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No. 53/32 WATER PROBLEMS ON THE CANADIAN BOUNDARY

An address given to the Canadian Manufacturers' Association, Toronto, by General A.G.L. McNaughton, May 28, 1953.

....I count it a very particular privilege to have been given this opportunity to talk tonight .... about some of the current problems in relation to water and the uses to which it may be put which exist along our 5,655 miles of boundary with the United States. This boundary extends from between the Province of New Brunswick and the State of Maine on the Atlantic Coast to between British Columbia and the State of Washington on the Pacific; further north it extends from the Portland Canal on the Pacific Ocean, inland of the Alaska Panhandle and thence north along the 141st degree of west longitude between the Yukon Territory and the United States territory of Alaska to the Arctic Ocean, whence it continues, according to our assertion, to the North Pole.

The international problems in relation to the use of water which are developing along this boundary, and for which solutions must now be found, are mostly the consequences of the historical processes which marked the evolution of Western civilization on the North American continent. In those times the uses to which we now wish to put water were not of any great significance in the life of the people, and so it is not to be wondered at that the aspects of the use of water which we have come to value received then but scant attention in the making of boundaries and the like.

The original London and Plymouth Companies were chartered by James I in 1606, and sections of the original boundaries of their geographic zones have persisted to this day. In those early days settlement came in from the sea, and rivers became a favourite topographical expression to choose for the practical demarkation of developing political administrations, although most of the customary extravagant assertions of ownership of distant territory continued to be expressed in geographic terms.

In that era this method had much to commend it. Waterways were the most direct, and almost the only, avenues of travel into the hinterland and, having been traversed by the explorers, their courses were indicated on the primitive maps of the day and could be recognized on the ground with some moderate degree of certainty. Their median lines of flow could be ascertained with all necessary precision for the circumstances then existing and, even if an island or so had to be arbitrarily assigned to one country or the other, or some branch or larger tributary

became mistaken for the main channel intended - what difference did it make then? A few thousand square miles of virgin territory, claimed by one side or the other, with populations numbered in individuals little pre-occupied in the result. In those days there was plenty of timber and fish and game for all, and these were about the only products of the wilderness of any interest.

And the native tribes whose alliance and later dominance was sought were characteristically transient or migratory and so not very specifically associated with particular areas. The requirements of navigation by canoes or other small craft were satisfied by equality of use and freedom of passage on either side by portage around the rapids and falls which then, of course, were only a nuisance as obstacles to be surmounted in the passage of the fur traders or early settlers, and in the movement downstream of timber in rafts or as loose logs to be floated to the settlements nearer the coast.

As for water power, anything but the smaller streams with concentrated heads of less than a score of feet or so had no value whatever, for, except for some small primitive wheel to turn a grist mill, there was no requirement for any larger provision of mechanical power in the locality and, even if there had been, there were then no physical or engineering means or methods by which such a requirement could be satisfied. And electricity as a means for transmitting power from a remote site to a distant place of use had, at that time, not even been dreamt of.

Such, then, were the conditions which dictated the demarkation between the political units which gradually formed along the Atlantic Coast of North America, competed with one another, crystallized into states, changed their allegiance with conquest or purchase or declarations of independence, and finally merged into nations with boundaries formally defined in treaties. These boundaries were later to be quarreled over, then interpreted and finally marked on the ground by monuments along the way so that uncertainty might end and in the hope that controversy would cease.

Unfortunately, this was a vain hope, for the river-line boundary has proved to be most singularly difficult and unsuited to the conditions inherent in the highly nationalistic states which came into existence on either side of river lines of political cleavage. And to add to the disadvantages, the rising tide of settlement and the widening application of science and engineering not only called for and made necessary, but also made available the means to carry out, the deepening of channels for water-borne traffic and the provision of locks and other aids to navigation. It was then that the serious defects of rivers as boundaries became apparent, because of the difficulties, under divided administration, of arranging for the timely construction and operation of the desired improvements.

These difficulties and disadvantages became of increasing significance when it became possible to develop the rapids and falls of the rivers, however large, into electrical power and to transmit it great distances. Certainly now, when conditions have come to favour the river basin as the unit of development in which all natures

of resources can be developed and made use of to the greatest advantage, we well might wish that our forefathers had found some method other than the river line to express the political divisions they set up. But as matters stand, these have now become fixed, and cannot be changed, and so we have to accept the problems which are posed. And we must bend our minds to find, through co-operation, the methods which will give solutions equitably and to the full benefit of the peoples in either country who are affected.

Following the establishment of these early settlements along the seaboard, there ensued a population movement inward from the coast, developing in the middle of last century into successive waves in a crescendo of migration which rolled on, always westward, until the shores of the Pacific were reached.

The Mississippi and its tributaries in the great central plain, flowing generally from north to south, lay across this line of advance; and so the paths of travel were mostly overland by trails which were widely spread and ill-defined. In any event, the pace was far too rapid for the deliberate diplomatic processes which had led to river-line boundaries and those who sought to exercise sovereignty had to revert to the simpler technique, for them, of making use of the global concepts of parallels of latitude or degrees of longitude as the definitions of the separations of political ownership.

Difficult as river boundaries have proved to be in regard to the modern uses of the waters affected, the problems are simple compared to those which have resulted from this particular phase of the boundary-makers' activities; for the latitude and longitude boundaries, determined from the stars, run right across the natural configurations of the earth's surface with no attention to realities, and rivers great and small are required to cross and re-cross these imaginary lines with no regard whatever to the service or convenience of man.

And so, in the use of these waters and of the channels through which they flow - for navigation in trade and commerce, for domestic purposes and sanitation, for irrigation, for the generation of electric power, for fisheries, for the conservation of wild life, and for sport and recreation - by reason of all these uses, which have now become very important, other intricate problems have been set and these, like those along the river-line boundaries, cannot be evaded but must be solved through measures of co-operation in order that due benefit may be given to the peoples in both countries who are concerned.

These were the complex and vital needs which had to be met and which were very clearly in the minds of the plenipotentiaries who negotiated the Boundary Waters Treaty of 1909, on behalf of Canada and the United States. This treaty sought not only to rationalize and solve the particular questions then causing concern, but it seeks also for the future to dispel trouble and prevent disputes. This it does by providing, in the International Joint Commission, a continuing mechanism through which any problems along the boundary of whatever sort, not only of water, can be brought under review at their inception and, we hope, before danger might arise that these problems might

magnify and enlarge through controversy to an extent which would create issues and disputes to alarm and embitter public opinion in either country, thus making their eventual solution increasingly difficult.

In the brief time at my disposal tonight, it is not of course possible to give you any comprehensive description of the detailed provisions of the Treaty of 1909 under authority of which the work of the International Joint Commission is carried on, nor can I give you an account of the three score and more of cases which, during the 42 years of its existence, have come to the Commission either in the form of references on matters of wide interest on which the governments required recommendations as to the policy which should be adopted, or as applications for the construction and operation of particular works where the Commission's conclusions take the form of an "order".

I have thought that, rather than attempt to cover these matters generally, it might prove more interesting and acceptable if I were to take several of the issues which are current, and then give you a more specific description of what is involved and how the solutions are being worked out. To this end, I propose to mention the studies which are now approaching a conclusion in the Saint John River basin in New Brunswick, Maine and Quebec, as a fine example of that spirit of close co-operation and sympathetic understanding of the difficulties and points of view of those concerned on either side which is a characteristic of the Commission's various engineering boards and other groups whose task it is to advise upon the technical aspects of the questions remitted to them for study and report.

I will then refer to the situation in the International Section of the St. Lawrence in regard to the development of power, and the addition of works for navigation, as these proposals presently stand as a consequence of the Commission's order of October 29, 1952, and of subsequent developments. I will include some observations relevant to the levels of Lake Ontario, which is a subject inherently related to the St. Lawrence.

Then I propose to mention very briefly the remedial works at Niagara for the preservation and enhancement of the scenic beauty of the Falls, which is a matter on which the Commission has just been able to render a unanimous report to the two governments.

Then, finally, I will conclude with a short account of the acute problems which are before the Commission under the Columbia River Reference of March 9, 1944. These are problems for which no acceptable solutions have yet been found, and I think you will be interested to know, objectively, the points of view which have been expressed, and between which we will continue to seek for an equitable agreement which will be mutually acceptable.

This schedule leaves out many current problems of great importance, such as those of tidal power in the Bay of Fundy - the suppression of pollution in the connecting channels of the Great Lakes - the pollution of the air by smoke and industrial fumes over Detroit and Windsor - the problems of flood control and minimum flows of the Red River, and of irrigation in southern Alberta and northern Montana.

Perhaps on some other occasion I may be permitted, in one form or another, to give you more information on these affairs which are of great interest.

In regard to the Saint John: This river is under reference from the two governments, calling for an investigation and comprehensive report on all potential power and storage sites which are capable of economic development in the basin either in New Brunswick or in Maine or in Quebec.

The need for power in these regions is acute and the rising costs of coal in New Brunswick and the even higher costs of imported fuel in Maine represent limiting factors on the development of industry which have become serious, more particularly because of the very hopeful prospects for the development of an important mining industry in consequence of the recent find of non-ferrous ore bodies in the Bathurst area.

The Saint John is a river of peculiar interest to the International Joint Commission because it furnishes examples of every one of the several categories of water defined in the Treaty of 1909. For many miles it is a "boundary water", where the territories of Canada and the United States meet in midstream. Then it has "waters flowing into boundary waters" and "waters flowing out of boundary waters", and it has principal tributaries which "flow across the boundary"; and it has "heads" for power development situate in one country which are entirely dependent on the flow from storage in the other. It is of very special interest also because, in the many discussions which have taken place in the IJC over the Saint John down the years, precedents have been established which, while they were very favourable to the United States in the particular circumstances of this watershed, are now proving to be even more advantageous to Canadian interests in other places.

The reference covering the river down to Grand Falls inclusive was received on September 28, 1950, and later extended to tide water near Fredericton, when it was found that power sites in this stretch held promise for early development.

In the two and one-half years which have since elapsed, the International Saint John River Engineering Board has completed its investigation, and its report outlining its recommendations to cover the requirements of the next ten years is now in course of reproduction. It shows that more than 500,000 horsepower may be developed economically in due course, if the Board's proposals are carried out. A site at Beechwood near Woodstock, which is capable of producing ultimately over 180,000 horsepower, has been proposed for early progressive development to ease the immediate power shortages in the province; and this plant, even without additional storage, has been shown to have a benefit-cost ratio of 1.52, which means power at about  $\frac{2}{3}$  the cost from the best of the existing steam plants against which the comparison has been made. The report is, as I have already indicated, an inspiring example of how a very complex international and inter-provincial situation can be rationalized in the best interests of all concerned.

Members of the Canadian Manufacturers' Association will be well aware of the long history of the endeavours of the Government of Canada, in the closest association and agreement with successive Presidents and in full accord with the Executive Branch of the Government of the United States, to bring about the development of the St. Lawrence for power and navigation in the International Section between Lake Ontario and Lake St. Francis.

There are in the archives of the diplomatic services a number of stillborn treaties and unratified agreements to this end, and these are accompanied by a long series of reports from engineering boards, advisory committees, and the like, which have endeavoured, by well-marshalled facts and careful logic, to bring conviction to those in Congress who had the authority to accept the proposals made by Canada and so launch this great project for the benefit of their fellow inhabitants of this continent. There are also the reports and propaganda of special interests opposed to the projects, whose arguments, even when disproved, have been repeated and repeated in weary succession. In all the long years which have passed since the favourable report made by the International Joint Commission in 1921 till the present, not one of these draft treaties was accepted by the 2/3 majority required in the U.S. Senate, nor was any agreement adopted by the required simple majority of the Senate and House of Representatives meeting jointly.

In 1952 a new approach based on the Treaty of 1909 was initiated by the President and the Prime Minister, and on June 30, 1952, applications in similar terms were addressed to the International Joint Commission by the respective governments, asking for the Commission's approval, under the authority vested in it by the Treaty of 1909, for the erection of the planned power works at Barnhart and the regulating works at Iroquois. The Canadian Government undertook that when these works were started they would add, at their own instance, the additional works or facilities required to open the channels to navigation, on a 27-foot basis, from Montreal to Lake Erie inclusive.

The extensive series of public hearings in Canada and the United States required by the Commission's methods of procedure in order that "everyone concerned should be given a convenient opportunity to be heard", was completed in Montreal on October 29, 1952, at which time the Commission issued its "order" approving the works and defining the arrangements both for their construction, and later, for their operation. Two days afterwards, the Canadian Government notified the United States Government that, in their view, the Commission's order superseded the draft Agreement of 1941 which, the Canadian Government stated therefore, would not be submitted to Parliament for ratification. The President of the United States accepted this position, and thus the way became clear for the further procedures required in the United States to name an "entity" which would be associated with the Ontario Hydro-Electric Power Commission in the construction of the power and related works. This duty fell on the United States Federal Power Commission which in its turn held prolonged hearings on the aspects of the matter pertinent to its jurisdiction within the

territories of the United States. The "decision" of the FPC's presiding examiner, Mr. G.R. Law, was rendered on May 12, 1953. I wish to say that I have been able to examine the text of this document, and I find that it is in satisfactory accord with the IJC order, which it fully supports on all international aspects of the matter. The provisions which have been added to govern the actions of the New York State Power Authority are appropriate, in our view, to the circumstances to be met. The presiding examiner is to be commended, I think, not only on the terms of his decision but on the apt argument with which his conclusions are supported.

We now await what further action may be taken by those who may still oppose this project. Some fourteen days remain for this procedure.

At the same time as it received the applications for the approval of works for power and to facilitate navigation in the International Section of the St. Lawrence, the International Joint Commission received a reference from the governments in regard to the levels of Lake Ontario, requesting recommendations as to what might be done to bring the levels of this lake under effective control with a view to diminishing the damage which occurs to interests along the shore whenever, as a result of high precipitation or greater inflow from the Upper Lakes, the levels rise above what is tolerable.

The Commission's proposals for correcting this situation will take the form of recommendations to the two governments, which, if they each agree, will go to Parliament and Congress respectively to approve the plans and to provide the funds necessary to carry out the remedial measures required.

It is of interest, however, that the structures to be erected for power and to facilitate navigation include the great regulating works which are to be built at Iroquois to meet the needs of power and at its cost. These works, with their associated channel enlargements, will incidentally, and for the first time in the history of Lake Ontario and the St. Lawrence, permit the exercise of control over the levels which would otherwise be imposed by the conditions in nature of high or low precipitation; and the Commission, in the exercise of its authority, by the issue of the order of October 29, 1952, has taken jurisdiction to ensure that this control will be exercised to protect the interests of all persons who might be affected both upstream into the Niagara River and downstream in the great power plants existing at Beauharnois and to be constructed to make beneficial use of Lachine; also to protect the vitally important interests in Montreal Harbour and the lower river.

Thus, in these problems of the St. Lawrence and Lake Ontario, the mechanism of the Commission and its procedures are proving to be of substantial assistance in harmonizing the interests of power and navigation and property owners along the shores, both upstream and down, who will be beneficially affected by the lowering of high levels and the raising of low levels along the shores of Lake Ontario and elsewhere.

Once the United States entity has been named, it is estimated that about five and one-half years will be required to construct the works and enlarge the channels as now planned and that an expenditure of about 3/4 billion dollars is involved. It is foreseen that all of this expenditure, whether for power or for navigation, will be self-liquidating in that a small portion of the benefits to trade and commerce will be retained to amortize the cost in some 30 years or so, after which the benefits will continue for the peoples of the two countries in perpetuity and without cost other than to meet the small charges for maintenance and operation.

As regards Niagara: the Treaty of 1909 defined the agreement which had been reached between the two governments in respect to the diversion of waters for the generation of power. What was sought was a formula which would give equality in the benefits to be derived by each country, and so, because of the fact that for convenience a plant producing power for United States use was established in Canada, the flows were unequal. With the passage of time these arrangements ceased to be suitable, and in the light of an insistent demand in both countries for the protection of the Falls from erosion, the Niagara provisions of the Treaty of 1909 were superseded by the Niagara Diversion Treaty of February 27, 1950, which has subsequently been ratified by both countries.

Under this treaty, very substantial increases of flow are made available to each country for the generation of power which is now so urgently required to assist in our defence preparations and other industrial developments. All the rights acquired by Canada have been made available to the Province of Ontario by an agreement dated March 27, 1950, in accordance with the established policy that the Canadian provinces should have the rights to power in their rivers even if these rivers are in part international in character.

In the Niagara Diversion Treaty, the Commission has been made, in effect, the trustee of both countries with a special duty to ensure the preservation of the scenic beauty of the Falls by the construction of works to redistribute the flow; and, to this end, the Commission was invited "to make recommendations as to the nature and design of such remedial works and the allocation of the task of construction as between Canada and the United States". Ontario has agreed to construct such works in Canada as may be decided upon, and it has been arranged that a similar authority will be named in the United States when the question of redevelopment of the power sites in that country has been decided by the United States Government and Congress. The Commission set up an engineering board and working committee of those in both countries best qualified to advise. Among those included were Mr. Hearn, Dr. Holden and certain of their associates in the Engineering Department of Ontario Hydro..... The necessary engineering investigations have been completed, the nature of the remedial works which are required has been determined and, as I have said, specific proposals accordingly have been made to the two governments. Meanwhile, Ontario has been made entirely free to proceed with the construction of the new works for power which will add eventually perhaps a million and a half installed horsepower to the plants at Queenston.



I am happy to say that, through the help and assistance made available to us by Mr. Robert Saunders, Chairman of Ontario Hydro, the International Joint Commission has been able to demonstrate the beneficial effects which the projected remedial works will have on the appearance of the Falls, and that the Commission and all those specially concerned with this aspect who have expressed their views are fully satisfied with the result.

The projects and proposals I have been describing are one and all advancing in manners which are fully satisfactory to the interests of the peoples of both Canada and the United States.

In what I have now to say this happy state of affairs does not exist, and I feel convinced that we have yet a long and weary road to travel before discordant views can be reconciled. However, I do not wish to convey any impression of lack of confidence in the ultimate result because I have, in fact, the strongest faith in the proved methods of the Commission that in the end an equitable arrangement will be determined and proposed to the two governments. I am strengthened in this view by the habit of agreement which seems to be building up through other important matters before the IJC some of which I have mentioned.

The Columbia is the third largest river in North America, only exceeded by the Mississippi and the St. Lawrence, in that order. In volume of flow, the St. Lawrence, with 220 million acre-feet of discharge carried into the Atlantic, is only slightly greater than the Columbia, with 180 million into the Pacific. As regards heads, the St. Lawrence starts from Lake Superior at elevation 603 feet which compares with Columbia Lake, the source of the Columbia, at 2,652 feet. Head and flow combined give power, and on this aspect of comparison it is now estimated that the Columbia in Canada and the United States will eventually have an installed capacity in excess of 34 million kilowatts as compared to the St. Lawrence, eventually, at Sault Ste. Marie, Niagara, Barnhart, Beauharnois and Lachine, all taken together, of about  $7\frac{1}{2}$  million. I only mention these main stream plants to constitute a measure, not a comparison, of the two basins, for, to the figure of  $7\frac{1}{2}$  million kilowatts on the St. Lawrence itself, must be added the great powers on the Ottawa existing and to be built, the powers on the St. Maurice, the Saguenay, the Bersimis, and many others not yet investigated which it seems may well bring both basins into something, in total, approaching equality.

As regards the total kilowatt hours to be generated in the Columbia Basin when the full development has been completed, it is estimated that about  $\frac{3}{5}$  will be derived from heads and storage in the United States; of the remaining  $\frac{2}{5}$ , about  $\frac{1}{2}$ , that is  $\frac{1}{5}$  of the total, will be from heads and storage in Canada; and the remaining  $\frac{1}{5}$  will represent in round numbers the energy which might be produced at United States plants at sites in the United States as a consequence of regulated flow from storage in Canada. This increment of  $\frac{1}{5}$  means about 35 billion kilowatt hours annually, or perhaps somewhat more, which compares with the estimated yearly output of Barnhart on the International Section of the St. Lawrence of 12.6 billion kilowatt hours.

These are large figures and it is most important that the public of Canada should realize the great magnitude of what is at stake in the settlement with the United States of the matters at issue in the Columbia Basin.

So far in the International Joint Commission, under reference of 1944 we have been principally concerned with the collection of topographical and other relevant information and its study. Parliament has been providing about \$640,000 a year to the Department of Resources and Development for the Canadian section of the Basin, and we anticipate that another two years of field work and an additional year and a half of compilation will be needed before we can make a final report. Meanwhile, because of their more immediately pressing requirements, the United States engineers have been able to advance their section of the work considerably ahead of ours and they now have the advantage of reports which are very voluminous and complete in almost all the possible alternatives.

The result of this was that, two years ago, the United States Army Engineers were able to select definitely a site at Libby, Montana, as the first of the Columbia Basin projects which would flood into Canada or would be dependent in large part on Canadian storage. The United States Government embodied this proposal in an application to the IJC for authority to proceed with construction forthwith. The estimated cost amounted to about 278 million dollars, of which some 7 million was assigned as compensation for flooded land and damage in Canada. The eventual installed capacity was put at 1,000,000 kilowatts approximately, and the 4,620,000 acre-feet of usable storage was estimated to add benefits to existing plants downstream, without any substantial additional cost, of about four times the firm power which would actually be produced at Libby itself. In energy, the amount added to the system by downstream plants would be about 6 billion kilowatt hours annually. That is, this incidental and consequential advantage, taken by itself, amounts to a benefit of the same magnitude as the whole benefit which it is expected will be derived from the Canadian plant at Barnhart.

Following its usual practice, on receipt of the application, the International Joint Commission held a number of public hearings in British Columbia, Montana, and Washington, at which it became apparent that the ideas current in the two countries as to the distribution which should be made of benefits were vastly different. As you know, under the arrangement traditional in Canada, the provinces are responsible for the control and use, within their boundaries, of their natural resources. Official representatives of the Government of British Columbia appeared before the Commission in the public hearings and pointed out that in the selection of Libby as the currently most beneficial project in the Columbia Basin as a whole, the boundary has been disregarded. They said that if this project were gone on with, likewise the boundary should be disregarded in the allocation of benefits. Following an early precedent from the Saint John River, they asked for power at the going rate to compensate for the head made available by Canada, which includes the power sites which Libby would drown out in

Canada. They asked also for an allocation of power in compensation for damages and for an equitable share in the benefits in recompense for the natural resources which the province would be contributing to the project and which would make possible the very large downstream benefits I have mentioned.

On the other hand, the power-hungry interests in the United States would concede no allocation of power whatever to Canada and some have sought to buttress this position by new acts of Congress, seeking to forbid even the discussion of any proposal in which this feature might be involved. These persons have expressed the view that British Columbia should be satisfied with some consequential benefits which would come from the increased storage to the power plants on the lower Kootenay in Canada downstream from Libby. This storage would also provide some benefit to flood control in the Creston area. The United States spokesmen before the Commission have refused anything other than a money compensation for lands flooded or other damage done in Canada. In reply, the British Columbia representatives have pointed out that over the long term of the life of a project such as Libby, which has been put at fifty years, American currency, like other currencies, was not immune to a decline in value which would mean that important resources had passed from Canadian to United States ownership without due compensation.

And so the matter stood, when early last month at the IJC meeting in Washington the United States withdrew the Libby application for the stated reasons that the location of the dam needed reconsideration to reduce consequent damages to railway rights of way and important forest interests which would be seriously affected by the flooding. With this withdrawal, the matter is no longer formally before the Commission, and so it may be discussed in public.

I believe the application must shortly again come forward for consideration, because the project is certainly one of the best from the point of view of its benefit-cost ratio, which is nearly as 2 is to 1. However, whether it is Libby or some other project in the Columbia, we are now face to face with the problem of an equitable allocation of benefits to be derived from storage in the Canadian portion of the Columbia Basin.

Head is, of course, a topographical attribute of the particular country where it exists, but it is only made of value by the flow which comes from wherever the storage may be. Certainly, if this storage is in another country, equity requires that there be some proportionate division of the resulting power. One suggestion which has been advanced is that as a joint enterprise the real costs of the usable energy which is added as a consequence of the contribution of Canadian resources should be determined, and that both the costs and this resulting energy should be divided equally between the two countries.

I am afraid that I must forecast that this problem will not only trouble the International Joint Commission but that it will trouble many other people also until the situation clears and the lines of equity

appear and are accepted. Meanwhile, it will be well to remember the vastness of the issues which are being determined and the vital consequences which the decisions will have on the future of industrial development in the Columbia and its placement, whether in Canada or the U.S.A. It will be well also not to forget the topographical advantages which, by divine providence, have been given to Canada and which are assets just as real for us as are the minerals from our mines and the products of our fields and forests.

North of the Columbia there lies the basin of the Fraser, where one of its tributaries, the Netchako, is in process of being dammed to create a great lake whence water will be carried by tunnels through the coastal range to be dropped into the sea at Kitimat, generating perhaps a couple of million horsepower eventually. This great project is fortunately national in character, and in consequence the IJC is not involved.

Projects of similar character are now under study in the Northwest Territories and Yukon, where the headwaters of the Yukon River, to mention one example, would be dammed back and diverted to advantageous sites of high head on the steep western slopes of the coastal range. The particular sites now contemplated are fortunately in Canada. Equally fortunately, under the provisions of Article II of the Treaty of 1909, which was adopted on the special insistence of the then Secretary of State of the United States, there is no doubt that Canada has full jurisdiction to dam and divert the Yukon River and its tributaries in Canada. In consequence, these great projects to divert waters through mountain ranges to gain heads which on the aggregate may amount to several thousand feet, involve no international complications whatever.

However, there are other sites in the territory of Alaska which, if adopted, would raise in the IJC in a very acute form the questions of allocation of benefits as between the owners of the head and the owners of the storage. An estimate of perhaps 6 million horsepower is involved in one of these alternative proposals alone.

I have mentioned some rather large figures of power to be generated and made available, but please do not think that this means there is going to be power in Canada which will be surplus and to spare. This is certainly not the case, for the most carefully-made predictions show that only a comparatively short time remains until we may expect that all our economically available hydro power will be in use....

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