

Grand View Extension.—It is expected that construction will be pushed through to Battleford, Sask., about 300 miles from Grand View, Man. During 1902 grading was completed on 38 miles from Grand View and in places beyond, towards the Manitoba boundary. All the contracts for this construction were expected to be placed by the end of April. Plans have been completed for the two bridges to be constructed across the Saskatchewan river, and have been submitted to the Minister of Railways for approval. Mackenzie, Mann & Co. have ordered 10,000 barrels of cement, to be used in the sub-structures, and contracts have been let for the superstructures. The bridge to cross the south branch of the river will be constructed in the vicinity of Osler, and the crossing of the north branch will be at the Elbow. (April, pg. 131.)

Erwood Westerly.—The extension of the line westerly from Erwood is expected to be carried as far as Melfort, about 50 miles from the point to where grading ceased in 1902, and possibly to Prince Albert, about 180 miles from Erwood. This line is expected ultimately to be extended from Prince Albert to a junction with the main line, now under con-

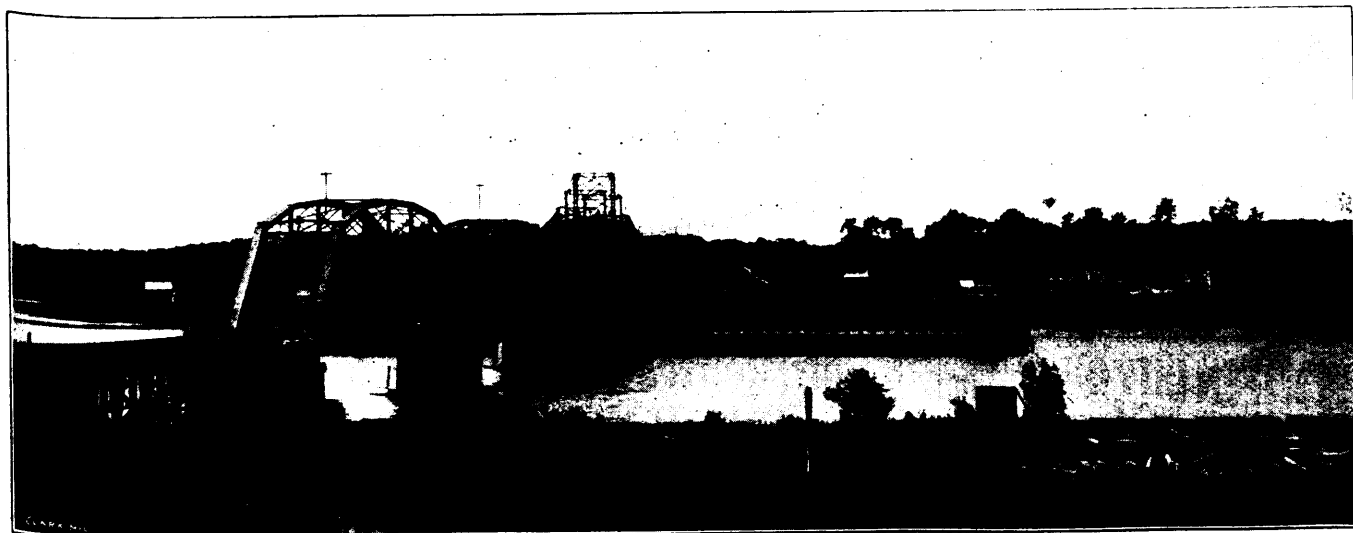
RAILWAY FENCING.

By R. W. Leonard, M. Can. Soc. C.E.

The subject of railway fencing, especially of determining the most economical and efficient type, does not appear to have received the consideration that the first cost and cost of maintenance would seem to justify. The many different kinds of fencing that one sees in common use in farming and woodland districts in Canada, where cattle are allowed to roam at large, may be estimated to cost all the way from \$300 to \$1,500 or more per mile, and the most expensive is not always the most efficient, durable or economical to maintain. The continued decrease in the supply of suitable timber, and the consequent increase in cost, should make this subject of keen interest to railway companies and to farm land owners. In Canada the fencing of a railway in country districts is necessary for the purpose of protecting the trains from danger arising from running down trespassing cattle or other domestic animals, or of protecting the company from damage suits arising from resulting injury to such animals, and for the protection of the railway from the accumulation

Where a fence 8 ft. high is insufficient to store the snow, it is generally better to use a temporary board hurdle fence placed back 50 or 100 ft. in the field than to increase the height. Fences built with horizontal boards so spaced do not interrupt the view greatly, and do not cause that unpleasant dazzling effect on the eyes of travellers. Where the ground rises or falls, the fence should maintain its height by adding a board to or dropping one off the top, giving the appearance of steps. A vertical batten on the boards at each post greatly strengthens the fence and hides joints. There are various forms of portable board hurdles for snow protection; probably the best is in the form of an inverted Y with widely spaced horizontal boards fastened to vertical frames, which will fold flat for transportation and summer storage. In prairie sections snow is stored clear of the rails by low embankments or hedges taking the place of the fences, or the snow is prevented from accumulating on the track by flattening the slopes of the cuttings.

Barbed wire has been very extensively used, but is justly condemned, as being destructive to stock and inefficient unless used in combination with boards or rails, which



CANADIAN NORTHERN RV. INTERNATIONAL BRIDGE OVER THE RAINY RIVER, BETWEEN RAINY RIVER, ONT., AND BEAUDETTE, MINN.

struction from Grand View, via Battleford. (April, pg. 131.)

Battleford to Edmonton.—Arrangements have been made with Rev. S. C. Barr, under whose direction about 2,000 British immigrants have recently gone into the country, for the grading of 100 miles near the lands set apart for the colony.

Survey parties under A. G. McFarlane and J. Armstrong, the latter of whom is principal engineer in charge of surveys, are working at different points between Edmonton and White Whale Lake, 38 miles.

Edmonton.—The bylaw to raise \$15,000 towards the purchase of 68 acres for a site for station, yards and workshops from the Hudson's Bay Co., has been passed by the taxpayers. (April, pg. 131.)

The Bell Telephone Co.'s calendar for 1903 gives a plan showing the long distance lines comprised in the Ontario department, which extends from Kingston to Buffalo, N.Y., and Detroit, Mich., and covers the Province from the lake boundaries to Bracebridge. The lines of the North American Telegraph Co., which serve a section of the country northward from the lake shore between Kingston and Cobourg, are shown in red.

of snow. With the modern heavy locomotive and rolling stock, there is little danger to trains to be apprehended from striking the smaller domestic animals, except perhaps pigs, which are generally kept by the owners within a limited space securely fenced, largely because they are difficult to keep within fences which will hold securely other domestic animals. The cost to the railway companies for injuring sheep or pigs is probably so small that it can fairly be considered not economical to try to fence against them in most localities.

It is perhaps unnecessary to consider rail fences, which are probably not now being built by railway companies, owing to their cost and liability to destruction by fire, and tendency to carry fire through the woods. Board fences with posts spaced about 8 ft. apart will perhaps be continued in special locations, such as through towns and close to farmers' buildings, where they are necessary to protect their smaller animals. Post and board fences will also continue to be used as a protection from snowdrifts. For such purpose it is often desirable to build them much higher than for cattle protection. I prefer to use cedar posts, spaced eight feet c. to c., with the boards nailed on horizontally, breaking joints and spacing about 3 ins. apart, selecting the widest boards for the bottom,

necessitate close spacing of posts, and consequent expensive construction and maintenance. Diamond-shaped woven wire fences and woven lath and wire fences with vertical laths are open to the same objections regarding cost and efficiency. There are a number of different patterns of woven wire fence with horizontal wires connected by vertical wires, woven either in the factory or in the field, which possess varying degrees of excellence, and are rapidly taking the place of the other forms above mentioned. In considering the value of each fencing, the following qualities are important:—(a) Efficiency in stopping horses and cattle without injury to stock or fence; (b) capability of adjusting itself to changes of temperature without unduly straining posts or wires in cold weather; (c) capability of yielding to weight of snow settling during a thaw, fallen trees, or persons climbing over it, without permanent injury; (d) liability of accommodating itself to inequalities of the ground surface; (e) low first cost; (f) low cost of maintenance. If the horizontal wires are plain straight wires, it is necessary, in order to satisfy b, c, and d, that springs be introduced at frequent intervals, also that vertical wires be not so stiff as to remain kinked or distorted. As the cost of cedar posts and labor is continually increasing and the cost of wire generally de-