

# The Canadian Engineer

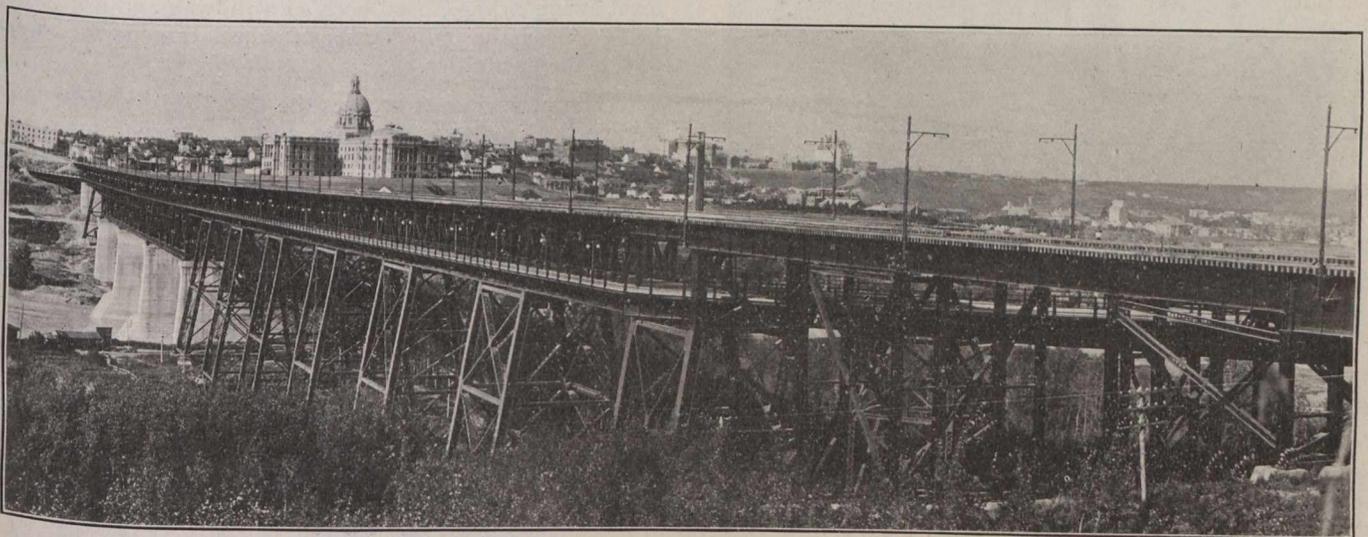
*A weekly paper for engineers and engineering-contractors*

## SOME STEEL RAILWAY VIADUCTS IN WESTERN CANADA

THE CANADIAN PACIFIC RAILWAY VIADUCTS AT LETHBRIDGE, ALTA., EDMONTON, ALTA., AND OUTLOOK, SASK., BRIEFLY DESCRIBED AND ILLUSTRATED.

WHILE the opinions of bridge engineers may differ regarding the features of steel bridge design that bespeak distinctiveness and character, it is improbable that there may be readily called to mind a railway viaduct in Canada with more interesting points relating to its design and construction than the Canadian Pacific Railway viaduct which crosses the Belly River in the western part of the city of Lethbridge, Alta.

nearly three miles of length, a number of them being over 100 ft. high. It had a curve, with no compensation, for every mile and to spare, and was burdened with a 1.2 per cent. grade (63.4 ft. per mile). The rapidly increasing traffic of ten years ago, coupled with the demands of rolling stock, for heavier structures, combined forces with the company's desire for lower grades and better alignment, and resulted in an entirely new line between Lethbridge



The C.P.R. Bridge at Edmonton, Showing Deviation of Highway at Each End.

The structure has received generous comment in the engineering press, not only for its large dimensions, but for little details that illustrate economic judgment in engineering design and dexterity in matters of construction. It stands out so prominently among railway viaducts of the age and is such a striking criterion of the scientific progress surrounding structural steel, that the following brief description of it, in conjunction with the more recently constructed C.P.R. bridges at Edmonton and Outlook, will doubtless atone for another reference to it, even after its six years of use.

### The Lethbridge Viaduct.

Lethbridge, 759 miles west of Winnipeg, is a divisional point on the Crow's Nest Branch of the Canadian Pacific Railway. It is the centre of an important coal mining district as well as of a large irrigation tract on the eve of springing into greater prominence. The old Crow's Nest line, in its 38½-mile course from Lethbridge Junction to Macleod, had twenty bridges, aggregating

and Macleod. This, compared with the old, effected a 5.26-mile reduction in length, a saving of 1,735 degrees of curvature (eliminating 37 curves) and a reduction of grade from 1.2 per cent. to 0.4 per cent. The number of bridges was reduced from twenty to two. One is a 1,900-ft. structure over the Old Man River valley, and the other is the world-famous Lethbridge viaduct, 5,327 ft. long with a maximum difference in elevation between river bed and base of rail of 314 ft.

The viaduct consists of 44 plate girder spans 67 ft. 1 in. long, 22 plate girder spans 98 ft. 10 in. long, and a riveted deck lattice truss span 167 ft. long. It is carried on 33 riveted steel towers, rigidly braced. Its general design is clearly illustrated in the accompanying views and elevation diagram. The substructure consists of concrete piles supporting concrete pedestals, the length of the piles under the land piers varying from 12 to 20 ft. The alignment is a tangent throughout. A 3-degree curve exists at the western approach and a 1-degree curve at the eastern approach. There is a grade of 0.4 per cent. rising towards the west for the entire length.