



# Architecture

## Big Ben

London, Great Britain



# Big Ben

Big Ben, officially known as the Clock Tower, has stood at the northeastern corner of the Palace of Westminster for over 150 years. It is one of the most recognized landmarks in the world today, and has become an iconic symbol of both London and England. The story of its design and construction provides a fascinating glimpse into one of the most interesting periods of architectural history.



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# History

When the old Palace of Westminster was destroyed by fire on 16th October 1834, a competition was announced for the design of a new palace building. Over 97 entries were received and in January 1836, it was announced that the competition had been won by the 40 year-old English architect Charles Barry. His initial design, in the modern Neo-Gothic style, was only two-thirds the size of the completed building and was without the 96.3 metre (316 ft.) clock tower that would become known as Big Ben.

As Barry's own architectural style was more Classical than Gothic, he asked for assistance from one of leading proponents of the neo-gothic movement, Augustus Pugin. While it is difficult to say exactly what work can be accredited to Pugin, it's commonly thought that he created much of the gothic-styled interiors of the palace and the design of the clock tower itself.

Neither man would live to see the completion of their work. The intricate designs had many construction difficulties: adding a whole decade to the estimated six-year building time and tripling the initial budget.

The design of the clock mechanism would also set new standards in the field of clock making and add further complications to the construction process. After a competition, the task was given to Edward John Dent (1790-1853) in February 1852 and he set about designing a mechanism that would live up to the then unheard demands that the first stroke of each hour should be accurate to within one second. It took seven years before the clock began keeping time on 31st May 1859; the construction of the tower itself



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crack appeared and a new Great Bell had to be cast. Though this one would eventually also develop a crack, successful repairs and a lighter hammer have ensured that it still rings out the time today.

The Neo-Gothic heritage of the Clock Tower is particularly emphasized by the ornate decorations of its upper floors and the clock dials. Each dial is seven metres (23 ft.) in diameter and made from cast iron and 312 separate pieces of pot opal glass. Once every five years, specialist technicians abseil down the dials to carry out cleaning and essential repairs.

The clock mechanism is wound by hand three times a week and is still as accurate today as when it was constructed over 150 years ago. Although Big Ben is one of the most famous tourist attractions, it is not open to overseas visitors. Residents of the United Kingdom are able to visit the tower after arrangement with their local Member of Parliament.

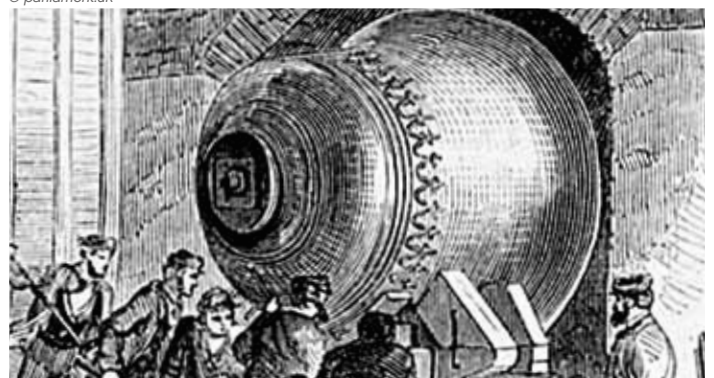


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was delayed, Dent passed away, and modifications had to be made when it was discovered that the clock mechanism was larger than the actual space allowed. Big Ben was the unofficial name given to the tower's Great Bell. It was the largest bell in Britain at the time and named after either Sir Benjamin Hall, the first Works Commissioner, or Ben Caunt, a champion heavyweight boxer. The first Great Bell was cast in Stockton-on-Tees and transported to London by rail and sea. Huge crowds gathered to watch it being pulled across Westminster Bridge by 16 white horses. During tests, however, a



# Construction

The foundation stone for the Clock Tower was laid on 28th September 1843 and it would not be completed until 1859, five years behind schedule. The Clock Tower was built from the inside outwards, meaning that no scaffolding was ever visible to the outside world.

The bottom 61 metres (200 ft.) of the 96.3 metres (316 ft.) high Clock Tower consists of brickwork with sand coloured Anston limestone cladding. The remainder of the tower's height is made up of a framed spire of cast iron. The tower was founded on a 15-metre (49 ft.) square raft of 3-metre (9.8 ft.) thick concrete, at a depth of 4 metres (13 ft.) below ground level. On its completion, the interior volume of the tower was 4,650 cubic metres (164,200 cubic feet).



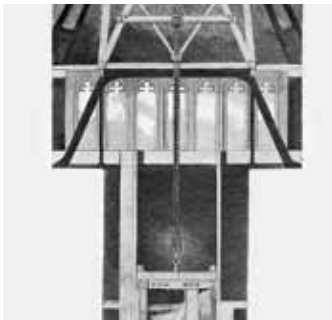
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When it was time to raise the Great Bell, it was discovered that its dimensions meant it was too large to fit up the Clock Tower's shaft vertically, so Big Ben was turned on its side and winched that way. It took 30 hours to lift the bell to the belfry in October 1858.

Over 150 years later the tower stands as a testament to solid architectural design and ingenious engineering. Changes in ground conditions, especially tunnelling for the London Underground, means that today the tower leans slightly to the north-west by approximately 22 cm (8.66 inches) at the clock dials.



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## Facts about Big Ben

Location:..... London, Great Britain  
 Architect: ..... Charles Barry / Augustus Pugin  
 Style: ..... Neo-Gothic  
 Construction type:..... Clock tower  
 Construction materials:..... Brickwork, stone cladding, cast iron  
 Date:..... 1843-1859  
 Height: ..... 96.3 m (316 ft.)



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# The architects



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## **Charles Barry 23.5.1795–12.05.1860**

By the time Charles Barry won the competition to build the new Palace of Westminster, he was already a well-respected architect. Born in Westminster in 1795, opposite where Big Ben would later stand, he was apprenticed to a London surveyor and architect's office at the age of 15 before embarking on a grand tour of Mediterranean Europe and the Middle East.

On his return, he opened his own office in 1821 and soon gained a reputation for his Church designs and remodelling of older country houses.

Though the Palace of Westminster project would further enhance his name, the stress caused by delays and cost overruns would affect his already fragile health. He died at home of a heart attack on 12th May 1860. Having been knighted by Queen Victoria in 1852, he was buried at Westminster Abbey and a life-size marble statue of him was later placed at the foot of the Committee Stairs in the Palace of Westminster.

## **Augustus Welby Northmore Pugin 1.03.1812-14.09.1852**

Having only a limited experience of the Neo-Gothic style, Charles Barry turned to one of the style's leading proponents for assistance. Augustus Pugin had literally grown up with Gothic style; his French-born draughtsman father trained him to draw Gothic buildings for the renowned reference books he produced on the subject.

After converting to Catholicism, Pugin designed churches and cathedrals in England, Ireland and Australia before joining Barry on the work of the Palace of Westminster. The intricate Clock Tower would be one of his last designs before he descended into madness, being committed to an asylum and dying on 14th September 1852 at the age of 40.

Though the popularity of the Gothic style had been growing throughout the 19th century, Barry and Pugin's work on the Palace of Westminster and Big Ben would popularize the architectural style and ensure it reached into every corner of Victorian life.

# Facts and statements

*There are 334 steps to the belfry of the Clock Tower and a total of 393 to the lantern (the Ayrton Light), which is illuminated each time Parliament sits after dark.*



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*Anston stone from Yorkshire and granite from Cornwall were used on the exterior of the tower to clad the brickwork core.*



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*In addition to its three-times-a-week winding, the clock's precision is maintained by using old pennies (taken out of circulation in the early 1970s). These are added to or removed from the clock's pendulum to maintain the timepieces' accuracy.*



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*'Double Three-legged Gravity Escapement' was the name of a new and revolutionary mechanism, ensuring the clock's accuracy by making sure its pendulum was unaffected by external factors, such as wind pressure on the clock's hands.*



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*Under each clock dial there is a Latin inscription carved in stone: "Domine Salvam fac Reginam nostrum Victoriam primam" which means "O Lord, save our Queen Victoria the First."*



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# A Word from the Artist

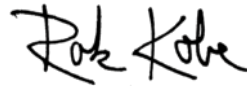
The first step in creating this LEGO model was to gather graphic and textual material of the original building. This gave me a deeper understanding of the building and its architecture and were later incorporated and reinterpreted into the LEGO design.

I then tried making different versions of the model at various scales, where each model followed certain different principles of the original. The LEGO Big Ben underwent more than fifty concept versions, ranging from humble thirty-piece model to a large replica with the height of over forty bricks. This concept work was done primarily in LEGO Digital Designer, with some of the details tested in actual bricks.

The final LEGO model emphasizes the tripartite division of the tower. The base is represented with 1 x 1 bricks in the corners of the tower, the more delicate shaft of the tower is made using 1x1 round bricks, which lead to the massive top housing the four big clocks. The ornate stonework of the windows of the tower and the palace

is recreated in LEGO Grille plates using the SNOT (Studs Not On Top) technique.

What I found most challenging in creating this model was representing the richness of 19th century gothic revival architecture in a scale usually more appropriate for modern or contemporary architecture of smooth surfaces and clean lines. Nevertheless, with a towers width of only three studs, the LEGO model still captures the main traits of the building, its appearance and its spirit.



Rok Kobe



## The 'Scale Model' line – LEGO® Architecture in the 1960s

The history of current LEGO Architecture series can be traced back to the beginning of the 1960s when the LEGO brick's popularity was still steadily increasing. Godtfred Kirk Christiansen, the then owner of the company, began looking for ways to further expand the LEGO system, and asked his designers to come up with a set of new components that would add a new dimension to LEGO building.

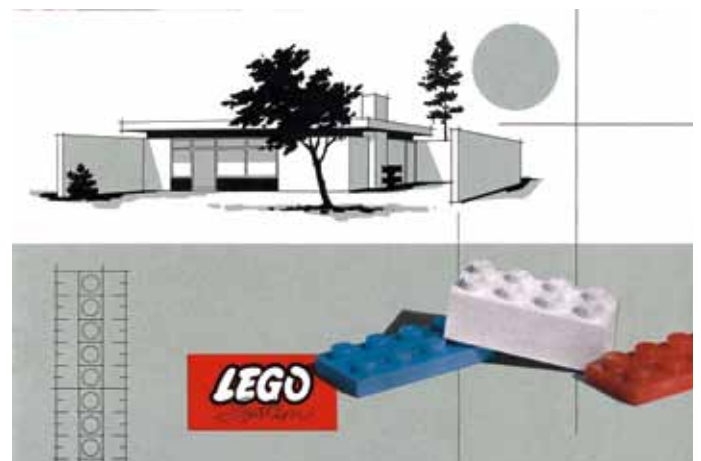
Their answer was as simple as it was revolutionary: five elements that matched the existing bricks, but were only one third the height. These new building 'plates' made it possible to construct more detailed models than before.

This greater LEGO flexibility seemed to match the spirit of the age; where modernist architects were redefining how houses looked, and people were taking an active interest in the design of their dream home. It was from these trends that the LEGO 'Scale Model' line was born in early 1962.

The name itself was a direct link to the way architects and engineers worked and it was hoped that they and others would build their projects 'to scale' in LEGO elements.

As with LEGO Architecture today, the original sets were designed to be different from the normal brightly coloured LEGO boxes, and also included 'An Architectural Book' for inspiration.

Though the five elements remain an integral part of the LEGO building system today, the 'Scale Model' line phased out in 1965 – it would be over 40 years before its principles would be revived in the LEGO Architecture series we know today.



## References

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