

# HEATING IN THE LATE MIDDLE AGES

by

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This general essay on heating aims to provide examples which are proven by documentary evidence or are still visible. Most of the references are to illustrations, those to Easter visits of the Vernacular Architecture Group are given under the year and place; much of the author's own research has been done at Oxford, where he prepared a thesis on the College buildings, and at York. Open hearths, their smoke vents and louvres, side fireplaces, chimneys, braziers and ultimately the fuels they used to generate heat are all treated. The study is basically concerned with medieval evidence but with some overflow into succeeding periods. The need to extend the chronological scope is obvious; for instance, the andiron is the ancestor of all iron grates up to c.1800 when the fixed grate ultimately took over.

Many early house fires were on a central hearth which required a smoke vent or louver; this was usually replaced by a lateral fireplace against a wall which then needed a cowl, often timber-framed; this then turned into a formal timber-framed fireplace, later rebuilt in stone or brick, with a chimney. Not only do private houses need heating but so also do large institutions. Castles, which are of their nature many storeyed, have fireplaces against their outer walls; at first there was no recess for the fire as this would weaken the wall (*Wright* p. 20) and an inevitable result is a cowl to draw the smoke to a flue in its thickness, often no more than a hole in the upper part of it. Ecclesiastical buildings, like castles, are usually of stone, and some of the finest surviving louvres are above monastic kitchens, while warming-rooms and infirmaries, theoretically the only other places in a monastery where a fire was permitted, have fine examples of side fireplaces and chimneys. Oxford and Cambridge colleges give particularly valuable examples because their very good building accounts provide accurate dating.

## The Open Fire on a Central Hearth

The early fire was usually in the centre of the hall on a round, octagonal or rectangular platform, and perhaps the best account of this basic type is a chapter on the central hearth by Margaret Wood in *The Medieval House* (p. 257 *et seq.*). As late as 1368 in the city of Rome 'all lighted the fire in the middle of the house on the floor' (*Muratore Antiq. Itallicae*, vol. III, quoted T.&P. I, xvij). Heating at Oxford in every college hall from c.1350 onwards was by an open fire on a base with a louver above.

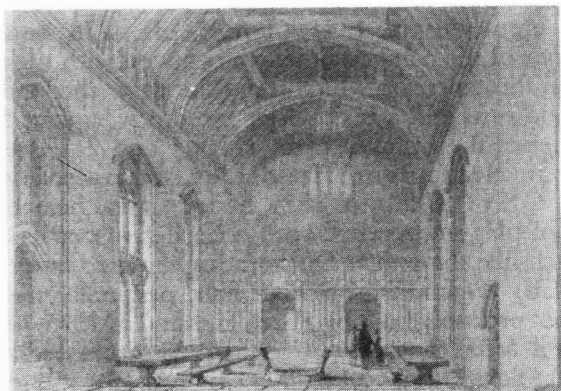


Fig. 1  
The hall and open hearth at Penhurst, Kent

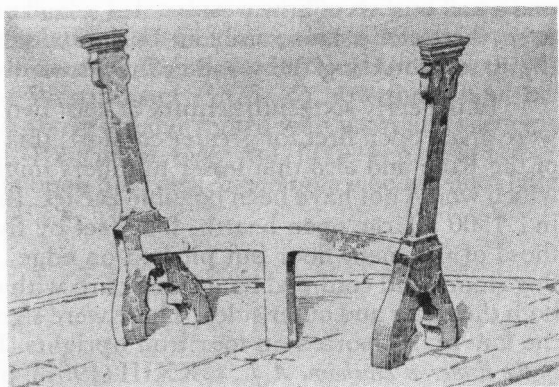


Fig. 2  
The andirons at Penhurst, Kent

Henry III (1216-72) ordered the Keeper of Woodstock Palace, Oxfordshire, to 'make a hearth of freestone, high and good, in the chamber above the wine cellar in the great court, and a great louvre above the said hearth' (Wright, p. 19). Norman Drinkwater discovered, recorded and restored an open hearth in the Old Deanery at Salisbury (1255-74) ('The Old Deanery Salisbury', *A.J.*, XLIV (1964), 41-59). His drawing is reproduced by Wood (Fig. 19, p. 50).

The most famous extant open fire, eight feet across, is that at Penshurst Kent, built for Sir John de Pulteney in 1341-49 and

given a licence to crenellate in 1341 (T.&P., II, 278 and frontispiece). The floor of the octagonal hearth is paved with tiles but with stonework in the centre on which stand the dogs; the logs were supported on andirons and a fireback or reredos was placed on the side from whence the draught came (Figs 1 and 2). The Manor of the More in Hertfordshire dated 1364, excavated by Martin Biddle (*A.J.*, CXVI (1959), p. 187), had a central hearth formed of oblong roof-tiles set on edge with a border of vertical tiles. It was very much like the one at Durham frater noted later. (cf. Wood, plate XLB) Westminster School hall, originally the Abbots hall, with a roof probably built by Hugh Herland in 1375-76 (Lethaby, *Westminster Abbey Re-examined* (London, 1925 p. 144), was in use as late as 1850 (T.&P., III, 58 & illustration p.49); it had a base for an open fire on which was a brazier and it still retains a louvre of saddle-back type, mostly original and intact.

In 1427 the open fire at New College Oxford was reconstructed; twenty large 'slats' were provided for the floor, two and a half bushels of lime were needed to make the mortar on which to set these stone slates, and four bushels of salt, probably to vitrify the base protecting the wooden first floor.

In the early sixteenth century at least two monastic refectories were given open fires for greater comfort; this implies a slackening of the Rule and also that lesser numbers might permit a practice which would not have been possible earlier. In the one at Durham in c.1500 a large open hearth, four feet by five, of clay tiles, like those of the main floor but pitched on edge, was surrounded by flag stones and confined by a stone curb with edges chamfered on both the inner and outer sides. There were signs of a canopy under the louvre, supported on four iron uprights (Eric Gee, *Discoveries in the Frater at Durham, A.J.*, CXXIII (1967), p. 69 *et seq.* and plate XIIB). At much the same date Lindisfarne Priory, a cell of Durham, also had a central hearth and an oriel window in its frater (R. Gilyard Beer, *Abbeys* (1958), p. 48).

At Cambridge there was a brazier or open fire in the centre of the floor of the halls at Gonville Hall, Trinity Hall, Corpus Christi College, St. John's College, Trinity College and Emmanuel College (Willis & Clarke, III, p. 356). The hall at Hampton Court in Middlesex (1535) had a central hearth raised on a pier of the undercroft. R.C.H.M., *Middlesex*, plate 80, shows in the foreground of the photograph, the position of the square hearth in the middle of the floor towards the east end. The louvre has vanished and the hearth has been renewed. The octagonal pier in the undercroft has four brick ribs on either side branching out to support the hearth. (R.C.H.M., *Middlesex*, plate 113; Wood, p. 257). There is a reconstruction of an open hearth from a medieval cottage from

Hangleton, in Sussex, in the Weald and Downland Open Air Museum at Singleton (near Chichester) (Harris p. 13). It is made of thin pieces of Wealden sandstone set on edge. Perhaps the most valuable example is in Wales at Brithdir-Mawr, Cilcain, Flint (1589-1642) where an open hearth of pitched brick or thin stones set on edge is preserved in the same room as the side fireplace which has replaced it (Peter Smith, *Houses of the Welsh Countryside*, H.M.S.O. (1975) pl. 52). In 1649 the hall at Richmond (Surrey) had a brick hearth for a charcoal fire in the middle of the tiled floor (Kings Works, IV part II, p. 227).

### Central Hearths in First-floor Halls

It is often considered that a first-floor hall with a wooden floor cannot have had a central hearth but this was provided at New College Oxford (1378-86) (see above) where the original wooden floor was not replaced by the present marble pavement on a vaulted undercroft until as late as 1722 (College History 81). Winchester College Hall, of much the same date and also on the first floor, had a central brazier platform and a louvre above preserved as late as 1857 (*Ingram's Memorials of Oxford*, under New College, p. 21). The abbot's hall at Westminster (1375-76) now the school hall already described, is above a cellar roofed with plain joists set close together (R.C.H.M. *Westminster Abbey*, vol. I (1924) p. 87) (T.&P. III p. 49) and had an open fire constructed on a wooden floor (Fig. 3).

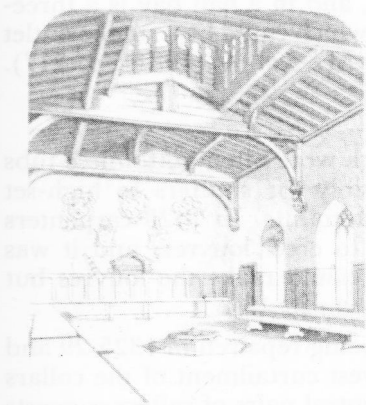


Fig. 3  
Westminster: the abbot's hall. The open hearth of this first-floor hall is constructed on a wooden floor.

### Smoke Vents

The sure sign of an open fire is a deposit of smoke blackening or soot and it is worth quoting once again the poem by Bishop Hall written in 1610:

*Of one bay's breadth, God wot! a silly cote,  
Whose thatched sparres are furr'd with sluttish soote  
A whole inch thick, shining like black-moor's brows,  
Through smok that down the head-les barrel blows.*

(quoted, Wright p.35)

This short verse is valuable for it uses the regular term 'sparres' for rafters and reiterates the fact that a cheap louvre could be made from a barrel without its ends by the coopers.

J. T. Smith discussing the mid fourteenth-century aisled hall at Nursted Court, Kent (See T.&P., II, pl. 280 and p. 282), suggested that smoke from the open fire escaped through gablets on the hipped roof at ridge level. A Wealden house at Shorne near Gravesend, Kent, had smoke vents of the same character (Barley, fig. 5, p. 27). At the Weald and Downland Open Air Museum at Singleton in Sussex, Winkhurst Farm from Chiddingstone in Kent (late fourteenth/early fifteenth century) has been reconstructed showing a smoke vent in the upper part of the gable (Harris, 6 and 7). An upper open window might also act as a smoke vent while an opposite window might allow an uncertain control of the draught (Wright 9). At Clevedon Court, Somerset (1320), there is a smoke hole in the soffit of the east window of the hall (Wood, pl. XLc). At York, nos 35-36 The Shambles has a first-floor hall with heavily sooted roof timbers; there is a range of unglazed windows at the top of the east wall, and in a half bay is a three-light opening with square mullions, which could be a smoke outlet (T.W. French in *York City*, R.C.H.M., vol. V (1981), p. 217).

### Louvres

Louvres in small houses in York were often bottomless tubs made by coopers, and ropes, possibly for shutters to high-set windows, are a regular feature in accounts. In 1425 carpenters contended with tilers for the right to erect louvres, and it was ultimately decided that carpenters should make the louvres but either craft could erect them (Swanson p. 13).

The Bedern Hall at York was being repaired in 1325-29 and in the second bay from the north-west curtailment of the collars of the scissor bracing to the three central pairs of rafters suggests that this may have been the site of a louvre for an open hearth (R.C.H.M. *York* V, p.60b, 61 and plan fig. 36). On the Old Deanery at Salisbury (1258-74) is a louvre, reconstructed by

Norman Drinkwater (Wood, p. 278, fig. 80) which is based on one at the Old Hall in Salisbury of which pictures remain.

Westminster Hall (late fourteenth century) at the Palace of Westminster has a fine louvre (T.&P., II, p. 39) which was restored by Sir Robert Smirke in 1835-37 (Colvin, *Dictionary of English Architects* 1st ed. (1954) p. 547) and was intended to be a faithful copy of the original one. Crosby Hall, once in Bishopgate, London (1466) was reerected in Chelsea (R.C.H.M. *London* II, West London (1925), p. 14) and apparently had both a central hearth and a side fireplace and a very fine hexagonal louvre. In the reconstructed building, in the middle of the fifth bay from the north is the original louvre opening but the lantern is modern (see A.W. Clapham and W.H. Godfrey, *Some Famous Buildings and their Story*, London, fig. 56. Also Garner and Stratton, *Tudor Architecture*, II, p. 218).

Horham Hall, Essex, (1502-20) built by Sir John Cutte, has a handsome hexagonal louvre (Fig. 4) with two tiers of four-centred lights capped with a lead spirelet and finial (Garner and Stratton, I, pl. XXIX; Wood, p. 279). There are not many surviving louvres in small houses but The Marsh in Herefordshire retains the base of one (V.A.G., Hereford 1968) and J.T. Smith has reported the base of a good louvre in Devizes.

One of the finest louvres remaining is the mid fourteenth-century example in kitchen of the Benedictine Abbey of Glastonbury

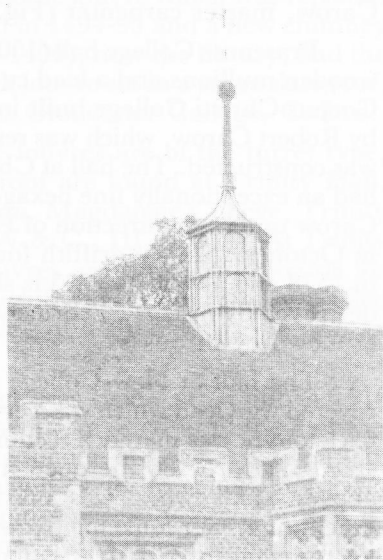


Fig. 4  
The hexagonal louvre at Horham Hall,  
Essex

in Somerset. There is a scale plan and section in Wright, p. 23, probably adapted from scale drawings in Pugin, *Examples* (vol. II, London (1836), p. 48 *et seq*; pl. I and plan, pl. II elevation and pl. III a section). There is a view of the lower or inner side of the louvre in Wood pl. XXXIXc, showing an open circle supported on ribs like a dome. Another famous louvre is that of the Durham Priory kitchen by John Lewyn, master mason 1367-71. (T.&P., II, p. 119 with a plan and interior on page 120; and Margaret Wood also gives a plan in fig. 75a, p. 250, and both exterior and interior in fig. 75b).

When David Loggan drew Oxford College halls in 1679 and Cambridge halls in 1690 they still retained their original louvres, of high architectural quality and many of them medieval (The sources for the Oxford ones are the College Bursar's Rolls for the year quoted). In general the louvre in a stone-tiled roof was of turret form and that in a lower-pitched lead-covered roof was of saddle-back type.

The hall at the Queen's College Oxford was constructed in 1388-1402 by William Brown, the master mason who built New College tower. The octagonal louvre was being built in 1400. The hall at Lincoln College, Oxford, erected in 1436-37 still retains its original louvre with ogee lights, perhaps of late fifteenth-century style (R.C.H.M., *Oxford* (1939), pl. 121a). The central hearth was abandoned and a new fireplace built in 1899 when the louvre was reopened and glazed. All Souls College hall was built in 1438-43 and had an exceptionally fine louvre built in 1501-02 by Robert Carow, master carpenter (Fig. 5).

Brasenose College hall (1509-16) had a late Gothic lantern with wooden mullions and a lead cupola over a large open hearth, and Corpus Christi College built in 1512-16 had a good turret louvre by Robert Carow, which was removed in 1741 when a new fireplace was constructed. The hall at Christ Church was begun in 1526 and had an exceptionally fine hexagonal turret louvre, made by Robert Carow under the direction of Humphrey Coke. It was mentioned in October 1529 ('a griffith for the femorale'), is shown by Agas in 1578 and as late as 1725 is shown in a drawing although it was destroyed by fire on 2 February 1719-20; it was similar to a louvre at Cowdrey in Sussex.

The hall at New College (1378-86) had a roof of low pitch covered with lead which was very advanced for the date. The saddle-back louvre was merely a section of the roof lifted on short uprights (Fig. 6). In *c.* 1380 the open fire beneath was reconstructed (see above). This work was on a wooden first floor which was exceptional, but must have proved satisfactory for over a century, as it was not until 1500-01 that a new chimney was provided for

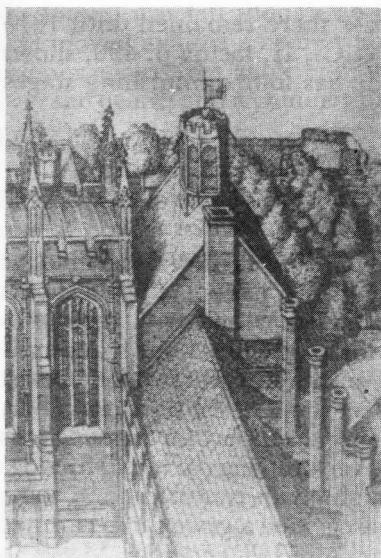


Fig. 5  
An exceptionally fine louvre of 1501-02  
at All Souls College, Oxford

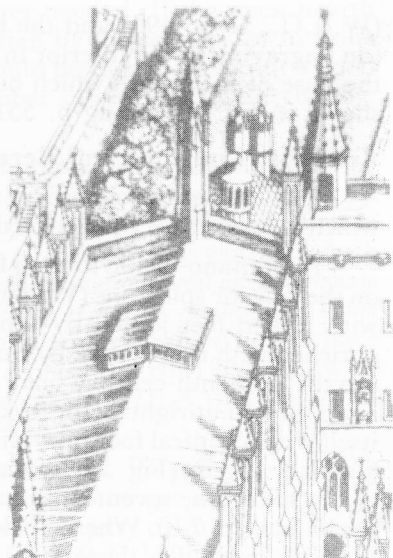


Fig. 6  
The saddle-back louvre of New College

the side fireplace which replaced the central hearth. Magdalen College hall (1474-80) also had a saddle louvre which was replaced when a side fireplace was provided in 1494-95 and a new chimney erected. Balliol College hall (1390-1400), now the library, had the remarkable feature of a saddle back louvre set in a stone slate roof, and there was a similar feature at Gloucester College, Oxford.

At Cambridge, where all the louvres are of the turret type, louvres in the centre of the hall roof are found at Trinity Hall, Christ's College, St. John's College, Magdalene College, Trinity College and Emmanuel College (W.&C., III, p. 355). At Trinity Hall and Christ's College the louvres are fitted with boards for ventilation, but in other colleges the lofty structures have been filled with glazed windows and terminate in a cupola, a spire and an iron vane.

The hall at St. John's College was being fitted out in 1516 and the brazier on the central hearth remained until the hall was enlarged in 1865 (W. & C., II reproduction of Loggan between pp. 234-35. N.B., Willis and Clark always refer to central fireplaces as 'braziers'). The great hall at Trinity College, designed in 1604-05 by Ralph Simmons, was copied from the Middle Temple, London



(W.&C., II, p. 490) and the brazier there remained until 1816 (an engraving of the interior in W.&C., II, facing p. 490, shows the base of the louvre which outside has four diminishing stages shown in fig. 36, facing p. 551).

### **Firedogs, Andirons and Reredoses**

The fittings for open fires are the ancestors of later ironwork which persisted up to the fixed grates of c.1800.

A Romano-Celtic firedog found at Voelas in Wales had loops on the side for spit-irons (Wright, p. 7). It consisted of two uprights with forked feet joined by a horizontal bar and with their tops enriched with horned heads. But perhaps the best known andirons are the sixteenth-century ones at Penshurst, Kent, which consist again of two uprights with forked feet joined by a horizontal bar, itself with a central foot providing a rigid support for burning logs (Lindsay, fig. 2) (Fig. 2). Lindsay gives drawings of many firedogs of the sixteenth, seventeenth and eighteenth centuries, and some useful facts (p. 7-9). When the dogs are joined a grate can be formed between them like those from Haddon Hall and Plas Mawr in Conway (Lindsay, p. 46 and 47) and this becomes the form of grate which continues in quite large houses until the late eighteenth century. It is interesting that some of the latest firedogs drawn by Lindsay are made by Carron of Falkirk (Lindsay, figs. 14 and 16 p. 8) who later with the Dale Company of Coalbrookdale have a virtual monopoly of producing fixed grates (Michael Owen, *Antique Cast Iron* (Poole 1977), p. 73 *et seq.*).

Another feature derived from the open hearth is the reredos; this was an iron screen or fireback put against that side of the fire from whence draughts came, to shield it and to prevent the fire flaring sideways, particularly in a timber building. The Revd William Harrison in 1577 talking about heating before his time said 'each one made his fire against a reredoss in the hall where he dined and dressed his meat' (Wright p. 36).

In 1363-66 7000 wall tiles were bought for fireplaces in the King's House at Gravesend and John Gardiner was paid for making three reredoses or backs for these fireplaces, (*King's Works*, I, p. 947). The moveable reredos became a fireback to protect the brickwork of a side fireplace and iron firebacks are henceforward an important feature. Lindsay gives drawings of firebacks of seventeenth century date mostly made in the ironworks of the Weald in Sussex (Lindsay, figs. 20-24).

### **Replacement of Open Fireplaces by Side Fireplaces**

The open hearth was usually replaced by a fireplace against a wall in the same bay, as seen at Rufford Hall in Lancashire where

the louvre was left though no longer needed. If the open hearth was moved against a stone wall, often by the screens 'or in stone regions against the gable end, it would be easy to build out a hood over the hearth and a chimney of timber and earth or stone' (Barley, p. 49).

A contract between the parishioners of St. Martin's Coney Street, York, and Robert Giles, carpenter, for the building of a row of houses in 1335 (transcript by Dr John Harvey, printed in Salzman, *Building in England* (1952), p. 430-32) gives wording which represents the perfect transition: '*quelibet camera habebit unum caminum continentem quinque pedes infra mantellum et hoc de emplastro et unum luvarium similiter*'. In other words these timber-framed houses have a wattle-and-daub structure with a plastered cowl five feet wide and above it a louvre of the same material (E.A. Gee, V.A.G. Occasional Paper no. 1 (March 1958)).

A later sixteenth-century house in Patrick Pool, York (monument 307) has a projecting end to the ground floor at the south end which was said to fit under the jetty of an end tenement of a range in Newgate (monument 290) (R.C.H.M., City of York V (1981), p. 174b and drawing, fig. 108 on p. 175). This author has always considered that there was a fireplace at this end with a timber-framed cowl which has vanished without trace, for there are only three posts to the main frame.

A two storey seventeenth-century house in Easingwold, Yorkshire, seen by the author on 20 October 1961 had a timber-framed cowl with oak studs supported on corner posts, the mortices for which remained but had themselves been replaced by lateral brick walls. The large plastered chimney carried through to the first floor and might help to keep the loft warm. A related feature is seen in the smoke bay in many Surrey houses (V.A.G., April 1975) in which a half bay, fully framed with vertical sides is open and smoke blackened up to the roof and has a first floor abutting it. A fireplace with chimney is usually fitted in the smoke bay later.

### Side Fireplaces

At the same time that the open hearth is popular the side fireplace against a wall and with a flue to take the smoke is found in monasteries, castles and houses with first-floor halls. Their development is outlined by giving some examples in chronological order.

In c.1190 the sophisticated keep at Conisborough castle in Yorkshire has fireplaces with a canopy and toggled lintel, perhaps derived from Islamic architecture, as the owner Hamelin Plantaganet was a crusader and could have admired this method



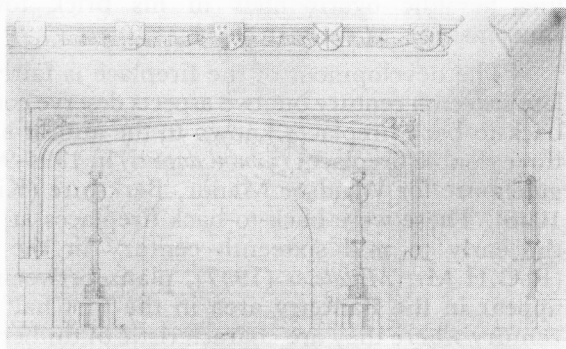
Fig. 7  
A fireplace in the sophisticated keep of  
Conisborough Castle, Yorkshire, with a  
canopy and toggled lintel, *c.*1190

of strengthening the lintel to take the weight (Fig. 7). There is a similar fireplace at Boothby Pagnell in Lincolnshire (T.&P., I, p.12). A thirteenth-century fireplace at Abingdon Abbey has stiff-leaf foliage and the remains of a hood (T.&P., I, p. 83) and a fireplace of the same date at Stokesay in Shropshire probably had a timber cowl. A late twelfth or early thirteenth-century fireplace at Rievaulx Abbey in Yorkshire has pitched clay tiles, which provide the ideal base, and the great fireplace in the warming room at Byland Abbey likewise has tiles set on edge for the hearth.

If masonry is used for hearths some stone is better than others. For example, at Oxford Teynton stone is always preferred to Headington stone, but both are superseded by brick or tile which being already baked in a kiln take the heat better.

A fireplace at Aydon Castle, Northumberland, of *c.*1270 (T.&P., I, p. 145) has a projecting head with a moulded cornice which forms a cowl, and in the same county a fireplace of *c.*1330 at Edlingham still has a cowl and also a toggled head (T.&P., II, p. 88). A fireplace at Meare in Somerset (T.&P., II, p. 40) has a very pronounced demi-octagonal cowl, tapering and supported on corbels; and there is still a cowl over fires at Caernarvon Castle and in Monk Bretton Prior's lodging in Yorkshire. But the cowl has been discarded for the fireplaces in the middle fourteenth-century Vicars' Close at Wells (Fig. 8) where the head is flush with the wall (though they still have andirons like those at Penshurst).

Fig. 8  
A mid fourteenth-century fireplace with the head flush to the wall in the Vicars' Close, Wells, Somerset



So too in the great hall at Kenilworth Castle, Warwickshire, built for John of Gaunt 1390-93, and for the large late fourteenth-century fireplace in the hall at Dartington in Devon.

A fireplace in the undercroft of the dorter at Rievaulx is of the fifteenth century and has the segmental head which persists in Yorkshire through the seventeenth century. Large fireplaces of this kind, and apparently original, were found at Cambridge at Peterhouse, Pembroke, Queens', Jesus and Christ's Colleges (W.&C., III, p. 357). Side fireplaces began to replace open ones at Oxford in the fifteenth century; there is a reference to the hall chimney in the Queen's College as early as 1472-73 and it definitely had a side fireplace by 1492-94. Magdalen had replaced the central fire by 1495 and there is the very good account of the rebuilding of one at New College in 1500-01. Salt is used when fireplaces of both kinds were built, probably for vitrification. Taynton was the best fireproof stone and the first mention of brick is in 1494-95.

There is a great fifteenth-century fireplace in the hall at Raglan castle, Monmouthshire, an early fifteenth-century one in the keep at Warkworth, Northumberland and a sixteenth-century one in the Park at Naworth, Cumberland. In 1441-42 the mantel stone for two great fireplaces in Tutbury Castle, Staffordshire, 'were painfully transported from Winshill [quarry] by a team of oxen which barely survived the journey' (*King's Works*, III, p. 848).

Brick now becomes much used for fireproof backs and there is a good original example of c. 1480 in the King's Manor at York (R.C.H.M. *City of York* IV, pl. 66a). In York the introduction of brick fireplaces and chimneys into timber-framed houses began in the sixteenth century and a new brick fireplace was inserted in the undercroft of the Merchant Adventurers Hall in 1574-75 (R.C.H.M., *City of York*, V (1981), lxxiii). Lord Cromwell had

fine heraldic overmantels in his brick tower at Tattersall, Lincolnshire, as early in 1434.

The development of the fireplace is fairly obvious from the late sixteenth century but two aspects deserve comment. The earliest back-to-back fireplaces known to the author are in a reference to three double fireplaces (*camini duplici*) in 1394-96 provided in a new gatehouse for Windsor Manor, Berkshire (King's Works, II, p. 1008). There were back-to-back fireplaces at Hampton Court in the early to mid sixteenth century in the Wolsey buildings. (R.C.H.M., *Middlesex* (1937), plans between pp. 48-49). They appear in the Banbury area in the first half of the seventeenth century where they are characteristic of timber-framed houses, for they give increased stability and safety against fire (Information *ex* R. Wood-Jones). Angle fireplaces however first appear in the late seventeenth century, a fashion introduced by Charles II who had seen it on the continent during his exile. In 1670 John Evelyn wrote in his diary 'To see his Majesties houes [at Newmarket] now building . . . many of the roomes above had the Chimnies plac'd in the angles and Corners, a Mode now introduced by his Majestie, which I do at no hand approve of' (*King's Works*, V, p. 216).

### Chimneys

A natural corollary of lateral fireplaces is the provision of '*tuellis vulgariter vocatis chymnes*' (Swanson, p. 21). At the beginning chimneys consisted of holes in the thickness of the wall, often issuing below roof or parapet level as at Aydon in Northumberland (T.&P., I, p. 148), where the circular flue had a conical roof with vent below it, but they rapidly develop many forms (Fig. 9).

A late twelfth- to early thirteenth-century chimney to the solar at Boothby Pagnel in Lincolnshire has a gabled square base on which sits a circular flue with open top (T.&P., I, opp. p. 52) and there are similar circular chimneys of *c.* 1291 at Stokesay Castle in Shropshire (T.&P., I, pl. between pp. 160-61). A chimney above the fireplace at Abingdon Abbey is rectangular in plan and has a roof on it with a gable to each face and three vents in each gable. (Parker, *Glossary*, II, pl. 32). Another monastic chimney to the thirteenth-century calefactory at the Cistercian abbey at Fountains in Yorkshire has a round flue on a square base and is open at the top, while at Easby Abbey, also in Yorkshire, the large square chimney has three weatherings in a relatively modern manner.

Leland in the sixteenth century writing about the late fourteenth-century castle at Bolton in Yorkshire, said 'One thing I much noted in the Haulle of Bolton how chimeneys were conveyed by tunnels made on the syds of the Wauls, betwyxt the Lights in

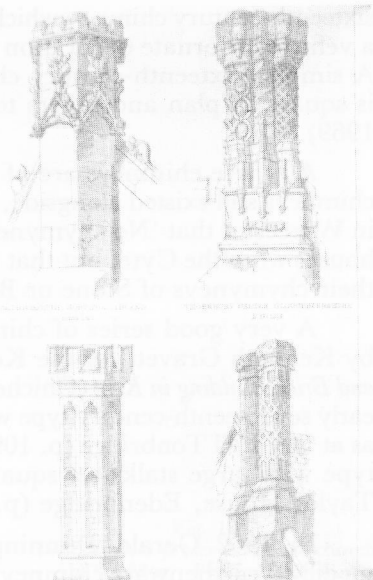


Fig. 9  
Chimneys rapidly developed many forms

the Haul; and by this meanes and by no lovers is the smoke of the Harthe in the Hawle strangely conwayed' (Quoted in Parker, *Glossary*, I, p. 102).

Lamphey, a palace of the Bishop of St. Davids has a round chimney, a form quite common Pembrokeshire. The first reference to a chimney at Oxford is at Exeter College in 1354; there is one at Merton in 1376 and one at the Queen's College in 1386-87. Chimneys continue to have roofs in the fourteenth and fifteenth centuries such as that at Bredon barn, with vents under a conical roof (V.A.G., Pershore, 1964), and one at the Vicars' Close, Wells, which has an octagonal shaft with the vents under a battlemented cornice (Pugin, *Examples*, III (1838), pl. 4).

In the fourteenth century, however, the top is sometimes open, as at Northborough Hall, Northamptonshire, where there is a fine octagonal chimney with sides enriched with gables and finials, and at the top a cornice with battlements and ballflowers (T.&P., II, opp. p. 91). A fifteenth-century octagonal and battlemented chimney at Exton, Rutland, drawn in the same illustration is similar but less ornate. There is a good octagonal chimney at Throckmorton Court (V.A.G., *Pershore*, 1964) which is open with a battlemented cornice, and those of a series at Oxborough Hall, Norfolk, are also octagonal with battlemented tops.

A fine chimney at Thornbury castle in Gloucestershire has enriched sides, is dated 1514 and is the forerunner of the typical

sixteenth-century chimney which is often stellar in plan and becomes a vehicle for ornate decoration (T.&P., III, part I, opp. p. 120). A simpler sixteenth-century chimney at Rosscarrock, Endillion, is square in plan and tapers to the open top (V.A.G., *Cornwall*, 1969).

All these chimneys are of stone or brick, but timber-framed chimneys still existed alongside, for in 1467 an ordinance was issued in Worcester that 'No chymynes of Tymber be suffred in thacched houses wтын the Cyte, but that the owners do hem away and make their chymyneys of Stone or Bryke' (Swanson, p. 35, note 106).

A very good series of chimneys in Kent has been published by Kenneth Gravett for the Kent Archaeological Society (*Timber and Brick Building in Kent* (Chichester 1971) and illustrates the typical early seventeenth-century type with stalks, square and set diagonally as at Dry Hill Tonbridge (p. 109) and the later seventeenth-century type with large stalks set square as at Biddenden (p. 55) and at Taylor House, Edenbridge (p. 61).

In 1962 Gerald Dunning wrote a very useful article on medieval earthenware chimney pots and louvres (*Studies in Building History*, ed. Martyn Jope, London (1962), pp. 78-93). Many of his examples are from Sussex and they usually have an open top and a thickening at the base for secure fixing on the roof. Some of them are louvres like the one found by Martin Biddle at The More in Hertfordshire (p. 84) and are noted as being 'used on the ground floor hall or manor house with an open timber roof'. Dunning associates them with a change in roofing materials and in particular with the grave risk of fire in timber-framed houses as most of the early roofs were of thatch or of oak shingles.

### **Braziers**

It has long been the author's opinion that despite apparent lack of heating in medieval churches and other buildings, the mortification of the flesh was never as great as is sometimes supposed. The Oxford chapels certainly had braziers and the author has slept in caravanserai in Persia in brick vaulted rooms, with the outside temperature much below zero, but adequately heated by charcoal braziers. (V.A.G., E.A. Gee, *Occasional Paper no. 1* (March 1958)).

A few braziers still remain in parish churches. There are two in St. Mary Barking in Suffolk (H. Munro Cautley, *Suffolk Churches* (Ipswich 3rd edition 1954), pp. 221 and 296) which are of wrought iron, stand on tripods and consist of round bowls with perforated lids with handles (Fig. 10). A very good fifteenth-century brazier remains at All Saints Hilborough church in Norfolk (H. Munro Cautley, *Norfolk Churches*, Ipswich (1949), p. 208).



Fig. 10  
Two braziers preserved in the church  
of St. Mary, Barking, Suffolk

The will of Reginald Bawtre of 21 November 1429 left '*unam pilam enneam vocatam a dry chauffuar*' for the High Altar at All Saints North Street, York. (*An Old York Church, All Hallows North Street*, ed. Revd P.J. Shaw, York (1908), p. 90).

Heating in the earlier chambers in the colleges at Oxford was always by charcoal brazier and in 1459 there is a reference to a louvre above a chamber at Merton to take away the fumes. At Cambridge the fire on the open hearth was often formed on a brazier and Trinity College paid £12 for a hall brazier as late as 1702.

In 1530-40 braziers were used to dry out newly-fitted rooms for immediate occupation by Henry VIII (King's Works, IV part II, 1485-1660, p. 22). At Holdenby in Lincolnshire in 1610 a document states that 'a cradle of iron is wanting to those rooms . . . which have no chimneye in them' (Information *ex* Muarice Barley, 1958). Margaret Jourdain (*English Decoration and Furniture of the Early Renaissance*, London (1924), p. 5) pointed out that the long gallery in many houses must have been especially difficult to warm in the winter and the fireplaces were supplemented by braziers which were portable; at Knowle in Kent these still stand in the rooms in which they were used, and as late as 1766 a 'brasire' was provided for the library at Windsor (Windsor Castle, II, p. 521). Lawrence Wright gives illustrations of braziers of many forms (Wright p. 30).



## Fuel

It is imperative when speaking of heating to consider the fuels, for the material burnt has a direct bearing on the type of fire and its fittings.

Timber is a basic fuel, but the character of the wood varies a lot. Ash is probably the best wood for it burns with a clear hot flame. Cherry is excellent and beech gives an even heat, while plane, willow and hornbeam are all good. On the other hand chestnut blazes fiercely with a lot of sparks, elm is sulky, and resinous woods (the conifers) are bad fuel, throw off sparks and produce black smoke. Oak is seldom considered for fuel but the lesser branches make good kindling (Wright, p. 11).

Charcoal, made by reducing wood, is excellent for its heating power, is smokeless and was used most for braziers, but it produces carbon monoxide which is dangerous in badly ventilated rooms. 'Carbonum', the word so often found in mediæval accounts, usually means charcoal unless qualified. In 1504 a York Minster expense minute '*pro xj skepe carbonum ligneorum pro le fynyng plumbi*' (Y.F.R., p. 93) explains itself, and in 1527-28 an entry '*pro diversi saccis carbonum de Waikfeld*' is qualified by '*et saccis carbonum vocatum charcoal*' (Y.F.R., p. 103).

In certain areas peat when dried burns readily and smoulders without a blaze (Wright p. 63). It forms in waterlogged areas through vegetation deposits which lack oxygen; further pressure would turn it into brown coal, which is found in northern Persia but is not common in England. A modern theory is that the Broads in Norfolk are the result of peat digging rather than clay pits for brick.

Furze and dried cowpats have been used as fuel in many areas. Maurice Barley has identified 'dythes' as cowdung for fuel (Barley, 152) and records that Thomas Stone, vicar of Bilsby in Lincolnshire had a stock of dythes in c. 1604 (Barley, p. 94) and that Roger Milner of Langtoft in the East Riding of Yorkshire was likewise burning cowdung (Barley, p. 171).

'*Carbonum Maritimum*' however is the mediæval term for coal in the modern sense, because it was carried by sea from Newcastle to London and elsewhere and the description then passed into use for any coal. In 1234 the freemen of Newcastle were allowed to mine coal as a right and in 1306 the use of coal in London was forbidden because of the fumes (even industrial chimneys were not very tall) but the law lapsed due to the growing shortage of wood (Wright p. 62). In 1272 there were references to four pits of 'sea coale' in the manor of Sedgley in Staffordshire (probably in Bradeley), in 1291 there was again a mention of 'mines of sea coal'

in Sedgley, and in 1315 Juliana de Heronsville granted land in Bradeley, near the coal pits, to her daughter Johanna de Wednesbury (Lawley, *History of Bilston* (Bilston 1893), p. 249). On 24 May 1401 the author's ancestor William de Perrye gave to John his son a piece of land with two coal pits on it in Bilston (Lawley, *ut supra*, p. 249).

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