

Sir Thomas Holte Builds a New House: An Explanation of the Design and Building Materials

Contents

Planning the house

- **Why did Sir Thomas want a new house?**
- **Where was the house sited and why?**
- **What influenced the design?**
- **How was it designed?**
- **How long did it take to build?**
- **How much did it cost?**

Materials used to build the house

- **Bricks**
- **Mortar**
- **Tiles**
- **Wood**
- **Stone**
- **Lead**
- **Iron**
- **Glass**

Planning the house

Why did Sir Thomas Holte want a new house?

Quite simply—to show off his wealth and status! Sir Thomas had surplus money because the Holte family had been building up their fortunes throughout the sixteenth century by acquiring land, in common with gentry all over the country. Landlords had been able to gather larger rents from their tenants when food prices rose in the late sixteenth century – further increasing their supply of ready capital.

- It was very much the fashion to conspicuously display one's wealth with a new mansion. The fifty years between 1575 and 1625 saw a tremendous amount of new building work everywhere: twenty substantial houses were erected in Warwickshire alone during this period-Aston Hall was of course one of these, begun in 1617 and completed by 1635.
- Sir Thomas was also amongst those who received new titles from James 1 following his accession to the throne in 1603. Sir Thomas Holte became a

knight in 1603 and a baronet in 1611. Again, it was important for such beneficiaries to visually display their social success with a new or renovated house.

- A contemporary concern with mortality encouraged people to leave tangible evidence of their existence i.e. a great house filled with their heraldic devices, initials, dates and mottoes. Sir Thomas was nearing old age when he planned this house

Where was the house sited and why?

- Sir Thomas chose a site on a ridge to the north of the village of Aston on the largest of his manors and a little way from the family home, Duddeston Hall. The house was to overlook the parish church and to be clearly visible from the Lichfield to Birmingham road to impress all who passed.
- Visitors to the house approached along an impressive avenue of trees - Aston Hall would have loomed larger and more overwhelming as the girth of its tall turrets, gable ends and large glittering windows.

- The grand front of the house could not only advantageously display itself to those passing along the main road, but it also faced east, sheltering the main door from the prevailing westerly winds - a common concern at the time.

What influenced the design?

- Fighting between great feudal magnates had been effectively eliminated under the Tudor sovereigns. It was no longer necessary to build fortified homes as the feuds which did erupt were never on a scale to justify a return to castle building. This enabled greater freedom in the design of houses with **growing emphasis on domestic comfort**. It was now possible to have larger windows improving the light- their cost made them a conspicuous symbol of wealth.
- The gentry could plan their new houses to suit a **more private way of life**. Communal life, centred on a great hall, was no longer - a less personal landlord/tenant relationship developed. Increasingly, landowners were gathering rents in

money. The relationship between master and servant became more distant as the gentry made use of smaller parlours for eating and sitting in.

➤ tall **turrets** drawing the eyes upwards and reminiscent of the ogee rooved tents of tournament fields in medieval days.

- The original design of Aston Hall was in typically Jacobean style. This style was the result of a number of influences and a detailed explanation can be found in the teachers information "Designed to Impress". Briefly the house displays a **peak of design influences** that were in circulation throughout the previous century.

- **Ideas from Renaissance Italy** - at this stage craftsmen were cobbling these together notions of design and building in a random fashion. For instance, at Aston Hall the East front was planned with a symmetrical façade but originally the main door was offset in the traditional fashion. Symmetry was achieved by a square bay projecting into the courtyard from each end of the hall. The southern bay window lit the high table in traditional fashion, and the other formed a porch approached by steps with the door set at right angles to the hall. The front was altered in the late seventeenth century to fit in with the newer, Classical taste for symmetry.

traditional style features:-

- **State rooms** on the first floor on the south side
- **Long Gallery.**
- centrally situated **Great Hall** with staircases at either end
- **the servants rooms** on the north side
- **a dramatic skyline** displaying massed chimney pots, gable ends and turrets.
- an enclosed or semi-enclosed **courtyard** created between the wings of the house

- **Flemish designs** were also circulating coming from Flemish craftsmen fleeing religious persecution as seen in the stepped gables or crow steps, and the 'diapering' or **diamond patterns in the brickwork.**

How was it designed?

Unfortunately there is only limited fragmentary evidence of the processes of design and the role of designer in the late sixteenth century and early seventeenth century. The 'name' architect was used but in a vague way rather than the accepted sense of a professional designer. Buildings were often built to a plan drawn up from the consultations between the principal craftsmen to be involved and the employer but much of the detail was left to those carrying out the work. In the case of some substantial houses, such as Aston Hall, country craftsmen trained as clerks at the Royal Office of Works and drew up plans for houses in which they were not otherwise involved. Sir Thomas employed one of these clerks, a certain John Thorpe of over 150 plans, elevations and architectural details. An examination of Aston Hall during the restoration work in 1982-83 suggests the house was built almost exactly to Thorpe's plans with the exception of minor practical alterations which must have taken place as the building progressed e.g. adjusting the fireplace positions to achieve a better grouping of chimneys. But Thorpe went no further than drawing up plans on paper - he may never have visited the site.

How long did it take to build?

The building work took about 17 years. The house was begun in 1618 and it is recorded as more or less completed by 1635. Sir Thomas Holte moved in sometime on 1631. Large houses like this usually took around 8 years to complete (little work could be done in winter until the roof was on). It seems likely Sir Thomas ran into financial difficulties. He would have needed an amount of capital at the beginning to purchase raw materials, and then further payments in wages, further materials equipment and so on were made as the work went on. Sir Thomas had other expenses in the 1620's and work may have stopped altogether for a time.

How much did it cost?

No accounts survive and it is difficult to estimate the complete cost of a seventeenth century house. Nevertheless by comparing the accounts of other similar houses built at that time, it seems likely Sir Thomas spent at least **£6000** on Aston Hall, its outbuildings, gardens and deer park.

Materials used to build the house

Unfortunately no accounts for materials or labour survive but a great deal can be inferred.

Bricks

Why were they used?

A number of large, and many smaller houses, were built solely using brick in the late 16th century and early 17th century.

- Its acceptance as a building material was encouraged by the newly formed **Tylers and Brickmakers Company** who were determined to bring the prestige of their craft up to the level of the stonemasons.
- Bricks were beginning to be appreciated as a useful building material.
- They were regular in shape and more versatile than many types of stone.
- They were relatively light and easy to move about on a building site.
- Brick made a strong structure when bonded together.

- There was a lack of good building stone in North Warwickshire.
- Good brick clay was in abundance.
- It was very expensive to quarry and transport blocks.
- Brick-making was relatively cheap, they could be made on the spot.
- Brickmakers' wages were lower than that of a quarryman.
- The durability of bricks meant they needed no further surface treatment, and very little maintenance.

Where and how were they made?

- It seems likely the bricks were made close to the site as was the custom at that time. This is supported by accounts from a century later which record a brickmaker being paid 'for his trouble coming to look at the clay bricks' for the park wall. There are several further 18th century references to temporary brick kilns in the park.
- A patent was taken out for a clay working machine in 1619 but manual predominated until the 19th century. They were as follows:

- In Autumn and Winter **the clay was dug** and heaped for **the frost to break it up** and make it more workable.
- In Spring it was turned and **mixed to a suitable consistency with water**, sieves for pebbles and kneaded with bare feet.
- The clay was then **hand moulded in wooden frames**
 - a charter of 1571 stipulated brick size to be 9ins(230mms) x 4 1/2ins(115mms) x 2 1/4ins(57mms).
- '**Slop moulding**' was the common method in the Midlands:-
 - the moulder **wets the mould**
 - the 'clot' of clay is thrown into the moulds.
 - a **wire** was drawn across the top to remove the excess clay.
- The bricks were turned out and dried on what was called a sanded '**flat**' before being stacked on a '**hack**' or drying platform in an **open - sided shed** to dry out before being fired. The bricks had to be thoroughly dried before being fired or they would be ruined by steam. This drying process could take from three to six weeks, depending on the weather.
- The bricks were fired in a '**clamp**' or '**kiln**' were used interchangeably in the early 17th century meaning

either structure although clamps usually referred to temporary structures of bricks stacked over channels containing burning charcoal. The stack of brick might be set in pre-dug holes or at ground level covered with turf. It seems likely that the bricks were fired in this way for the building of Aston Hall.

- It was difficult to regulate the heat, the clamp was lit and allowed to burn itself out. This process took several weeks.
- Purpose built **kilns** were fairly primitive structures at this time. The heat was drawn through the stack of bricks from underneath, they were therefore called '**up-draught**' kilns. These kilns were also fuelled by charcoal. Most early up-draught kilns required lots of fuel and wasted much of the heat.
- **Firing** changed the chemical structure of the dried, mud bricks into a fire - resistant, hard-wearing, reasonably weatherproof article. A bright red heat was required - 950 to 1150 degrees centigrade (1742 to 2102 degrees).
- Brick takes its colour from the clay used and most clays contain iron and therefore stain red with firing. **Over firing** can lead to darkened, burnt bricks. At

Aston Hall, good use of these in the Flemish style 'diapering' or 'diamond' pattern seen in the walls of Aston Hall and many other houses built at this time. Of course 'diaper' pattern depended on the brick layers having sufficient burnt ends and, as seen at Aston Hall, the diapering is irregular if the 'ends' ran out.

- Underfired or damaged bricks were used for the core of the walls.

How were the bricks laid?

They were laid in traditional **English bond** - alternate **headers** (brick ends) and **stretchers** (long sides).

- Bonding meant the bricks were laid in a **regular pattern** which gave aesthetic pleasure as well as greater strength.
- English bond is considered to be the strongest of bonds, each header is centred over a joint or stretcher.
- Iron tie rods were included to prevent the walls from 'bellying' out.

- The bricks were laid on **iron slag foundations** which came from smelting furnaces sited along the River Tame in Aston.
- **Scaffolding** was erected when the walls reached shoulder height - poles of ash or elder were lashed together with rope supporting rough cut boards.
- Bricks and mortar were taken up to higher levels by means of **barrows** which were wheeled up **ramps**, or put in buckets and raised by **simple hoists and pulleys**.
- Outside building work halted in late autumn and **partly finished wall were thatched with straw or bracken** to prevent frost shattering. Work re-started in the following Spring.

Who were the craftsmen?

- The labourers digging and preparing for the clay.
- Skilled brickmakers.
- The labourers carrying the bricks on the building site.
- The bricklayers both those skilled in constructing the walls and others with specific skills for the gable ends of chimneys.

Mortar

- A simple **lime mortar** was used to bind the bricks. It was prepared by:-
 - burning the limestone in kilns
 - mixing or 'slaking' it with water
 - beating it thoroughly
 - covering it with sand
 - leaving it to stand over winter
 - When ready to be used the lime was:-
 - mixed with sand - two parts sand to one part lime
 - water was added to mix to a suitable consistency to make a mortar to bind the bricks.
 - Lime undergoes a chemical change which causes it to set permanently.
 - Limestone was **expensive** and would have contributed significantly to the cost of the house.

Who were the craftsmen?

- the **quarrymen** obtaining the limestone with pick and axe.
- the **limestone burners** working at furnaces near the limestone quarries.

- the **carters** taking the burning limestones to the building site
- **labourers** to mix the mortar.

Tiles

- Like bricks these were also made from local clay.
- The same craftsmen made them and they were fired in the same way as bricks.
- **Ridge tiles** were formed in specially designed wooden moulds.
- The tiles were fixed by means of **iron nails** to simple **wooden battens**.
- '**Nibbed**' tiles were not made in the seventeenth century.



Wood

Where did it come from and how was it used?

"Despite its brick shell the house's structural timbers and ornamental woodwork consumed several hundred oak trees from Sir Thomas Holte's woods..." Grand Old Mansion: Oliver Fairclough.

- **Oak** was the most commonly used wood at that time. It was **strong and durable**.
- Oak trees were in abundance in the West Midlands, the shortage noted in other areas of the country in the late 16th century was not evident here.

How was it prepared?

- The principle carpenter selected the trees to be used.
- Woodsmen with axes and saws felled the trees. Horses guided the direction they fell by pulling them over when the trunk was all but sawn through.
- The trunks were sawn and roughly shaped in **saw-pits**:-
 - **saw-pits** were rectangle holes dug somewhat deeper than the height of a man.
 - the trunks were laid lengthways across the hole.

- A **sawyer** and his apprentice shaped the wood by means of a **long, two-handled saw**. The sawyer worked on top. The apprentice stood in the pit underneath the log, this was an uncomfortable position - sawdust and wood shavings fell on him as he worked.
- **Green or unseasoned wood** (wood used shortly after felling) was used for most of the structural work. But the sap in unseasoned wood dried out when in position and caused extensive warping.
- **Seasoned wood**, which was hard and unlikely to warp, would have been better but it was not easy to cut and time consuming to produce. When a tree is chopped down it is made up of at least 50% water. To **season** the wood it had to be left for a number of seasons to dry out. It took a year for each inch (two and a half cms.) of trunk thickness to dry. Efforts were sometimes made to speed up the process by soaking timber in a river or mill-pond, so the water would replace the sap, and then drying the wood in a kiln or oven.
- A carpenter would carry a certain amount of ready seasoned timber in his yard but not enough to meet all the requirements of a large mansion.

Nevertheless there would have been sufficient to use for the wall panelling, panelled doors and floor boards where use of unseasoned wood would have caused disastrous distortion.

- The conversion of a log into timber for building required the classic tools, axe, saw, hammer and wedges. For finishing the face of the timber and adze was used.
- A **framing yard** was set up on site.
- The carpenters laid out **main and subsidiary beams** with the floor and ceiling joists which made up floor frames.
- The joints were cut and all was assembled on the ground with temporary pegs before being put into the building.
- Once erected permanent **wooden pegs** called **trenails** were driven into holes drilled slightly off centre so the pegs would pull the point tightly together. Iron nails were only used in significant places.
- **The frame of the roof** is fairly plain because it is hidden above the ceilings. The only complications in the framing are caused by numerous rooflets running back from the gables at right angles to the

main ridge. The roof of Aston Hall is 'of the *through purlin type with trusses made up of principal rafters, a collar beam, a tie beam and braces with common rafters in between...*' Oliver Fairclough 'Grand Old Mansion' The placing of the roof in position was an occasion for celebration. Ale, and sometimes food was provided for the workmen accompanied occasionally by music and dancing, the 'topping off' ceremony on modern building sites is a continuation of this tradition.

- The walls were made of a **plastered frame of timber** except for those containing chimney flues which, of course, had to be of brick.



Stone

Where was it used?

Stone was used for the quoins (corner stones), gable ends, mullions and transoms in the windows (horizontal and cross pieces), the parapet, string courses, doorcases, niches and other decorative effects.

Why use stone?

A display of stone was **prestigious** if the stone was not quarried locally or was unsuitable the heavy transportation costs precluded all but the very wealthy from building solely in stone - small quantities were used instead for decorative effect. Sir Thomas Holte took this option at Aston Hall.

What type of stone was used?

- **Soft. grey sandstone** was used for the **dressings** - as this decorative stone work was called. The stone may have come from quarries on Sir Thomas Holte's estates or from a rented quarry on a neighbouring estate.

How was the stone prepared?

- A principal mason from the site was sent to the quarry to inspect the stone and select the most suitable for building. Quarrying was usually reserved for unskilled labour.
- Masons were employed at the quarry to square and roughly dress (or shape) the stones as they were quarried to cut down surplus weight and therefore transport costs. The stone was also easier to work when first broken away, exposure to the atmosphere causes them to harden.
- The roughly shaped stone was carted to the building site and further shaped by skilled masons who worked in temporary wooden huts or 'lodges'. Wooden 'patterns' were used as a guide to give uniformity of appearance.
- The decorative, carved stonework may have been commissioned from an independent mason not employed on the site - there was a long standing medieval tradition of monumental masons carving figures and tombs in their own workshops for erection wherever they were required, and this sort of independent work

continued to flourish in the sixteenth and seventeenth century.

The Workmen

- **Quarrymen** using gunpowder, picks and levers to obtain the building stone.
- **Carters** to transport the stone to the site,
- **Stonemasons** of varying skills to dress or shape the stone.
- **Stonemasons** skilled in carving decorative effects.
- **Labourers** for moving the stone about on site.
- **Setters** - masons to place the stone in the building.



Lead

Where was it used?

Lead was used for drainpipes and for drainpipe heads, strips of lead were moulded to hold the glass in the windows and lead was used for waterproofing various areas of the roof. In the seventeenth century it was the only guaranteed waterproof covering for the roof.

Why was it used?

Lead is waterproof, malleable and does not rust.

Where did it come from?

The lead probably came from the mines in Derbyshire where it was smelted - in other words impurities removed at high temperatures in a furnace. The lead was transported in sheets. Transport costs were high and it was common to re-use lead bought from local derelict sites such as disused monasteries.

How was it prepared?

The lead was heated and poured in moulds to form the drainpipes, window bars and so on.

The Workmen

- Miners extracted the lead ore in the mines.
- Furnace workers smelted the ore.
- Carters took the ore to the site.
- The men moulding the lead and fixing it on site were called plumbers.



Glass

What was it made from?

- Glass is the result of a **silica (pure sand, flint or quartz)** fused at a high temperature
- an **alkaline flux** (potash or soda) is added to make the sand melt more easily in the furnace and draw out the impurities.
- various other substances including **limestone or potash of lead** might be included to make the glass hard and waterproof.
- if the sand is not iron free it gives glass a **greenish or brownish tinge** - this is often seen in early glass
- in its molten state **glass** is very **ductile** , in other words it can be drawn out.

Where was it made?

It seems likely that the glass used at Aston Hall was made at **Stourbridge** - approx. 20 miles south west of Aston. By the early seventeenth century the use of coal for fuel instead of charcoal encouraged the growth of

the glass industry on or near coalfields, hence glass was made in the Stourbridge area.

How was it made?

The traditional method of making sheet glass was by:-

- blowing molten glass into a cylinder with the aid of a hollow blowing iron.
- the cylinder was opened out and flattened by heating it in a oven. Glass made in this fashion was called **muff glass**.

In the seventeenth century **crown glass** became popular:-

- the bubble was prepared in the normal way
- a solid rod was inserted on the opposite side to the blowing iron and the whole rapidly rotated
- the open shell formed a net disc
- when cooled the rod is removed leaving the bulls **eye'**

Crown glass had greater brilliance than muff glass. Nevertheless whichever method was used the glass was cut into small pieces. A **diamond shape** was favoured in the sixteenth and seventeenth century. These panes were set in lead strips called **comes**, which were soldered

together. The size of determined by the pliability of the lead **comes** that could not glass was be relied upon to withstand excessive wind loading.



Iron

How was it used?

Both **wrought** and **cast iron** were used.

Wrought iron has been forged or rolled.

Cast iron has been cast in a mould,

Iron was used for:-

- **door hinges**
- **locks**
- **glazing bars**
- **grates**
- **firebacks**
- **the workmens' tools**

Where did it come from?

Iron would have been mined and smelted locally.

How was it prepared?

Cast iron articles such as firebacks and some tools

were cast in a **foundry**:-

- wooden patterns were made
- the patterns were stamped in sand moulds
- molten iron was poured in to set to the required shape.

Wrought iron was shaped in a **smithy** using techniques little changed through the centuries:-

- fierce heat was required - the fire **was** fanned
- with air from a bellows.
- the iron was tempered or beaten with a hammer on an anvil. Tongs were used to hold the hot metal.

The Workmen

- **Miners** to extract the iron ore.
- **Furnace workers** to smelt the impurities from the ore in simple furnaces using charcoal to provide the heat and limestone as a flux to draw the impurities.
- **Smiths** of varying skills cast or form wrought iron articles.

