

# The early-modern carpenter and timber framing in the rural Sussex Weald

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*The 16th and 17th centuries witnessed the peak of post-medieval iron and glass production in the Sussex Weald together with an upsurge in the building and re-modelling of local houses on such a scale that it has been called by some historians 'The Great Rebuilding'. The link between iron, glass, and construction was the wood and timber industry, which utilized an ancient form of woodland management to provide charcoal for the furnaces and oak for the timber-framed buildings characteristic of the region. There is evidence to suggest, however, that timber from woodland sources was not as freely available as might be thought, and that the use of hedgerow trees, especially for the smaller vernacular house, was a viable alternative. It is possible to tell from tool marks on timbers in a surviving building not only what type of tree was used and how it was worked, but also how many were needed to complete the frame. These facts reflect on the local availability of building timber and thus the contemporary management of timber supplies. The life and work of the carpenter, the figure at the centre of the wood, timber, and construction industries at this time, are not so easily understood. In the absence of written accounts probate inventories have been taken as the most revealing source of information on standards of living and work practices and in the process have added considerably to what is already known of the rural Wealden artisan in early-modern Sussex.*

## INTRODUCTION

The study of small domestic houses, both as historic structures in their own right and as a cultural context within which men and women have lived their lives, has been attracting increasing attention from historians over the past 50 years or so. Before this, general assumptions about the social and economic health and wealth of the population were drawn from studies of castles, ecclesiastical foundations, and the great houses of the country, with little value being placed on what could be learned from the more modest dwellings of town, village and countryside. Nor were any detailed regional studies attempted until the 1950s, when the value of local vernacular studies began slowly to be recognized. These were spearheaded by the work of Sir Cyril Fox and Lord Raglan in Monmouthshire, W. G. Hoskins in Leicestershire and the East Midlands, and Maurice Barley in Lincolnshire and Nottinghamshire, and led eventually to the formation of the Vernacular Architecture Group in April 1954 with the aims of encouraging and supporting detailed work on pre-industrial buildings.<sup>1</sup>

Fortunately, the study of vernacular architecture in a regional context now enjoys wide appeal and

plays an increasingly significant part in social historical research. This is important, since each part of the country possesses its own distinct vernacular style developed from the combination of natural resources to be found in its particular geological region. In the Sussex Weald, the clay soils have supported not only the manufacture of bricks and tiles but also the growth of oak for timber, and in terms of structure it is almost impossible to overemphasize how crucial timber framing was in the construction of its smaller vernacular domestic buildings for at least 700 years. The timber which provided the raw material for the frames was locally obtained and worked, and the way in which it was grown and harvested had a profound effect both on the physical appearance of the landscape and on its economic health and viability. Timbers in surviving buildings offer a unique opportunity for the practical interpretation of their provenance. The quality of the timber itself and the workmanship it displays furnish valuable information relating to the means and position of the occupier of the house (whether owner or tenant). The type of conversion from the parent tree (whether a whole tree was used or a larger tree halved, quartered or diminished even further) will indicate whether the tree was coppice- or hedgerow-



Fig. 1. 16th-century carpenters at work (Jost Amman's *Book of Trades*, 1568).

grown, which in turn has further implications regarding the state of local woodlands at the time of building. The method of conversion (by hewing, cleaving, or sawing) leaves a permanent record on the timber of how the early-modern carpenter worked and of what tools he used.

During the 16th and 17th centuries in the Weald, woodland management, felling, timber working and transport provided an almost constant source of employment for local people, and produced not only wood for their hearths, tools, and fencing, but also charcoal, the fuel of the iron and glass industries. Much research has been published on the history of these industries, which, although unsustainable in the long term, were crucial at the time to the economy, development, and conservation of the region and endowed it with a distinct and enduring character.<sup>2</sup> The timber industry itself, however, has not hitherto been studied in such depth. As a result, the research on which this paper is based was undertaken to try to discover, from the study of both standing buildings and documentary evidence from the 16th to the 18th centuries, what sort of trees the

timber for construction in the rural Sussex Weald came from, how the trees were turned into timber, how the timber-frame tradition developed in the region and something of the life and work of the carpenter, the key figure who transformed the raw materials to hand into the many domestic dwellings which still survive in the landscape today.

#### WOOD AND TIMBER: THE TREES OF THE SUSSEX WEALD

For the timber industry in the Sussex Weald the 300 years between 1500 and 1800 saw what was arguably the most productive period in its history. Naturally well-endowed with trees from the time of the last ice age, the region had for some time been settled and exploited, albeit in piecemeal fashion, by the early years of the first millennium, and it was oak in particular which flourished on the heavy clay soils and was utilized by early man for fuel, fencing, the making of tools and the building of houses (Fig. 1). The management of trees of most broad-leaved species by coppicing to ensure a renewable and sustainable crop of wood and timber at regular intervals was a skill well understood and practised from prehistoric times. Coppicing involves the cyclical felling of young trees close to the ground and then allowing new shoots, or spring, to grow up from the stump. This not only ensures an almost constant supply of small-section wood which can be harvested again and again once it has reached an appropriate size, but also provides, because of the peculiar nature of its growth in a woodland setting, the perfect environment for the nurture of trees suitable for building timber. As the coppiced wood, or 'underwood' grows up between felling, it forces any uncut saplings around it to grow more swiftly than they would in the open in order to compete for light. The result is tall, straight trees beginning to form a crown well above the level of the coppice, unable to throw out lower branches because of the close proximity of the underwood, and producing the ideal material for the timber frames of buildings (Figs. 2 & 3).

The amount of documentary evidence in Sussex concerning the supply of timber by lords of the manor to their tenants is disappointingly small, but where it can be found, it tends to support the view that timber for building and repairs was only infrequently granted from managed woodlands; much of it came instead from hedgerows and shaws,



Fig. 2. Oak trees growing amongst coppiced underwood near Kirdford, West Sussex.

in the majority of cases free from any charge. Shaws, or rews, were (and still remain today) a distinct characteristic of the Wealden countryside. They are small areas of woodland, more or less linear in shape, found bordering a highway or fields of between two and four acres, often between 30 and 50 feet wide and containing standing deciduous trees as well as up to 20 species of other shrubs and woody plants. Records of similar strips of woodland known as 'hays' — 'small, hedge-girt woods' — have been found in the customals of the Forest of Knaresborough in Yorkshire dating from the 13th century.<sup>3</sup> Recent research into the construction of the smaller early-modern house of the Sussex Weald, including the study of one late 16th-century house in some detail, has suggested that the use of hedgerow and shaw trees was a viable alternative to the use of managed woodland, and the general lack of surviving records for the grants or sale of woodland timber for building indicates that it was an alternative commonly adopted.<sup>4</sup> In fact, a great deal can be discovered about the provenance of timber simply by studying its



Fig. 3. Coppice with standards, Ifold, West Sussex, shortly after felling.

characteristics in surviving buildings today, so that even where records are sparse or non-existent, it is possible to say where in the landscape a tree came from, how it was worked, and, from the quality of both timber and carpentry, what might have been the status of the person who had commissioned the building. Following the example of Oliver Rackham's work on Grindle House in Suffolk, the survey of Butts Cottage in Kirdford in the Sussex Low Weald revealed not only practical information which enabled many conclusions to be drawn regarding the cottage's original construction from trees in the local landscape, but also underlined the value and importance of undertaking such research into the structural content of buildings.<sup>5</sup> Properly interpreted, ancient buildings can provide invaluable information about their construction that cannot be found elsewhere, and it is hoped that similar research in other parts of the country will lead to a wider understanding of timber provenance and its usage in construction both locally and generally.

Examples from customals and accounts of manors



Fig. 4. A 16th-century timber frame under reconstruction (Poplar Cottage, the Weald and Downland Open Air Museum, Singleton).

such as Shillinglee, Framfield, Amberley, and Ferring and Fure all reveal an accepted right that any man could without penalty fell hedgerow trees on his own holding when timber was required.<sup>6</sup> A survey of the Manor of Shillinglee in north-western Sussex made some time between 1547 and 1570 recorded that:

Our custom is that if any Tenant wanteth any timber for the reparation of his Holding that then he shall take to him a Carpenter and three or four of the Tenants and go upon his Holding and take so much timber as shall be necessary and needful for his said Holding without waste and to present the same how it is employed upon the Holding at the next Court.<sup>7</sup>

It is probable that there were other manors such as Warminghurst, which has been studied in depth by Currie, where the lord gave standing timber grudgingly and only when there was no reusable material to hand.<sup>8</sup> Since it was an obligation to find timber for tenants to build and repair their houses, whether that timber came from woods, hedgerows or dismantled barns, it is understandable that the lords would prefer to dispose of the manors' less valuable assets before granting trees from their woodlands to their tenants.

Properly interpreted, ancient buildings can provide as much information about their construction as the most detailed contemporary documentation (Fig. 4). Though Currie argued that 'the survival of early buildings is random and unrelated to their original quality', and that the value of standing buildings in

reflecting past numbers should be questioned, the inescapable fact is that these buildings do survive. Regardless of any deeper significance that the ratio of survival over destruction may have for the actual period of building in question, they survive in sufficient numbers to make an investigation of their history a viable exercise.<sup>9</sup> Gulley was convinced by his study of Wealden timber-framed buildings that:

there are in the Weald many more houses built between 1570 and 1640 than in any period of comparable length before or afterwards, and most

of the older surviving buildings incorporate substantial structural alterations carried out between 1570 and 1640. This process affected both High and Low Weald.<sup>10</sup>

#### THE CONVERSION OF TREES TO TIMBER

From the earliest days of permanent settlement, the selection of trees for building in the Weald was a highly organized process. The commonest woodland timber tree in England had long been the oak, which grew well on the Wealden clay, so well that it has now become the best-known symbol of the Weald. However, its dominance probably results from the diligence of early woodsmen in encouraging its growth for timber at the expense of its less favoured competitors rather than from natural selection. In medieval times, a carpenter would have had an abundant supply of small oaks of less than 50 years' growth, and would have cut out, or converted, his timbers from the smallest tree available for the job.<sup>11</sup> For the best building timber oaks were usually felled when they were between 15 and 70 years old and if a tree happened to be of a particularly irregular shape, it was quite normal for some sapwood and bark to be left on the finished baulk if removing it would result in a significant reduction in its dimensions at any point. This did make the finished members more susceptible to beetle, which will normally only attack the bark and sapwood of oak, but care was generally taken to place these timbers away from the effects

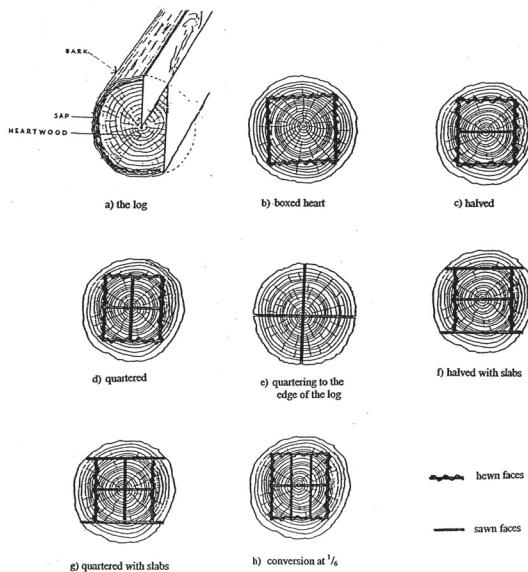


Fig. 5. Types of timber conversion.

of weathering in situations that were dry and well-ventilated. The fact that many surviving medieval — and indeed post-medieval — buildings have bark on their timbers may indicate that bark was only a minor by-product at this time; its value did not increase until the period after 1750 when the tanning industry reached its peak. Timber is best felled in winter when the bark is not easily removed, and this has generally been traditional British practice, since it is easier to select trees for size and quality when not covered with foliage. Indeed, felling trees in winter causes less damage to the surrounding young growth: there is less undergrowth to impede access and movement and the trimming of branches is less difficult when the leaves have fallen. For tanning use, however, bark must be removed in spring, and by the early 18th century the end of April was considered the best time.

Carpenters preferred to use oak unseasoned, or 'green', mostly because it is up to 70% easier to work than that which has been left to dry out and harden before conversion. This term, used when talking of trees becoming timber, is a process considered in two different ways: the *method* and the *type* of conversion. The *method* refers to the physical treatment of the tree: whether the timber is cleft or hewn by an axe, or sawn, with each process leaving easily distinguishable tool marks on its surface. The *type* refers to the part of the tree or section of the log that is used to make

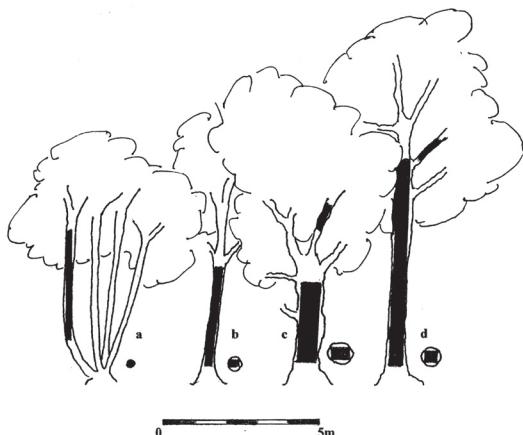


Fig. 6. Conversion of trees for wood and timber.

up the finished timber: for example, boxed heart (a log with the bark removed and the edges squared up with an axe or saw to form a beam or post); halved (as boxed heart, but the timber then cleft or sawn in two); quartered (halved and then halved again); or radially cut — the tree trunk sliced again and again at an angle to produce planks (Fig. 5). It is quite common to find different types of conversion from different parts of the same tree, with rafters and studs being taken from the tops of trees where the diameter is smaller and posts and planks from lower down (Fig. 6). In the earliest surviving buildings, most timber used was boxed heart; the change to timbers halved, quartered or cut through-and-through by sawing which became common in the post-medieval period actually began in the 14th century, but seems to have been adopted only very gradually.

There are, unfortunately, no relevant surviving accounts of the construction of Wealden timber-framed buildings for this period, although records of the cutting of coppices and the sale of wood can frequently be found well into the 18th century. However, the lack of evidence for the supply of building timber from managed Wealden woodlands in the 16th and 17th centuries, especially for the small-to-average sized house, does not mean that there was no other local source of material, since the shorter, stouter, slower-grown trees of hedgerow and shaw were a readily available alternative to trees specifically managed for the purpose. These hedgerow and shaw trees, growing as they did with relatively unrestricted light and space and throwing out side branches at low level, produced timber that tended to be knotty and comparatively difficult to



Fig. 7. Oak tree growing at the edge of a small shaw at Kirdford, West Sussex today: about 70 years old and with the crown beginning to form at about 4 metres from the ground.

work. (Fig. 7) Despite this, and the fact that their average usable trunk length was only of 12 to 14 feet, there is evidence to show that even these trees were considered valuable, sometimes being cut into as many as six or eight sections to form posts or beams. The presence on them of sapwood and even bark indicates that the maximum amount of timber possible was being taken from the tree.<sup>12</sup>

The implications of the fact that houses were constructed in the Sussex Weald towards the end of the 16th century of 'wild' hedgerow timber rather than of timber 'cultivated' in a wood are important for the support they give to the view that there may have been a local shortage of timber at the time. It must be made clear, however, that this was a shortage of building timber, not of coppice wood; the latter was being extensively and efficiently managed to provide fuel for the glass and iron industries. There is little evidence to suggest that any of the industrial sites suffered from a lack of supply (apart from some of the glass workings, which tended to use beech, a less common Wealden tree, as fuel). From early times coppices in the Weald were concerned with producing 'wood' — that is, anything harvested below about six inches (150 mm) in diameter or

24 inches (610 mm) in girth, not timber, and in medieval times fuel was a particularly important product, while only a secondary interest was shown in the timber. 'Wood' was titheable, 'timber' was not. Timber was generally considered as a long-term reserve of material or capital for use in an emergency, even though it must have been in demand for building and repairs. By the 16th century both green timber and wood had long been scarce in the Downland, which frequently sourced its needs from the Weald. Timber, generally sawn in the form of laths, posts, beams, and planks, was also exported in quantity from the Weald to other English towns through the ports of Rye, Winchelsea, Hastings and Pevensey, and Wealden timber was sometimes shipped to London ready mortised as frames to erect houses.<sup>13</sup>

Legislation passed in the 16th century to protect woodland trees — much of which specifically exempted the Weald because of its proximity to London and importance to the iron industry — shows an awareness that the management of coppiced woodland could be detrimental to the timber trees growing within it. It is easy to imagine that when the demand for underwood was high, landowners might deliberately fell or fail to replace within woodlands standard trees which would have been seen as taking up space and resources at the expense of the coppice. Even if timber within the Weald was relatively plentiful, it may not necessarily have been accessible: many of the roads on the heavy clay that were notoriously bad at the best of times would have become impassable after use by the iron-working traffic throughout the winter months. The lack of documentary evidence for the sale and granting of timber at a time when record-keeping generally was improving, may therefore indicate not only that landlords were reluctant to grant woodland trees to tenants when there were hedgerow trees available on their holdings, but also that the woodland trees themselves were in short supply. There is no body of evidence to show that the Weald between 1500 and 1800 was a region full of woodland timber being freely bought, sold and granted, whereas coppice wood can be seen to have been plentiful and in continued production even after the demand for fuel for industry ceased. Evidence of the use of hedgerow trees in the construction of the smaller Wealden house is particularly interesting in that it has revealed economy in the use of timber being practised during one of the most prolific times for construction in one of the most densely-wooded regions of the country. It

is the larger house and barn of the time that display the longer spans of straight timber that would have required the use of woodland trees and for such buildings they were undoubtedly reserved.

### THE GREAT REBUILDING DEBATE

The early-modern period, which saw an increase in timber-frame construction throughout the Weald, is a period of unique importance in the history of vernacular architecture generally. Much of the work published on regional studies during and since the 1980s has tended either to support or refute the theory put forward by W. G. Hoskins that the late 16th and early 17th centuries in England witnessed a period which he termed the 'Great Rebuilding'.<sup>14</sup> This theory was based on observation of a selection of surviving buildings in various parts of the country which had either been totally or partially rebuilt between 1570 and 1640 and which saw, during the same period, a marked improvement in the standard of household furnishings and equipment. There was also a wave of construction on previously unoccupied sites, and although this included many poor cottages on marginal or 'waste' land, the average occupiers of new buildings belonged to an emerging 'middling class' of yeomen. They were able, in a time of internal peace and prosperity, to enjoy security of tenure, low fixed rents, and high selling prices for agricultural produce, and now demanded the standards of comfort and privacy previously only achieved by the upper classes.

Hoskins's views of a national Great Rebuilding were fully supported for the Wealden district by Gulley, although he did make the point that alterations to buildings were not always complete or consistent within a given local area, and that new ideas rarely affected the original ground plan in a radical way.<sup>15</sup> Mason chose to call the 16th- and 17th-century rebuilding in the Weald the 'Second Great Rebuilding', since he felt that the first rebuilding had occurred there in the 15th century.<sup>16</sup> By 1977, however, historians of vernacular architecture were beginning to dispute altogether Hoskins's conclusions, which appeared to be at variance with new archaeological evidence relating to the accurate dating of buildings.<sup>17</sup> An increasing ability to ascribe buildings to a specific construction date cast doubt on the somewhat arbitrary classifications which had been made in the past — sometimes on no firmer evidence than that of a dated stone attached to a building.

Without accurate dating it was obviously not possible to confine any period of apparent rebuilding within specific limits. Furthermore, the whole hypothesis of the number of surviving buildings being a true reflection of the number originally built came into question. It was even possible that groups of dated buildings might not represent a sudden upsurge in building activity at all, but were merely a snapshot of a lengthier, more consistent process of expansion whose only remarkable attribute was the fact that so little permanent building seemed to have been achieved in earlier years. Many historians, therefore, considered that it was the emergence of the desire and ability to construct vernacular buildings for permanence that was the crucial 15th-century precursor to the concept of a Great Rebuilding in the 16th and 17th centuries, a major step from medieval to modern living which primarily involved the replacement of the open hearth by a chimney and the insertion of upper floors.<sup>18</sup>

Whether the term 'Great Rebuilding' can be seen as a true reflection of the increase in construction or not, these changes in building techniques, which began around the end of the 16th century, were to have a profound and permanent effect on the way in which the timber-frame tradition continued to develop. Once the insertion of chimneys had enabled the building of entirely two-storeyed houses to become predominant, the plans of average-sized domestic dwellings were to change very little until the advent of brick and the two-pile Georgian house of two adjoining ranges, the one situated behind the other. Construction still continued to make use of the medieval system of building in bays, and although the basic form remained constant, the use of space began to alter with more emphasis being put on upstairs rooms. Carpenters began commonly to use larger trees and to cut them down into smaller component parts rather than choose the right-sized tree for a particular member as in earlier times. The considerations both of fashion and of cost became more important, the two merging with the eventual adoption of tile-hanging and weatherboarding which were both used to conceal inferior timber framing.

### THE LIFE AND WORK OF THE RURAL SUSSEX CARPENTER

Recognition of the importance of the timber-frame tradition in the Sussex Weald leads naturally to consideration of the carpenter as the central figure



Fig. 8. The tie beam lap dovetail joint.

within that tradition, since in most cases, particularly with regard to smaller domestic buildings, it was he who converted the trees for their construction and who, in true vernacular fashion — without architects' plans or drawings or imported building materials — determined the style and layout of a house from a combination of his own experience and the materials which were to hand. Whether the concept of a 'Great Rebuilding' is accurate for the Weald at this time or whether the region simply maintained a steady increase in its housing stock from the late Middle Ages to the end of the 17th century, it is inescapable that the period did see a form of revolution in house building and reconstruction. In the main this concerned the introduction of the chimney in smaller domestic buildings, which in turn allowed for a greater division of space within the house and more privacy for its occupants, and the increasing availability of cheap window glass. Despite the carpenter's central role at this remarkably productive time, to date little has been published on his life, and few records of his work exist outside London. The most authoritative source is Salzman.<sup>19</sup> In his definitive study of medieval buildings and building techniques he used documentary sources to

cite many examples of carpenters' work on timber-framed buildings including their wages, tools, and organization. Although his examples are early and deal with a largely urban workforce, they provide a sound background on which to build a picture of the less well-documented artisan of later times. Carpenters' tools are fairly well understood, as these have been extensively studied, but since carpenters did not, at least prior to the 19th century, keep diaries or leave behind them detailed accounts, the evidence of how and where they worked, particularly in the sphere of house building, is sparse.<sup>20</sup>

Carpenters do not appear to have been itinerant (unlike stonemasons and possibly sawyers), and since all buildings, even those constructed largely of stone, contained timber in their roof supports, joists, floors, doors, and windows, it is probable that there was always plenty of work in each locality for resident carpenters well into the 19th century. Usually two carpenters and a boy would work on an average-sized timber-framed house and it would have been possible for a five-bay structure to be built in about three to four months. Whether the material for construction came from managed woodlands or from tenants' hedgerows, the majority of timber-framed buildings in England constructed following the Norman Conquest conformed to a recognizable formula that was to remain unchanged in its basic essentials from the 11th to the 19th century.

It is evident that the skills employed in traditional timber-frame construction, even in small and insignificant buildings, were highly developed. A good example of this can be found in the use of the 'tie beam lap dovetail joint', a complex assembly of tie beam, post, principal rafter and wall plate, which, although described by Harris as 'not even particularly good at its apparent job', appears to have been used with dogged persistence in virtually every secular timber-framed building (excluding those with cruck frames) down to the 19th century (Fig. 8).<sup>21</sup> It would appear that the uncompromising consistency which saw the same technique survive for more than seven centuries underlines the fact that carpentry was very much a tradition rather than simply a craft. Perhaps being able to construct a tie beam lap dovetail joint was one of the criteria on which a carpenter's skill was judged. Today, a study of timbers in surviving buildings can reveal not only the techniques of framing, but also some of the more obvious aesthetic skills possessed by the carpenter: the ability to match timbers within a

frame or even within a whole building; to produce a hewn face as smoothly worked as a sawn one; to be consistent in the use of assembly marks; to make joints neatly so that they remain close and true over time; to place timbers with bark or sapwood away from general view or from exposure to the elements with the fairest face visible from exactly the right viewpoint. It is, however, one of the difficulties in studying anything but the most practical aspects of early-modern carpentry that even when it is known *how* certain techniques were employed, it is often impossible to say exactly *why* they were employed, especially when there are examples of different solutions to the same problem of construction to be seen in other parts of the country or in timber-framed buildings abroad.

It is also difficult to make an accurate assessment of how much the rural Sussex carpenter would have earned, but it is likely that his wages would have been fairly consistent with those recorded in other parts of the country, apart from London and other cities or where particularly important works were under way. The wage of 5s.6d. for four days' carpentry recorded at a Buckinghamshire farm in the mid-17th century was about the general average at 1s.4½d. per day: a skilled worker could have expected around 1s.6d. and an unskilled worker 1s.<sup>22</sup> This had increased from 4d. per day for unskilled and 6d. per day for skilled workers in the late 15th and early 16th centuries, mostly owing to increases in the money prices of goods and especially foodstuffs. By the early 17th century, however, the purchasing power of building craftsmen and agricultural labourers was less than half what it had been in the late 15th century. At roughly the same period a Sussex bill for carpentry work dated 1694 shows that a skilled carpenter might expect 1s.8d. per day (which had risen by 2d. per day since 1691), a labourer 1s.2d. per day and a boy 6d. per day.<sup>23</sup>

Although there is no direct evidence of the rural carpenter's life and work, it is possible to make an assessment of his general standard of living and the tools he used from information recorded in probate inventories, of which a good number survive in the East and West Sussex Record Offices.<sup>24</sup> Such information, which reveals not only the assets possessed by carpenters at the time of their decease, but in many cases also the number of rooms they had in their houses, any income they received from sources other than their stated profession (for instance farming or smallholding), whether they

kept livestock, leased property, invested money or gave credit, is crucial to an understanding of the whole character of employment in the Weald in the 16th and 17th centuries. To date the most valuable of Wealden inventory studies for this period is by G. H. Kenyon, who researched 136 inventories for the parish of Kirdford in the western Weald in exceptional detail.<sup>25</sup> Kenyon's main aim was to use the inventories to illustrate how farming had been conducted on the Weald clay in the 17th and 18th centuries, since farmers, in common with carpenters, had left no contemporary accounts and he found manorial sources meagre and unhelpful. It is remarkable that he found very few of his 59 farmers — only two, in fact — following a trade unrelated to their farming activities, whereas he estimates that most of the 44 smallholders would have had some other trade or part-time work to support them.

From the 165 Sussex carpenters' inventories used in the present study, it is clear that almost half had considerable farming or smallholding interests and that many could perhaps have considered themselves, on financial grounds at least, primarily as farmers who also followed a carpenter's trade rather than the other way round. This is consistent with what is generally known of Wealden artisans of the time, since the practice of dual employment appears to have been common in an area in which agriculture traditionally gave unreliable returns. The average Kirdford farmer, however, died with assets worth around £157, considerably more than those of the average Wealden carpenter which amounted to £80.<sup>26</sup> Despite this, an analysis of the number of carpenters' inventories when compared with those of other trades, together with a study of apprenticeship records for the 17th century, reveals that carpentry was a reasonably popular trade, followed by around 10% of the Sussex male apprentices.<sup>27</sup>

Although the total value of assets left at death was not high, a quarter of those assessed lived in houses that had at least five rooms and 16% in houses that had more than eight rooms. Since 42% of the carpenters died with debts owing to them and the average percentage value of this debt within the total estate was 44%, it is indicative that for almost half of them credit played an important part in their lives. Even though it is usually impossible to determine whether the money was owed for goods or services or lent out at interest, it is likely that if many could afford to lend money and to stand a certain amount of debt, the average carpenter would in fact have lived

Reference No.	Parish	Year	Name	Total Value
EP/1/29/203/083	Warnham	1703	Thomas Tovee	£39 8s.1d.

Rooms in house: 5, plus a shop and barn — kitchen, brewhouse, chamber over the kitchen, chamber over the brewhouse, garrett

Item	Value
Small bag of hops	£0 4s.0d.
Parcel of wheat	£2 10s.0d.
Parcel of beech boards	£0 10s.0d.
Shop: Four & twenty crozing planes, 2 jointers, 2 jack planes, 5 smoothing planes, 18 chisels, 15 formers and 6 adzes, 5 files, 5 wimble bits, 2 wimbles, 2 hammers, 3 broad axes, 4 scoring axes, 2 sp?? (damaged), 2 holdfasts, 3 hand saws, 2 iron bars, 2 drawing knives, 12 augers, 2 Adzes, 6 bottoms for coffins and other pieces of boards in the shop & one plough.	£2 18s.5d.
In the barn: one pit-saw and several boards and rails and other lumber and 2 ladders	£1 10s.0d.

N.B. – the inventory is not reproduced in full. Only entries relevant to the present research have been recorded, i.e. the possession of tools and timber.

Source: WSRO probate inventories EP/1/29

Fig. 9. Transcript of an early 18th-century probate inventory showing tools assessed in a Wealden carpenter's shop.

in more comfortable circumstances than the written total of his assets might suggest.

In any study of carpenters' inventories, the question of both timber and tools possessed at death is an important one. It must be borne in mind that many carpenters may well have been old, ill, or infirm at the time of death rather than in the prime of their working lives, but it might have been expected that at least some of the inventories would list timber in the process of being worked into a frame, if the commonly-held view that every carpenter had his own framing yard is to be upheld. However, not only is there no direct reference whatsoever to any carpenter working on the frame of a house, there is little mention of any building work in hand at the time of death, and the type of timber found in the carpenters' yards is overwhelmingly that used for planks, boards, and small works. It therefore appears that there were no frames in the carpenters' yards, yet at least some of the men must, in a period of intense building activity, have been working on them somewhere. The inference to be drawn from this, particularly in rural areas where the buildings were comparatively small, may be that the frame would be prepared on the final site and not in a yard between that site and the location of the growing trees and that the material of the frame was owned, not by the carpenter, but by the owner or commissioner of the building. In this case it would be clear that a common

practice was for the commissioner to provide the timber for the main structure of a building which was worked on at a site away from the carpenter's own premises, and for the carpenter to buy in and prepare timber for boards and other items which needed seasoned wood, such as doors and window frames. Certainly the commonly held view that in the rural Sussex Weald between 1500 and 1800 a 'framing place' or 'framing yard' was in general use in the preliminary construction of a timber frame appears to be misplaced.

Almost 10% of the inventories studied give lists of individual tools owned by the carpenters (Fig. 9). Although this is a relatively small sample, it is of value nonetheless since it can be assumed, in the absence of any indication to the contrary,

that these itemized tools were likely to have been representative of those possessed by the majority. Despite the availability of published works dealing with ancient carpenters' tools, there is still a need, particularly in this country, for more work to be done on gathering evidence for the use of different tools, on their identification from names found in documentation and on discovering whether certain tools were common only in specific parts of the country.<sup>28</sup> It is only from a thorough knowledge and understanding of tools that proper interpretation of the working of ancient timber can be achieved, yet even today there are names appearing in literature that cannot be matched to any type of tool and tools which cannot accurately be matched to the purpose for which they were made. Once tools are successfully identified, their appearance in probate inventories can tell the modern researcher a good deal about the work in which their owner was engaged during his lifetime — for instance, whether a man designated as a 'carpenter' also undertook joinery, whether in fact he was more of a joiner than a carpenter, or whether he was principally involved in shipbuilding.

The innate conservatism of carpentry as a trade appears to be reflected in the tools which were used by those who followed it. Apart from the development of more sophisticated planes for joinery and cabinet work and the increase in the use of steel for saws, it appears that few changes occurred in the making and

use of most carpenters' tools from the Middle Ages to the early 19th century. Probably the only sign discernible from the inventories of the changes that were taking place in the use and working of timber generally is that large numbers of saws and planes appear, often in the ownership of the same carpenter. On the other hand, it is evident that many of the carpenters, especially in rural areas, took on work that might not strictly be considered as carpentry — many of them were evidently making furniture, tools, and coffins as well as being involved in house building. Although this is hardly surprising in areas which had to be more or less self-sufficient in most trades, it is worth remembering that men who could not only build houses, make furniture and repair farm implements were also likely to be involved in the rearing of livestock, the harvesting of crops and the management of rents and leases — an active working life that on average somehow left less than £100-worth of goods and chattels behind to show for it.

Some of the most direct information on how the carpenter conducted his craft has come from the tool marks left on timbers in surviving ancient buildings. From these it is possible to identify the different timber conversion processes centuries after the timber was originally worked, as long as the oak has been protected from the effects of weathering and damage caused by damp and insect infestation. Once the conversion type and method are known, it is possible to reconstruct the 'parent' log for each timber, and thence to calculate the number of trees used to construct a single house.<sup>29</sup> The appearance of the timber itself will show whether the trees came from woodland or hedgerow, and the marks left on it will indicate the tools used by the carpenter. The most common of these were axes, used for hewing and trimming, which leave outlines at the end of their stroke in which the individual flaws present in the blade can often be seen; adzes, long-handled axes with curved blades set at right angles to the handle used for smoothing off and working in tight corners, which leave characteristic ripple marks on the timber, and saws, which leave different marks depending on which type of saw was used. This can often be valuable in dating the conversion process.

#### THE DECLINE OF THE TIMBER-FRAME TRADITION AND DEMISE OF THE RURAL CARPENTER

The last of the carpenters' inventories studied is dated

1796, and it is doubtful whether by this time any carpenters working within the Sussex Weald were devoting much of their time to the construction of timber-framed buildings. By the end of the 18th century brick had become the fashionable material with which to build, and although timber framing continued to be used for roof and floor construction and on occasion for the upper storey of a house otherwise made of brick, the popularity of exposed framing had been in decline for some time, the scantling of the frames used had become smaller and they tended to be concealed from the beginning beneath tile-hanging, weatherboarding or brick. Although in the more remote rural areas of the Weald small cottages continued to be completely timber-framed well into the 19th century, the material used tended increasingly to consist of small-section cheap imported softwood. With the establishment of brickyards throughout the county which produced good-quality, affordable brick, the use of local oak became less cost-effective, and the practice of constructing a house around a timber frame gradually died out completely. With the change in building materials dictated by fashion came changes in the design of houses in which the traditional craft of carpentry had no place. In fact, with the demise of timber framing, house-building ceased to be a craft, and although there were now almost unlimited opportunities for the concept of design to be incorporated into buildings, the methods of construction became purely functional and utilitarian, with the carpenter losing much of his authority over the building.

Even before the decline in the popularity of timber framing in the 18th century began, a deterioration in the state of the Wealden woodlands appears to have been well under way. Iron production in the Weald peaked around 1650, and although furnaces and forges continued to function in the region for at least another century, surveys undertaken from this time onwards chronicle waste and devastation of wood and timber, usually blamed on the fact that, because of the fall in demand for underwood, coppices were not now being enclosed after they were felled to prevent damage to the new spring by browsing animals.<sup>30</sup>

The failure of the iron and glass industries owing to more cost-effective production elsewhere did not in itself always result in the neglect of the coppices that had provided the fuel for furnaces and forges; wood was still required to heat the massive number

of chimneys now being built in new and refurbished houses; lime kilns for the production of fertilizer took much of the fuel hitherto consumed by the iron works; and in the east of the county, the making of hop poles from coppiced wood became an important part of the economy. However, a less intensive use of coppiced woodland did not see the return of flourishing standard timber trees; many years of the suppression of standards within coppices in favour of the underwood crop meant that the trees did not regenerate, and the replanting of oaks within woodlands does not appear to have been successful on a large scale. Letters written by members of the Ashburnham family as early as the mid-17th century record not only the difficulties that an established estate owner faced in finding timber to extend his property, but also the low value of the woodland he was trying to lease out to tenants. William Ashburnham had planned to build onto his house, but wrote to his godson in despair of the estate being able to supply the necessary timber:

Nothing is done or so much as begun on either of the two rooms on the garden side and that timber not being to be got was the cause of it. Why if that be so I despair of ever seeing that done while I live. Good god, no timber to be got in a summer to build two pigstyes, for the additions to those two rooms is little more for God's sake.

And on the subject of one of his tenant's lands:

I told him the mills was not worth ten years' purchase, the house without the land not worth a shilling, the woods nothing ... as for timber there was not enough to repair the house and mills ... But O godson, my building, my building, we shall all be undone for want of it.<sup>31</sup>

At the same time, there is evidence from the Sussex Parliamentary surveys of 1649–53 that some woods were suffering from an over-long coppice rotation, with the new spring — if any appeared at all after felling as late as 16 or 17 years — being under-protected from grazing livestock, with the owners and tenants of the woods being accused of neglect.<sup>32</sup> The enthusiasm for replenishing stocks of local oak was further dampened by the increasing availability of cheap softwood from the Baltic and the British colonies. As this became more and more absorbed into the building of new houses, standing timber was left to over-mature and was thus suitable only for shipbuilding, which in the wars with France of the early 1800s was an important and demanding industry. Thus the building timber

that had made possible the widespread construction of enduring housing in the Sussex Weald in the 16th and 17th centuries had, by 1800, sunk to the level of a by-product of the tanning industry. Traditional carpenters now had the choice of learning new skills of construction which might lead them on to become architects or surveyors, or getting by on repairs and general woodwork, thus forfeiting their centuries-old predominance as professionals in the building industry.

The tradition of timber-framed building in the rural Sussex Weald has been a long one. From its beginnings as a recognizably distinct form of construction in the 12th century to the replacement of all that was local, individual and vernacular by the importing of foreign materials and the use of standardized plans in the 19th, the conversion of Wealden trees into structural timber by craftsmen has been at the heart of almost every ancient building to appear in this extraordinary landscape. Although it will never be known exactly how many houses were built at any one time, or why some have survived when others perished, there remains a remarkable legacy of standing buildings dating from 1500 to 1800, the most prolific period in the history of Wealden timber framing. The process of studying timber in these buildings for the clues it can reveal, not only about the buildings themselves, but also about the trees which produced the timber and the landscape in which they grew, probably owes more to archaeological than to historical research, and until now it appears that the study of vernacular buildings and the study of ancient timber have, in general, followed different paths. However, since much of the value of the nation's vernacular tradition lies in the diversity of local styles and the use of local timber in buildings, it is a pity that only a minority have been studied in detail by historians, and even fewer by those who might be termed building archaeologists. As a result, our knowledge within the whole field of vernacular architecture must be the poorer. The hope, therefore, is that studies in the history of vernacular architecture will increasingly encompass the field of practical research and the interpretation of ancient building materials, and that this will ultimately provide a data base for countrywide comparison, our need being, in the words of Eric Mercer, one of our finest vernacular architecture historians, 'a continuous process of putting to the documents questions which arise from a study of buildings and which would never arise from a study of the documents alone'.<sup>33</sup>

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