Dominion Government Engineer's Report

for

Golden - Windermere Limited

on the

Reclaiming of Bottom Lands on Columbia River in East Kootenay, B.C.

By

Hon. F. W. Aylmer

C.E., B.C.L.S.

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CHASE, B. C., 19th June, 1914.

THE GOLDEN-WINDERMERE, Limited,
Ottawa, Ontario.

Dear Sirs:

Your company's project, on which I have been asked to report, has always been of great speculative interest to me. Being engaged for several years on improvements to navigation on the section of the Columbia River involved, has given me opportunity to observe and examine the conditions thereon, and also to make, from time to time, actual experiments in local reclamation. In consequence, I have myself no doubts whatever of the feasibility of the undertaking. Potentially valuable land of great extent awaits reclamation, and the conditions necessary are at hand ready to be utilized and developed. Sound precedent exists to support the contention of possibility in works of considerable magnitude, as, the reclaimed Tule Swamps of Southern California, which now bear annually enormous crops of hay and wheat, and among others, certain Italian reclamations. The suitability of the land, after improvement, for raising commercial crops is beyond question. Lacking close data obtainable only by extensive surveys carefully directed to the investigation of the whole conditions and the solution of the problems involved, I am prevented from putting forward estimates and close figures to support the arguments that follow, and from entering with any detail into the measures to be employed in various particular localities.

THE UPPER COLUMBIA VALLEY

The Columbia River from its source in Columbia Lake runs northwesterly for 95 miles to Golden. For the first 7 miles, it flows through inundated bottom-lands and then widens to form Windermere Lake, 8 miles in length. At the outlet of Windermere Lake, formerly known as the "Salmon beds", is the townsite of Athalmer. Below Windermere and to the junction of the Spillimacheen River at the boundary of the Railway Belt, the valley is uniformly wide between the Brisco

Range, an outlying precipitous ridge of the Rocky Mountains, on the East, and the Selkirk Mountains on the West; the summits average 30 miles apart, and the actual valley about 14 miles wide. The Brisco Range being close to the River provides only tributaries that are both short and small; its further slope drains to the Kootenay River. The Selkirk Watershed divide is remote from the Columbia and in consequence the west bank tributaries are generally long and of considerable size, this ridge drains westerly into the Duncan and Kootenay Lake Valleys. From the River-bottoms the ground rises to the foot hills in a series of sloping benches, those near the front have latterly been brought under irrigation systems from the tributary streams, and are being settled up by fruit growers on small holdings, the prices of which range from $150.00 to $400.00 per acre; the remaining upland areas constitute excellent and extensive cattle ranges. Between the benches are the bottom-lands under consideration, averaging one mile in width of fertile river-silt and decayed vegetable matter, the outcome of centuries of alluvial action. Through these the river meanders, its main channel, split up among islands and dammed by shoals, finds relief for its retarded high water discharge by flooding back over its banks and through the several back-channels leaving shallow ponds in the depressions as the water falls, many of great extent. Below the mouth of the Spillimacheen River, which enters from a wide lateral valley on the west side, the mountains close in, those to the east known as the Beaverfoot Range, while those on the west form a ridge between the Columbia and Spillimacheen Valleys; the benches here are narrow, but the bottom lands maintain their width and general characteristics down to the delta of the Kicking-horse at Golden where the section of the river involved in this discussion ends.

PROFITS AND COSTS

It is assumed that there are 43,000 acres of land that can be acquired and reclaimed, and that their improved value should average about $270.00 per acre, which would give a gross return, after the completion of the undertaking, of approximately $11,600,000, and, assuming the cost of reclamation to come to $37.00 per acre or $1,600,000 for the entire area, a sum of $10,000,000 is left to provide for purchase, selling expenses, legal and other charges, and profits to the Company. The cost quoted for reclamation per acre is based on the experiments alluded to earlier, and allows for the use of efficient machinery and the economy of works put through on a large scale.

SKETCH OF RECLAMATION METHODS

The methods best adapted to reclaiming these lands may be summarized as: dredging in the main river, closing back-channels, bank protection, dyking and draining, and sedimentation. The bed material throughout the length of the river is admirably suited for removal with great economy by a suction-dredge, which could be employed to increase the cross-sectional area of the main channel, and this improvement coupled with the closing, as far as possible, of the back channels would assist the run off of the floods, and so prevent a great deal of the present needless accumulation of dead-water The class of dredge proposed possesses the further advantage of being capable of depositing its excavated material within a wide radius directly in the bank depressions in a sufficiently fluid state to insure level settlement. Bank protection will be necessary in many places to train the river to accept altered channel conditions, and can be cheaply and effectively secured by the use of brushed piling walls. Dyking to be of value depends entirely on the suitability of foundation and material for construction; this can be decided only by careful local investigation. By this method, if found feasible, certain areas could be rendered useful, and safe against abnormal rise in the river. Sedimentation has been proved by actual local experiment to be comparatively rapid, effective and simple, besides utilizing a prominent natural feature of the Columbia River, which carries an enormous amount of silt in suspension, principally derived from the long creeks entering on the west bank; of these it should be noted that three of the largest, namely: Toby Creek, Horsethief Creek, and No. 2 Creek, enter within the first 8 miles below Windermere Lake, and their accretions can in consequence be made to apply to a long stretch of the flats below. By means of a carefully considered and effected plan of sedimentation, many of the present perennial ponds and marshes can in time be built up to a level to warrant their being drained and improved. In common with all rivers of its class, combs or ridges of land have been formed bordering the flowing channels, as will be seen in the accompanying cross-sections; these combs are covered with deciduous timber and brush, which will have to be cleared off in places to allow the main works to proceed.

COMMERCIAL VALUE

All temperate zone crops amenable to a free subirrigation could be successfully grown on these lands, after improvment, notably hay, fodder and roots; a profitable dairy and creamery business should be possible as an adjunct on a large scale, especially in view of the fact that butter in British Columbia is mostly imported from east of the Rockies and New Zealand.

Hay crops of all kinds command a ready market at a good figure, and should be, when grown locally in quantities, an important factor in building up the beef-cattle raising industry for which the adjacent ranges render the district so peculiarly suited, besides providing excellent winter pasture when the upland ranges become snow bound. Field peas and alfalfa can be profitably fed to hogs for which the market is always open, and conditions would be excellent for high-class horse breeding, while the local fruit grower on the benches, whose land will not raise fodder crops without great expense for labour and irrigation, and the nature of whose industry precludes his possessing pasture, will also benefit by the proposed change.

TRANSPORTATION

One great advantage possessed by the district is its accessibility, the Canadian Pacific Railway Company's branch known as the "Kootenay Central" taps the main transcontinental line at Golden, and is being built to join the Crow's Nest Pass route to the south via the Columbia and Kootenay Valleys; this line is completed and in operation to Vermilion Creek at the present writing and is in an advanced state of construction for some distance beyond, so that the Company's lands will be served in their entirety. Good government wagon roads exist on both sides of the river, and steamboats run throughout the summer from Golden to Windermere Lake; navigation will be greatly assisted by the proposed improvements and on the easy current throughout the distance should always be a competitive factor in handling freight.

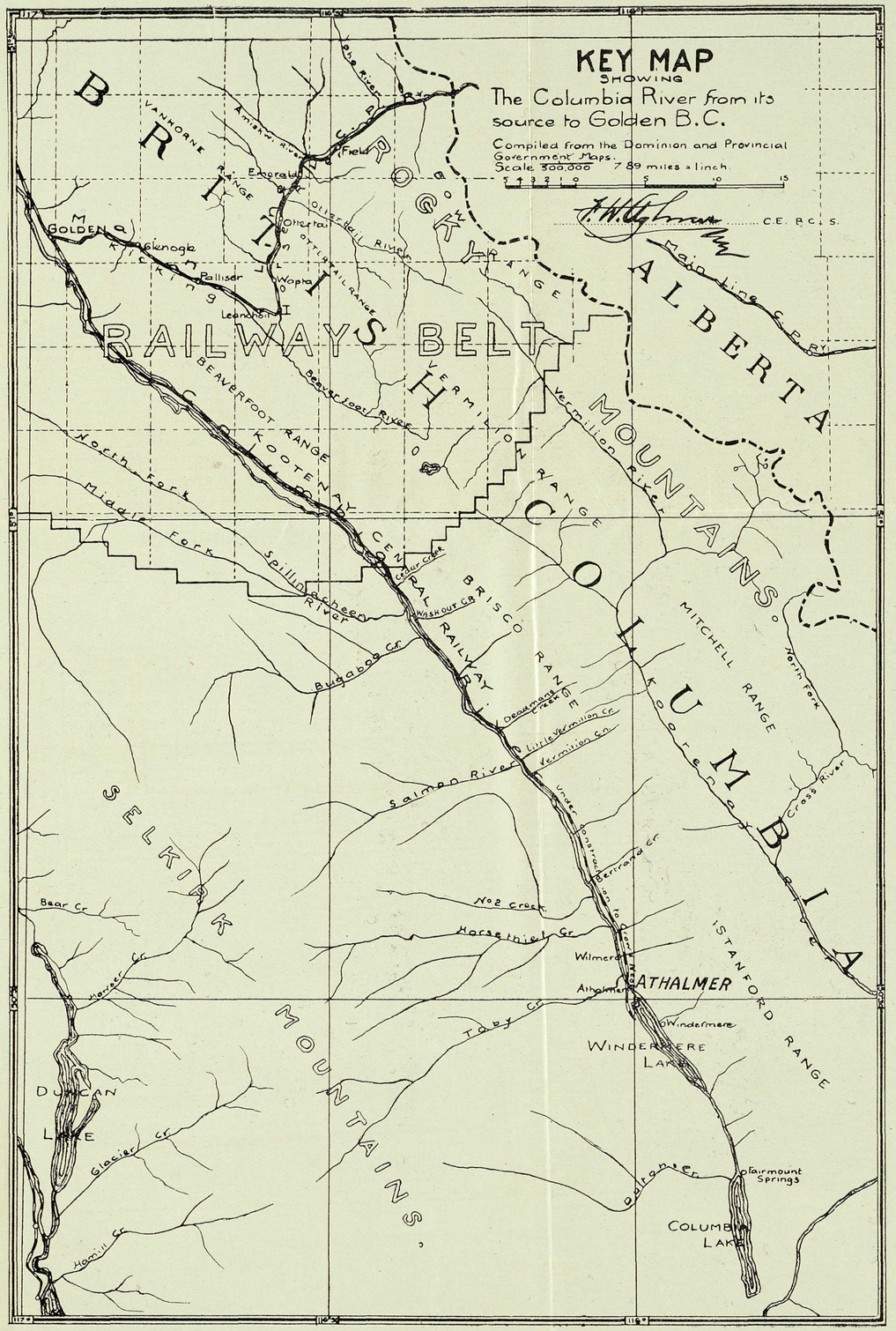
CLIMATE

The climate is typical of the British Columbian Dry-belts, the rain fall is slight and the percentage of sunny days is very great, between Windermere and Spillimacheen the snow fall averages about 9 inches, sleighing lasts generally for two months, below Spillimacheen there is more snow, but the general winter weather is clear and bright. There is almost invariably one "cold snap" during the winter lasting for about 10 days, but as this is accompanied by still bright weather, it is neither unpleasant nor injurious.

Accompanying this report are a key plan of the district compiled from the Dominion and Provincial Government maps, and three cross-sections typical of conditions in the bottomlands; in scrutinizing the latter it should be borne in mind that the vertical scale is very exaggerated to bring out clearly the comparatively small differences in ground elevation.

Yours faithfully,

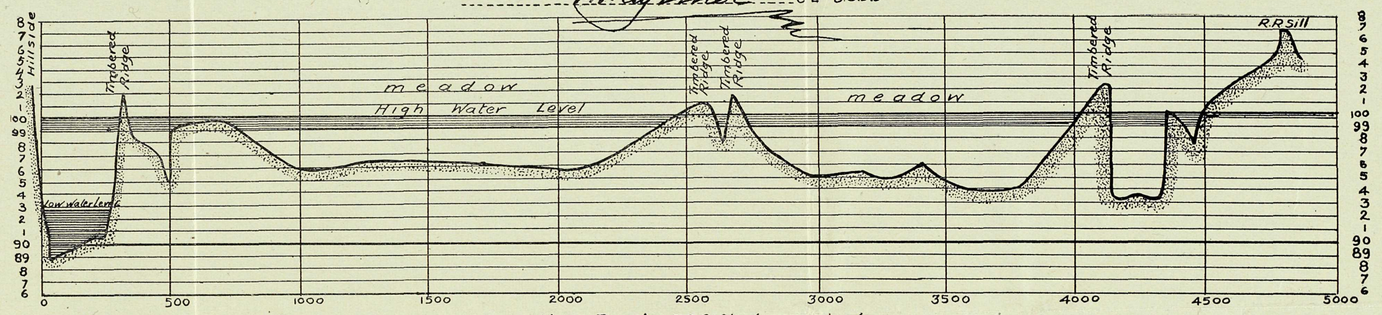
F. W. AYLMER.



REPRESENTATIVE CROSS SECTIONS
— OF —
COLUMBIA RIVER FLATS, B.C.
(All within Railway Belt)

Note Elevations referred to an assumed datum.

C.E. B.C.L.S.



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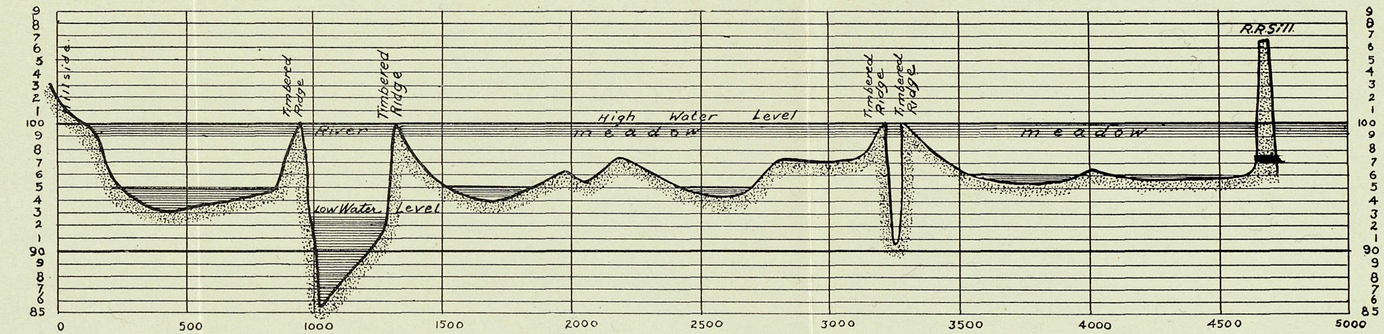

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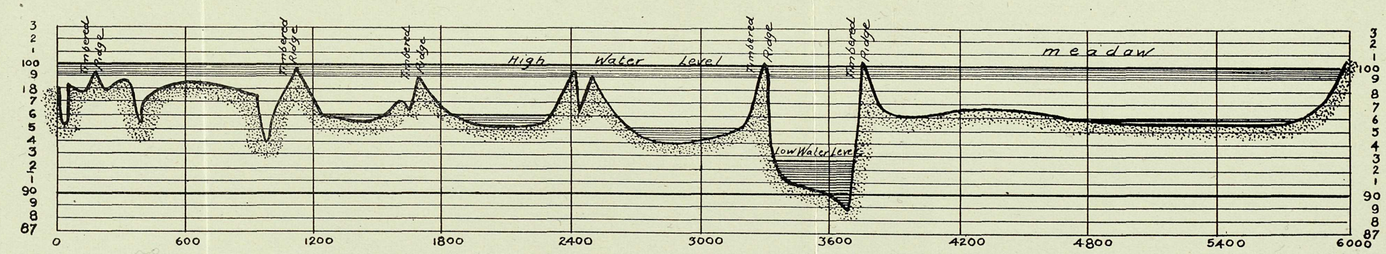

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