

THE ROTUNDA FOR THE VIENNA EXHIBITION.

We have already given some particulars and an illustration of the building erected for the Vienna Exhibition. Let us add a few statements made by the correspondent of the *Journal of the Franklin Institute* :—

Accurately stated, the exterior diameter of the Rotunda is 107.83 metres, and its height 84.1 metres. A rounded roof, supported upon thirty-one iron columns, 24.35 metres high, rises, with an angle of 31°, to a height of 48.2 metres, and is terminated by a central ring of 30.9 metres diameter. The exterior of the roof is covered smoothly with sheet metal, and, viewed from below, has the appearance of a smooth truncated cone. Upon this conical roof is placed a so-called observatory, composed, like the rest of the structure, entirely of iron, the outer diameter of which is 32.4 metres, and the height 10 metres. Upon this, finally, there is placed another building, 8 metres in diameter, and 18.5 metres high, which terminates in a crown, whose highest point is 84.1 metres above the flooring below.

At a height of 23 metres in the interior of the Rotunda there is placed a gallery, directly against the pillars, having a breadth of 142 metres. This may be reached by two stairways, on opposite sides of the Rotunda, or by two elevators, introduced for the purpose.

The entire space covered by the Rotunda measures 338.8 metres in circumference, and the surface covered by the roof measures 9,405 square metres, the interior circumference is 319.6 metres, and the space available for the purposes of the Exhibition and accommodation of the visitors is 8,129 square metres.

To give an idea of the forces operating upon the various portions of this structure, a few data are attached.

The vertical pressure upon one of the iron columns of the Rotunda=109 tons. Pressure on the lower portions of the radial rafters=211 tons; horizontal strain on same=181 tons. Tangential strain on the lower roof ring=863 tons. Pressure on the upper ring, upon which the observatory rests=217 tons. The total weight of the structure of the Rotunda may be stated in round numbers at 80,000 hundred-weight (Zoll centner), or about 4,000 tons. The pillars rest upon *béton* foundations, which were prepared for this purpose as early as October 30th, 1871.

LAKE SUPERIOR MINES.—The statement has frequently been made that the shipments of iron ore from the Lake Superior mines this year will reach enormous figures. According to estimates made last fall 800,000 tons were to be shipped from Escanaba alone, and adding the probable shipments from Marquette and L'Anse, and possibly from Ashland, the grand total of shipments from the Lake Superior mines this year were to reach nearly, if not quite, 1,500,000 tons, against about 900,000 tons last year. It is now said, however, that present prospects do not warrant any such conclusion. The iron markets are falling, and it is expected that the demand for iron must decrease, and prices decline, being far in advance of those the iron manufacturers are willing to pay. Of the whole prospective product there have been but about 300,000 tons entered upon as sold at "the market price." In order to get out anything like the amount of ore estimated last fall to be shipped this year, a heavy force in the mines would be required; but mines in work are run very light, the owners not being willing to take the risks of the market. From this it is inferred that the estimated product for this year is too high, and that in reality it will not be very much in excess of last year.

RAILWAY MATTERS.

CAR WHEELS AND AXLES.—It is stated that 104 patents have been granted in this country upon car axles and wheels having the idea in view, of making car wheels to run independently, as in turning a curve.

SUTRO TUNNEL.—The *Territorial Enterprise* of the 11th says: It was yesterday reported that Adolph Sutro had succeeded in negotiating in Europe a loan of \$3,000,000 for the Sutro Tunnel Company. What foundations there may be for the report we are unable to say.

The railroad tunnel at Baltimore, which is to unite the roads on the north and south sides of the city, is to be completed before the end of June, and, until the completion of the Broadway Underground Railway in New York, will form the largest underground railroad possessed by any city in America.

AUTOMATIC RAILWAY COUPLINGS.—In reference to the premiums proposed to be offered by the Association of German Railway Companies for the best system of Automatic Couplings for Railway Carriages, we understand that the full details and arrangements are not as yet definitively decided upon; but in the course of a few weeks the particulars will be made known by the *Geschäftsführeren Direction Deutscher Eisenbahn Verwaltungen* at Berlin.

FIRELESS LOCOMOTIVE.—Dr. Lamm's "fireless locomotive" has been introduced to the inhabitants of Brooklyn. The machine consists of a thickly-clothed and strong reservoir and a small steam-engine. Into the reservoir, water, at a very high temperature, is forced from a stationary boiler, and sufficient steam is thus obtained to propel an ordinary car at twelve miles an hour. During the first half of the journey this pressure fell to 90lbs., but decreased less rapidly in the second half, when the gauge showed 65lbs. at the termination of the six miles. The journey appears to be continuous.

The importance of railroads in the development of the resources of the American States may be estimated from the fact that the cost of transporting Indian corn or wheat over an ordinary highway is about twenty cents per ton per mile, while those cereals may be moved upon railroads at one and one-fourth per cent. per mile.

It is expected that in a few years Germany will equal, if not surpass, England in her resources. She is now constructing a new network of strategical railway, which will extend in extent four thousand kilometres. The backward state of France has occasioned some natural annoyance, and the French press urge the importance of making some vigorous efforts to make up for past deficiencies. They point out that the General Councils have given a veritable *pronunciamento* in favour of multiplying the railways. If she cannot do better, they trust that France will prove sufficiently ambitious to raise herself to the level of Switzerland and Denmark in the statistics of railways.

CONSTANTINOPLE TRAMWAYS.—The report of the directors of the Constantinople Tramways Company for 1872, states that the company's four original lines of tramways were in full work eight months before the period stipulated. There are 16,000 metres of tramway, and 5,390 metres of omnibus lines at present worked by the company, or rather over 13 miles in all. These lines were served last year by 64 vehicles. The number of passengers conveyed last year was 5,035,042, who paid 6,545,597 piastres. The present number of passengers ranges from 125,000 to 130,000 per week, and this number, it is expected, will increase when the fine season sets in to from 180,000 to 200,000. The company's staff consists of 431 persons, exclusive of fore-runners. The return realised upon the shares last year was at the rate of 6 per cent. per annum.

A REPORTER of the Hartford, U. S., *Daily Times*, thus describes Smith's vacuum brake, which is in use on the road between that city and New Haven: "The apparatus is simply an air ejector placed in the cab of the locomotive, which is connected by pipes and hose to a flexible air chamber, similar in construction to an accordion, and this is connected to the brake rod underneath each car. The engineer, by opening a steam valve, produces a vacuum in the ejector, causing the expulsion of air from the flexible air chamber, bringing the heads of the air chamber together, which movement contracts or shortens the brake rod and applies the brake. The moment the engineer opens the air valve, the pressure is instantaneously relieved. The pressure is applied externally and gradually, and is applied to the rear car first. This obviates the breaking of couplings and hose; and the jerking, unpleasant motion of the cars that accompanies the usual method of applying the brakes is done away with. Another advantage is, that when the vacuum is produced it draws the hose coupling and joints together, while other power brakes, operated by inward pressure, strain and open the couplings and joints.