BLENHEIM PALACE
EDUCATION

This is an introduction to Blenheim's Built Heritage.

This module is an overview of the past and the present of the Palace.
Topics include Materials, Science, Art, Design and Technology

"We shape our buildings and afterwards our buildings shape us."

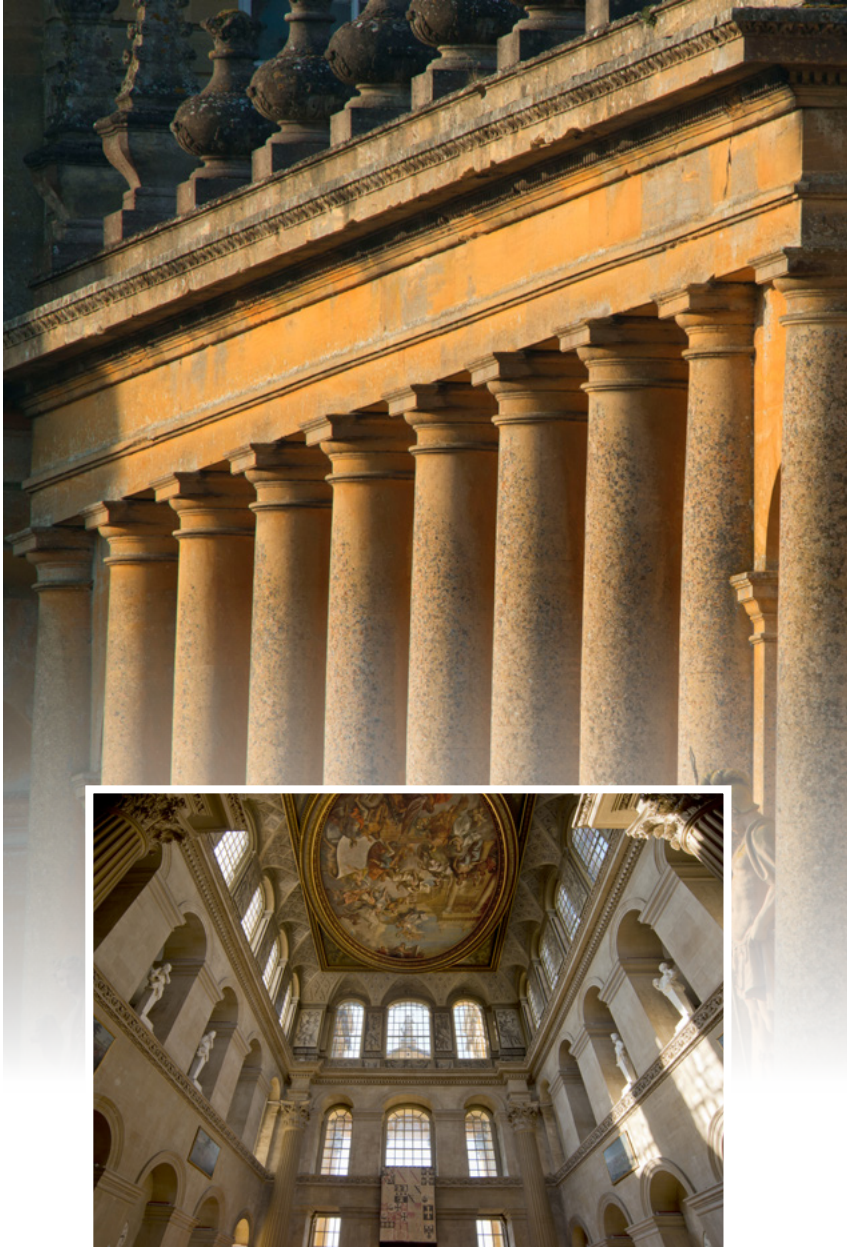
Winston Churchill, October 1943

Stonework

Stone was the main material that humans used in the Stone Age. Humans made tools out of stone.

Q: What is stone?

A: Stone is smaller than rock. Rock is a natural compound of the Earth. It is a mixture of minerals that occur naturally through a long period of time.



Blenheim Palace is mainly built of stone. There is stone inside and outside the house.

Q: Why is it built of stone?

A: Because stone is a **strong** and **long-lasting** material. It is more **weatherproof** than other natural materials.

Q: Where did the stone come from?

A: The stone came from over 20 different quarries in Oxfordshire. It's called **Cotswold stone.**

Blenheim Palace was designed by architect **Sir John Vanbrugh**. He designed the house to look symmetrical.

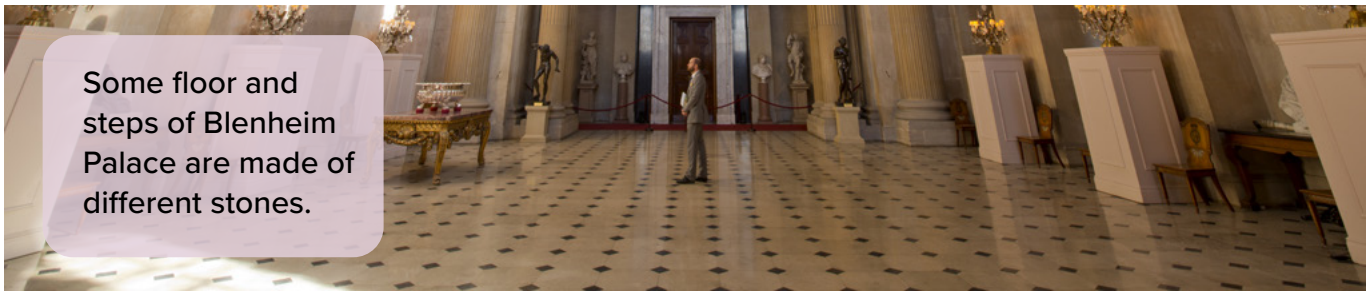


Q: Why did he design such a big symmetrical house?

A: Because the style of the time was called **Baroque**, and everything had to appear large, bold, and impressive. The symmetrical shape helps emphasise and balance the enormous building.

Q: Do you know a famous building in London that reflects the Baroque style?

A: **St Paul's Cathedral** was rebuilt by architect **Sir Christopher Wren** after the Great Fire in 1666.



Some floor and steps of Blenheim Palace are made of different stones.

Q: Why were they made of different stones?

A: Because floors and steps are walked on regularly and are subject to be damaged more quickly than walls. The indoor floors are made of **Portland stone**. The outdoor steps are made of **Plymouth stone.**

A: Outdoor stone will be affected by the weather e.g., rain, wind, sun, etc.

Q: How was the stone cut and put together?

A: Stone was cut from quarries with **chisels**, **hammers**, and **wedges**. There were stone cutters and stone carvers. Then the stone carters carried the extracted stone to the building location.

A: For large sections of stone, dry **wooden wedges** were placed into holes and the wedges were then soaked. In the drying process, the wedges expanded, and this cracked the stone.

A: Stone pieces were held together with **iron cramps.**

There are other stone structures than the Palace.



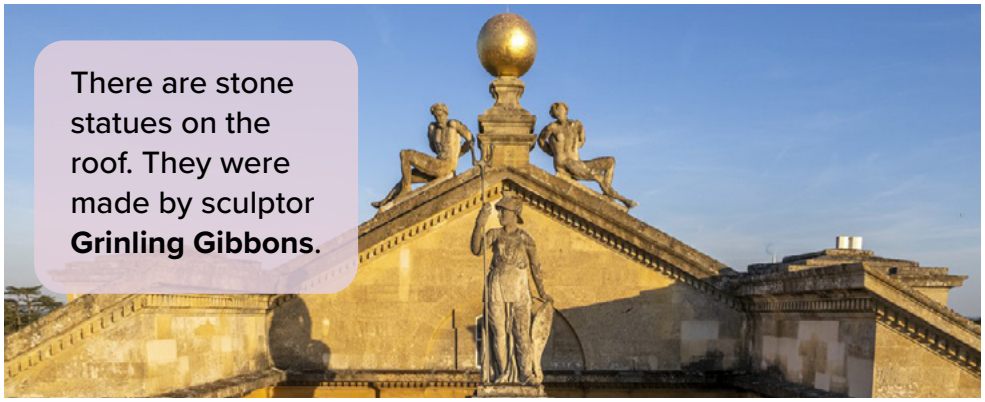
The **Grand Bridge** was built between 1708 and 1724. It was designed as a habitable structure. Several window apertures were left unfinished. There are 33 rooms within the bridge.



The **Triumphal Arch** was erected in 1723. There are small windows at the top of the arch: The Park bailiff lived up there.

The **Column of Victory** was erected in 1733.

There are decorative stone features around the palace.



There are stone statues on the roof. They were made by sculptor **Grinling Gibbons**.

There are stone plinths and ornaments in the Great Courtyard.

Metalwork

The advent of **metal** changed the way humans lived. The use of metal was introduced during the Bronze Age and evolved though the Iron Age. Tools were now made of metal which was lighter and easier to handle.

Q: What is metal?

A: It is a **mineral** found in rocks.

Q: How is metal extracted from rocks?

A: With **heat**. Minerals can be melted out from rocks, and then bent, stretched or twisted into any shape.

A: **Minerals will separate from 900°C.**

Q: How do minerals become metal?

A: Minerals are melted and then cooled down.

Iron is the most widely used metal on Earth.

Q: What is iron?

A: Iron is a metal obtained when mixing **ironstone** and **limestone** at high heat.

A: **Iron melts at 1,538 °C.**

Q: Was metal used to build the Palace?

A: Yes. From the **iron cramps** that held the stone together and the **stair rods** that fixed the steps to the walls to the cast iron **doorknobs** to the wrought iron **handrails**, iron can be found everywhere.

Q: What is **cast iron**?

A: It's when the minerals are still in the liquid phase in the heating process, and it's poured down into a mould to give it a specific shape.



Q: What features are made of cast iron?

A: The rainwater leader heads.

A: The front door knocker.





Q: What is **wrought iron**?

A: It's when the minerals are cooling down and it's manually shaped with tools.

Q: What features are made of wrought iron?

A: Stair railing.

A: The mechanism of the wind director.

Q: Can you see other features made of metal?

A: Outside: Flagstaff Gates.

A: Inside: Candelabra, chandelier, gas lamps, front door lock and the Coronet Key.



Most of iron ore is found in Australia, Brazil, and China.

Flagstaff Gates were not an original feature of the Palace. They were installed by the 6th Duke of Marlborough. He had visited the **Great Exhibition of the Works of Industry of All Nations** in 1851 at Crystal Palace and he had seen the metalwork displayed by **Bramah**, a London-based company who specialised in metalwork. Today, they make door locks.







The front door lock was not an original feature of the Palace. It was installed by the 5th Duke of Marlborough. The lock and the key were made by inventors and makers **Charles Smith & Son.** They were based in Birmingham. The company was established in 1704 and they also made bells.



Woodwork

Wood comes from trees. It comes from trunks and branches of trees. There are different types of trees, hence there are different types of wood, and they all have different properties.

Q: What are the main properties of **oak** wood?

A: Oak wood is **strong**. Oak wood is **resistant to insect infestations.**

A: Oak wood is of a **light-brown** colouration.



Oak trees grow in temperate climate.
They grow mostly in the northern hemisphere



The Palace front doors, the table in the Saloon and the floor in the Long Library are all made of oak wood from the Estate. The front doors and the library floor are original features of the house.

Q: What are the main properties of **mahogany** wood?

A: Mahogany wood is long-lasting. Mahogany wood is **water-resistant** and **fire-retardant.**

A: Mahogany is of a **red-brown** colouration.

Mahogany trees grow in tropical climates. They grow in South America and the West Coast of Africa.

The doors between the State Rooms are made of mahogany wood.



Q: What are the main properties of **beech** wood?

A: Beech wood is **tough**. Beech wood is **shock-absorbent**.

A: Beech wood is of a **pink-brown** colouration.

Beech trees grow in temperate climates. They grow mainly in North America and Western Europe.

The frame of the green armchairs in the Second State Room are made of beechwood.

Q: Wood is used to make furniture and tools. What other objects does wood give us?

A: Paper and cardboard. They can be squashed, bent, and twisted.

Q: How is wood turned into paper?

A: Wood is cut into small chips and boiled in water until the mixture looks like a paste. Chemicals are added into the mixture. The mixture is pressed down to squeeze the water out, then it's rolled out flat.

Glasswork

Glass is obtained when mixing sand with other minerals, and then heated at very high temperature (1,700°C). When the mixture cools down, it becomes glass. There is see-through glass like **windows**. There is reflecting glass like **mirrors**.

Q: What are the properties of glass?

A: Glass is transparent. It lets light in. Glass is solid. It blocks air and liquid.

Q: How is glass made into a mirror?

A: A mirror is made by adding **silver** or **aluminium** when making glass.

Glass windows let the sunlight through, but they block the cold air and rain coming through.

Glass mirrors reflected the candlelight back into the room in days of no electric lighting.





There is usually a chandelier or a candelabra in front of large mirrors in the State Rooms. The pier glass mirrors in the State Rooms were made by **James Moore**. He was a royal cabinetmaker.



Landscape

The landscape at Blenheim is considered built heritage.

Royal gardener, **Sir Henry Wise**, designed the Park and formal gardens for the 1st Duke of Marlborough between 1705 and 1712. The style was very **formal**. Everything was contained in straight lines.

Q: Why was everything designed to be in **straight line**?

A: Because it gave a sense of order and neatness.

Q: Was everything designed in straight lines all the time?

A: No. **Geometric shapes** with curved lines were also found in early 18th century formal gardens.

A: Wise designed a large Parterre on the south side of the Palace. It no longer exists but it was designed to be contained in a rectangular shape. It was annexed to a wild-growing feature contained in a hexagonal shape.

Landscape architect, **Lancelot "Capability" Brown**, redesigned the Park and formal gardens for the 4th Duke of Marlborough between 1763 and 1774 in a less formal, and more **naturalist** style.

Q: How did Brown transform the formal style landscape into a natural style landscape?

A: Brown **grassed** over the Parterre (South Lawn) and the Great Courtyard.

A: He planted a lot of **trees**.

A: He created the **Lake** and the **Cascades**.

Q: How did he create the Lake?

A: The Glyme River flows through this area. The water was dammed at the top, in the Woodstock Town. Then Brown's labourers dug the earth to create the shape of the lake. Then they patted down the sides to shape the bottom of the lake, which was then sealed with layers of puddled clay (sand, clay, and water) to make it waterproof. The clay was then "pounded" by herds of cattle and sheep. Once the pounding process was done, the water was released, and it filled up the Lake.

The scenery around the Palace was created by successive landscape architects.

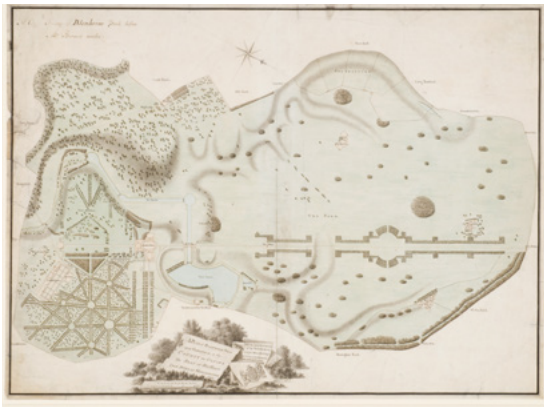


Q: What is left of Wise's original design?

A: **Grand Avenue**. It's the stretch of road from Ditchley Gate to the front of the Palace. Behind the Column of Victory, elm trees were planted in straight lines to symbolise the line of soldiers in formation under the 1st Duke of Marlborough. This road follows the North-South axis.

A: **Hensington Avenue.** It's the road from the main gate to Flagstaff. This road follows the West-East axis.

A: **Kitchen Garden**. It's the red brick walled garden where fruit and vegetables were grown to supply the Palace kitchen.





French garden architect, **Mr Achille Duchêne**, created formal gardens for the 9th Duke of Marlborough between 1902 and 1930.

Q: What are Duchêne's contributions?

A: He restored the **Great Courtyard** to the original cobbled and gravelled design.

A: He designed the **Italian Garden** to the east of the Palace and the **Water Terraces** to the West of the Palace.

A: He restored Blenheim to its original formal style, but he left Brown's work untouched.

Today's landscape is the result of three garden architects working in the style of their respective time.

Natural resources

Stone, metal, wood, and glass are materials that all come from natural resources.

A lot of the Palace is the original materials dating to 300 years ago. Some of it has been restored or replaced due to weather damage, passage of time, or accidental breakage.

Q: If stone is a strong, long-lasting, and weatherproof material, why does it need replacing or restoring?

A: Stone pieces are held together with 300-year-old iron cramps. These iron cramps have suffered from weather damage. Rain causes rust. Extreme temperatures cause the iron cramps to expand, which causes stone to break.

Q: Why should we preserve old buildings and monuments?

A: Because they are part a community's heritage, whether it's a town, a county, a country, or the world.

A: Because they are a symbol of a community's past and present: they connect people from past generations to the present generation.

A: Because a community's heritage is the base of one's sense of identity.

A: Because identity is an essential human need that feeds the sense of belonging to a community.

Lichen on the Palace Walls

There is a large **community** of lichens growing on the walls at Blenheim, and they're often mistaken for normal plants. But the truth is that they're so much more than this. In fact, many scientists now think they are more like complex **ecosystems** than single living organisms.

Read the report Our Living Stone

Q: What is a lichen?

A: A lichen is what is known as a **symbiont** and is made up of several different living things, such as **fungi, algae** and sometimes **cyanobacteria** that all like living together in what's called a **symbiosis** (a sort of friendship). Like plants, lichens need water, light and a suitable temperature to grow. How the symbiosis works is that the fungi provide moisture and shelter for the algae and any cyanobacteria present, and the algae or cyanobacteria provides food for the fungi.

2. Why does it grow on the stonework?

A: The lichens that grow on the stonework at the palace are known as **saxicolous** lichens. The walls act as their **habitats** and provide the things they need to grow. The types of lichens that grow (and how well) depends on the stone present (its type, roughness, porosity, pH), how much water is available, whether any mortars are there and what the architecture is like (in terms of aspect, surface slope, exposure etc.).

Q: Why are lichens important?

A: Lichens play a very important role in our **ecosystems**.
A: They provide **food** for some animals (and so are a part of **food chains** and **food webs**), **shelter** for insects and **nesting materials** for birds.
A: Lichens can also catch dust and absorb pollutants like nitrogen. This makes them very good **indicators of air quality**. Many lichens will only grow in clean air (you'll be pleased to hear Blenheim lichens tell us the air around the palace is of good quality).
A: Also, importantly for humans and animals, llichens help **turn carbon dioxide into oxygen** during **photosynthesis.**

Did you know...

The world's oldest living organism is a lichen located in the Arctic that has an estimated age of 8,600 years. It is known as *Rhizocarpon geographicum* or the 'map lichen'.

The Ancient Egyptians used lichens in embalming. The lichen *Pseudevernia furfuracea* was pushed into the body cavity together with sawdust, cassia and other spices, because it was highly absorbent and had antibacterial properties.

The European Space Agency exposed two species of lichen to the vacuum of space, cosmic radiation and huge swings of temperature for fifteen days and they survived undamaged.

Words and photographs by Dr Nicholas Carter/Blenheim Palace

Heritage site

Blenheim has been designated a **World Heritage Site** since 1987.

Q: What does it mean to be a World Heritage Site?

A: It means that the site and its buildings have a universal value to humanity.

Q: How does Blenheim represent a value for the world if it was built as a private home of a British soldier?

A: The value for the world is not only the Palace, it is the combination of the Palace and the Park which were both harmoniously designed and built by a succession of architects and labourers..

A: The world heritage value resides in the fact that the natural environment of the site has kept its integrity alongside human interference. High Park and the lakes are Sites of Special Scientific Interest (SSSI).

A: The international value of the site resides in the layered history of the land that goes back to the Roman period.

Read the Blenheim WHS management plan

Read Blenheim's description as WHS

Heritage protection

We carry out conservation and restoration projects to ensure that Blenheim will be enjoyed by future generations.

The challenges are:

- Finding similar material in sufficient quantity
- Finding the people with the right skills to perform the task
- Finding the funds to complete such a task

Conservation is prolonging the life of an object in its current state, preventing future deterioration and ensuring longevity.

Restoration is restoring an object back to a specific point in its past.

Repair work is fixing a damaged object in order to restore its function or appearance.

Q: How do we set priorities?

A: We comply with the **laws** that regulated buildings and natural sites.

A: We ensure that the staff and visitors can enjoy a **safe**, clean, and healthy environment.

A: We aim to become a **sustainable** business.

It is the history attached to the stonework, the metalwork, the woodwork and the glasswork that constitutes the collective built heritage and that requires protection.

If you have any questions or comments about this self-led resource, please contact our Education Team at **education@blenheimpalace.com**

"Monuments are the hooking irons that bind one generation to the next."

Word Heritage Day, UNESCO

Points of interest:

