



STONE WONDERS WILL NEVER CEASE

By Tina Luton

The new 7 Wonders of the World were announced on 7 July 2007 following a global poll to decide a new list of man-made marvels. The contest was organised by the New7Wonders Foundation—the brainchild of Swiss filmmaker and museum curator Bernard Weber—in order to “protect humankind’s heritage across the globe.”

Almost a hundred million votes were logged by Internet and phone, and lo and behold all seven wonders are made of stone – which proves that the wonders of natural stone will never cease.

The new 7 Wonders of the World are:

CHICHÉN ITZÁ

Deep within the jungles of Mexico and Guatemala and extending into the limestone shelf of the Yucatan peninsula, lie the mysterious limestone temples and pyramids of the Maya. The ancient city of Chichén Itzá in Mexico is possibly the most famous temple city of the Mayas, a pre-Columbian civilization that lived in present day Central America.

It was the political and religious centre of Maya civilization during the period from AD 750 to 1200.

At the city’s heart lies the Temple of Kukulcan (pictured above), one of the greatest architectural achievements in all of the Americas. Dedicated to Kukulcan, the ‘Plumed Serpent’, the temple rises to a height of 24 metres. Each of its four sides has 91 steps – one step for each day of the year, with the 365th day represented by the platform on the top.

Chichén Itzá attracts a large number of visitors on the days of equinox – March 21 and September 21. Between 4 pm and sundown, the position of the sun on these days creates the illusion of a giant snake of light gliding down the temple’s main flight of stairs, thus symbolising the return of the plumed snake to his people.

THE GREAT PYRAMID OF GIZA

The Great Pyramid of Giza has been a mystery and an enigma to mankind for ages. The largest, tallest and most intact of Egypt’s pyramids, it was built in about 2560 BC by Egyptian pharaoh Khufu to serve as his tomb. The Great Pyramid was the first structure on the original Seven Wonders of the World list compiled by Greek scholars about 2200 years ago, and is the only one remaining.

The Great Pyramid is believed to have been built over a 20-year period and is constructed from approximately 2.5 million limestone blocks weighing on average 2.6 tons each. The King’s Chamber, where Khufu was laid to rest, was made entirely from blocks of Aswan granite.

Covering an area of 53,000 square metres, the Great Pyramid can accommodate St Peter’s in Rome, the cathedrals of Florence and Milan, and Westminster and St Paul’s in London combined. The architectural masterpiece originally stood 145 metres high. Today, due to weathering and pilfering, it stands 137 metres tall, but for a period of 4300 years it was the tallest building on earth, unsurpassed until the 160 metre spire of Lincoln Cathedral was completed in 1300.

The Great Pyramid was originally covered in 144,000 casing stones of white highly-polished Turah limestone that reflected the sun like a mirror, and was capped, according to legend, by a perfect pyramid of black stone, probably onyx. Over the centuries most of the casing stones were removed – first by an Arab sultan in AD 1356 and the rest by the Ottoman Turks in the 15th century AD – to build houses, mosques and fortresses in nearby Cairo. Today, only a few stones still remain at the base of the pyramid.

The stones have been cut so precisely that a credit card cannot fit between them. The builders left very fine, deliberate spaces between the limestones to allow moisture to drain away from the structure and

to keep the stones from cracking and breaking due to the extreme temperatures of the desert – blazing hot by day and sub-zero by night.

To cement the highly-polished casings together and to attach them to the sides of the pyramid's walls, the builders used specially-made glue – an ancient form of spot fixing facades created some 4600 years ago! The glue was as strong as granite but elastic enough to allow the limestones some movement over the centuries without causing cracking or breaking. Though it has been tried, no one has been able to replicate this glue today.

CHRIST THE REDEEMER

Brazil's most photographed monument is the 38 metre tall statue of Jesus called 'Christ the Redeemer' that towers over the lively city of Rio de Janeiro in Brazil, welcoming people with open arms.

The monument was built from 1926 to 1931, with funds raised from donations. It spans 28 metres from fingertip to fingertip and there is a chapel for 150 people housed in the base of the statue.

Local engineer Heitor da Silva Costa designed the statue and it was created by French monument sculptor Paul Landowski. The structure is made out of reinforced concrete. The outer layers are soapstone, chosen for its enduring qualities and ease of use. Stone for the monument was taken from Limhamn in Malmö, Sweden.

The monument opened on the 12 October 1931. It has undergone several restorations since then. The latest, in September 2002, saw the addition of a panoramic elevator and escalator to ferry people to the top of the mountain. Originally they had to climb 220 steps.

THE COLOSSEUM

The Colosseum in Rome, Italy, was the only finalist from Europe to make it into the top seven.

Despite the ravages of time the most conspicuous of the ancient monuments in the city has endured through the centuries to become a symbol of Rome's eternity.

Its correct name is the Flavian amphitheatre, after the dynasty of emperors who oversaw its construction which began around AD 70 under Emperor Vespasian. The nickname Colosseum, or Coliseum, derives either from a colossal statue of the emperor Nero that once stood nearby which, according to the ancient historian Suetonius, was over 35 metres high, or from the colossal dimensions of the building itself.

Until the construction of the Colosseum there was no permanent structure in Rome for the increasingly popular gladiatorial games. Despite its sinister associations, the world's most famous amphitheatre is a memorial to Roman engineering.

The Colosseum stands below the slopes of the Oppian hill in a marshy valley. The first task was to drain the area and lay a thick foundation of concrete over the bed of the lake. Huge blocks of travertine, over 100,000 cubic metres, were dragged from quarries at Albulae near Tivoli along a road that had been especially constructed for the purpose, to be set without mortar but clamped into place with iron bars. The organisation of the work force was revolutionary, requiring four different and independent building sites.

The structure is massive in its proportions, covering more than three hectares: the elliptical outer circumference measures 527 metres and is around 50 metres high. Four superimposed orders of arches articulated by pilasters with Tuscan, Ionic and Corinthian capitals decorate the perimeter wall. The attic storey has sockets for wooden poles which were used to support a sailcloth awning which shaded the seats below. At maximum capacity the Colosseum could accommodate up to 50,000 people, who entered the amphitheatre through 80 numbered arches on the ground floor to their tiered seats.





THE TAJ MAHAL

The Taj Mahal in Agra, India, is the spectacular white-splendoured marble tomb built by Muslim Mughal Emperor Shah Jahan to honour the memory of his favourite late wife, Arjumand Banu Begum, better known as Mumtaz Mahal or ‘Chosen of the Palace’.

Construction began in 1632 and took a 20,000-strong workforce 22 years to complete, with craftsmen coming from as far as Turkey.

The opulent, domed marble mausoleum, which stands in formal walled gardens, is generally regarded as the finest example of Mughal art and architecture. It includes four minarets, each more than 13 stories tall.

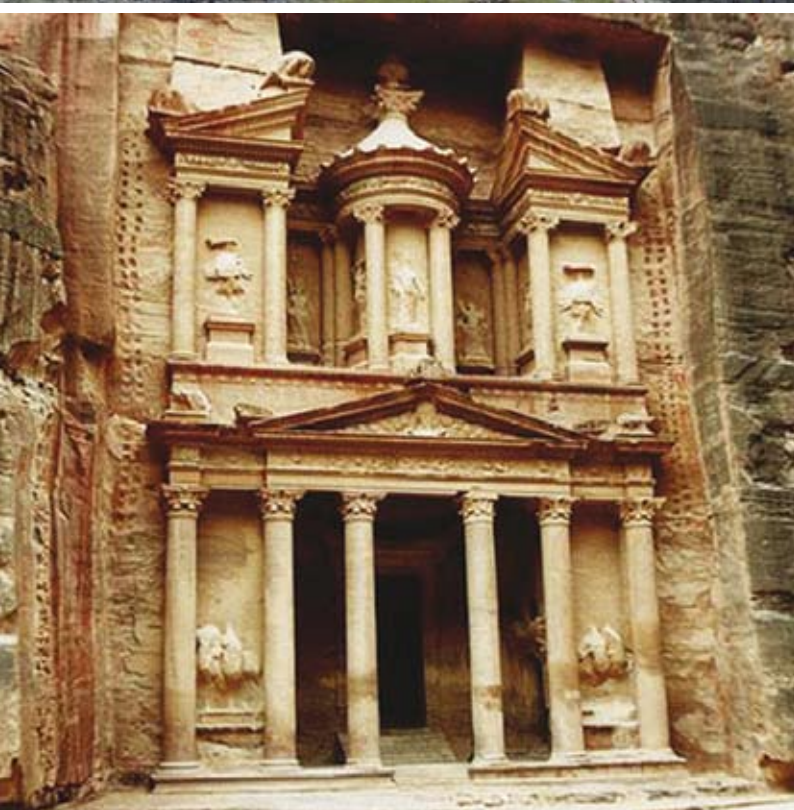
The white marble was quarried at Makrana near Jodhpur in Rajasthan. It assumes subtle variations of light, tint and tone at different times of the day. At dawn, it takes on a soft, dreamy aspect; at noon, it appears to be a dazzling white; and in the moonlight the dome looks like a huge iridescent pearl.

The main vista is accentuated by a red sandstone channel set between rows of cypress trees. The main entrance is from the west, but there are two other entrances from the east and from the west. The main gateway is a large three-storey sandstone structure with an octagonal central chamber with smaller rooms on each side. The walls are inscribed with verses from the Quran.

Today, the Taj is regarded all over the world as a supreme labour of love. It is alleged that on its completion, Shah Jahan ordered the right hand of the chief mason to be cut off so that the masterpiece could never be recreated. Numerous other legends abound – according to one Shah Jahan desired to have another matching Taj built across the river, entirely in black marble.

THE GREAT WALL OF CHINA

Regarded by many as one of the world’s great engineering achievements, the Great Wall of China is the world’s longest human-made structure, stretching some 6400 kilometres. It is a furphy that it



can be seen from space. The wall was built by hundreds of thousands of workers during the Ming Dynasty (AD 1368–1644) to keep Mongol invaders – not rabbits! – from raiding the northern Chinese lands. The best-known section was built around 200 BC by the first emperor of China, Qin Shi Huang Di.

The Great Wall is built out of a simple structure of bricks, stone and dirt. Slabs of stone were used for the base and sides of the wall, and it is filled in with dirt, rocks, and rubble. It is the mass of this stone that keeps the wall from toppling over due to the horizontal thrust of the soil behind the wall. This type of wall is termed a gravity wall; providing you have enough stone and the ground under the wall is strong enough to support the wall's weight, you can make the wall thick and heavy enough to retain a great volume of earth.

The wall ranges in height from 5 to 9 metres is 8 metres thick at the base and spans 5 metres across the top. It contains some 25,000 watchtowers, gates, fortresses, castles and temples. Beacon towers were spaced approximately 18 kilometres apart, and would use signal fires to warn of invasion.

PETRA

Perched on the edge of the Arabian Desert, deep in a valley in Jordan, Petra was the capital of the Nabataean kingdom of King Aretas IV (9 BC to AD 40).

The ancient site wasn't known to the West until Swiss explorer Johann Ludwig Burckhardt came across it in 1812. Now, it is one of the most heavily-visited World Heritage sites on the planet, with more than half a million people per year flocking to see – and touch, which is causing serious erosion – more than 800 rose-coloured structures that have been intricately carved out of the valley's sandstone walls. The most popular attraction is the grand Al-Khazneh tomb, which soars 42 metres above the floor of the valley and was immortalised in the 1980s blockbuster *Indiana Jones and the Last Crusade*.

Elaborately carved with classical elements (pediment, columns, entablature, etc), the tomb consists of a large approaching staircase, two small exterior flanking chambers and a primary chamber with three antechambers. (for a full report on Petra, see *Discovering Stone* issue 11, page 38)

MACHU PICCHU

The Inca ruins of Machu Picchu in Peru are one of the finest examples of prehistoric architecture in the world.

Perched on an Andean mountain top, some 600 metres above the rumbling Urubamba river, the cloud-shrouded ruins have palaces, baths, temples, storage rooms and some 150 houses, all in a remarkable state of preservation.

The carved granite structures are wonders of both architectural and aesthetic genius, characterised by exquisitely cut masonry placed together completely without mortar. Many of the granite blocks weigh 50 tons or more and some have as many as 30 facets worked into the surface, yet they are so precisely sculpted and fitted together like a gigantic puzzle with such exactitude, that a needle won't fit between them. 🗿