The Knowledge Bank at The Ohio State University

Ohio State Engineer

Title:	Niagara Falls Project
Creators:	Lough, Judd
Issue Date:	Mar-1929
Publisher:	Ohio State University, College of Engineering
Citation:	Ohio State Engineer, vol. 12, no. 5 (March, 1929), 10, 28.
URI:	http://hdl.handle.net/1811/34565
Appears in Collections:	Ohio State Engineer: Volume 12, no. 5 (March, 1929)

NIAGARA FALLS PROJECT

By JUDD LOUGH, '31

For many decades Niagara Falls has been a point of interest to everyone. The horseshoe shape of the Canadian Falls exemplifies good luck. This may be the reason for its being the rendezvous of honeymooners. A source of six million horsepower of energy is certainly an object to arouse extensive engineering interest. The contour of the falls is gradually changing and differences of opinions as to the cause of the change have resulted in much discussion of a remedy for the trouble. Some think that too much water is used above the falls for power purposes. This is partially true but the basic trouble is that the water is gathering in a greater volume at the center of the river. By referring to old photographs and cuts, it may be readily seen that the present cascade on either side of the horseshoe is much smaller than it was a few decades ago.

Underlying the horseshoe falls is a soft strata of stone which is undergoing the process of erosion. From the basic laws of nature it is obvious that more erosion will take place. As this effect increases less water will pass over the outer edges and more will go over the center. Eventually the cascades will dry up. What started this trouble? Was it caused by the diversion of water?

We shall assume that a definite amount of water must go over the falls. It has always been a fact that the most water went over the center, as there is the channel. Since erosion varies directly as the volume of water passing over in any particular place, more water will continue to pass over the center and less over the sides. The result will be that the beautiful horseshoe will be replaced by a deep narrow gorge.

We shall now consider the remedy, from the standpoint of water diversion for power purposes. It is obvious that if water is taken out above the falls that less will pass over the cascades. Of course this must not be allowed. The solution of this problem seems to be channel deflectors.

The American or lesser falls, carries only five per cent of the total discharge of the Niagara River, yet it forms twenty-five per cent of the total scenic spectacle. Natural deflectors in the form of rocks and islands would distribute the water over the entire edge of the falls. This could be done in the Canadian channel and the result would be two-fold; it would make the falls more beautiful by the water's being distributed evenly instead of causing a deep channel at the center; and it would allow less water to run over the center which would cut down the erosion factor. One may ask how this has any bearing on water power. With the water deflectors more water could be diverted for power purposes and still the falls would retain its scenic value.

At the present time every available cubic foot of water is being utilized for the generation of electricity. The demand for electricity makes even this supply deficient. In view of the fast diminishing coal resources of the country this demand will always be greater than the supply unless more water can be utilized in the making of more electricity.

Although the Federal Power Commission, an international power plant regulating board, has full control of the situation, a loud enough cry from the people would undoubtedly cause action.

First of all, the people must be educated to the plans and made to realize that they are possible from an engineering standpoint, and not a passing dream. This is exactly what the Niagara Falls Power Company has decided. In order to give the people an idea of the plans, they have planned an object lesson for them in terms of a model of the falls.

This model is a reproduction of the falls to scale. The horizontal scale is 1 ft. = 100 ft. and the vertical scale is 1 ft.= 25 ft. This model was made by the use of charts, aerial photographs and past records. The water is allowed to flow over the falls in proportion to the actual flow in the river. The quantity of water passing over may be varied by increasing or decreasing the discharge through intakes located at positions relative to the present power plant intakes.

The two proposed methods of stream control can be tried out on this model. The first, weirs, which have been proposed by the U. S. Army Engineers are of convenient size and may be placed at any position relative to the channel. The second, islands, which were suggested by the Owen Victoria Niagara Falls Commission, can be placed in various positions for demonstration purposes. This model is at the disposal of any organization or commission that wishes to make use of it, to determine the most effective remedial plan. The Niagara Falls Power Company also gives demonstrations to visitors and tourists to show that the real trouble with the falls is not altogether due to the water diversion, and to show the effect upon the scenic value with remedial plans in effect even after more water is diverted.

Another proposed plan for an increase in power production is to take the water from the lower level of the Whirlpool Rapids and utilize the drop in the river bed for a distance down the river. It has been estimated that an additional 200,000 horse-power could be generated by this plan. The small amount of water used relative to the amount on hand would not distract appreciably from the appearance of the Whirlpool Rapids.

If the total head from Lake Erie to the lower rapids and the full flow of the Niagara River could be utilized, six million horsepower could be produced. At present the intention is not to make use of the entire flow of the river but much more water could be diverted without destroying the scenic value of the falls.

At present 56,000 cu. ft. per sec. of the 200,000 cu. ft. per sec. discharge of the river may be diverted for power purposes. This is the result of a treaty made in 1910, between the U. S. and Great Britain. Of this amount the U. S. gets 20,000 cu.

(Continued on Page 28)

NIAGARA FALLS PROJECT

(Continued from Page 10)

ft. per sec. and the Canadian side gets the remainder.

The 56,000 cu. ft. per sec. produces approximately 1,200,000 horsepower. It is believed and supported by experimental data on the model that 100,000 cu. ft. per sec. can be diverted for power generation and make the falls even more attractive than they are at the present time. This would mean a total generation of approximately 2,200,000 horsepower. There is without doubt some feasible plan available for increasing the economic value of this great natural resource, and it remains for the engineer to decide what plan is the most advisable to take advantage of this wealth of potential power that is now being wasted.

NOTE ON HOGS

"Do you think it healthy to keep your hogs in the house?" a social investigator asked.

"Waal, I dunno," was the reply. "But I been a-keeping' my hawgs there for 14 years and I ain't never lost one of 'em yet."