping, and compel it to pass by way of the Erie Canal, which is State owned

and not under the control of the Central Government, and to further jeopardise the flow down the St. Lawrence at seasons when inland and ocean navigation is in the greatest need of all the water which can possibly be had.

For all these reasons I am of the opinion that every effort should be put forth to oppose the erection of any such works at the outlet of Lake Erie as the dam and gates proposed by the U. S. Deep Waterways Commission.

Yours very truly,

(Sgd.) JAMES WILSON,
Superintendent.