Introduction

The modern Barbican Estate lies to the north west of the city of London within the three ancient City wards of Cripplegate Within, Cripplegate Without and Aldersgate. The complex of buildings is made up of residential accommodation of 2000 flats housing some 4000 people, schools, a surviving medieval church (greatly restored), an arts centre, gardens and lakes.

As the capital city, the wealthiest and most important city in the country, it was possible to find a wide variety of building materials exploited in the area during the middle ages. However, it is generally accepted that;

*In the medieval and Tudor periods, London Houses were built out of four basic materials; stone, timber, brick and earth.*

John Schofield  *Medieval London Houses* p 135

I wish to approach earth as the use of soils suitable for tile making, and explore the sources of the above materials before contrasting their importance with the modern materials commonly used in the city today.

Transportation

The transportation of building materials to London was principally undertaken by water. Boats on the upper Thames and tributaries such as the Lea and the Medway brought bulky cargoes such as grain, stone and timber to London, and there were a great many craft ranging from flat bottomed river barges called *shoutes* to larger sea going vessels, many of which were foreign. In some cases building materials were brought into the country as ballast on such boats.

Sources of Timber

Most buildings in medieval London were built of timber. In his book *Medieval London Houses* John Schofield tells us that stone and brick examples were very rare and limited to more important buildings, such as churches and palaces. Oak was the preferred and the most prevalent timber, producing structural members, laths and boards. Other timbers used were elm, usually for boards, ash for tool handles and the uprights in wattleting, and beech for puncheons (studs) and laths.
Over 90% of all building timbers are oak…Records show oak to have been the most expensive as well as the commonest tree; other species, elm, ash, aspen – are most often found in medieval terrace houses and homes of the relatively poor.

Oliver Rackham, The History of the Countryside, p86.

The sources of the timber would depend upon the status of the individual commissioning the building works;

Oak for royal contracts would be carried out using timber from royal woods in Hampshire, Berkshire, Surrey and Hertfordshire. The leaders of the church could also rely on royal or noble assistance for large structural timbers…

John Schofield Medieval London Houses p 140

Other customers would have obtained oak from local sources. Schofield tells us that London Bridge bought timber in Lewisham, Croydon & Coddington, and obtained elm in Essex, Kent, Middlesex and Surrey. It is possible to be extremely precise about the sources of timber in the middle ages; we know where it originated geographically but also from where it came into the possession of the individual. Schofield mentions magnates such as the Earl of Kent, who had an estate in Stepney, or the abbot of Chertsey who had sixty elms at Petersham. He then goes on to say that the majority of timber must have come down the river from Kingston and identifies a distinct area associated by the mid fourteenth century with timber trade in the city.

What is curious about the sources of timber is that one might imagine its use was due to the ready availability created by the close proximity of its sources. However, it would seem that by the thirteenth century a great deal of oak and fir was actually transported over long distances, such as from the Baltic. As Rackham states;

Building materials are not always local; the medievals had good roads and used them on the slightest pretext. Trees more than 25 feet in usable length or 18 inches in diameter did not normally grow in the local woods; they were rare and expensive and were brought from a distance.

Oliver Rackham, The History of the Countryside, p87.

With the prevalence of the imported timber and the ability to purchase it for no more than the price of local timber, it would appear that whether the source of timber was local or not was immaterial. What is clear is how important timber, particularly oak, was during the Medieval period.
Sources of Stone

London has no indigenous stone; it was an expensive material that would have been transported from various locations and used principally on important structures such as palaces and ecclesiastical buildings (Figs. 4 & 5). The main stones used in London were ragstone, chalk and flint. The earliest source of stone would have been the reuse of rubble from the Roman buildings in the early medieval city;

*Large scale digging out ("robbing") of both standing and buried walls was common practice...Saxon and early medieval (pre 1200) stone churches and secular stone buildings all contain some element of re-used Roman stone or tile in their fabric...*

John Schofield, *Medieval London Houses* p 135
Ragstone is a coarse hard grey stone that was used extensively in rubble walling. It was quarried in Reigate, Merstham and Godalming in Surrey, and in Kent (hence the name Kentish Ragstone), where it was found in various places around Maidstone (Fig. 3).

Other stones that have been noted on churches and public buildings include Wheatley Stone from around Oxford, Stapleton and Huddleston stone from Yorkshire, Purbeck, Corfe and Portland stone from Dorset and Beer stone from Devon\(^1\). Stone was also imported, such as Caen Stone from Normandy.

Flint is a silica nodule that occurs naturally in chalk, and would have been transported from where chalk was quarried, such as in the Chiltern Hills to the North West of London (Fig. 3). It was used in walls where it was combined with lighter coloured stone to produce a chequerboard effect (Fig. 6).

As we can see, in common with timber, far from being chosen from a local source stone was likely to have been transported to the capital over great distances. The use of stone would, I believe, have been particularly influenced by the changing fashions of the time since it was the preserve of the wealthy, who could afford to follow the latest

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\(^{1}\) John Schofield, Medieval London Houses p135
trends. If one had the money to buy stone then it is likely that one could also afford to be selective about where it comes from. As a consequence I do not believe that the use of stone was particularly dependent on the location of its source;

Building stone was not necessarily local; stone from Barnack (Peterborough) and Box (near Bath) is found in many places up to 80 miles from the Quarry.

Oliver Rackham, The History of the Countryside, p259

Sources of Clay Roof Tiles

Roof tiles were the most local of materials used in the city throughout the middle ages. The use of tiles was forced by the building regulations in the thirteenth century, which forbade the use of thatch as a roof covering. The clay used for tiles was local, Schofield tells us that:

Tilers were to be found in St, Sepulchre’s parish, on the western fringe of the walled city by 1230, in 1275-6 tilers bought the clay excavated from the Tower moat. By the fourteenth century, tile making centres for London had moved further east. Digging for clay is recorded in Stepney in 1366…Woolwich was another production centre on a large scale from at least 1375…

John Schofield Medieval London Houses p 97

The use of clay tiles must have been widespread. Schofield interprets Stow’s remarks about slate roofs in A survey of London, 1598, as evidence of the rarity of an alternative material to tiles being used. The extensive use of tiles was undoubtedly because they were produced locally, were easy to transport and inexpensive.
Sources of Brick

The Romans introduced brick making into Britain, although it seems to have almost died out after their departure. Bricks in the early medieval period were often imported from Flanders, and Schofield tells us that they were used in great quantities in the Tower of London in 1283. However, it would appear that bricks were also manufactured in England, although not as much as tiles because their thicker profile meant that they required more firing and were more difficult to produce. Local bricks were used at Eltham Palace, Northolt Manor House, Kennington Palace and in Charterhouse, Clerkenwell, although it is interesting to note that these are all prestigious buildings, indicating that brick was still a relatively expensive material. In the case of bricks it was not the raw material that was imported, but the expertise with which to make them;

The wardens of London Bridge engaged Dutch craftsmen to make bricks at Deptford

John Schofield, *Medieval London Houses* p 150

This is interesting in itself because it suggests that it was cheaper to bring workers and expertise over from the continent to make bricks than it was to use stone for the same purpose, which is presumably the material that the bricks would have been substituting. Indeed, the main use of brick seems to be as an alternative or supplement to stone (Figs. 8 & 9), particularly in the construction of chimney stacks and party walls, which had to be made of non-flammable material under building regulations.
The Importance of Medieval Materials Contrasted Against Modern Materials

Modern materials that proliferate in the Barbican area are steel, glass and concrete. The character of the area has changed significantly in that with the exception of the Barbican it is now almost entirely commercial – very few people actually live there. This has a great bearing on the type of architecture found there.

The importance of the medieval materials contrasted with that of modern materials can be considered in a number of ways, for example;

- The importance of the material as a commodity within the building industry and a method of construction.
- The importance associated with the material as a signifier of fashion and one’s wealth and social status.
- The importance of the material to the development of building typology generally.
- The importance of the material to the local and global economy.

Modern materials are always brought from off site, and there is a global trade in materials of all kinds – stone from South America, or steel from the Far East. Since we now have far better transport links this could be considered to be a feature of the modern world. However, as we have seen above, far from being a recent trend this would appear to be simply a continuation of an age-old tradition in the transportation of materials. With this similarity in mind, it will be interesting to explore whether materials retain the same uses and significance that they had in the middle ages.

Timber, Steel and Concrete

Timber is no longer used in the same capacity that it was in the medieval world. Timber in London nowadays is mostly restricted to internal panelling and shuttering for concrete. This is, however, an interesting link, since it can be said that the timber frame has given rise to the development of the concrete frame and steel frame (Figs. 10 & 11), securing its importance in the overall development of structures. The importance of the medieval timber frame and modern concrete and steel frames are similar. They are used as the basis for a building onto which all of the other components are then placed, suspended from or supported by.

As a commodity it is still as important as ever, although we may not end up seeing the timber used in the construction of a building in the finished article as we would have done in the middle ages. As an important material in the sense of indicating the wealth and social standing of the owner or user of the building, the importance of timber, concrete and steel is also similar. They can be used in the most utilitarian of ways with no decoration or embellishment or decorated to great effect according to the prominence of its location and owner (Figs. 12 & 13).

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2 With the advent of sustainable design there is a growing interest in sourcing materials locally, although this is nowadays usually the most expensive option.

3 Although enjoying something of a renewal in popularity timber frame construction is generally no longer used, certainly not in the city. The same restrictions still apply to its use as existed in the middle ages – it is unsuitable for buildings over four storeys in height.
The tradition of pre-fabrication that existed with timber framed buildings in medieval times also continues today. Timber houses were often first assembled in the forest before being transported to and assembled on the site; exactly the same process is used in the erection of a steel frame that has been fabricated to size in an off site workshop, or the use of pre-cast concrete components (Fig. 14). The wooden jointing peg of the middle ages is the forerunner of the modern nut and bolt.

An interesting comparison can also be made between the economic status of timber in the middle ages and steel in the modern world. Much is made of the demand for oak, indeed one gets the impression that the economic and social life of the city would shut down if oak were not available to construct dwellings and business premises form it. A similar situation would surely exist with concrete and steel if they were to be in short supply. I note with interest
that Corus (British Steel) recently turned a profit for the first time in decades, surely an indicator of a great demand for the material.

**Stone**

Insofar as it is an indicator of the wealth and status of a building owner or user, stone can still be said to be used in the same capacity and have the same importance nowadays as it was in the middle ages. It is still an extremely prestigious and expensive material that is used in the most prominent of locations on important buildings to impress the onlooker and reinforce the status of the owner. Use of the material is limited to those who can and are willing to pay for it.

However, as a commodity, method of construction or material in the overall development of structures I do not believe stone is still as important today as it was in the medieval world. Its application has been drastically altered; it is generally no longer used as a load bearing material but fixed to a steel or concrete frame as cladding (Fig. 15 & 16). In this way its importance has been diminished since it no longer embodies a particular method of building – the medieval builder had the choice of a loadbearing wall in stone (or brick) or a timber frame. Stone has ceased to be loadbearing and is simply another material to fix onto a frame.
Out of all materials discussed, brick is perhaps the one that is still employed in the same way as it was in the middle ages - as an infill panel in a frame or a loadbearing element (Figs. 17 & 18). It is also still not used particularly often in the city, and even then only on ‘unseen’ parts of the building in the same way that medieval builders would have used it for chimney stacks and party walls. There are very few modern brick buildings in the city and as a result it follows that its importance there as a material is similar now to the middle ages, i.e. not particularly important.

Figs. 17 & 18. Modern brickwork infill to concrete frame, St. Bartholomew’s hospital and the Barbican
Glass

The finest glass used in London in the middle ages was generally imported from France or Flanders, although some of a lesser quality may have been produced in the wooded Weald of Kent, Sussex and Surrey, the trees providing fuel for production.

Glass was an expensive material found only in the windows of the wealthy; the poor generally had openings filled with grills or shutters. As a result of the prestige attached to glass, it followed that the larger the amount of glazing on a building, particularly coloured or stained, the richer and more important the inhabitant. This can be recognised in the large windows of the Guildhall (Figs. 19 & 20).

The invention in 1959 of float glass made it possible to create large sheets of glass for curtain walling to clad buildings. This has led an increase in the transparency of the façade, and, as in medieval times, the larger the area of glazing the greater the cost of the building. Whilst standard sheets of glass are commonplace and relatively inexpensive, larger sheets of double glazed glass such as those at 88 Wood Street (Figs. 21 & 22) are extremely expensive and represent the modern equivalent of the medieval stained glass window in a church or palace.
In this form glass has retained the same importance as a social indicator and commodity that it had in the middle ages, and due to technological advances in its use glass as a material in the development of architecture has increased in importance.

Conclusions

The evidence suggests that use of materials from local sources during the middle ages was not as important a consideration as one might have imagined, and that people used materials from a great many miles away. Timber, brick and stone were all imported from the continent, as well as transported from all over the country. This may have been because London was the capital city, but it would seem the use of materials from distant sources was common in many areas, for example;

…the choice of material is quite unrelated to whether or not there was woodland, and evidently depended on local fashions and etiquette which we cannot now explain. Cambridge had abundant easily worked stone and no local woodland; but apart from colleges it was an almost entirely timber framed town.

Oliver Rackham, The History of the Countryside, p86.

On the whole, the importance of medieval materials when contrasted with that of modern materials has remained roughly similar. Admittedly, timber frames have been superseded by steel and concrete, but it is the timber frame that has given rise to these techniques, and there are some methods of construction, such as pre-fabrication, that are common to all three. It is also difficult to imagine a building site that does not have some timber resources. Stone is still used as an indication of wealth and status, although the application of the material is very different nowadays, and the craft of the mason has largely disappeared from modern buildings. In most areas brick has grown in popularity and influence, but its use in the city is still limited, perhaps because it is simply too ordinary a material. Glass, on the other hand, has increased in popularity and importance, and continues to do so.

What is clear is that together with the sources and relative importance of materials, the same preoccupations have concerned medieval and modern builders and clients alike; the following statement is as relevant today as it was eight hundred years ago;

…the choice of materials actually to be used depended on a balance between tradition and fashion as well as between economy and extravagant display.

R.W. Brunskill Traditional Buildings of Britain p 78
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