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## REPORT

Submitted to His Honour the Lieutenant-Governor by Professor Louis G. Carpenter, of Fort Collins, Colorado, and the Honourable Frederick J. Fulton, who were appointed Commissioners to inquire into the irrigation of land in the Province of British Columbia.

By Command.

H. E. YOUNG,

*Provincial Secretary.*

*Provincial Secretary's Office,*

*February 11th, 1908.*

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VICTORIA, B. C., February 10th, 1908.

*To the Honourable James Dunsmuir,  
Lieutenant-Governor of British Columbia,  
Victoria, B. C.*

SIR,—In accordance with the requirements of the Commission dated the 19th day of August, 1907, issued to Professor Louis G. Carpenter, of Fort Collins, Colorado, and myself, empowering us to inquire into the irrigation of land in the Province of British Columbia, as Chairman of the Commission, I have the honour to report to you as follows:—

Your Commissioners, accompanied by R. F. Child as secretary, left Victoria for the interior of the Province on the 20th day of August, 1907, and visited the following places, viz.: Ashcroft, Kamloops, Vernon, Kelowna, Penticton, Osoyoos and Keremeos, these places being selected as typical of the general conditions existing in the arid belt of the Province.

Arriving at Ashcroft on the afternoon of the 21st August, we drove out past Judge Cornwall's ranch almost as far as the Basque Ranch, this part of the country furnishing a good illustration of the irrigable bench lands of the dry belt. The next day we drove up the Bonaparte as far as Hat Creek, on the way back calling at the Dominion Ranch, owned by Mr. Semlin. From Ashcroft we proceeded to Kamloops and spent the afternoon inspecting the irrigation ditch and works of the Canadian Real Properties, on the west side of the North Thompson River. This company has had a system in operation since 1904, having a ditch some seventeen miles long, intended to supply some 5,500 acres of land. The next day we drove up the South Thompson River and round by Campbell Creek, where a number of small holdings are being irrigated by separate individual ditches. On the 24th we proceeded to Vernon and spent two days inspecting the Earl of Aberdeen's Coldstream Ranch and the subdivisions which have been made there; also the irrigation scheme of the White Valley Irrigation and Power Company, which is intended to supply some 20,000 acres. On the 27th, accompanied by Mr. Price Ellison, M. P. P., we drove down by Long Lake to Kelowna, noting during the drive thousands of acres of valuable land which are expected in the near future to be brought under irrigation. The following day we drove round Kelowna and the Mission Valley and on to the benches above Mission Creek, and had pointed out to us the wonderful capabilities of that district. On the 30th we took the steamer down Okanagan Lake to Penticton, and the next day drove round inspecting the irrigation scheme of the South Okanagan Land Company, which has shown much energy and expended a very large amount of money in developing its scheme, and is able to show many orchards in splendid condition. On the following day we drove to Osoyoos, accompanied by Mr. L. W. Shatford, M. P. P., observing some 12,000 or 14,000 acres which the South Okanagan Land Company intend shortly to bring under ditch. When this is done, what is now simply pasture land will become most valuable fruit and garden land. On the 3rd September we drove over to Keremeos and the next day rove along the valley of the Similkameen, where we looked over the scheme of the Keremeos

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Land Company, which proposes to irrigate some 6,000 acres, and which had its ditch already partly constructed and a large force of men at work. From Keremeos we returned by way of Penticton and Sicamous to Victoria, where Professor Carpenter spent some time in examining the system of water records and the Statutes relating thereto.

Subsequently, in the month of September, I left for Colorado, reaching Greeley on September 23rd, where I was joined by Professor Carpenter. We there met a number of prominent men who had for years been connected with, and made a study of, irrigation matters, and discussed many of the leading features in connection with the matters we had been commissioned to inquire into. From Greeley we drove to Fort Collins, taking some two days in that district examining various irrigation systems, some of which have been in operation for years; also in interviewing a number of practical and experienced men in such matters. From there we went to Denver, where we spent a day or two interviewing irrigation engineers and lawyers and examining the system of State Water Decrees. I left Denver for Victoria on the 29th September.

The views of Professor Carpenter, in which I fully concur, are set out at length in his personal report submitted herewith.

I have the honour to be,

Sir,

Your obedient servant,

(Signed) FRED. J. FULTON.

*Chairman of Irrigation Commission.*

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## REPORT OF THE IRRIGATION COMMISSION OF BRITISH COLUMBIA.

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In considering the present and desirable laws of British Columbia, I have considered especially the laws of Colorado and of the other Western States of the Union, with which I have previously been acquainted, and, in addition, the laws of many other countries, especially of the various British Colonies. I have been acquainted for a good many years with the conditions in Western United States, and have seen the development of much of their system, and of the development of the laws as applicable to their condition. From the examination of the laws of all the countries, and a knowledge of the general conditions, I come to the general conviction that those of the Western United States are, as a whole, the ones which best meet the general conditions that have developed and are likely to develop in British Columbia. These will be discussed more at length later in this report.

### GENERAL CONDITIONS OF BRITISH COLUMBIA.

The Commission visited the southern portion of British Columbia, especially that between the Canadian Pacific Railway and the International Boundary. This was because the problem which had arisen in connection with the irrigation had mostly developed in this section. Some parts were, therefore, typical of the situation which was arising. A knowledge concerning the other portions of the Province (so far as one member of the Commission is concerned) was obtained through various means—by conversation, by study of reports, especially of the Canadian Geological Survey and the interpretation of these facts by various meteorological conditions. It was a great surprise to find the mild climate and the great possibilities in the growth of fruit, and especially with such crops as peaches. The trials already made and the experience already acquired show, beyond question, that large areas can be devoted to the growth of peaches and fruits of like character; besides the hardier fruits, like apples.

Speaking generally, this portion of the Province is bounded both east and west by high ranges of mountains, and the extensive intermediate area with mountain masses of much lower elevation. These are largely isolated, extending to an elevation of from 4,000 to 7,000 feet, generally wooded, and form sources of many small streams. The larger streams, like the Fraser, Thompson and Columbia, are cut down below the elevation of the country and are largely out

of consideration for use for irrigation. The smaller streams must be the source of water for irrigation, with slight exceptions. The land in the low mountain masses is separated by valleys of moderate extent, but of great fertility when supplied by water. The lands then command a price of from \$100 to \$200 per acre, and more, almost as soon as water is available—an increase which is remarkable.

The location of the land on benches above the main streams in relatively small tracts makes the construction of gravity ditches on a large scale almost out of the question, because of the excessive cost. The natural development is by irrigation from the side streams or by some system which will take the water from the main streams and use it on a limited tract, which is naturally some system of pumping. The great increase in the value of land with the application of water makes a great inducement for irrigation, and is bound to develop to a very great extent in the immediate future. I think that everyone will agree that it is the part of wise statesmanship to encourage the development of these natural resources. Of all sources of wealth, that which depends upon agriculture is the most stable, varies least from year to year, and furnishes a population whose interest is always on the side of good government, and forms an element which is always in favour of good citizenship.

The communities which depend upon irrigation are particularly stable and of high character, because the very fact of irrigation reduces even such risks that are inherent in the growth of crops dependent upon water. It gives opportunities for the exercise of skill and depends less upon chance, and thus makes the returns much more certain and creates a contented frame of mind. The difference between such agricultural communities and those dependent upon mining is noticeable throughout the Western States. While the latter have brilliant periods of activity, they also have great periods of depression; the population is transient; the communities are subject to great extremes, and one who is interested in his country and his fellowmen cannot but wish for the characteristics of the more stable agricultural communities. The periods of financial depression emphasise these distinctions, for even if the returns become small, the agricultural community is largely self-supporting and is able to tide over a period of depression with very little distress.

The resources of British Columbia in this line are very great. Undoubtedly, nearly all the valleys and the benches at an elevation less than 2,000 feet may be turned into productive land of high value, certainly if water can be supplied. In general, it may be expected that from three to five acres of watershed will be required to irrigate one acre of land, but the conditions are such that almost no limit can be put to the future development. The casual examination of Southern British Columbia would indicate that several hundred thousand acres might reasonably be expected to be developed within a reasonable time. The question of development is largely an economic one, and thus the limit changes from year to year. Land which cannot be developed now, under changed conditions, might justify development, as the tendency is for the values of land to increase and the cost of development to decrease; this limit is constantly extending. Moreover, the limit which is set by the available water supply also tends to increase, because it is a well-known fact that a given amount of water will serve more land after the land has been irrigated for a few years; this is both because the aridity of the land has decreased and the skill in the use of water has increased.

It is, therefore, evident that British Columbia is destined to be an extensive area of irrigated land of high price, and which will be divided into small holdings, and thus maintain a large population. The part of wisdom, as has been recognised by your people, is to foster this development. Up to the present time, such development as has taken place has been an incident in the history of the Province. In that respect it has been parallel to the experience of almost all other commonwealths. It has reached a point where difficulty has arisen in the application of laws that have been on the statute books, and also conflicting interests have arisen which neither precedent nor law has been able to meet. This has likewise been the case with almost all other commonwealths. A marked feature of the development for the past few years in almost all countries is the struggle over water; the great growth of cities, the development of large manufacturing industries, has made necessary for water one of the important ones.

In earlier conditions and in a more humid country, very little question of this character arose; but now, with the larger settlements, it becomes a primary question, and the legislatures, parliaments and courts had to meet the question, and communities have found it necessary to go to great expense to bring water for domestic and manufacturing supply. Such requirements cannot be entirely foreseen, but the general needs can be anticipated and provision made for the conditions shown by experience.

## THE EVOLUTION OF IRRIGATION LAWS.

(Colorado as an example.)

The statute laws, as well as judicial decisions, are generally an outgrowth of conditions, and there is a marked growth in both to meet changing conditions. Communities under the same situation are apt to go through periods of development of much the same character. It is because of this that I take Colorado as an instance, for it has gone through stages of progress in its irrigation development which, it seems to me, are the same as those which British Columbia is likely to experience. Colorado was the first of the United States to feel the need of special legislation; the first to feel that the riparian doctrine of the common laws did not apply, and thus made the first systematic development in its attempt to fit the needs of an Anglo-Saxon community to the conditions of the arid regions. Its laws have come by steps as the needs have been recognised; its development has been much more extensive than other States and, therefore, it is farther in the march of progress. Other States have followed the same path, have in some cases avoided the difficulties which experience had shown in Colorado, but, as a whole, have gone through the same periods of development. The application to the present case is not in recommending their laws as laws to be followed, but by being instructive instances of progress of development and the conditions which will need to be met, though with slightly different circumstances of custom and legislative authority. It may be divided into the following periods of development:—

- (a.) That of individual or small development.
- (b.) That of co-operative or company period.
- (c.) The reservoir period.
- (d.) The consolidation.

These periods overlap each other, but, at the same time, the beginning of each period can be quite definitely stated.

The individual period of development is the first, where individuals are struck with a desire to take up land and choose the land which can best be irrigated, that is, on the small streams of large falls where short ditches can be built and then constructed with individual effort or with the help of only a few. This is prior to the time when capital is available.

After a time the locations which can be improved by individual effort are largely taken up, and it is realised that more extensive enterprises are necessary. This means large areas of land take large capital, and thus either the co-operation of owners of a large tract is required, or the construction of a canal by combined capital; thus it may be either a co-operative enterprise on a large scale, or a ditch built as an investment. In Colorado, the first of the co-operative ditches was built about 1871, and the ditch, by the investment of capital, a few years later. The settlement of the country and the greater pressure on the water supply follows.

Then comes the period when the current water supply is insufficient. Farmers found that they might grow more profitable crops if water were available at periods when the streams are low. With a stream of water in its natural state, crops, like grain and forage crops, may be raised to the greatest extent, but these do not produce the greatest returns, nor will they keep the lands at work for a large part of the year. They realised that potatoes were a profitable crop, forced the construction of the first reservoir, and when it was found that the profits were even greater than anticipated, it brought an immediate demand for a large increase. Thus, within a dozen miles of Fort Collins, the farmers have themselves invested some \$3,000,000 or more in the construction of reservoirs. It has also revealed the fact that many supplies of water, which were considered small and negligible, are of great value when collected in reservoirs.

The consolidation period is one which as yet has been developed but little in Colorado; but I think the tendency, however, is evident. The occasion arises from the fact that during the construction of the early enterprises the projectors had only a small amount of capital; consequently, they were limited often, and built a ditch whose cost would be within their means. Perhaps they built a ditch to cover as much land as they thought would ever be used, but with the development of the country someone else found it profitable to build another ditch that would parallel the first and cover a larger amount of land; then, probably, comes a third enterprise, and may be a fourth, paralleling each other, duplicating their management; often two or more ditches supplying water for the same tract, and thus proving an economic waste. Even after it became evident that economy would result in the combination of these

ditches and supply the same land, local jealousies often prevented the consideration of such a question. Such considerations are still effective, but in many ways the tendencies are manifest, and I anticipate before many years that many of these ditches now parallel will unite their enterprises, and at any rate work in co-operation so that water may be run through the ditch best prepared to supply a given tract of land. The development which takes place at present is the natural outgrowth of the situation, and comes mostly from a realisation of the community of interest.

These periods are such as are being passed through in British Columbia. The condition of the Province has made the first stage at present the principal one. The physical conditions render large canals out of the question, but would render experienced enterprises necessary. The necessity for construction of reservoirs is already upon you; the streams having low supplies of water in summer, a time when the needs of fruit call for an available supply, and the great value of the fruit crops force this condition with added emphasis.

While the above give the steps in the development of the law, the laws themselves may be divided into different classes. The first class may be considered those which have to do with determining the right to water. In Colorado the rights in general were taken to depend upon beneficial use, and not upon a record as in British Columbia. This was definitely established as the basis when the constitution was adopted in 1876. A series of laws was required to provide means for determining the amount of water to which a claimant was entitled; while the general principles recognised beneficial use, the first decree based the appropriation on the size of the canal. Afterwards this was seen to be wrong and it was changed by Court decision so as to recognise the area which was irrigated or the amount of water which was used as the measure of beneficial use, rather than upon the amount which the canal might carry. This was determined after the water had been applied. Subsequently it has been recognised that this again should be modified, so as to allow some time for the project to develop.

The laws provided the machinery for establishing the fact of use. These consist essentially of means to make claim to an intended use, and subsequently to make a final claim showing the amount of use. The final record is made by the Court and is termed a decree, and states both the amount of water that is called for and the date of the beneficial use, the latter being of importance in case of conflict with other claims. There have been made suits between different claimants to establish the prior claim. The defects that have arisen in these laws will be pointed out later, the purpose now being to give a summary of the general steps.

A second class which may be recognised are those laws which provide for the public administration of waters. The public control recognised that all waters in public streams belong to the public. It was very soon found, as the country developed and as the claims increased, that water gave rise to very serious disputes very early in the history of the commonwealth where the germs of a public administration were developed. It was not, however, until the claims increased in number, and especially until after large canals were built, that the necessity became acute, and that it became generally recognised that the State must take the control and distribution of waters into its hands.

The particular occasion for this arose on the Cache la Poudre River. At first the newer ditches were short, and up-stream above the older ones, so that they had the advantage of position. Afterwards the lower community joined in large ditches which became up-stream ditches, and thus the lower community gained the advantage of position. The experience converted two influential communities on the same stream, so that they recognised the necessity of a public distribution of water, and this public management developed into the present system, although not at once. It has grown and extended as necessity has become evident from year to year, and undoubtedly will be extended in the future.

The control itself is invested in an officer who is termed a State Engineer. Under him are five Division Engineers, one for each of the particular water-sheds of the State, and subordinate to these are sixty-seven Water Commissioners, as they are termed, one in each district, with deputies as they may need. In general, these commissioners have to deal with one stream or a small portion of a larger stream. They are employed from ten days to the whole year, according to the local necessities. Their duty is to distribute water among the ditches in accordance with the rights of the respective ditches. In that respect they have summary authority. An appeal lies to the State Engineer from any decision of his subordinates.

In carrying out his duties as subordinate to this general purpose, the State laws require measuring flumes or other devices to be put in each canal and to be under the superintendence of the State Engineer. The State Engineer also determines the quantity of water in streams; the loss of water by seepage; determination of the capacity of reservoirs; direct supervision of the amount which is distributed by reservoirs, etc.—all having for their general purpose the determination of the fairness of distribution and to protect the rights of the respective users.

In general, the control of the State ceases after the water enters the ditch. The Water Commissioner may reduce the amount entering a ditch in case of waste or excessive use. This is a delicate power to exercise and is very rarely done, except in such cases of waste as is evident when water is permitted to run over roads. Excessive use is difficult to establish, and in general, Water Commissioners do not attempt to exercise this power except in extreme cases. Their power depends very much upon the tact and good judgment which they display, and it is found that, with experience and confidence of the community in their judgment, more power and authority is given them willingly by the community.

Aside from these duties of the State Engineer, which arise from his authority as an administrative officer, there are other duties which cluster about his office, as for example: He has jurisdiction over the construction of dams, has power to determine their safety, and to condemn or fix a safety line for any given dam, beyond which they shall not fill, and to exercise in general both an engineering and a police supervision.

It is also an office of record, in that all preliminary claims are filed in his office. The supervision of the construction of State roads and bridges has also fallen to the office, as a matter of convenience, because there has been no other officer of the State to whom it could be conveniently given.

A *third general class* of laws and of court decisions have been in connection with the *development of reservoirs*. There has never been any question as to the right to expropriate land for this purpose. The laws have developed along the determination of the rights to store any flood or excess water, and in defining the limit of their rights. It was originally stated that they had no right to store during the irrigation season, and, consequently, that the right of canals was superior to the right of storage. In the course of years conditions have changed. The importance of reservoirs has been increasingly evident, and there is a tendency, more especially noticeable in court decisions, to recognise the right of a reservoir to store at any time. The recognition of ditches as having superior rights to reservoirs resulted in placing decrees for ditches, even of recent date, prior to reservoirs that have been built many years, and as, with the development of the State, the reservoirs are producing more public wealth by raising higher priced crops, it has been increasingly felt that their prior rights should be respected. This doctrine is not as yet fully developed, but the tendency, I think, is unmistakable.

The right of a reservoir to use a portion of the bed of a stream as a reservoir was early recognised in a court decision. Likewise the right to carry water in a stream from a reservoir to the head-gate of a canal was first an outgrowth of practice and subsequently incorporated in statute. The right to condemn land for reservoir purposes has always existed, on the same footing as the right to condemn land for ditch purposes.

There has also developed an important right to exchange water. Sometimes a canal having an early right of record to the running water of a stream has been situated down stream. They might not need water at all times, but if their right was recognised as primary, the reservoirs above would be prevented from storing. Newer canals nearly all start farther up the streams. They could build reservoirs and fill them through their ditch. By then using reservoir water to compensate the ditches with earlier rights below, the upper ditches could take water from the main stream in exchange. This has led to an elaborate system of exchange, so that in some cases the upper ditches obtain water at their head-gate which is the result of some six exchanges.

Several of these rights, and especially the last one, are instances of development to meet local conditions; a few years ago they might not have been thought necessary. In most cases the practice has developed in some communities by common consent, in order to meet the situation which many thought was necessary, and subsequently may have been converted into statute. These are illustrative of the point I above mentioned, that the law will to a great extent develop to meet the conditions.

A number of other laws have developed because of the necessity to protect the rights of others. These are essentially such as to see that the reservoirs do not store water so as to

infringe on the rights of others, and to see that the reservoirs do not take advantage of their position to capture water as it goes by at the expense of others. Some reservoirs have been prone to do this when the stream ran through their basin. The State Engineer may put in measuring head-gates, may require gauge rods, and may cause a survey to be made of the capacity of the reservoir at the expense of the owners when the reservoirs are on a natural stream.

There is a constant tendency to recognise the increasing importance of reservoirs and their value. It has been found, as a matter of experience, that many insignificant streams of water become of importance when stored. While the public and the courts have been jealous to prevent any encroachment on the rights of others, it is now recognised that a canal may store water which has been used previously in direct irrigation. This is a recognition of the general right to do almost anything that does not conflict with the rights of others.

Practically, the difficulty in this is that the amount of water which has been previously used has been so poorly defined and often has been stated in excessive terms, that the result has often been unjust.

A *fourth class of laws* is of more recent development. These are the ones *relating to water districts*, and modelled essentially on the Australian law. In effect, it gives a community authority to organise a municipal organisation, and power to construct or build irrigation works for the benefit of the whole area, to contract indebtedness and to raise the cost by taxation. One of the principal benefits at present is that the land of a community can join together, and often may be combined in a joint work which would otherwise be almost impossible. There has been in some cases evidence of a tendency for districts of this character to be formed to purchase existing works. In most cases this has been so far to purchase reservoirs to supplement a supply which they already possessed.

Besides the laws mentioned in the above classes, there have been innumerable laws and decisions which scarcely fall into any general class, and are not of particular importance, so far as indicating the development of the system. For instance, such laws as determine the method of the payment of the Water Commissioners, or to provide that bridges over canals on roads should be maintained by the public, and many others, which are matters of minor detail and practically give a rule of action.

#### DEFECTS OF COLORADO LAWS.

The summary given above of Colorado laws is rather to illustrate the development, not to carry the idea that they are perfect. Some material defects have been evident, but, as a whole, her system of laws has been recognised as one of the most perfect, because it has fitted the conditions. Senator Stewart, of Nevada, spoke of them as being the most perfect of any system.

One of the most serious defects is in the establishment of decrees, corresponding to the record of British Columbia. This largely arose from the lack of knowledge of water and ignorance of terms, especially those relating to measurements at a time when water rights were determined. This led to excessive grants, which have been the source of most serious troubles which have arisen, and which are not yet ended. This condition has become a serious one, and while a corresponding situation has developed in British Columbia, it is much easier to rectify. The difficulties would have been lessened, or possibly entirely prevented, had the State been represented by a qualified engineer, or had the hearing been before someone acquainted with water conditions.

A second defect has arisen from the fact of the non-continuity of service of water officers, therefore, there has been no cumulative experience for the benefit of the public. All subordinate officers have been appointed for a short time. Experience in water matters has not been a necessary qualification, and the result is that there has been a constant change of officers. Each officer has had to practically learn the duties of his position and come in contact with troubles without the aid of the experience of his predecessor; hence it is that some districts are no farther advanced than they were twenty years ago. Other districts are now meeting problems that other regions of the State solved to their satisfaction many years since. A very great progress would have been made could this defect have been provided for.

As a consequence of the system of appropriation and decrees already mentioned, there has been a very serious over-appropriation of streams. When, in addition to this, there has been recognised a right to transfer water from one canal to another, a very serious situation has developed, especially from the indefiniteness of the former records and the difficulty of

determining the amount to which a claimant should justly be entitled. He may, for instance, have had a record for 50 cubic feet per second, but have applied it to an area of land that might not have used more than two or three. When transferred to another canal the physical limitations are removed, and in court procedure it has been difficult to establish limitations which have been made otherwise by its physical situation. The excess decrees in themselves would not be so bad in many cases if the transfers were not admitted, or the transfers would not be so bad were it not for the excess decrees. The combination of the two, however, has revealed a weakness that is the subject of much irritation, and must lead to some move to remedy.

The law in regard to decrees or records provides that, after the decree of the court has been rendered, no appeal can be made unless entered within four years. Inasmuch as the injustice is not generally evident until long after that time, the decrees have become permanent and there has been no provision to establish abandonment; it has led to many cases which are manifestly unjust and are contrary to general public interest.

I have given so much space to Colorado conditions because, in many ways, it appears that the physical development of British Columbia is similar to the development of Colorado. The fundamental difficulty of the water rights depends on the record made with the Government officer, and that there is power to modify or amend this grant. The situation in British Columbia is, therefore, freer from more fundamental complications. The development of the irrigated country has not proceeded to so great an extent as to have caused the establishment of many vested rights that would cause so much difficulty to modify or re-define; nor is the power of Government or Parliament limited, as it is in an American State.

A number of minor *recommendations* may be made, a few more general ones and of greater importance. The first of these concern *reservoirs and their development*.

It is manifest that future development of British Columbia, to a very great extent, depends upon reservoirs. The small streams heading in the low mountains are apt to become low at the period of the year when water is most needed; there is an excess of water at other seasons. In many of these cases there are splendid reservoir sites, some of which can be improved at an absurdly low cost. There are other natural lakes which touch upon private land. Any development of the fruit interests requires water late in the season when the stream is low. The storage of water becomes, therefore, of extreme importance and of very great value. Whatever may be its value to the immediate owner, it is of still greater value to the Province as a whole, and hence, in my judgment, it is of extreme importance to the Province that improvement of this character should be encouraged, and power be given so that projects of this character may be facilitated. It seems that under present conditions a person who wants to store water does not have the right to expropriate land. This power is a fundamental one, and the use is properly a public one. It has been found that the benefit to an individual is an exceedingly small part of the benefit to the public. The present situation, therefore, renders it possible for one man owning a small tract of land to hold up an enterprise and play the policy of a "dog in a manger." This is exceedingly unfortunate and contrary to public policy. The power to expropriate does not necessarily mean that it needs to be exercised. It is found by experience that the fact that it is known that such a power exists makes it much more probable that an agreement may be reached without the exercise of the power.

In connection with reservoirs there is also associated the right to use the streams to transport the water from the reservoir to the canal. There should be no question about this right. Water, when once stored in the reservoir from flood or other unused water, becomes more particularly private property. It has been stored and saved by the foresight and at the expense of the owner of the reservoir. Otherwise it would have gone to waste; his enterprise should be encouraged. When once stored in the reservoir and saved to a time when needed, then his right to the water should be recognised as a matter of common justice and a matter of necessity of development. There are, however, some cases arising in the Province where such right has not been recognised or at least disputed. If any doubt exists, I should by all means recommend that it be settled by the inclusion of a clause which specifically recognises the right to use the natural streams for such purposes.

The natural limitations to the use of a reservoir or to such use of a stream are that the rights of others shall not be infringed upon, and this means that the owner shall not take out more than he puts in, and might possibly suffer his portion of the loss of the stream in carriage. This loss is a question of fact. It varies under different conditions and provision need to be

made for its determination and also means taken for determining the amount which is turned into the stream. Confusion has sometimes arisen in the practical administration of reservoirs by the difficulty of determining whether the amount turned out of the reservoir is equal to that which enters, at times when the reservoir is not entitled to store. This difficulty I met by the use of a gauge rod and by records of the height of water in the reservoir. When the level of the water remained the same, then it was evident that storage was not going out. The details of such management would naturally be worked out by the proper officer, and some discretion should be left him to adopt the best method fitted for the particular case. Apparently a large part of the development of British Columbia depends upon the ability to construct such reservoirs of large or small capacity.

A second important defect is that relating to records. In this case the present situation in British Columbia is very much the same as it has been in Colorado. I have gone over the records on file in the office of the Chief Commissioner of Public Lands, and specially examined the records of the early years. The similarity in the character of the records and the early claims in Colorado are remarkable. They have the same faults and lead to very much the same case troubles. They are indefinite in character. The land to which they apply is often poorly defined or not defined at all. The amount of water is not capable of exact definition. The amount of the record is almost invariably that which the claimant asked for, and not what he actually needs. In many cases, perhaps in most cases, this has yet led to no great difficulty, but the system has inherent in it the seeds of future difficulties. On some streams already there has been serious trouble, and the only reason why it has not been more serious, or has not been evident on a greater number of streams, is simply because the development has been slow and thus the pressure has not been very greatly felt. In a few cases the difficulty has been encountered, and is only an indication of what will be met on nearly all the streams of the Province with future development, unless steps are taken to deal with the issue.

The question is undoubtedly a delicate one, for people whose rights are affected are jealous of any move which may seem to disturb them, and yet the matter is so serious that it needs to be faced, and the sooner it can be met and disposed of the less will be the difficulties and, consequently, the better can the problem be met. The fact that the rights in British Columbia depend upon the record of the grant from the Government renders it possible for Parliament to treat the matter better than it could be treated in the States. Great care needs to be exercised that the rights are not interfered with arbitrarily. Undoubtedly the users would have a right which might be recognised as a moral right even if it is not fundamentally a legal one, and it would not be recognised as good policy to arbitrarily disturb these rights or to unsettle them. At the same time, the situation is so fraught with greater difficulties, and the disturbance of rights and of values is so great under the present conditions of over-appropriation which have grown up under the past situation, that I would very strongly recommend some decided action that would enable the situation to be met.

The conditions differ on different streams and, consequently, the remedy that might be suitable on one might quite possibly be unsuited to some other. Hence there should be some means by which a stream could be taken by itself, the facts investigated as they exist, the evils that have arisen investigated, some means to determine the amount actually needed or the amount which has actually been used, and then power to revise the records to correspond. From consideration of this subject, or one almost exactly similar to it, extending over some eight or ten years, this seems to be the most feasible way to take care of a delicate and difficult situation which will become worse as time goes on.

This might be done through the court or through some other body like a Commission or a Provincial expert official, as might be thought best. From observation and experience in this country and from many discussions with attorneys, I am very strongly of the opinion that a Commission or an officer of the Government would be the most satisfactory way. The very fact that he is not confined to the procedure of a court gives a freedom of method which is almost necessary to get at the facts. It is to a great extent true that the strongest evidence will be obtained on the ground, and not from the tongues of witnesses, and the Commission or the expert, if properly qualified, would be able to ascertain the facts and to determine a substantially equitable revision of the records. It would probably be desirable that there should exist an appeal to the court to avoid manifest injustice or to insure that the finding has been based upon sufficient care and evidence. If these have been exercised, the finding should not be lightly disturbed, and should, I believe, remain effective unless lack of such care has been exercised.

The management of this problem, as has been mentioned, is a delicate one, for it involves not only the problem of getting essential justice, but it also involves to a great extent the problem of creating confidence in the justice of the decision. People are more prone to dispute over their water rights than over almost any other issue. An interesting relic of this feeling, even in ancient times, is involved in a word that has come down to us from those times, and although the word now has a different signification, yet it embodies the sense of a bitter feeling. This is a word which originally meant the two people who took water from the same artificial water-course; in other words, disputants over water rights, and these were termed "rivals." From that day to this, users of water have been very sensitive over any question which affected their rights and, consequently, while the essential equity might be determined by an expert, the other necessity of establishing confidence and acquiescence in the result as found could probably be obtained by a body of larger number—a Commission. It has been found in most experiences that the essential elements of water disputes are rather problems solved by a complete knowledge of facts than a knowledge of law. Our lawyers themselves in the Western United States recognise the complexity of the problems, and that they are most apt to be solved rightly when there is a knowledge of the water problems and some knowledge of law, rather than when there is a great knowledge of law and a small knowledge of water conditions. In most cases, furthermore, an immediate decision is needed and summary action needs to be taken. Hence there is an increasing feeling in Colorado, at least, even among attorneys, that there should be a separate water court, with power to pass promptly upon water questions. If such Commission has such authority to examine into the various records of older streams, it should have power to examine witnesses, to determine facts on the ground itself, and be constituted so that it will have the inclination and the power to examine into the facts as they exist, and then to decide in accordance therewith.

A third matter that will soon become pressing in British Columbia is some form of water administration. I have personally been reluctant to make such recommendation, but with much thought given to the various questions that are arising and class of questions that seem bound to arise, they nearly all lead to the desirability of some form of water administration. Whether this should be under the charge of the office of Chief Commissioner of Lands, whether it should be in the form of a Commission, whether it should be a separate office, or in what particular form, is a matter of secondary moment. It is already manifest that on the streams where the records exceed the flow of the stream, serious local feeling has developed. It is common enough in such case for one to take what he can, to build his dam with only such consideration for the rights of others as he may be forced to give. Then there arises the tearing out of the offending dam by the injured party and sometimes that occurs by violence; at any rate, the situation is not conducive to good feeling.

When action is called for by the court, it is one not apt to be adapted to the situation. The action is apt to be deferred, and is like bringing a ponderous piece of machinery where a small mechanism would suffice. The condition calls for constant supervision to meet the varying, fluctuating flow of the stream and to meet the varying conditions from day to day. No user wants a constant flow. Some one with summary power to act from the situation as it develops from day to day, or even from hour to hour, is needed on these streams. This, I believe, will be best accomplished if such men as may be required should be under the general supervision of some responsible power higher up, who can give general directions and to whom may be exercised the right of appeal.

Such officer should have the power to cause each canal to construct a suitable regulating gate, a measuring device, so as to give a means of distributing the water in accordance with the records.

The expense of such administration would be the greatest objection, but that need not be large, in comparison with the benefit that would result, and especially when it is realised what a future lies before the agricultural part of British Columbia. It is only a question of time when such an officer or office will need to be provided for. The revenues that are received from the water records are many times the cost of any such administration. The immediate benefit would probably be to soon increase the revenue more than in proportion to the additional cost, but at any rate, if it did not do this it would save the public the expense of enormous litigation or prevent the neighbourhood difficulties that are the source of much public tribulation. So far as the extension of such administration is concerned, it should naturally be adapted to growth. The streams which would require supervision are at present few, and these could be taken up in the order in which administration is most needed. The

same thing is true of the investigation and settlement of the excessive records. Such an officer could allay disputes, could solve difficult problems, and thus smooth the way of the Government.

The points above mentioned are the most important which develop in the consideration of the situation in British Columbia. There are, in addition, many minor points, many of them isolated. It is not to be expected that a law can be drawn up at this time that shall be perfect or shall meet all future conditions which may arise. It is more important that it should have within itself the possibility of development; that it should meet the principal classes of questions; that it should be elastic so as to adapt itself to the growth of the future. If a law could be made that would perfectly meet all difficulties that now exist, it is undoubtedly true that within a few years some questions would arise which are not now foreseen. The one lesson which it is desirable to draw from the Colorado experience, which is typical, is that a constant evolution is taking place, and the laws and the decisions and the administration must develop to meet these as they arise.

Of some minor questions, one is the *unit of measurement*; a simple matter apparently, and yet it involves the source of much difficulty. The use of water in British Columbia, as in the Western United States, has apparently been a development of the early Californian miners' rights, and thus came the use of some of the many forms of the miner's inch. This has been a convenient term, but has lacked the essential element of a unit. The characteristic of a good unit is that it is one which has a definite value at all times and all places, and which can be repeated or re-measured with certainty. Now, a primary difficulty with any of the so-called units which is measured by the size of the opening, under a given pressure, is that it is a varying quantity. Ten inches is more than ten times one inch, and one hundred inches is more than ten times ten inches, when measured under the form prescribed by custom. The conditions are also such that the amount of water flowing through a given orifice may very easily be altered. Consequently it is far better to define the quantity of water in all public records in definite terms, as cubic feet per second. This is a definite quantity, does not depend upon the manner in which it is measured, and as the necessity arises it can be measured with a greater degree of refinement. At present the weir is in most cases the best method of measurement to determine the cubic quantity and cubic feet per second, but no single method is at all essential, and the objection to the miner's inch may be lessened, if not entirely removed, by defining as a cubic foot per second.

Another matter of considerable importance which has often been spoken of is the *duty of water*, or the amount of land which a given quantity of water would irrigate. This is subject to such wide variations, according to conditions and to legitimate variations, that I should feel it would be unwise to fix a quantity unless there was some possibility for a revision in some cases. In the case of heavy soils and sandy soils, the quantities would differ. In the case of fruit or grain, in the case of soils underlaid with gravelly sub-soil, or those with impervious sub-soil, the conditions may vary very much. The records have, however, so often been excessive that it would undoubtedly be beneficial to fix a sum as a guide that should be liberal enough to cover most cases, and yet giving an opportunity for some variation, if the proper officer thought best. The record in most cases indicates rather the extreme rate at which the water may be used at any one time, than the continuous flow. All things considered, for the conditions of British Columbia no single amount would probably be better than an amount of 75 acres per cubic foot per second. This, if maintained as a continuous flow, would cover a tract nearly two and a half feet in the course of ninety days. This is more than would be required or could be used, except for a short period. The tendency of continued irrigation is to fill the sub-soil, and thus after a few years to decrease the amount of water required. No one would use such an amount of water for ordinary crops. With hay meadows of the higher elevations or for meadows farther north, an amount much greater than this would probably be called for. At present such lands are not under irrigation, and apparently will not be for many years to come, if they ever are. There are times when the owners of orchards or of other lands requiring irrigation would want water at this rate, or perhaps even at a greater rate for a limited time. Hence, as ordinarily used, this amount would be a fair duty to adopt, and if made the basis of record would be liable to cause very little injustice, especially if there be some provision for revision or examination by an expert officer in case of appeal.

It is manifest from the general conditions of the Province that there is also destined to be much development by *pumping* of water from streams. The questions that arise from this are much simpler than those which arise from reservoirs. The same right to appropriate land or

right to occupy the stream channel with pumps or water wheels, actuated by the current, should also be encouraged. The same right to expropriate should be given to all structures of this kind and to all the necessary construction, like pipe lines or electric lines, if power is to be transmitted electrically.

A fundamental question which has been the source of much discussion is as to whether water should be *appurtenant* to the land, or whether it would be separated and *transferred* from one use or one piece of land to another. Engineers as a whole have felt that the water should be appurtenant to the land and not capable of transfer. Through most of my experience I have shared in this belief, but from later developments and from later experience I think this should not be absolute. The difficulties that have arisen from the right to transfer have been such as have come, to a great extent, from excess records, or from the fact that a transfer often affected the rights of others. It has been manifest, however, that future uses could not be foreseen. Cities have developed, manufactories have been established that have required water that could not have been anticipated. If there could not be some way of obtaining water for such uses, then the development of the community is limited. An important manufactory may give the means of livelihood to hundreds of thousands of families. The amount of water which it uses may be small and it may become of great public importance that some means be provided to meet these conditions when they arise. Likewise it may be a matter of public wealth that water be transferred from land producing coarse product of small value to other lands which are capable of producing higher products of greater value. The danger that has been feared is that the water might be severed from its use and fall into the hands of separate owners. There is also the trouble that has come from excessive records. Men who have had excessive records have sold a part of their record, and still retained enough to supply them with what water they needed. There have also been cases where the needs of land have been supplied by a seepage, and where the owner has disposed of his whole record for transfer and still had his land watered completely. These have been abuses. The first difficulty would be eliminated when the records are made to agree with the actual use of the water. The other case could be eliminated under the conditions of the record in British Columbia. I am now convinced that there should be some right to a limited transfer. This should not be a right open without limitation, and should be subject to enquiry by competent officers in each case. Evidence taken in court, without reference to the actual evidence in the field, has been unsatisfactory, and, therefore, in case some administration is provided for, a better result will be secured by referring this to that office or officer, and his decision be taken as final, subject to the proper provision that he be competent and the proper pains be taken.

It would seem to me the proper policy for the Province to pursue is to be as liberal as is consistent with the general interest. Every company which attempts to develop an enterprise, either for irrigation or power, is running many risks, and the conditions may be very easily made so onerous that development will be very slow. Unrestrained developments, or the conferring of rights which may be the subject of extreme speculation, may be troublesome. But, on the other hand, it is proper for the Parliament of a new Province to consider whether the advantages in the increased settlement and the increased taxable property is a partial return for liberality in other respects.

The forms of contract made by irrigation companies with its customers should be subject to some supervision.

A company which starts out in good faith and proposes to initiate an enterprise should be given a reasonable time for its construction and development. This should be a variable time, depending upon the magnitude and difficulties of the enterprise. It may easily be three or five years, and with some enterprises that will undoubtedly be developed in the Province a longer period. It has been found by experience in the States that the period of settlement, or of full use of the water of large enterprises, at least may be ten or fifteen years. Many of these enterprises have been financial failures, one reason being the fact that the condition of the laws and the interpretations of the courts made it seem necessary for the canals to build to the full capacity at once, even though a large portion of that capacity might not be called for for a number of years. Hence, some of the companies have been swamped by the accumulated interest. This is not good policy, for in the long run such extra expense becomes a charge against the land which it supplies, or, if it is a failure, it reflects upon the community. The point is to encourage enterprise, made in good faith, surround with safeguards, and not to load with such conditions as to prevent development.

Some cases have already developed in British Columbia where water is carried from one stream across a divide and used on land in another watershed. So far, there are generally cases where the water is taken from one tributary to another tributary of a larger stream. Some objection may be made to some of these cases in the future. The practice is a natural development and in many cases it is to be encouraged. The practice has been very extensive in Colorado. Some canals have been built at an elevation of over 10,000 feet, long tunnels have been constructed, and, as a matter of fact, water brought from the Pacific slope to the Atlantic. The essential element for determination is whether the water is beneficially used, and whether it injuriously affects the previous rights of others. Where such questions are properly shown, no difficulty has been made to the carriage of water to another watershed.

In the laws of British Columbia relating to water there is much to commend, and the fact that nothing has been said of other points does not mean that it is otherwise. Attention has been given in this report more particularly to the points where supplementary clauses need to be added, or the Act changed in order that trouble should be prevented in the future. The conditions of British Columbia are much more favourable for the improvement of conditions by remedying some of the greatest defects than are the conditions in most of the United States. I have been particularly encouraged by finding that some of the difficulties which have been the most serious in American legislations, that relating to riparian rights, has already been considered by your jurists. In a case many years ago which arose from a controversy in British Columbia, one of your jurists stated: "It would be useless to expect that the table lands upon mountainous ranges stretching throughout the Colony should ever attract settlers upon them, or that the stable wealth of the Colony should ever be worked beneficially, if riparian proprietors of land should be permitted to set up the common laws of England against the advancement of the material interests of the Colony."

While undoubtedly it would be wise to revise the Water Act, yet the most necessary changes can be included in a few headings as already indicated, and these may be summed up as, first, a recognition of the right to store water in reservoirs, to expropriate land for that purpose, to carry water through natural streams. Second, a means of investigating and handling the excess records that already exist on streams and to adjust to the situation as found. For this, a Commission would seem to me to be the most likely to establish confidence, as well as to obtain an equitable decision. Third, a water administration, or the germs of one which could develop as necessity grows. This could best be with one responsible head, and might be under such provision as accords with the genius of your institutions. Fourth, most of the other desirable changes would come as a consequence of these provisions. The water administration needs to be elastic enough to fit the needs as they develop. The most pressing needs of the excess records on the streams where the need is already felt should be taken care of now. On most streams the need is not as yet pressing, but the administration should be provided with means whereby it could investigate other streams, ascertain needs of those who apply for records, and should pass upon the records of the future so that the difficulties of these cases will not arise again.

In closing, the Province should be congratulated upon its great natural resources. While they are evidently great in many lines, there is no question of their greatness in the lines of agriculture and fruit-raising, and that this greatness and the difficulties of the future will be materially affected by the wisdom of the legislation of this and succeeding Parliaments.

It is the evidence of history that a country once irrigated always continues to irrigate and the practice extends; it is the support of dense populations; it is the principal wealth of a prosperous and contented community, and though Governments rise and fall, even though civilisations perish or change, that small and apparently ephemeral structure of irrigation persists and remains throughout all the changes.

Respectfully submitted,  
(Signed) L. G. CARPENTER.

*New York, January 22nd, 1908.*