THE NEW GRAND OPERA HOUSE, TORONTO.

The new and elegant Opera House now being erected by the Toronto Opera House Company for Mrs. Charlotte Morrison, under the direction of the celebrated Architect of the New York Academy of Music, Thomas R. Jackson, Esq., is situated on Adelaide Street, West of Yonge Street, the most central and desirable location in the city It has a front on Adelaide Street of ninety-one feet, and a depth of two hundred and eight feet, and is perfectly isolated from surrounding buildings by a street on the west and a lane on the east side. The principal entrance to the Opera House is on a level with the street, through a spacious corridor fifteen feet wide, fifty feet long, and fourteen feet high, to the main vestibule, twenty-four feet by sixty-five feet, and eighteen feet high, in which are the Box and Ticket Offices, stairs to Family Circle, etc. Beyond the vestibule is the inner lobby, from which access is had either to the Parquet or Balcony or by wide and easy stairs to the Dress Circle. The Auditorium is arranged with Parquet, containing 324 Orchestra stall chairs; Parquet Balcony, containing chairs; Dress Circle, containing 324 seats; Family Circle 270, and eight Private Boxes, with four chairs in each, making a seating capacity of 1,323, and campstool and standing room for 500 more, every one having a perfect view of the stage. The chairs in the Parquet and Balcony will be the latest improved folding-seat Opera chairs, upholstered with leather. The sofa seats in the Dress Circle will be upholstered with reps. There are also ladies' and gentlemen's cloak and hat rooms, crush-room, dressing rooms, etc. The Proscenium and Arch, of chaste and ornate design, will contain eight private boxes. The orchestra will be depressed below the floor, so as not to obstruct the view. The Stage, 53 by 65 feet, will be fitted up with all the latest improvements and equipped with a full stock of Scenery, Curtains, Properties and Appointments. For the necessary accompaniments of the Opera House and the accommodation of its attachés, there is a two-story building adjoining, in which are a spacious scene-room, property-room, green-room, dressing-rooms, Manager's and Treasurer's offices, etc., all above ground, with windows and entrances opening on a street, and fitted up in the most comfortable manner. The facilities for egress in case of fire have been fully provided by a fire escape, and four wide door-ways opening out of the side street and lane, and of such capacity that a full house with all its attendants can be emptied in two minutes. The entire building will be heated by steam at a low pressure from a safety boiler in a fire-proof cellar, outside of the main building; and ample provision will be made to guard against fire by placing on the stage two fire-plugs with hose ready for instant use, and fire extinguishers distributed through the building. The Auditorium will be brilliantly illuminated by a centre sun-light in the dome, chandeliers under galleries, and brackets on the walls, and lighted by electricity. The construction of the building is of the most substancial character, and the decorations and furnishing will be in the most artistic taste and style; and, taken as a whole it will be one of the finest Opera Houses on this continent.

WIRE-ROPE TOWING ON CANALS.

Towings on canals by the application of a submerged wire-rope and clip-drum has to contend with difficulties which are not, or at least to a much smaller degree, experienced on rivers of considerable depth, where the system, as on the Rhine, is in most successful operation, and has been for several years. The shallow draught, the crooked line of the water-course, the want of current, and the slow speed admissible on canals, affect the working of ordinary wire-rope tugs mainly in two ways—they reduce the steering power of the vessel to a minimum, and increase to an extreme degree the difficulties caused by the irregular tightness of the wire-rope, which in river towing can be sufficiently controlled by the steering power of the tugs. To make these points clearer we have shortly to recapitulate some of the main features of the present method of wire-rope towing.

The general arrangement of existing wire-rope tugs is the following:—The clip-drum, worked by the steam engine and suitable gear on board the vessel, is placed either horizontally on deck, or vertically on the side of the boat. In both cases the wire-rope is led along the same side by suitable guide-pulleys, and after taking half a turn round the periphery of the clip-drum is permitted to sink back again to the bottom of the river. This lateral disposition of the rope has invariably been adopted, although it offers very serious drawbacks for two reasons: It overcomes to a certain extent difficulties caused by slack rope, and it diminishes other difficulties referring to the steering of the vessel when the rope is too tight When nearing a curve the rope, which lay originally in the centre-line of the watercourse, is pulled by the tug towards the inside bank of the bend. A considerable amount of slack rope thus obtained has at such moments to pass rapidly through the machinery, and is deposited behind the tug in the bed of the river. Whilst passing over the tug this slack rope is liable to "kink," or otherwise to entangle itself, and it is only by guiding it perfectly in closed channels of a short length, and letting it sink down again into the water as soon as possible after it leaves the clip-drum, that constant and serious accidents can be avoided. For this reason alone it is highly desirable to get rid of the rope behind the clip-drum at once, which can be done conveniently by the lateral disposition above referred to, whilst it would be impossible if the rope were led over the deck along the centre-line.

But the question becomes of still greater importance with regard to the steering power of the boat. The steering of a wire-rope tug is evidently an entirely different thing from the steering of a paddle or screw steamer, quite independently of the fact that the wire-rope tug, between certain limits, is absolutely fixed to the line indicated by the position of the rope In an ordinary steamer the propelling power acts always in the direction of the keel. In the wire-rope tug it is independent of the direction given to the keel, and acts in the direction of the wire-rope. If a screw steamer is turning at any angle to its original course, it readily and without difficulty proceeds in the new direction given to the centre-line of the vessel A wire-rope tug will always show a tendency to follow the direction of the wire rope by which it is pulled. It will, to a certain extent, move broadside on, instead of straight in the direction of its keel.

The steering arrangements of a wire-rope tug must therefore contend with two distinct elements. They must give to the tug sufficient "turning power"—*i.e.*, the power of turning the vessel readily, so as to place its centre line at any reasonable angle to the direction of the pulling rope; at the same time the tug must also possess a sufficient degree of "staying power"—*i.e.*, the power of maintaining the course indicated by the direction given to the keel, without proceeding broadside on, or, as sailors would say, making lee-way.

Now there are two points which evidently influence the turning power of the tug most materially, viz., the original tightness of the rope, or, more correctly, the tightness of the back rope, and the length of rope to which the tug is rigidly bound—a length which is measured by the distance, in the direction of the keel-line, from the first to the last guide pulley. If this line could be reduced to a point, it is clear that even with an absolutely rigid rope the tug could be turned readily at any angle to it. Practically the turning power of the boat will be in proportion greater, the slacker the back rope and the shorter this line is. This, then, was the second reason for guiding the rope along the side of the vessel. If led over the centre of the deck, the line from the first to the last guide pulley becomes very long, whilst laterally disposed it can be reduced to a minimum, thus materially reducing the resistance against turning and steering the vessel. On the other side there are very serious inconveniences only partially removed by this arrangement and others directly aggravated, by it, which we can only mention here. The lateral disposition of the clip-drum and guide pulleys necessitates very considerable weights to be carried on the side and even overhanging the side of the vessel. The machinery thus projecting is in frequent danger of being knocked to pieces by passing boats, and requires powerful and heavy guards. All this made it practically impossible to build tugs of less than about 3ft. draught —a draught which on really shallow, though navigable rivers and canals, cannot frequently be obtained. Further, the tugs cannot and do not steer equally well towards both sides of the rope, having a tendency to turn less readily to the side on which the rope is attached than to the opposite one. The staying power remains as much as ever impaired as soon as the hind rope becomes tight, whilst when it is slack there remains the danger of kinks forming even at the bottom of the watercourse after it leaves the boat.