

HER MAJESTY'S THEATRE AND GRAND OPERA HOUSE, SYDNEY.

THE ceremony of laying the foundation stone of Her Majesty's Theatre and Grand Opera House, at Sydney, was performed by his Worship the Mayor (Mr. Thomas Playfair), at noon on January 27th. The building is to occupy a site immediately opposite the establishment of Messrs. Farmer & Co., and at the north-eastern corner of Pitt and Market Streets. The land has a frontage of 102 ft. to Pitt Street, by a depth of 167 ft., the width increasing at the rear to 125 ft. There is a frontage to Market Street, of 29 ft. The main entrance to the theatre will be in Pitt Street. The most has been made of this valuable site by devoting the frontage in Pitt and Market Streets to hotel accommodation, separated entirely from the theatre by thick walls and fireproof floors and ceilings in the vestibule and passages which give access to the theatre from the streets. The hotel (the plans of which have been approved of by the Licensing Board) will contain 100 rooms, distributed over seven storeys, accessible by wide staircases and an hydraulic elevator.

In the design of the theatre the details of construction have been particularly studied to secure the comfort and safety of the public, and the arrangements, by affording facilities of access on three sides to all parts of the building, from one of the necessary features of the structure. The dangers of fire will be considerably lessened by the use of brickwork, concrete, iron work, and non-combustible materials where practicable, instead of timber. The stage will be separated from the auditorium by a thick wall, the proscenium opening being protected by an asbestos fireproof dropcurtain, and all others openings protected by iron doors made to close automatically. The principal entrance to the theatre will be by a vestibule 57 ft. by 38 ft., opening into Pitt Street by three doors, each 9 ft. wide. This vestibule will give access to every part of the auditorium, which may also be reached by numerous fireproof staircases and passages, opening into the side lanes and Market Street. On entering the vestibule the staircases will be so distinctly visible that, it is asserted, no confusion can exist by their being used for ingress or egress. Visitors will know at once which way to turn their steps, according to the portion of the auditorium they wish to occupy, thus obviating all unnecessary hurry. Staircases for the public will lead from the lanes and from Market Street to all parts of the auditorium. These staircases will be separate, straight, and direct from each storey, and will be constructed in concrete arches between solid walls. Other staircases will give access to the orchestra, and to either side of the stage. The total area of stairs and passages to the auditorium will be over 4,500 square feet, and the width of egress 110 ft. The area of passages inside the auditorium will be over 4,000 square feet, and the area of the vestibule, degagement and ground-floor passages will be 3,239 square feet. The auditorium is intended to contain only 1,400 seats, although sufficient area will be provided for 2,000 sittings. Consequently the passages inside the auditorium will be of sufficient size to contain the whole of the audience when on their way out, with standing room equal to 2.86 square feet per person. In addition to this the area of the stairs leading from the auditorium to the ground floor will give standing room equal to the 3.25 square feet per person; and the area of vestibule and passages on the ground floor standing room equal to 2.3 square feet per person. From these actual measurements it will be seen that there is provided in the stairs, passages, and vestibule standing room equal to 8.4 square feet for each person. Comparing the widths of exit on the ground floor with the number of the audience, the building is calculated for 12.59 persons for every foot of width of exit. It is stated that of 40 of the best theatres in the world only three have better means of ingress and egress. Regarding internal arrangements, the stage is to be of large dimension, namely, 84 ft. wide and 50 ft. deep, and measuring in height 109 ft. from the basement to the roof, in which will be placed a grid to work the machinery. All the most modern appliances are provided for in that part of the building to ensure admirable order. Eighteen dressing rooms, artists' rooms, and other conveniences are to be provided, and will communicate with the stage by separate staircases, and iron-lined doors. These rooms are to be furnished with the most improved sanitary arrangements. All the machinery of the stage is to be supported by massive iron girders, and the whole of the roof trusses will also be of iron. The auditorium will consist of stalls, dress-circle, amphitheatre, and gallery, each of the storeys having separate means of access, with crush and retiring rooms for

ladies and for gentlemen. Provision has been made for 18 private boxes. The whole of the framing within the walls of the auditorium is to be of iron, and the ornamentation work covering the walls, ceilings, and balustrades is to be of papier-mache, lino relief, fibrous plaster, and other non-combustible materials. The comfort of the audience will be secured by luxurious seats, richly-carpeted floors, and ample space and ventilation. The lighting is to be effected by four different services—one for the stage, another for the dressing rooms, a third for the auditorium, and the other for the passages. Provision has also been made for lighting the auditorium and stage by electric light. The system of ventilation adopted will reach every part of the house, the fresh air being washed and cooled by water-spray before being introduced into the auditorium. Outlets are to be provided in such a manner that the fresh air forced into the building will not cause any draught or unpleasant sensation to those sitting near the doors. The apparatus is calculated to introduce 30,000 cubic feet of fresh air per hour into the auditorium, which is more than 20 cubic feet per person. To prevent this enormous quantity of air from rushing through the proscenium when the curtain is raised, some of the ventilating pipes are connected with the stage to equalized the temperature; the whole of the ventilation is to be regulated by throttle valves in a large ventilating shaft passing through the roof. This shaft will also be provided with an apparatus to exhaust the vitiated air. The most important features of the design are the precautions taken against fire, or the panic which generally follows an alarm of fire. The staircases and passages being made fireproof, and each floor of the auditorium having four separate staircases (two of which are direct) the audience will be able to disperse from each part separately, without crushing to the same outlet. Water will be stored in a number of tanks in the roof, and 14 fire-cocks, with hoses and nozzles, will be placed in the auditorium and on the stage. Where the use of timber or other inflammable material is indispensable on the stage, it is to be coated with asbestos fireproof paint. It is understood that the building will cost between £50,000 and £60,000. Mr. G. A. Morell, C.E., is the architect, and Mr. W. H. Jennings the contractor.

TORPEDOES OF THE AUSTRIAN NAVY.

At the time of the Austro-Italian war, in 1866, the Austrian Government made great efforts to put its ports in a state of defense against attacks of the Italian fleet. Torpedoes in large numbers were sunk, and all the commandants of these places were ordered to exercise the greatest vigilance.

The torpedoes were placed in several concentric lines, and were sunk to such a depth below the level of the water that at the surface no signs of their presence could be discovered. Each of them was connected by a wire with a post of observation situated at a sufficiently high point on the coast to allow the port to be well seen. The operating-room was dark, and in the wall a lens was fixed facing the port. The luminous rays from the exterior traversing this became refracted and passed into a prism which directed them upon a plate of ground glass lying horizontally upon a table in the center of the room.

According to the well-known laws of optics, an image of the port is thus formed upon the glass. Black points marked upon this image indicate the exact site of each torpedo, and all these points bear numbers that are reproduced upon the keys of a key-board. It is only necessary to press one of the keys with the finger to put the corresponding torpedo in connection with an electric battery, through the intermedium of the wire that connects it with the port, and to cause it to explode. One employee of the telegraph never takes his eyes off the glass upon which the faithful image of the port is reproduced. No detail, no movement, escapes him. If a ship of the enemy attempts to approach, its image appears upon the glass, and, at the moment it passes over a point indicated upon the latter, a simple touch of the key corresponding thereto causes an explosion and destroys the vessel. These torpedoes are sunk to a sufficient depth to allow ships of the port to move around without having anything to fear. It is probable that it was due to a knowledge of the danger that the Italian fleet would have experienced in attacking the Austrian ports that the latter were protected against all surprises. Arrangements analogous to those just described are now adopted by most of the navies of Europe.—*Ec.*