the rest of Canada and with the United States has given definite form to the plans. A very thorough inquiry is being made to determine beyond dispute as to what—from every point of view—will be the best route for a trans-provincial highway, as far as it affects British Columbia.

There is a highway leading from Alberni, at the head of the Alberni canal, Vancouver island, down through Nanaimo to Victoria; thence by steamer to Vancouver; then south across the Fraser river and up the left bank of this river to Hope. Improvements to this road have been carried out from time to time, and there does not remain a great deal of work to be done to make this section a thoroughly first-class highway. At Hope it becomes necessary to cross the coast range of mountains by one of three routes—either up the canyon of the Fraser river to Kamloops; up the Coquihalla valley and down the Coldwater to Merritt, and thence to Kamloops; or up the Silver creek valley and down the Roche river to Princeton.

Some Prominent Highways

The Silver creek route to Princeton, and its continuation, would be an excellent highway, but one which will require a considerable amount of work to complete. From Princeton to Cascade via Fairview, Greenwood and Grand Forks is a good road, and the construction of approximately 30 miles of road from Cascade to Rossland was decided upon early this year. At this time a fairly good road was being used from Rossland to Nelson. From the latter point a ferry-steamer is taken to Kootenay Landing, and from Creston the remainder of the highway leading through Cranbrook, Waldo, and Fernie to Crowsnest is completed and will not be a difficult matter to improve.

With regard to the other roads of the province, there is a heavily travelled road leading in a northerly direction from Ashcroft, through Clinton and Soda creek, to Quesnel. From there the road to Fort George will require to be located and built, as the old route is not desirable. Within a very short time it would be possible to complete the road leading west from Fort George along the Nechako river to Fort Fraser; thence up the Endako river to Burnt creek, and then down the Bulkley river to Hazelton.

The provincial government has also a road leading from Waldo, near Fernie, up the Kootenay river to Columbia lake, and thence along the Columbia river to Golden.

Banff-Windermere Road

There is another projected highway known as the Banff-Windermere road, which is destined to link up the east Kootenays with western Alberta. The route of this highway commences at Sinclair, on the Kootenay river valley road north of Windermere, proceeds along Sinclair creek to the Kootenay river valley; thence along the Vermilion river to the Vermilion pass (elevation 4,662 ft.) at the Alberta boundary. Of this road about 23 miles was constructed between the years 1912 and 1914, leaving about 48 miles to complete. Early in 1919 the uncompleted section was taken over by the Dominion government, who entered into an agreement with the British Columbia government to complete the road before the expiration of 4 years. This projected highway is situated midst magnificent mountain and valley scenery, a large area of which is being reserved for park purposes, and will eventually afford access to the Banff national park in Alberta.

Some idea of the magnitude of the work carried out upon this highway system may be given by stating that for the ten years preceding 1919, the expenditure upon extension, improvement and repair to the roads, trails and bridges in British Columbia has been nearly $3,000,000 annually.

It is anticipated that the Lethbridge southeastern irrigation project embracing some 350,000 acres, of which the two big natural reservoirs, known as the Milk River reservoir and the Raymond reservoir form a part, will cost between $3,000,000 and $4,000,000. H. B. Muckleston is now preparing estimates.

Letters to the Editor

DRIFTING SAND FILTRATION IN TORONTO

Sir,—For a variety of reasons the writer is particularly interested in Mr. Howard's paper on drifting sand filtration in Toronto, published in the October 2nd issue of *The Canadian Engineer*. In the first place the process is a radical departure from long established practices in water purification; and, second, the drifting sand filter plant at Toronto has ever been enveloped in a fog of uncertainty respecting its cost of operation and practical performances.

In the winter of 1913-14 the writer was preparing a monograph for the American Water Works Association entitled, "Present-Day Water Filtration Practice," and learning of the probable decision on the part of the Toronto authorities to adopt the ver Mehr drifting sand system in the proposed 60,000,000-gal. (Imperial) extension to the existing slow sand system at that place, sought to obtain reliable information about it, that he might refer to it in his then forthcoming article on water filtration matters in general. He learned that Sir Alexander Binnie was alleged to be an advocate of the process, and as the time was short before his article went to press, he cabled Sir Alexander for a statement regarding it. Sir Alexander replied that the only plant of this type he had seen was a small installation in Wales, but that he was impressed by it and thought highly of its possibilities. Correspondence with certain public officials in Toronto, and even personal inquiry on the ground, developed only the same line of indefinite information.

Prior to May, 1913, a test plant having a daily capacity of 500,000 Imperial gallons was installed by the ver Mehr company near the old West Toronto pumping station, and on May 21st, 1913, turned over to the city authorities for official test. The results of this test were reported on by George G. Nasmith and F. Adams, of the Department of Public Health, Toronto, in an article which appeared in *The Canadian Engineer* for April 8th, 1915. This test was run between the dates of May 21st, 1913, and June 27th, 1913, and upon the results then obtained, and the recommendations of Dr. Nasmith, the ver Mehr company was permitted to put in a bid for the 60,000,000-gal. installation. Of the four bids tendered, the ver Mehr bid was $1,096,000 as against the other three of $1,177,000, $1,197,000 and $1,750,000 respectively, and the contract went to the low bidder

From the time the test plant was installed in May, 1913, until the present day the writer has endeavored to obtain information relative to the cost of operation and maintenance of the new filtration works, but his efforts have thus far been without definite result. The 1915 article by Dr. Nasmith was scrutinized in vain for light on this important point, and it is with regret that even at this late date Mr. Howard seems unable to give the profession any information on this vital phase of the matter. In reply to a question by Col. Longley, he sweepingly dismisses the subject with the reply that "there are no figures available as to cost of operation." Personally the writer does not see how any discussion of the merits of the drifting sand filter can be of definite utility until some one is ambitious enough to relate the whole story and advise the public, not what this plant cost to build as compared with what either a slow sand or the established type of rapid sand system might have cost, even going so far as to grant that all three would produce an equally satisfactory effluent, but what are the actual costs of operation and maintenance.

A somewhat mysterious phase in operating results was described by Mr. Howard at the last annual meeting of the New England Water Works Association. In reply to a question by Mr. Caird relative to whether alum passes the filter, Mr. Howard states that "there is a slight trace of aluminum hydrate in the filtered water." He further said:—

"We experimented by passing the filtered water through