The Tasmanian Exhibition of 1894-1895.

Far in the antipodes, in Hobart, Tasmania, under the auspices of the Tasmanian government, is to be opened an international exhibition of arts and industries. The colony of Tasmania has a population of 150,000, and the neighboring colonies contributing to the affair make a total of over 4,000,000 of inhabitants. The site for the buildings, about eleven acres in extent, has been granted by the government.

The period for the exhibition comprises the Tasmanian summer, some six months, from November, 1894, being chosen. The ground plan of the buildings shows an irregular triangle, containing one main building with a long exhibition building, forming a perimeter for the triangle, and with two cross buildings running across it at right angles to each other. The entire arrangement is novel and apparently excellently well adapted for an exhibition whose purpose is to exhibit things, and not to form a world's playground.

After the great Chicago Fair everything of this nature seems dwarfed. But placed under a powerful and influential directorate, with the full sanction of the colonial government and with a simple and easily understood code of regulations already in official print, there is every reason to believe that the dwellers on the other side of the line will make their exhibition a grand success. One hundred and fifty-six classes, in twenty-four groups, are organized as the division of exhibits.

The idea is to make the occasion of direct utility for those desiring to purchase supplies. It seems obvious that for the manufacturers of the United States an excellent opportunity is afforded to extend their market by exhibiting their products here. A small charge for space is made, and the rules affecting exhibitors seem excellently conceived and well designed to secure fairness and satisfaction.

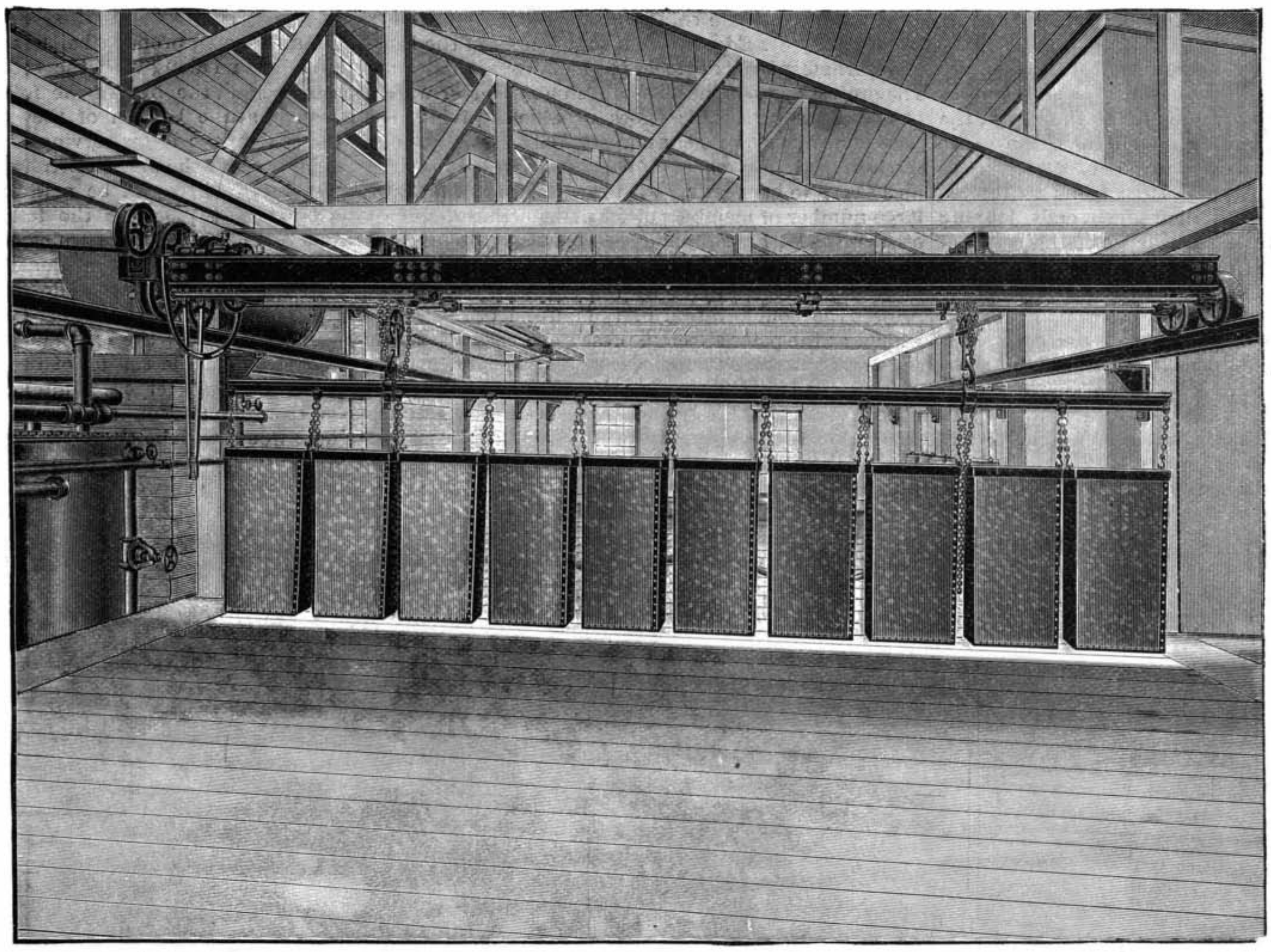
The firm of Woltmann, Keith & Co., No. 11 Wall Street, New York, represent the exhibition, and intending exhibitors should apply to them for full details and particulars.

A NEEDLE passes through eighty operations before it is perfectly made.

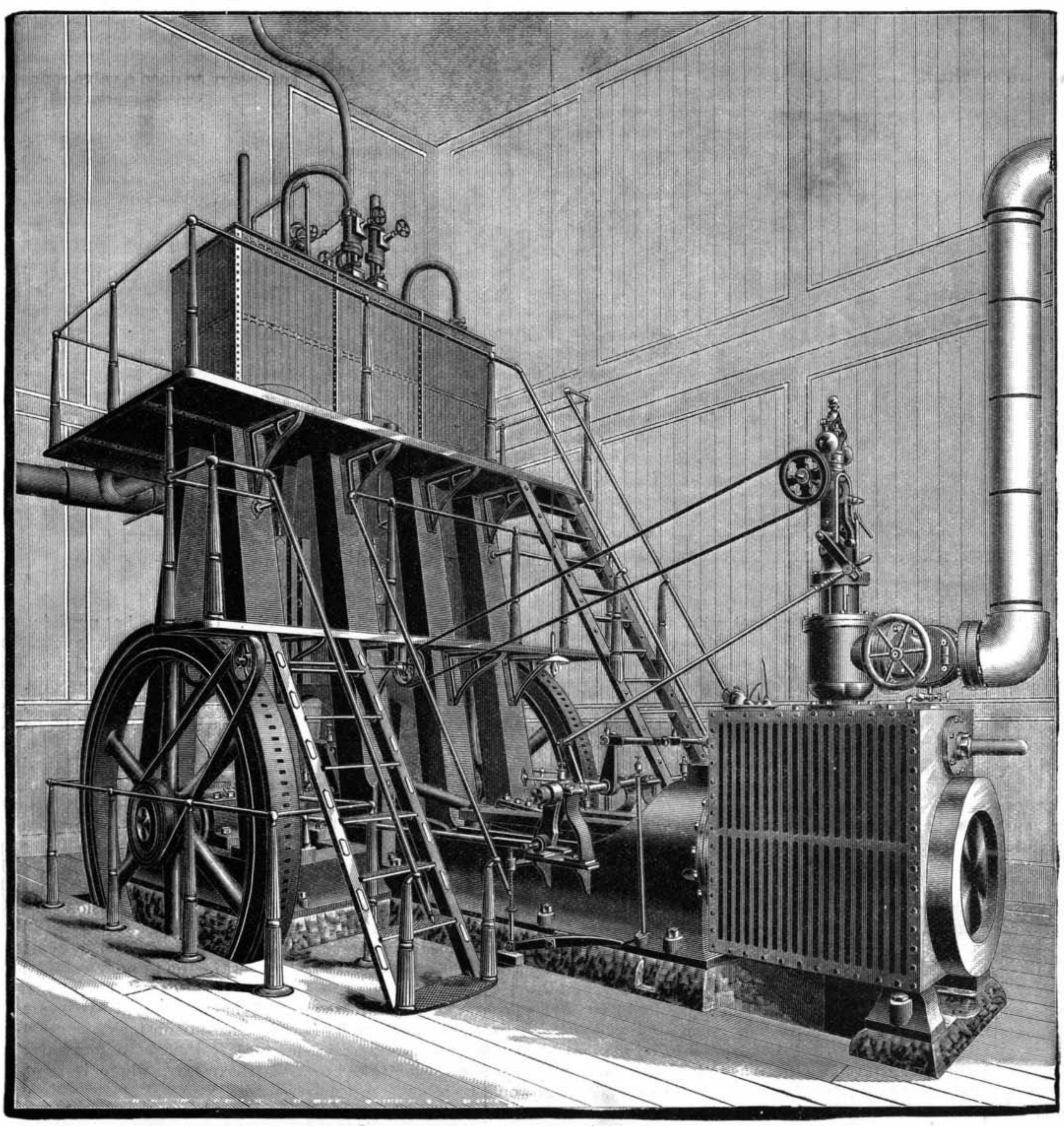
A LARGE PHILADELPHIA ICE MAKING PLANT.

The Knickerbocker Ice Company, of Philadelphia, for many years engaged in the business of harvesting, delivering, and shipping ice, and owning large houses on the Hudson River and in Maine for the storage of naturally frozen ice, has recently established in Philadelphia a large plant for making ice artificially. The company had previously taken up the production of artificial ice, having had several plants therefor in continuous operation for sufficient length of time to make it certain that the business had passed the experimental stage; but this new establishment is the largest and most important of them all, having a capacity of sixty tons of ice daily. The company has sought to make this plant a model one for the production of artificial ice, sparing no expense in obtaining the best mechanical contrivances and facilities, that the cost of manufacture might thereby be reduced to a minimum. The work was executed by the York Manufacturing Company, Limited, of York, Pa., under the direction of Mr. Stuart St. Clair, of that company.

The compressor of this plant, shown in one of our illustrations, is the St. Clair compound, having two low pressure or evacuating cylinders 18 by 30 inches, vertical and single acting. The duty of these cylinders is simply that of evacuation and compressing at low tension, maintaining nearly a constant temperature in the cylinders, thereby saving the large percentage of loss that accrues from highly heated cylinder walls. These low pressure cylinders and the receiver of same are water jacketed. The high pressure or delivery cylinder is 15 by 30 inches, and its duty is to simply deliver the partially compressed gas to the condenser. This cylinder works under nearly constant temperature, and is also water jacketed, the temperature of the gas at no point in the delivery ranging



SIXTY-TON ICE MAKING PLANT PHILADELPHIA—POWER CRANE IN POSITION HOISTING 3000 POUNDS OF ICE.



SIXTY-TON ICE MAKING PLANT, PHILADELPHIA—THE ST. CLAIR COMPOUND COMPRESSOR.

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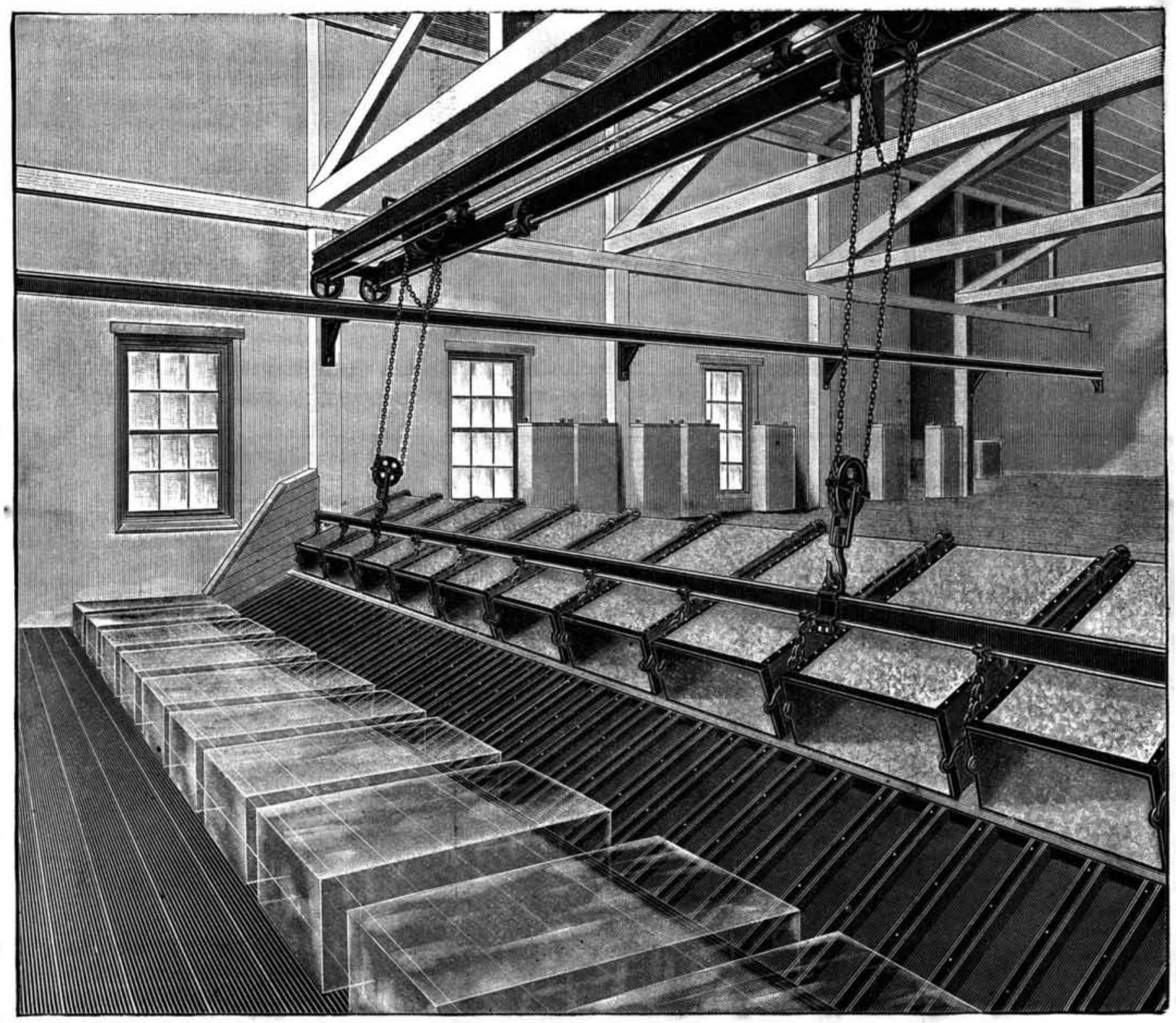
higher than 130° Fah. The compressor pumps are operated by one of the York Manufacturing Company's balanced valve engines, 26½×30 inches, controlled by a cut-off governor of their own make. The claim made for the efficiency of these engines is very high. The engine and ammonia pumps are operated without any internal lubrication whatever, and, it is said, without any increased friction, demonstrated by careful tests.

The power crane for raising and transferring the ice cans, delivering the ice where desired for storage, is a great labor saver. As shown in one of the views, the crane raises at one lift ten 300 pound cans, the crane being then moved with its load to where the ice is to be stored, when the cans are lowered so as to rest in an inclined position, with their open ends looking down the slide ready for the discharge of the cakes of ice to the dumping platform. In lowering the cans they are dropped between a series of perforated pipes, from which, when the cans are in position, hot water is ejected to sprinkle the surface of the cans, thus liberating and discharging the cakes upon the platform in the manner shown. By this means it is said that one man can easily harvest and put away in storage thirty tons in his twelve hours' watch. Three men on each watch is the total crew required to operate the system at this factory. For our illustrations and particulars as to this plant we are indebted to *Ice and Refrigeration*.



SIXTY-TON ICE MAKING PLANT, PHILADELPHIA—POWER CRANE IN POSITION AT DUMPING PLATFORM DISCHARGING 3,000 POUNDS OF ICE.

Petroleum Briquettes.

The method of making fuel bricks of crude petroleum adopted by Engineer Maestracci, of the Italian navy, is as follows: The bricks are of similar form and size to the coal briquettes extensively used in France and Germany. The mixture is made in the proportion of 1 liter of petroleum, 10 per cent of resin, 150 grammes of powdered soap, and 333 grammes of caustic soda. The mixture is heated and stirred at the same time; solidification begins in about 10 minutes, and the operation must then be carefully watched. If there is a tendency to remain liquid, a little more soda is added. The mixture is stirred until the mass becomes nearly solid. The thin paste is then poured into the moulds, which are placed for 10 or 15 minutes in a drying stove. The briquettes are then cooled, and are ready for use in a few hours.

Signor Maestracci recommends the addition of 20 per cent of wood sawdust and 20 per cent of clay or sand, which will make the briquettes cheaper and more solid. In trials made at Marseilles on several tug boats the petroleum briquettes furnished about three times as much heat as coal briquettes of the same size. They were burned in the ordinary boiler furnace, without any special preparation, and gave out very little smoke, leaving also little or no ash. The advantages claimed for the petroleum briquettes for marine use are the absence of smoke and a large reduction in bulk of fuel which must be carried, as compared with coal, while the risks attending the carrying of liquid fuel are avoided.

THE tunnel which carries the Colorado Midland Railway through the Rocky Mountains, at Hagerman Pass, Col., has just been completed. The tunnel is close upon two miles long, and it is bored through solid gray granite. Its completion involved three years and twenty days' work, each day comprising twenty working hours. The tunnel is 10,890 feet above the sea level.

A Projected Tubular Railway between Calais and Dover.

There is at the present moment a question of a new project having for its object the connection of the European continent with England by railway. It is a problem that has for a long time attracted the attention of engineers and for which many solutions have been proposed. The solution under consideration is proposed by Sir Edward Reed, a member of the English Parliament and engineer in chief of the Admiralty. His project consists in the establishment, under water, of one or more metallic tubes capable of giving passage to a railway, and thus avoiding the principal objections that his predecessors have encountered. The idea seems to be meeting with favor in England and a large number of members of Parliament, hostile to all other projects, have pronounced themselves partisans of the tube.

Sir Edward Reed gives as the *raison d'etre* of his project the configuration of the bottom of the strait, which, at the place selected, presents a relatively plane surface, or, at all events, exceedingly gentle slopes. The tubular line would start from a point of the French coast situated to the south of Cape Gris-Nez, would pass to the northeast of the shelf of the Varne, which it would entirely avoid, and would end at the English coast between Folkestone and Dover, to connect with the Southeastern and London-Chatham-Dover lines. In following this general direction the bottom is found at depths much less than might be expected. The greatest depths are found at about a third of the distance between France and England, where they reach 185 feet. The greatest difference of level between any two of sixteen consecutive soundings a mile apart on the direction line is about 39 feet, which for a length of a nautical mile corresponds to a slope of scarcely 0·08 inch to the foot.

Sir Edward proposes the adoption of a double-walled tube of iron or steel plate. The annular space would be strengthened by a series of longitudinal I-girders, and then filled in with beton of Portland cement. Such a tube under conditions of resistance easy to determine by calculation would be perfectly tight and offer guarantees of almost indefinite duration. As for the putting of it in place, that is a subject that has received special study, and the method proposed forms the most original part of the project. It is proposed to construct the tube in sections of 300 feet, each of which would be hermetically closed at the two ends, so as to be capable of floating and of being towed to the place of submersion. It would be attached by one of its extremities to a huge caisson designed to form at the bottom of the water a very low pier for its support. It is clear that if we have a floating tube, and that by any means whatever we force one of its extremities to descend to the bottom of the water, the other extremity will emerge, the tube as a whole taking an inclined direction. That is precisely what occurs here. The tubular section is brought near the emerging extremity of the section that has preceded it. The floating caisson is attached to it by means of large hinges, and, after being properly ballasted, is made to descend to the bottom along with the second extremity of the first tube and the first of the following. The tube is thus laid at the bottom of the water section by section, each of the latter serving as a guide to the following. After the first section has been properly laid and directed there can be neither error nor difficulty in putting in place all the following, which adjust themselves in a line in the prolongation of one another. As for the forming of the final joints under water, there are numerous ways of doing that.

In order to resist the transverse stresses that may occur when one of the extremities of the tubular section remains at the surface of the water, Sir Edward proposes to submerge simultaneously two tubes 70 feet distant and connected by metallic crosspieces. There would thus be obtained a sort of huge horizontal girder, of which the two tubes would form the chords, and which would present sufficient rigidity to resist all the stresses due to the motion of the water. Each of these tubes would contain but one railway track, designed for the running of trains in a single direction.

Finally we have seen that the tube would be supported by very low submarine piers. It appears preferable, in fact, not to allow them to rest upon the sea bottom. There is assured in the first place a free circulation of the currents above and below, and, in the second place, the laying is greatly facilitated without recourse to submarine dredging, since it is possible to regulate the height of the piers in such a way as to avoid all unevennesses and the slight changes of level of the bottom. As the tube is held at the bottom by the weight of the piers only, it is submitted to upward stresses that may be regulated at will by properly calculating its own weight. It would be possible, even, to completely annul such stresses by giving the submerged tube an ascensional force equal to the weight of a train upon a section. At all events, the projector anticipates that the tube in service will be submitted to stresses that are notably less than in any existing bridge.

As for the ventilation, that will be assured by the fact of the trains always running in the same direction in each tube. They will thus act like huge pistons, forcing the more or less vitiated air before them and sucking in a new column of pure air. There is nothing in the way, however, of having recourse to artificial ventilation, which could be easily established. Electric propulsion would naturally be employed.

According to the calculations of Sir Edward, the total cost of the tubular railway ought not to exceed 375 millions at a maximum, and the construction of it might be effected in five years. Navigation would experience no obstacle, since the tube would be at least 65 feet beneath low water at a short distance from the coasts, where it is very easy to establish beacons.

In case of war, there would be numerous means of inundating the tubes immediately.

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