

Creek competition by Mr. T. E. Brown, for a double leaf bridge with a clear span of 150 feet. Mr. Brown, four years earlier, submitted a plan for crossing the canal at Duluth, which is said to have been the first important bascule design in America. It had no counterweight, and the estimated cost was \$125,000. The towers of the Newton Creek design, standing on each side of the water, were 74 feet high and unsymmetrical, the width of road being 30 feet, with a 9-foot walk outside the trusses at each side, making a total width of 50 feet. The six cables at each side, passing over two 10-foot sheaves made of riveted steel plate, support a permanent counterweight hanging inside the towers, and each span is operated by eight hydraulic rams, the leaves being pushed open by struts connected to the heels of the trusses which swing on trunnions fixed in the tower legs. An unusual feature of the design is, that swinging hinged bents attached to the ends of the leaves gave them a centre bearing under live loads. These bents were to rest on the cast iron caps of submerged piers which could be cleaned of sediment or silt by water pressure from pipes especially laid for this purpose beneath the river bed. Mr. Brown also proposed an alternate plan for disposing of the bents and supporting the leaves by cables from the towers. The estimated cost was:—

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| Superstructure and machinery | \$105,000 |
| Foundations | 105,000 |
| Total | \$210,000 |

In this design, the tower height could be fixed by the required vertical movement of the counterweight without special reference to the inclination of the lifting cables. But the design with its unsymmetrical towers was complicated. Referring to the various plans which appeared at this time, the *Engineering Record*, in commenting thereon, rather harshly declared that "the Newton Creek competition has produced an exhibition of more structural ugliness and awkwardness than any other event of its kind in this country." A design somewhat similar to Mr. Brown's was prepared in 1900 for another place, by a structural company in Milwaukee.

The first bridge of the kind completed is at Ohio Street, Buffalo, finished in 1906, with a single leaf 166 feet long and lattice trusses 21 feet deep, over a channel 140 feet wide. One leaf was evidently more economical than two, since it required only one tower, one set of machinery, and one operating house. It replaced an old swing bridge, which was removed when the channel was deepened from 19 to 23 feet. The roadway, 30 feet wide, carries two car tracks, and 7-foot walks project out at each side, making a total width of 44 feet. The span is balanced by twelve plough-steel wire ropes, 2¼-inch diameter, passing over 10-foot cast-steel sheaves (cast in halves) at the top of tower, the two counterweights, each containing 180 tons of cast-iron, moving vertically between guides. The lifting is controlled by hydraulic power from a tank in the tower, under which are girders 52 feet long, and the approach span at the opposite end is 100 feet. Its total cost was:—

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| Superstructure (including plans and royalties) | \$117,700 |
| Foundations | 59,300 |
| Total | \$177,000 |

The cables have a heavy bending stress, due to winding over their sheaves, and the breaking load of each one is 190 tons.

The Burel drawbridge, invented prior to 1840, is a modification of that by Poncelet. The counterweight is placed at the extreme end of a 90-degree revolving segment, over

which the cables pass when the bridge is in motion. The system has been recently revived and a patent thereon granted February, 1900, to Elmore D. Cummings, of St.



Cambell Avenue Bridge, Chicago.

Paul. It is described as "having a counterweight pivoted to a separate approach framework and connected to the moving leaf by chains which pass under the counterweight framing and over the top chords of the trusses in such a manner that equilibrium is maintained in all positions. The operation is by a rack and pinion on the top chord."

REPORT ON FORESTS.

At the fourth annual meeting of the Commission of Conservation, held at Ottawa January 21st and 22nd, the report of the Committee on Forests was approved, covering recommendations with regard to the following points:

Approving the plan of co-operation in effect between the Board of Railway Commissioners and the Dominion and Provincial Governments for the enforcement of the fire regulations of the board; urging the establishment of a fire-protective service along the Intercolonial and National Transcontinental Railways similar to that provided for in the fire regulations of the Railway Commission; urging the governments of New Brunswick and Nova Scotia to organize separate branches devoted especially to forest fire work and to appoint technically educated provincial foresters as has been done in British Columbia, Ontario, and Quebec; calling attention to the necessity of considering the requirements of brush disposal in the issuance of new licenses and the renewal of old licenses by Dominion and Provincial Governments; approving the organization of co-operative associations of limit holders and the principle of contribution by the Dominion of Provincial Government in proportion to the benefits received; urging the Dominion and Provincial Governments to begin a systematic study of the extent and character of forest resources; emphasizing the necessity for the collection of complete fire statistics; approving co-operation with the government of Ontario in an examination of forest conditions west of Sudbury and south of the Clay Belt; approving the proposed extension of the Dominion Forest Reserves and the establishment of a game preserve in the southern portion of the Rocky Mountains Forest Reserve and in southeastern British Columbia adjoining the Glacier National Park; urging that all appointments in the forest services of the Dominion and Provincial Governments should be based solely on capability and experience; urging the government of Ontario to undertake a systematic classification in the Clay Belt in advance of settlement to the end that settlement may be properly directed, and that non-agricultural lands may be reserved from settlement and entry.