

to carry one hundred passengers each, while the cars of the Otis elevators carry only fifty each, but their speed is double that of the others. The top lift, a vertical distance of 493 feet, is made by elevators on the Edoux system, in which the carriage is worked by an enormous piston. Those who go above this distance to the lantern will have to climb a spiral staircase.

The total height of the tower is 984.24 feet, or 300 meters, but the inclined or curved part of the legs considerably increases the length of travel of the elevators in these portions, a vertical height therein of 372 feet making an actual length of the curved part of 493 feet. The angle of inclination in this portion varies from 54 degrees at the start to about 80 degrees at the finish, but the carriages are so hung as to always accommodate themselves to the varying angle, so that their floors will be kept even. The steps leading to the different landing places are made to fold up when the car is traveling.

The great hydraulic cylinder of the Otis elevator, which is placed in the foot of the tower, perpendicularly to the cross pieces, is 38 inches in diameter and 41 feet long, while the circulating pipe, valve, and water chest are all 9 inches in diameter. In this cylinder is a piston fed with water from reservoirs placed on the stage where the vertical portion of the tower commences, or at a vertical height of 372 feet above the lower end of the cylinder. The piston rod operates on a carriage bearing guide wheels and multiplying pulleys, cables thence connecting with stationary multiplying pulleys, and the carriage being suspended by six ropes of steel wire. One of these ropes alone is designed to have sufficient strength to bear the carriage full of passengers without breaking. The carriage is partly counterbalanced, and rises or falls twelve feet for one foot movement of the piston. Under the cabin is a safety brake, with the jaws working automatically in case of rupture or of the elongation of one of the ropes.

THE EIFFEL TOWER.

One of the most notable objects of this year's exposition in Paris will certainly be the Eiffel tower, named for the constructor Eiffel, and finished March 31. The reader knows that this immense and bolt iron structure, which is 984 feet high, is by far the highest building in the world. In the accompanying illustration we show the Eiffel tower in connection with some of the highest structures of the world, all being drawn on the same scale. Only by such a comparison as is made possible by this cut can one realize the size of this new wonder of the world.

The highest structures of ancient times are the pyramids of old Egypt, the highest and best preserved of which are the pyramid of Cheops, near Ghizeh (450 feet high), and that of Chephren (448 feet high). Both of these are less than half as high as the Eiffel tower. Heretofore the highest building in Europe was the Cologne cathedral (about 523 feet high), and the highest in America the Washington monument (about 555 feet high). Both are greatly surpassed in height by the Eiffel tower.

To give the reader an idea of the comparative heights of the Eiffel tower and the buildings nearest it, we have shown in the picture a few of the highest structures in Paris, viz., Notre Dame (223 feet high), the dome of the Pantheon (272 feet high), and the Column Vendome (144 feet high).—*Illustrirte Zeitung.*

THE UNIVERSAL EXPOSITION OF 1889.

Without having seen it for one's self, it would be impossible to imagine the amount of work that has been done in two years at the Esplanade des Invalides and Champ de Mars, which are connected by a covered gallery on the bank of the Seine. The Universal Exposition of 1889 will be the greatest and the most imposing manifestation of human industry that has ever been carried out up to the present. The entire world will

offices and telegraphs; further on there are other structures designed for the exhibition of the Dutch Indies and of the islands of Java and Sumatra; then come the pavilions belonging to the sections of the French colonies—Cambodia, Annam, Cochin China and Tonkin, etc.

On the Invalides side, we may mention the large building of the panorama of Paris and, at the other extremity, the gastronomic pavilion. And now let us leave this spot, already so well filled, in order to cast a glance over the Champ de Mars.

Among the structures of the Champ de Mars, two will be especially beautiful. We mean the machinery palace and the 300 meter tower, the effect of the latter of which is absolutely grand and majestic. The machinery palace is entirely finished, as far as the architectural part properly so called is concerned. The supports for the shafting are placed upon their beton foundations, and some days ago a beginning was made toward moving in the host of machines which are to animate this immense structure, the largest that has been built up to the present, and which does honor to its engineers, its architects, and its decorators.

At the right of the Champ de Mars rises the palace of liberal arts, and, to the left, the palace of fine arts. Twenty years ago, either of these structures would alone have nearly sufficed to contain a universal exposition. Between

the two palaces are laid out gardens that are to be illuminated at night with floods of electric light, and in the center of which luminous fountains will play. A little beyond these two palaces are the pavilions of the city of Paris, where the visitor will enter the galleries of the various groups by passing under a central dome of very majestic proportions.

In front of the Champ de Mars, the Eiffel tower, placed upon its four iron pillars, forms the arch of triumph of science and industry. Its aspect, now that it is finished to its definite height, can be judged of and appreciated. Its early detractors are mute, and the approbation of engineers and artists is unanimous. When regarded from a distance, the 300 meter tower appears graceful, slender, and light. It rises toward the heavens like a delicate lattice work of wires, and, as a whole, it is all full of poesy. When it is approached, the structure becomes monumental, and

when the base of the colossus is reached, the spectator gazes with admiration and meditation at this enormous mass, assembled with mathematical precision, and forming one of the boldest works that the art of the engineer has ever dared to undertake. This surprise increases when he ascends the staircases of the tower. Before reaching the first story, he traverses forests of iron uprights, which offer fantastic entanglements; then, in measure as he ascends, he is astonished at once at the immensity of the structure, its apparent lightness, and the splendor of the panorama that it permits of contemplating. Apart from the undoubted interest that attaches to the Eiffel tower, as much from the standpoint of its metallic structure as from that of its height, we can now no longer deny that the gigantic work is absolutely beautiful.

Sunday, March 31, while descending the tower stairs after the ceremony of placing the flag upon the summit of the cupola, we had the pleasure of hearing one of our most distinguished members of the Academy of Sciences exclaim that this iron monument was

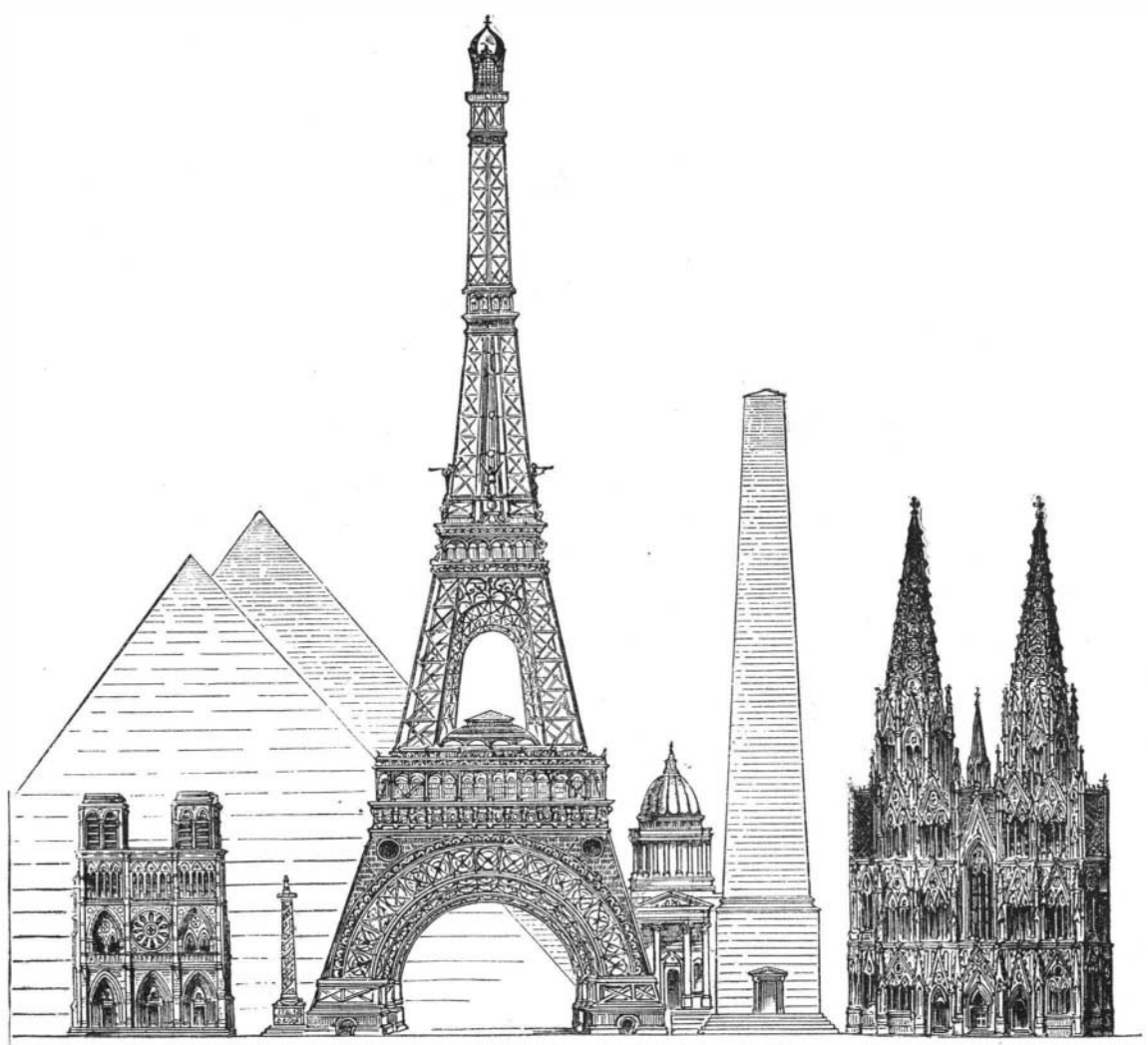


ASPECT OF THE EIFFEL TOWER AT A DISTANCE OF TWO MILES.

figure in it, and the representatives of all countries will come to it in a crowd.

On passing through the structures accumulated here and there, and the innumerable galleries, and on visiting the machinery palace, and admiring the Eiffel tower, that dominates the whole, we could not repress a genuine feeling of patriotic joy; for the exposition will be a triumph for France and for Paris.

The Esplanade des Invalides will offer a peculiar attraction to the visitor, and everything that he sees there will prepare him in some measure for the wonders of the Champ de Mars. A multitude of varied buildings form here, as a whole, a most attractive sight. Among them is the palace of the Minister of War, with the military exhibit. The palaces of the Tunisian and Algerian sections opposite it are also most remarkable, though less monumental. Alongside of these structures an edifice is reserved for the administration of post



THE EIFFEL TOWER.