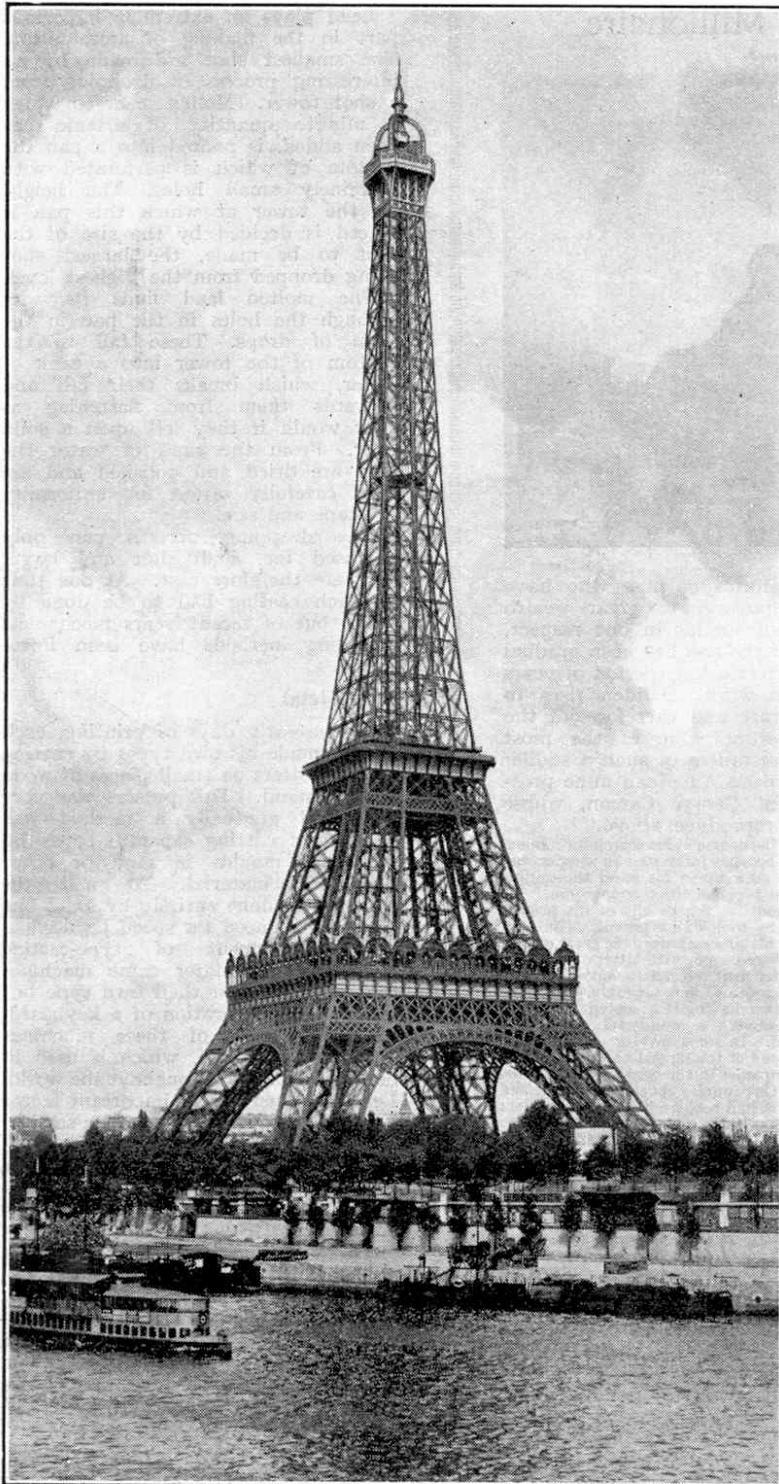


# The Highest Structure in the World

## The Eiffel Tower and its 6,500 Tons of Iron



Eiffel's Masterpiece

The Eiffel Tower is the Highest Structure in the World

FROM the time of the Tower of Babel to the present day, very high buildings and objects have always exercised a great fascination. The Pyramids of Egypt, one of which is 484 ft. in height, and the Colossus of Rhodes, a bronze statue 105 ft. in height, are early examples of high structures, those of more recent origin including Cologne Cathedral, 528 ft. in height and the Washington Obelisk, 541 ft. in height.

In 1886 a French engineer, Gustave Eiffel, proposed to erect for the Paris Exhibition of 1889 a building that should dwarf every previous structure. His proposal met with strong criticism, and many prominent engineers ridiculed the idea and predicted the speedy collapse of such a towering structure. Eiffel had absolute confidence in the success of his scheme, however, and he commenced operations and persevered with his task. In two years, to the confusion of his critics and the astonishment of his friends, the great Tower was completed in the Champs de Mars, where it stands to this day with unimpaired strength.

### A Great Engineering Triumph

Gustave Eiffel was born at Dijon on 15th December, 1832. From his early boyhood he was determined to become an engineer, and was so successful at school in all subjects connected with mechanical or engineering matters that he was placed as a student in the Paris School of Arts and Crafts. Here he qualified as an engineer, and while quite a young man was appointed to superintend the construction of an iron bridge over the river Garonne at Bordeaux. By 1868 he had succeeded so well as to be able to establish his own engineering works, and from that time onward his name became closely associated with striking engineering achievements all over the world. He built the famous Garabit Viaduct of Cantal, the great bridge over the River Douro at Oporto, and the movable dome at the observatory at Nice.

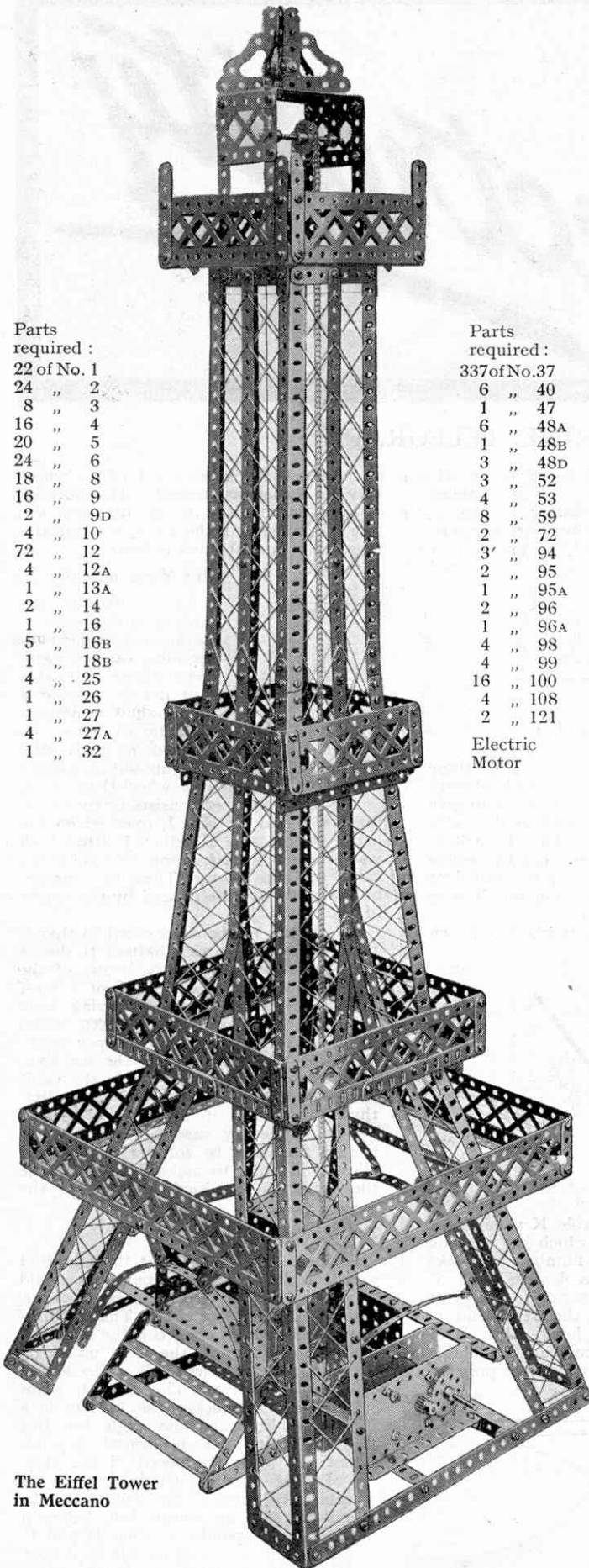
For many years Eiffel gave particularly careful study to the combined effects of iron columns and cross ties, and he was the first engineer to use the compressed air method in bridge construction. After several years of experience in connection with metal bridges, he undertook successfully the building of the framework of the huge Statue of Liberty in New York harbour in 1884, and five years later he became world-famous as the designer and constructor of the great Eiffel Tower—the highest building in existence.

### The Massive Foundation

In erecting this huge structure Eiffel's first task was to secure foundations capable of supporting the enormous weight of the tower—6,500 tons. Four trellis-work piers were decided upon and work on the foundations for them was commenced early in 1887. The two piers furthest from the river Seine presented comparatively little difficulty, as a thick layer of gravel was found at a depth of 16½ ft., the ordinary water level of the river. The other two piers gave more trouble, however, as their foundations had to be taken down to twice this depth in order to reach the gravel.

The masonry foundations rested upon concrete, and the four uprights of each of the four pedestals were fixed to the masonry by anchor bolts. In order to counteract any possible displacement of the anchor bolts, a hydraulic press was inserted in each of the four feet of the structure.

The tower itself was built of a series of main ribs braced together by elaborate trellis work. As far as possible the various parts of the structure were finished in the workshops and hoisted to their final positions by cranes, leaving only the junctions to be completed. Two-and-a-half million rivets were used, and on the verticality of the tower being carefully tested, when



Parts required :

22	of No. 1
24	" 2
8	" 3
16	" 4
20	" 5
24	" 6
18	" 8
16	" 9
2	" 9D
4	" 10
72	" 12
4	" 12A
1	" 13A
2	" 14
1	" 16
5	" 16B
1	" 18B
4	" 25
1	" 26
1	" 27
4	" 27A
1	" 32

Parts required :

337	of No. 37
6	" 40
1	" 47
6	" 48A
1	" 48B
3	" 48D
3	" 52
4	" 53
8	" 59
2	" 72
3	" 94
2	" 95
1	" 95A
2	" 96
1	" 96A
4	" 98
4	" 99
16	" 100
4	" 108
2	" 121

Electric Motor

The Eiffel Tower in Meccano

the structure had reached the height of 720 ft. it was found to be absolutely correct. The total cost of the tower was £260,000, of which the State contributed £60,000.

**Electric Lifts for Visitors**

The total height of the tower is 984 ft. from the ground or 1094 ft. above sea level. The first platform is 189 ft. up—only 27 ft. lower than the towers of the Cathedral of Notre Dame, Paris. The second platform is 380 ft. up and the actual tower that rises from this second platform is 526 ft. in height, finishing at the third platform at a height of 906 ft.

The campanile and lantern above the third platform bring the structure to its full height of 984 ft.—more than twice the height of the dome of St. Paul's Cathedral. A further comparison will no doubt interest the large numbers of our readers who have visited Blackpool. The Blackpool Tower, which seems to reach almost to the clouds, is only 500 ft. in height—scarcely more than half the height of the Eiffel Tower!

The Tower proved a great commercial success during the Exhibition of 1889, and tens of thousands of visitors took a trip to the top to enjoy the wonderful view. Afterwards it was found to be unprofitable, however, and was eventually taken over by the municipal authorities of Paris, partly with the idea of using it as a scientific observatory. The tower has always been very popular with sightseers on account of the marvellous view of Paris and its surroundings that can be obtained from the highest gallery, and for the use of these sightseers electric lifts are installed. Several spectacular feats, such as climbing to the top by means of a

loose rope and cycling from the highest platform to the ground, have also been staged from the Tower.

**The Tower during the War**

During the war the Eiffel Tower proved of the greatest value as an anti-aircraft observation post, enabling warnings to be sounded on the approach of Zeppelins or Gothas. Also it has for many years been one of the most powerful radio stations in the world. Many Meccano wire-

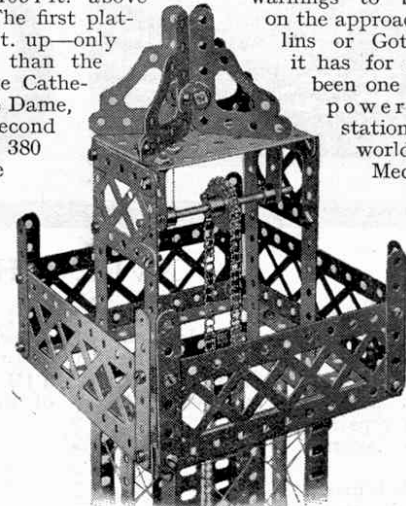


Fig. A

less amateurs, and especially those who possess valve sets, are familiar with the well-known call sign of the Eiffel Tower—FL. In this connection

the Tower received what is perhaps its greatest vindication when General Ferrie, Inspector of French Military Telegraphs, said that "FL" served so many important scientific and military purposes that if such a tower had not already existed it would have been necessary to build one.

It is interesting to know that last year the Tower received the fifth coat of paint since it was built.

Some idea of the vastness of the undertaking may be obtained from the fact that thirty tons of paint were used in the process and the job occupied 100 men a total of 4,000 hours! Eiffel was always extremely proud

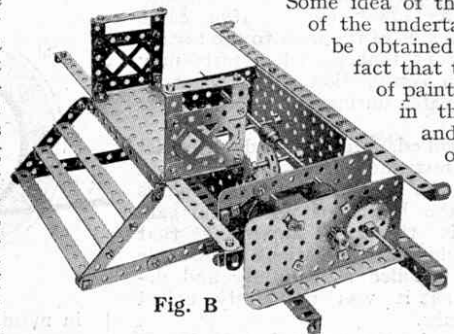


Fig. B

of his achievement, and the success of his original plans must have been a source of great satisfaction to him. Until the time of his death, in December 1923, he maintained a flat on the third floor of the Tower. There, 906 ft. above the ground, the great engineer would retire to his comfortable room to think in quietness of the past and plan out new schemes for the future.

**The Eiffel Tower in Meccano**

The Meccano model of the Eiffel Tower is well known.

(Continued on page 389)