

## THE BUILDING OUTLOOK FOR 1889.

**GALT, ONT.**—Building operations here do not look very bright at present.

**OWEN SOUND, ONT.**—Building outlook, fair. Not many very large buildings under contemplation so far.

**BERLIN, ONT.**—Building operations during the coming season are expected to exceed those of last year, which were very large.

**ST. CATHARINES, ONT.**—The outlook for building is fair; no great push is looked for; quite a number of alterations and improvements are proposed.

**DESERONTO, ONT.**—Building operations have already commenced, and the probabilities are that many new houses will be put up the coming season.

**KINGSTON, ONT.**—The outlook for the approaching building season here promises very fair; as good or better than last year. There is more work out now than last year at the same time, and more in the different offices under way.

**ST. THOMAS, ONT.**—There will be a fair amount of building done in the city during the coming season. There will be a very large amount done among the farmers in the vicinity, fully as much as during the past two or three years put together.

**COLLINGWOOD, ONT.**—The building outlook is not of the best; tenders are being asked for a general and marine hospital to cost about \$30,000; a by-law has been passed to raise \$20,000 for a new town hall; one or two stores are spoken of, also some dwellings.

**HAMILTON, ONT.**—The building outlook here is considered good. A great number of cheap buildings have been contracted for; in fact, if all is true that I hear, the city will be boomed this summer. I don't think the architects as a rule are busy, as most of the buildings are in speculative builders' hands.

**GUELPH, ONT.**—Ten contracts have already been let for new houses to be built this spring. From the number of contracts already awarded there is promise of considerable activity in building operations in the spring. Amongst the prospective erections will be the new passenger station of the G. T. R., and a new skating rink.

**LONDON, ONT.**—Building prospects for the coming season are not very bright. A few small contracts have been let. A block of stores on Richmond St. and a large hotel on York St. are contemplated, and the Canadian Savings & Loan Society are about erecting new offices on Richmond St. The architects appear to think there will be plenty of work, and our principal builders are hopeful.

**BROCKVILLE, ONT.**—Building operations do not tend to be very brisk; no work has been yet let, although plans have been prepared for a number of residences and several summer hotels, including a 150 room hotel on Rideau Lake, probable cost \$32,000, and addition to a summer hotel at St. Lawrence Central Park, containing 80 rooms, probable cost \$3,600. The Leeds and Grenville County Court House will also be remodelled and a new fire hall built.

**REGINA, N. W. T.**—The prospects of a busy summer are very good. A new Methodist Church and a large school building to cost about \$12,000, are contemplated. Operations will begin as early as possible on the police riding school, and also on the Indian Industrial school. Contractors are expecting the plans for the proposed gubernatorial residence, will be ready soon. A number of handsome substantial blocks are to be erected, and also several residences.

**STRATFORD, ONT.**—There is every appearance of a good trade this season. Already a large number of contracts are let, among others, Worth's block—4 stores and public hall, to cost \$14,000; alterations to Dr. Kilroy's residence "Glebe House," to cost \$5,000; houses for Jas. Corcoran, cost \$3,000, H. M. Johnson \$3,000, and John Hogarth \$2,000; also one for J. R. Kilbura, architect, to cost \$3,700. A large number of smaller contracts ranging from \$1,000 to \$1,500 are also let, and from present appearances the builders will have a busy season.

## FAILURE OF THE SUSPENSION BRIDGE AT NIAGARA FALLS.\*

THE members of this Society will be glad I am sure to be informed of the circumstances connected with the recent failure of the Suspension Bridge at Niagara Falls, which I constructed for the Bridge Companies, and which was opened for traffic on the fourth January, 1869, just twenty years ago. All the particulars relative to the first construction of this bridge were published in a report made by me to the Directors, dated 1st March, 1869, and this report with illustrations was the same year given in "Engineer," in England.

The span of this bridge is 1268 feet between the points of suspension at the towers. The roadway was 10 feet wide, providing a single track for carriages, and a path for foot passengers. The roadway was supported by two cables, each cable composed of seven wire ropes, each rope of seven strands, each strand of miniature wires 0.155 inch in diameter, No. 9 B.W. O. Each rope had a guaranteed tensile strength of 100 gross tons=112 tons net. They bore the test of 108 tons net without rupture of the rope, when the fastenings gave way.

\* Extract from the annual address of the President of the Canadian Society of Civil Engineers, held at Montreal, Jan. 17th, 1889.

The single track bridge was designed to carry with perfect safety a load of 100 tons without producing a strain of more than 25 per cent. of the ultimate strength. Besides the cables there are over-flow stays which are a real support to the roadway; and in order to keep the roadway from swaying about in the wind, there were 54 guys, 28 of which were on the up stream, and 26 on the down stream side. Some months after the bridge was opened there was added both on the up stream and down stream side a horizontal arched cable, with horizontal stays between them and the roadway, which had a good effect in steadying the bridge.

The original bridge rested on wooden towers, but for fear of accidents by fire the Directors submitted steel towers for wood.

About two years ago the Directors decided to make the bridge a double track bridge without consulting me in the matter. They proceeded to take down my single track roadway, and to substitute a double track. This enlargement was completed in September last. I have not seen any of their work, and from lack of information I am unable to state what means were adopted by them to secure the double track against the additional strains that must come upon it. The additional strain on the cables and stays, and the additional surface offered to the force of the wind, for which more guys would have to be provided.

My bridge, before it was opened to the public, was officially inspected by officers of the Dominion, and of the state of New York; the Directors also employed the Hon. W. I. McAlpine, their consulting engineer, to report more fully in regard to its sufficiency.

My bridge weathered the storms for twenty years. My cables and anchorages are still in place, and, I understand, are to be used in the reconstruction of the bridge. My roadway was not blown from the cables, it was taken down by the Bridge Company. It was the double track roadway substituted for the single track that was blown away only three months after it was put up; and I am not aware that there was any Government inspection of it.

It is a fortunate circumstance that no lives were lost in this accident. From all accounts it was a terrible storm. The anemometer at Buffalo registered the velocity of the wind 88 miles an hour.

The great problem to be solved in the construction of a bridge over this chasm is to keep it from being injuriously affected by wind storms which not only causes vibrations like that of a pendulum, but wave like undulation through the length of the roadway and the suspended portion of the cables. To guard against these a cradle form is given to the cable and the over-floor stays from the towers to the roadway, as well as the cradle stays from the cables to the base of the towers seem to check these undulations, while the under-floor guys reaching down at various angles from the roadway to the rocks along the river bank, meet and check the lateral force of the wind upon the whole suspended system.

To balance these forces one against the other, and leave a fair margin for safety, will tax the best skill of the engineer, because the storms through this gorge seem to drive with greatest fury in consequence of its funnel shape.

An opinion was expressed by the late J. A. Roebling, who built the railway suspension below this, that no bridge could be made to stand here at the falls; not on account of the storms, but from the spray coming from the American Fall, which would cover the bridge with ice and break it down. But the experience of twenty years has proved there is no danger to be apprehended from this cause. In deference however to his opinion the bridge was made a tentative structure, and if successful might afterwards be enlarged and made a permanent structure.

## HOW TO USE DYNAMITE IN WINTER.

IN view of several fatal accidents which have occurred recently from dynamite explosions, Mr. John A. Macdonald, writes from Sault Ste. Marie to the *Toronto Empire* as follows:

"In order to prevent such accidents in future I offer a few suggestions for the benefit of those who may be engaged in the use of dynamite in cold or frosty weather. Your correspondent has used all kinds of explosives on the C. P. R. on the north shore of Lake Superior, from the 30 per cent. up to 60, and the glycerine in its pure state. In winter make a good strong fire, and around this fire put three or four bushels of common plasterers' sand; as it dries push it into the fire and make it hot enough to run. Now pull the sand out of the fire and apply cold water to the sand, so that it will be all damp. This can be accomplished with a hoe. Mix well, the heat will be very great, and no fire. Put this in a shallow box, say two feet wide by three feet long and about eight inches deep; spread four inches on the bottom, then place the dynamite on this, then cover up with this warm sand, throw a blanket over the box and everything is safe. This can be done at night, and with protection from the wind and a larger quantity of sand all the powder for the following day can be thus prepared without fear. I have used dynamite by the tons in every form, and for all kinds of work, but of all the plans for thawing dynamite the above is the safest. Dynamite is as harmless up to 50 per cent. as candles if handled properly. Dynamite is more dangerous in winter than in summer. Dynamite that is not properly thawed is dangerous, because in a low temperature it will sometimes burn and not explode; but frozen dynamite may burn down to dynamite that is properly thawed and cause this to explode.