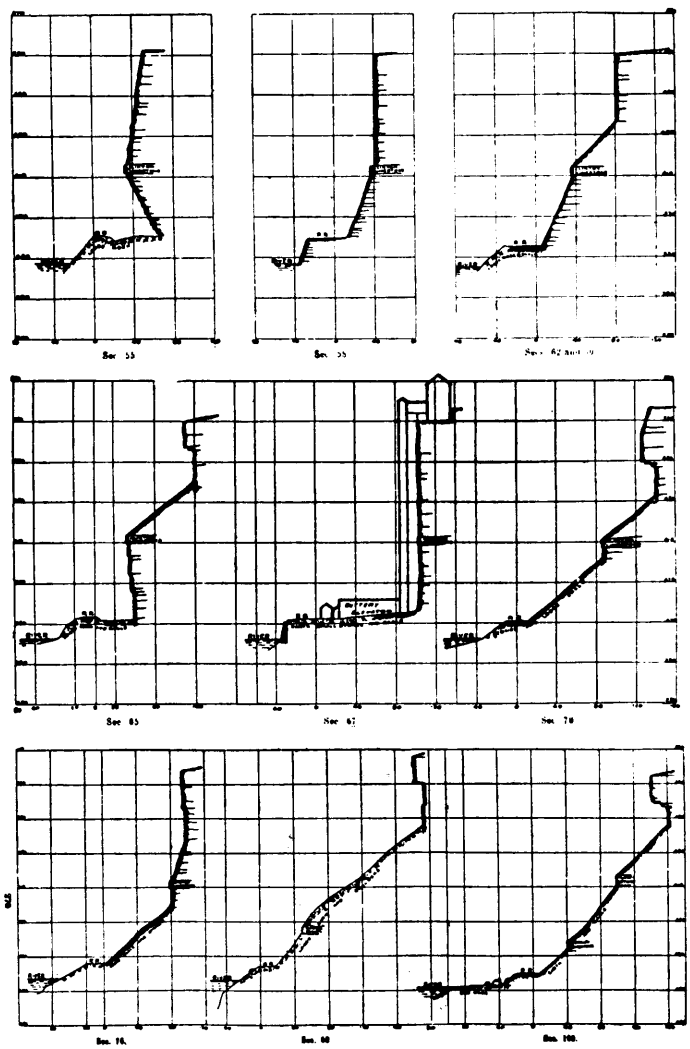
to attempt to place in its way any structure less substantial than the cliff which it had cut out. During a period of extreme high water in the spring of 1897, when the river rose 19 ft. above its ordinary level, most of this embankment was washed away. In its place rough, but heavy, longitudinal walls were built to resist the encroachment of the current; spaces between the walls were refilled with stone & a stout timber trestle built to carry the tracks. In the spring of 1898 this structure was swept away, after which the Co. determined to do what it might have profitably done at first, & the old elevator-shaft was removed, the cliff blasted away, & a shelf made of sufficient width for a single track. Three timber cribs, each about 60 ft. in length, protect the roadbed at critical points above this bay.

"Beneath the railway bridges a combination of difficulties was met. A small waterwheel under the Suspension Bridge, which furnished power for a flour-mill at the top of the bank, was rearranged to permit building the roadbed, the transmitting cable raised, & a portion of the tailrace changed & a retaining wall built to hold the embankment. Near this point is an inclined railway, the floor of which, resting directly over the centre line, was raised vertically about 15 ft. Between the incline & the cantilever bridge heavy walls were put in to hold back the loose rock on the inner side of the track, & retaining walls built on the outer side to prevent encroachment upon the head race.

"Permission was obtained from the Michigan Central R.R. to build abutments on both sides of the cantilever bridge piers and a central pier in front of & between their piers. The underlying material at this point is composed of very large boulders, upon which rest the foundations of the cantilever bridge, between which & the deep waters of the river there were but 13 ft. in which to pass. To prevent possible danger to the bridge foundations, blasting was prohibited within 100 ft. on the south side & 50 ft. on the north. No soundings could be obtained on account of the swiftness & great depth of the current. Within this limited area, hedged about by restrictions, construction was made doubly inconvenient.

"From the bridges to the top of the high cliff, a distance of nearly a mile, the tracks are laid on a slowly ascending grade up the talus for about 3,500 ft.; thence entering the cliff & passing through a cut 60 ft. deep at the lower section, rising continually until the top of the bank is reached. The average gradient is 4.7, the maximum 6.4 % & the total elevation overcome, from the bridges to the top, is just 200 ft. Passing beneath the New York Central tracks, the line swings sharply to the right &, paralleling the Central for a few hundred feet, reaches Second St. in Niagara Falls. At the southern end of Second St. connection is made with the Niagara Falls St. Ry. and thence over the tracks of the latter company to Prospect Park. The under-crossing of the Central is made at an angle of 55°; the bridge is of trough girder type and carries at present 5 tracks.

"I think you will grant that it was not practicable to make detailed plans for construction of this peculiar road. It was not possible to determine, with even approximate accuracy, how the unseen conditions might alter proposed methods. I cannot say that any very serious engineering difficulties were met with, & I think there are no problems to be solved that will not be successfully met. The same vigor & energy which characterized the attack upon the ground were exhibited later in the effort to put the road in operation, & as gangs of men & construction tools would have been unsightly, work was suspended as suddenly as it was begun. You will recall the fact that wooden trestles & bridges had been put in place because the Co. was not willing to wait for permanent structures. The work was, therefore, left unfinished, but I was sustained by the vain hope that in the coming spring I should be permitted to scale down the slopes & replace the temporary structures.



SECTIONS OF THE NIAGARA GORGE.

"When 1896 arrived all our efforts were concentrated upon construction above the Buttery elevator, & this section, too, when nearly completed, was given over to operation in much the same incomplete form as was the lower. It was expected that immediate earnings would be so great that a goodly portion of them could be applied to completion of the work, but receipts proved disappointing, & all further work was suspended, excepting such as was necessary to clear the track of slides & to provide for maintenance. As the outcome of business complications the owners of the road were obliged to relinquish it a few months ago, & it passed into the hands of a receiver. Reorganization of the Co. is now being undertaken, & I am engaged in making the necessary repairs, which amount to a reconstruction of the road, as considerable damage had been sustained by the track from slides & by the roadbed from the action of the river.

"A fall of rock that occurred in March, 1899, accounts of which appeared in the technical journals & in the daily papers, & called an avalanche, was greatly exaggerated. Before the road passed into the hands of the receiver I had recommended that some of the overhanging Niagara limestone just above the Buttery elevator be removed by blasting, as it seemed to be insecure. The railway was shut down; all people were warned not to walk upon the tracks, as it was intended before beginning operations to remove all overhanging rock which appeared to be dangerous. By reason of some blasting that was going on near by, within 100 ft. of the point in question, where the city was excavating for a sewer, two large pieces of limestone were dislodged, falling between the tracks & the cliff without doing damage. A few days later our Superintendent blasted & threw off into the river the large boulders, which now rest in the margin of the rapids just outside of the tracks. A considerable amount of loose material, of course, fell with the boulders & covered the road for a distance of about 200 ft., a depth of from 3 to 5 ft. This was easily removed, & when taken away it was found that the rails were cut in several places, but that no great damage had been done, except to the lower portion of the shaft of the elevator, the casing of which had been carried away. Where these large rocks now stand in the river some difficulty had previously been found in maintaining the embankment, owing to the heavy current thrown against it, & a retaining wall about 400 ft. long had been resorted to for protection. With great good fortune these large rocks now stand directly in the way of the heaviest attack of this current, & the retaining wall is no longer necessary. In general it may be said in regard to falling rock that it comes down only in the early spring months, when, under the new management, it is not intended to operate the railroad.

"Since the opening of the road in 1895 to the present time no passenger or employe has ever received injury from falling rock. I was daily over the road during the construction, & have since been frequently from the Falls to Lewiston & return, both on cars & on foot, & have never seen a rock fall. It is my opinion that, with due care, the maintenance of this railway need not be excessively expensive, & that the same safety of operation can be obtained as is secured on any mountain road."

The Montreal Elevator Syndicate.—The Conners Syndicate has awarded a contract to the Barnett & Record Co., of Minneapolis, to build at Montreal a steel elevator with a capacity of 1,000,000 bush. of wheat, & 2 annexes with a capacity for storing 2,000,000 bush. It is said the construction of these structures will involve an expenditure of nearly $1,000,000. Plans are being prepared & it is expected that the first sub-contract for piling will be let at an early date. This will require 2,620 piles. Some 2,000 tons of steel will be used in the structures.