

submerged weir is built the level at the inlet to the canal will be 202.5, and the level at the power-house in the fore-bay will be elevation 201; whereas, under present conditions, the level would be 195. Consequently, there will be 6 feet additional head at the Massena power-house. Now since we have 6 feet greater head and are developing the same power, we will use correspondingly less water. So water that is now being diverted to Grasse river through the Massena power canal will be correspondingly diverted to the Big Sny and help raise the level at lock 21, particularly under low water conditions. The head at the power house will be increased about 6 feet. We now develop a maximum of 86,000 horse-power. If we increase the head, that reduces the quantity of water, because the higher the head the less quantity of water required."

On cross-examination, Mr. Rickey stated that the present head is in the neighbourhood of 35 feet, and admitted that with the additional head of 6 feet, 16,000 more horse-power could be obtained, provided, of course, more turbines were added.

It may be observed that the application does not call for, nor does the order of the Commission grant, any approval whatever of diversion of water from the St. Lawrence river through the power canal of the applicant. This is clearly shown by the final paragraph of the order. If the applicant has no right to divert water from the St. Lawrence river—and no evidence was made of any protest against the diversion which it has been making since a number of years, for the power canal was constructed and was in operation long before the Waterways Treaty—the order of the Commission gives it no such right. It will therefore be open to the state of New York or to any other interest to question this diversion. Under the order of approval adopted, no vested rights of diversion will be acquired by the applicant and no existing right to object to this diversion—if such right exists to-day—will be prejudicially affected.

ICE CONDITIONS IN THE SOUTH SAULT CHANNEL.

In his evidence Mr. Rickey fully explained what are the ice conditions in the South Sault channel at the present time. About the end of December, to use as much as possible his own language, ice jams start to form in the vicinity of Cornwall island and build up both channels. In severe winters these ice jams will continue following up the South Sault channel. In addition there is a different set of ice jams that are formed by ice coming down the main channel of the St. Lawrence river which divides into two parts, some of which will go between the northwesterly end of Croil island and the main shore through what is known as Farrans Point channel. The remainder of the ice goes through the main channel on the south side of Croil island. It there splits. Part of the ice will go down the Big Sny and into the main channel north of Long Sault island. The remainder will go down the South Sault channel on the south side of Long Sault island. When a strong northwesterly wind is blowing, substantially all of the ice of the river will be blown into the channel south of Croil island, and in such cases a very large part of the ice will be diverted into South Sault channel near Peppermill point, about one mile east of the intake of the power canal. Immediately below that point the channel widens out and is deep and the current slow. The ice is therefore not carried off as fast as it is brought into the channel and the ice jams begin to form in the vicinity of Peppermill point.

The way in which the proposed weir in connection with the dredging above will remedy these ice troubles was explained in detail by Mr. Rickey and by Mr. B. F. Groat, a hydraulic engineer of the Aluminum Company. Certain channels have been dredged out in the bed of the river and the wing dam, mentioned in the permit above described, will throw the surface currents across these channels, while the bottom of the channels will carry the water down that dredged channel underneath the surface currents so that it will be comparatively free of ice. The surface currents with the ice