

## Medieval Smoke-blackened thatch in England

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*Presentation given to Toits de l'Europe II workshop at Centre d' études médiévales, Auxerre, 9 October 2008; text slightly revised*

*The figures are collected at the end of the paper.*

Thatch is the pre-eminent roofing material in the British Isles for vernacular buildings from earliest times to the present day. A published map shows roughly the proportion of thatched buildings to all listed historic buildings in England in 1981. In a sinuous group of southern counties stretching from Devon through Hampshire and Wiltshire to Northamptonshire and across to Suffolk and Essex, 75% of all listed buildings were thatched; and on the fringes of this group, in Cornwall, Somerset, West Sussex, Berkshire, Hertfordshire, Warwickshire, Leicestershire and Norfolk, 17% were thatched. However, there are exceptions to this dominance. Towns often had bye-laws requiring tiles; a few localities with good fissile stone had early stone-slate roofing traditions, e.g. the Cotswolds, Rutland, the Lake District, and even parts of Devon; by the late Middle Ages, in rural areas large houses often had tiled roofs where small houses and farm buildings had thatch. Thus in 1981 in the Welsh border counties, Lincolnshire, and the south-east, only 7% of listed buildings were thatched, and in the north and various urban and suburban counties only 1%<sup>1</sup>. Moreover the number of thatched buildings has greatly declined since 1800<sup>2</sup>.

Thatching materials included various minor components, such as heather, which was widespread in the north and Scotland (fig.1 a, b), flax, brushwood (solid thatch), and

1 ENGLISH HERITAGE, *Thatch and thatching: a guidance note*, London 2001, p.3 fig. 1.

2 J. MOIR and J. B. LETTS, *Thatch: Thatching in England 1790-1940*, English Heritage research transactions 5, London 1999, p. 15, 18.

combinations of materials including turf. However, over most of England three principal materials are dominant: water reed, long straw or crushed straw, and the so-called «combed wheat reed».

For water reed (fig. 2 a, b), reeds came from Norfolk, and locally from other estuarine and swampy areas, and more recently have been imported from Eastern Europe. Historically water reed seems to have been very limited in use, but it increased in the later 20<sup>th</sup> century – partly through a perceived greater durability (though that is not certainly valid), partly because of the availability of reed from eastern Europe and a lack of thatching straw. In water-reed thatching, the entire coat is replaced each time the roof is re-thatched.

Historically the two major techniques have used straw, generally described as wheat straw, but historically using a variety of grains. The techniques are called respectively «long straw» or «crushed straw» thatching, and «combed wheat reed» thatching<sup>3</sup>. These names are confusing: the straw in long straw is not any longer than the other, and the straw in combed thatching is not reed, nor necessarily wheat.

Nevertheless, the names do reflect the major difference in materials and their treatment. In long straw thatching, the straw has been threshed, and crushed in the process, and is applied irregularly, with much of the length of the straw visible on the roof surface (fig. 3). In combed straw thatching, by contrast, particular care is taken to keep the stems unbruised, and aligned together, and the ends of each bundle are knocked into alignment with a *leggatt*, a bat-like tool<sup>4</sup>. The result is thatch where the roof surface is made up of the ends of the straw – aligned downwards so water doesn't penetrate (fig. 4).

3 J. COX and J. THORP, *Devon Thatch: An illustrated history of thatching and thatched buildings in Devon*, Tiverton, 2001, p. 24-26.

4 COX and THORP, *Devon Thatch*, cit. n.3, p. 28.

Historically, combed straw was used in south-west England, long straw thatching over most of the rest of the country, certainly in southern and midland England – with some reed in Norfolk and smaller areas. Maps of the pattern of use *c.* 1790 shows that long straw was not, or was no longer, found north of a line from the Ribble to the Humber (where heather may have predominated); on the other hand, long straw and combed straw overlapped in Somerset and part of Dorset<sup>5</sup>.

The key discovery of the last 40 years has been that for combed thatching, and in some cases long straw thatching, when re-thatching was needed, unless the whole roof was in bad condition, only the outer layer was removed and replaced, leaving the inner layers untouched.

Further, because of the medieval English tradition of the open hall with its hearth in the centre, from which the smoke rose uninterrupted (fig. 5), the insides of the roofs of our medieval houses are invariably stained with soot and smoke – sometimes even heavily encrusted – though sometimes it seems that the roof was swept down, and the soot can only be seen in the cracks of the joints.

This has led to the discovery that, sometimes, not only are the roof timbers sooted (fig. 6) but also the thatching laths, and the lowest levels of the thatch itself (fig. 7). NWA may have been the first person to recognize smoke-blackened thatch in Devon in the 1960s and 1970s, when he collected samples with a view to future palaeo-botanical study, although its full significance only became apparent with the work of John Letts<sup>6</sup>.

5 MOIR and LETTS, *Thatching in England*, *cit.* n. 2, p. 71, 79.

6 J. LETTS, *Smoke blackened thatch: a unique source of late medieval plant remains from southern England*. with contributions by J. MOIR, D. SMITH AND D. DE MOULINS, Reading, 2000.

This is the smoke-blackened thatch that is the subject of this paper. It is now recognised as being of both scientific and historical interest, as well as being an architectural feature which it is very important to conserve.

Furthermore, since the open hearth disappeared in England, broadly speaking, in the course of the 16<sup>th</sup> century, we can date this thatch to the medieval period, and often more precisely through dendrochronology on the roof timbers. In some areas, a transitional type of house retained an open hearth in a smoke bay when the rest of the hall had become two-storeyed; CC found smoke-blackened thatch in one such house in 1985-6 (fig. 8 a, b; note the layering of the thatch).

The distribution of examples sampled for palaeo-botany has been plotted, showing also where smoke-blackened thatch has been found (Fig. 9). The overwhelming majority of known instances are in Devon, with 5-10 cases per county in each of Somerset, Wiltshire, modern Oxfordshire, and Buckinghamshire, and a handful in Dorset, Hampshire, and Northamptonshire, and this reflects, in part, the historic distribution of the different types of thatching: heavy survival of smoke blackening in part of the area which has historic combed straw thatch; some survival in long-straw thatch counties; no survival where water reed was used.

As the map shows, Devon is the county for smoke-blackened thatch *par excellence*, and it is there that the remainder of this paper is concentrated. First, a published map of smoke-blackened thatch, and more widely of medieval roofs in Devon (Fig. 10), shows where they are: overwhelmingly in the south-east of the county, and in mid-Devon between the highlands of Dartmoor and Exmoor. There are few in the far west and north-west of the county.

The building types and roof structures in the county have considerable uniformity of character. Mass-walling is invariable – most often in what is called «cob», earth mixed with

some gravel and straw, around 70 cm thick, built unshuttered in levels of up to a metre high, that are then left to harden, before the builders continue with the next level. Almost invariably, these houses have plans with three rooms and a cross-passage (figs. 11-12).

The roof structures are variations on crucks – especially the type known as jointed crucks (Fig. 13 a, b)<sup>7</sup> in which a cruck truss is formed as a composite arch, with wall-posts and principal rafters jointed at the elbow. For their dating, dendrochronology has established that these open-hall Devon houses are characteristically of the 15<sup>th</sup> century, but that some are considerably earlier.

For individual examples, we start with these earlier houses – indeed, the house with the oldest date for a domestic building in Devon, Townsend, Stockland, of about 1260. It is very characteristic in appearance of a Devon cob house, formerly with a two storey porch (Fig. 11). Fig. 12, a b c shows the plan and sections of the roof trusses<sup>8</sup>. The interior of the roof is intensely black (Fig. 14), and close examination reveals that the history of this house in the medieval period is more complex than might appear. It is just possible to see an early halved joint in the rafter (low down on the left-hand side), but the attached scissor-brace has been removed, and the joint is itself soot-covered. What has happened here is that the roof has been reconstructed, in about 1400, and the scissor-braces were replaced by a collar. Sooting from the open hearth then continued.

We can go further in understanding the nature of these houses from the evidence of this roof. Through the hole in this partition (fig. 14), it can be seen that the smoke-blackening continues. However, the far side of the partition itself (invisible) is in fact not sooted. Thus the

7 Fig. 14 (b) from N. W. ALCOCK, «A Devon farm: Bury Barton, Lapford», *Trans Devonshire Assoc.* 98 (1966) 105-131.

8 N. W. ALCOCK & M. LAITHWAITE, «Medieval houses in Devon and their modernisation», *Medieval Archaeol.* 17 (1973), 100-25.

partition was inserted into a formerly open truss, during the medieval period. This and similar evidence demonstrated that in many Devon farmhouses, originally the only partitioning between the rooms took the form of low screens – as seen in this imaginative reconstruction by Cary Carson (fig. 15)<sup>9</sup>. Now we look more closely at the roof and the thatch itself. Another typical mid-Devon house is Lower Chilverton (fig. 16), dated by dendrochronology to c. 1495<sup>10</sup>, with a handsome inserted chimney of the mid 16<sup>th</sup> century. Fig. 17 shows the interior roof with its thatch. It is notable particularly for the neat alignment of the base layer of the thatching – probably using rye straw<sup>11</sup>. The pegs holding the straw sheaves on can be seen as well; they are also sooted. It is clear that the appearance of the roof from the inside was of importance, and some examples are even more decorative.

More usually, the thatching bundles were held on with ties, as at a house a few miles away, Elley (figs. 4, 18). These ties were of straw rope or hemp twine – occasionally, even, brambles (*Rubus fruticosus*) were used. In one Somerset house, wild rose stems with thorns (*Rosa arvensis*) have been found<sup>12</sup>. Outside Devon, ties of willow or hazel wood are sometimes found.

One alternative to the aligned straw as the lowest level of the roof was to use woven wattles. This is seen in the final house presented here (fig. 19 a, b), which is another

9 N. W. ALCOCK, «Vernacular Architecture: Historical Evidence and Historical Problems», in I. M. Quimby (ed.), *Material culture and the study of American life: Proc 1975 Winterthur Conference* (1978).

10 Programme for *Vernacular Architecture Group Spring Conference in Devon 2008: organised by Roger Waterhouse and Keystone Historic Buildings consultants*, March 2008.

11 COX and THORP, *Devon Thatch*, cit. n. 3, p. 50 and pl. 11.

12 LETTS, *Smoke blackened thatch*, cit. n. 6, pl. 70c.

particularly early example – not precisely dated but probably from the years around 1300. It has the same tripartite plan as already seen, but here is of the form known as a «long-house», in which one end of the house was used as housing for cattle (a shippon or byre).

The photograph of the interior of the roof (Fig. 20) was taken in 1973, but about 10 years later, following a fire, the thatch was removed. It was found that above the wattling was a layer of broom [*Cytisus scoparius*] c. 30 cm. thick, with above it rye straw, and above that an estimated seven thatch layers, to a total of about 1.7-2 m thick<sup>13</sup>.

In 1993-4 John Letts and James Moir analysed the thatching materials of 33 samples of smoke-blackened thatch, and by 1999 Letts had added a further 14<sup>14</sup>. Of these samples, 24 came from Devon, a smaller proportion than in the national total. And at least 30 were of the 15<sup>th</sup> century, rather than earlier or later. The cereal types can be summarized as follows:

Mixed cereals 30;

*Triticum aestivum a.* (Wheat, *froment*) 36;

*Triticum a.a.* + *Triticum turgidum t.* (rivet wheat) 22;

*Secale cereale* (Rye, *seigle*) 30;

*Hordeum vulgare* (Barley, *orge*) 14;

*Avena sativa* (Oats, *avoine*) 2.

Most of the samples include more than one kind of cereal straw, although it seems that sometimes one species predominated, and in some cases remains of more than one coat, each of a different species, have been identified. Leguminous crops were found in two samples, and broom in two others. At least 35 arable weed species were also identified, some of which are mentioned in medieval written sources.

13 E. GAWNE and J. SAUNDERS, *Early Dartmoor Farmhouses: Longhouses in Widecombe*, Orchard Publications [place not given], 1998, p. 33.

14 LETTS, *Smoke blackened thatch*, cit. n. 6, p. 52-62.

There are some surprises, notably the common occurrence of rivet wheat, which is very rare in other archaeo-botanical contexts<sup>15</sup>, and in general smoke-blackened thatch provides a useful corrective to archaeo-botanical conclusions extrapolated from excavation.

But we might suppose that these samples tell us a lot about medieval and early-modern agriculture. The crop remains, unlike seeds or pollen in some archaeo-botanical deposits, are intrinsic and not strays. They seem to tell us what crops were grown, and the character and yield of ears, and the weeds even indicate at what height above the ground the sickle cut the corn.

In our view, however, it is dangerous to accept this evidence uncritically for two main reasons: the samples are concentrated in the 15<sup>th</sup> century, a period of arable depression and contraction, and in Devon, which was at all periods a predominantly pastoral county and particularly so in the 15<sup>th</sup> century. Most of the rye samples, for example, come from Devon.

Moreover, even when we can correct for period and areas, and make comparisons between the samples and what other evidence tells us, we find serious discrepancies. Barley, the commonest documented medieval corn crop, particularly among the peasantry, only occurs in a minority of the samples. In farm accounts in much of England, oats is much more common than rye, but it is rare in these samples. At Harwell, the smoke-blackened thatch sample consists entirely of wheats, but we know from probate inventories that, in around 1600, barley was twice as common as wheat in the fields<sup>16</sup>.

An alternative view, therefore, is that the needs of the thatcher influenced what crops were grown for thatching. For example, broom was found in two Devon houses near

15 LETTS, *Smoke blackened thatch*, cit. n. 6, p. 38.

16 C.R.J. CURRIE, «Early Domestic Architecture in North Berkshire, c. 1300- c. 1650» (Oxford University D.Phil. Thesis, 1976), p. 233-4.

Dartmoor, where it rarely grows wild, and Letts cites a source suggesting that it must have been deliberately planted for thatching<sup>17</sup>.

In conclusion, even if we have some doubts about the uncritical use of smoke-blackened thatch as a source for agricultural history, it does remind us strongly of the character of life in medieval English houses, particularly in the south-west. In his *Canterbury Tales*, Chaucer wrote of the poor widow in the Nun's Priest's tale that «all soote was her halle and eke her bower», but in Devon not just poor widows but substantial yeomen (*franc-tenanciers*), down to the 16<sup>th</sup> century, lived in houses centred on rooms without ceilings; the often ornamental character of the roof – carefully shaped, chamfered and moulded timbers, regularly laid battens and neat straw thatch – would have been often barely visible in the gloom cast by its unrelieved blackness, lit only by the flickering light of the open hearth.

FIGURES FOLLOW ON NEXT PAGE ....

17 LETTS, *Smoke blackened thatch*, cit. n. 6, p. 38. Dr Haio Zimmermann, pers. comm. at Toits de l'Europe workshop, Auxerre, Oct. 2008, states that rye was deliberately grown for thatching in parts of Germany near the North Sea.



Fig. 1. Mixed thatch with heather – Hugh Miller's Cottage, Cromarty, Scotland: (a) general view; (b) detail (CC).

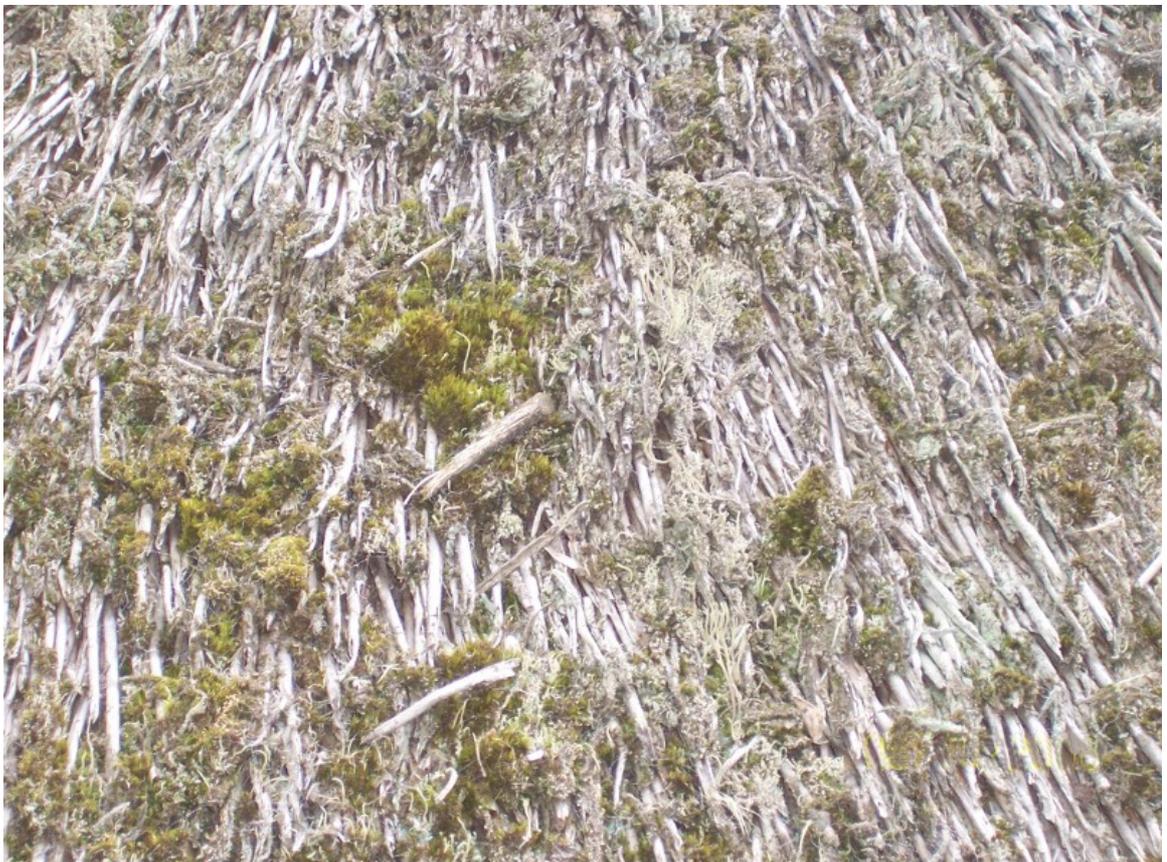




Fig. 2 Water-reed thatch: (a) Waxham barn, Norfolk; (b) thatching at Catfield, Norfolk (both NWA).





Fig. 3. Very decayed long-straw thatch in 1971: Godfrey's Farm, East Hendred, Oxon.[then Berks.] (CC).



Fig. 4. Combed-straw thatching: Elley, Colebrooke, Devon (NWA).



Fig. 5. An open hall with central hearth: Bayleaf, Weald & Downland Museum (NWA).



Fig. 6. Sooted roof-timbers: Old Rectory, Clifford Chambers, Warwickshire (NWA).



Fig. 7. Sooted rafter, lath, thatch, under-thatch: Hill, Christow, Devon, 2008 (CC).



Fig. 8. A smoke-bay house: Pomander Cottage, Harwell, Oxon: (a) end view showing thatch layering and (b) side view. The smoke-bay is marked by posts on either side of the inserted left-hand chimney (photographs 1970, 1986) (CC).



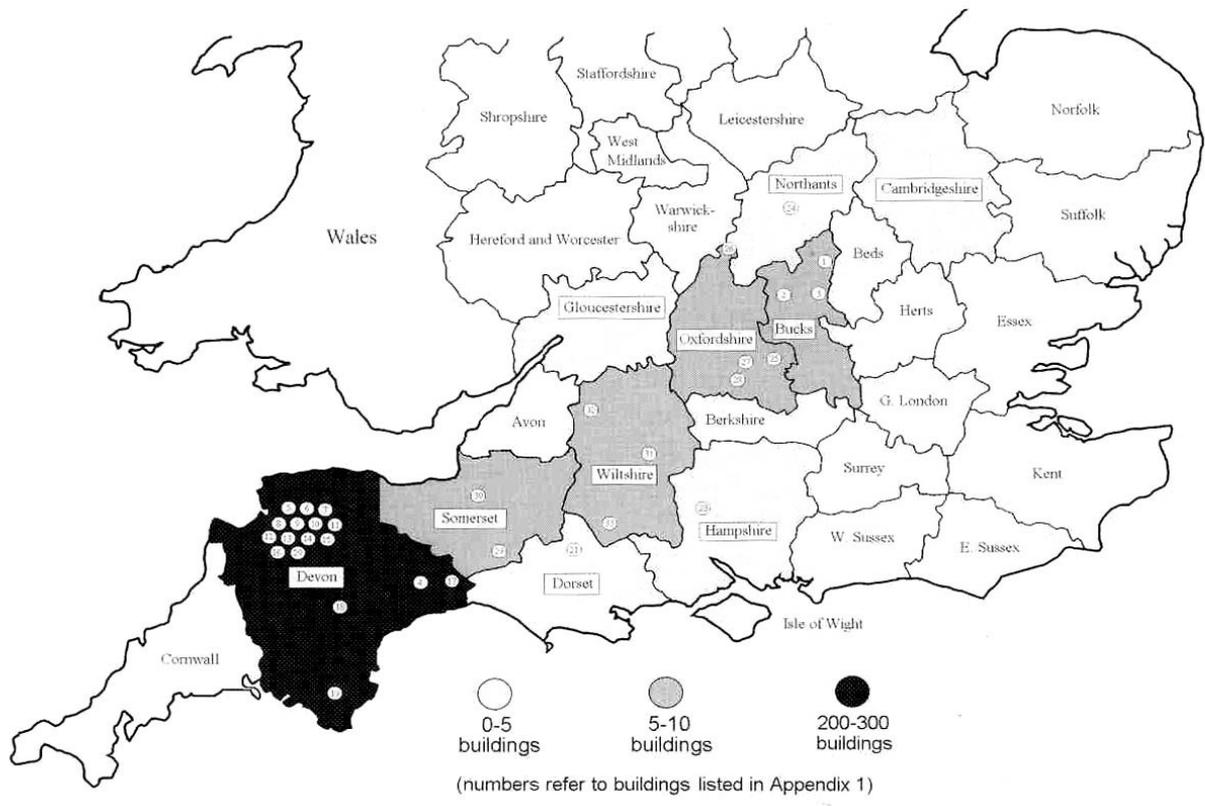


Fig. 9. Distribution map of smoke-blackened thatch in southern England (from LETTS, *Smoke blackened thatch*, cit. n. 6, p. 29; reference to Appendix 1 is in Letts, not the present paper.).

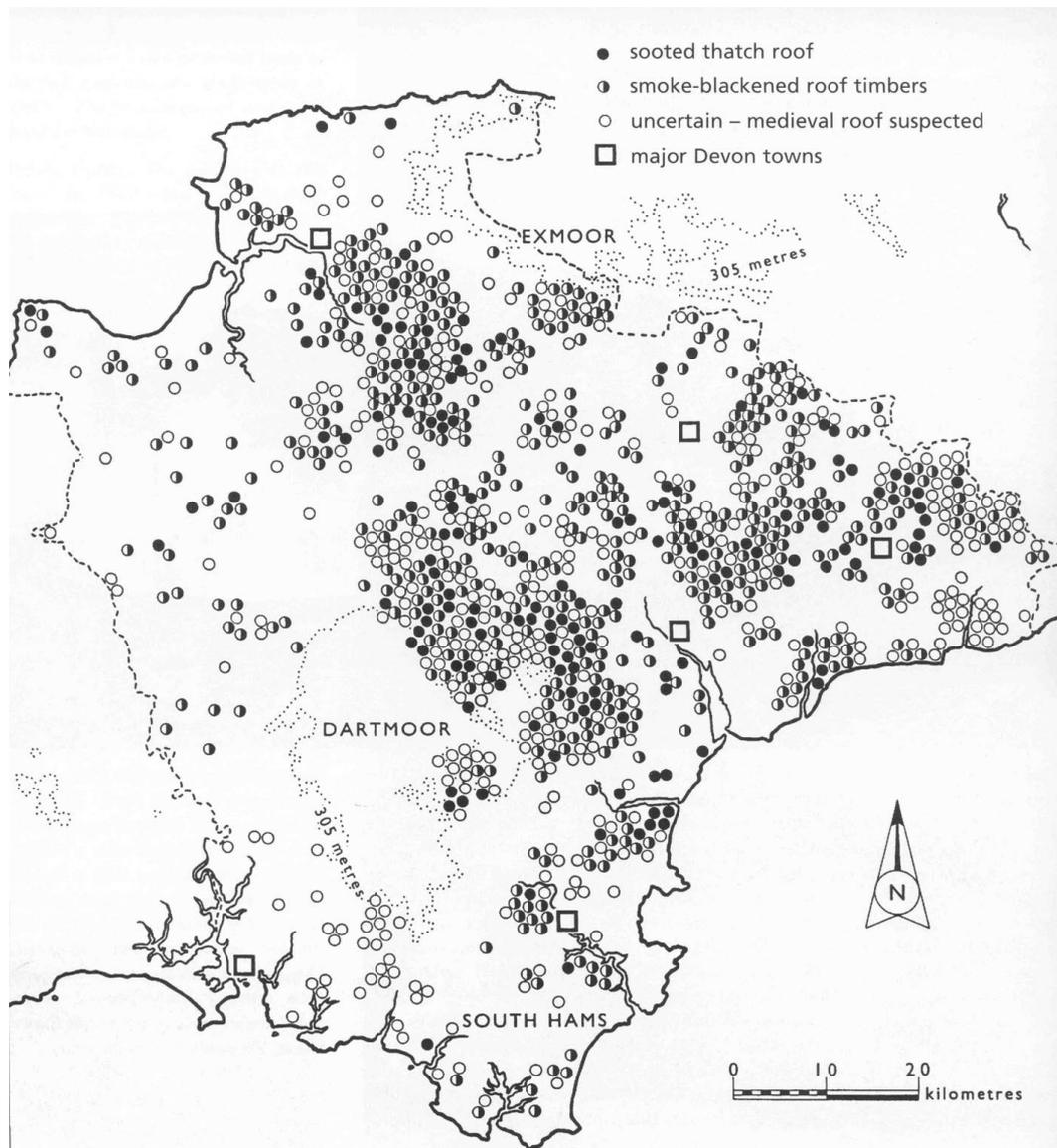


Fig. 10. Distribution map of smoke-blackened thatch and medieval roofs in Devon (J. Cox J. THORP, *Devon Thatch*, cit. n. 3, p. 40; copyright to Keystone Historic Buildings Consultants).



Fig. 11. View of Townsend, Stockland from the east (NWA).

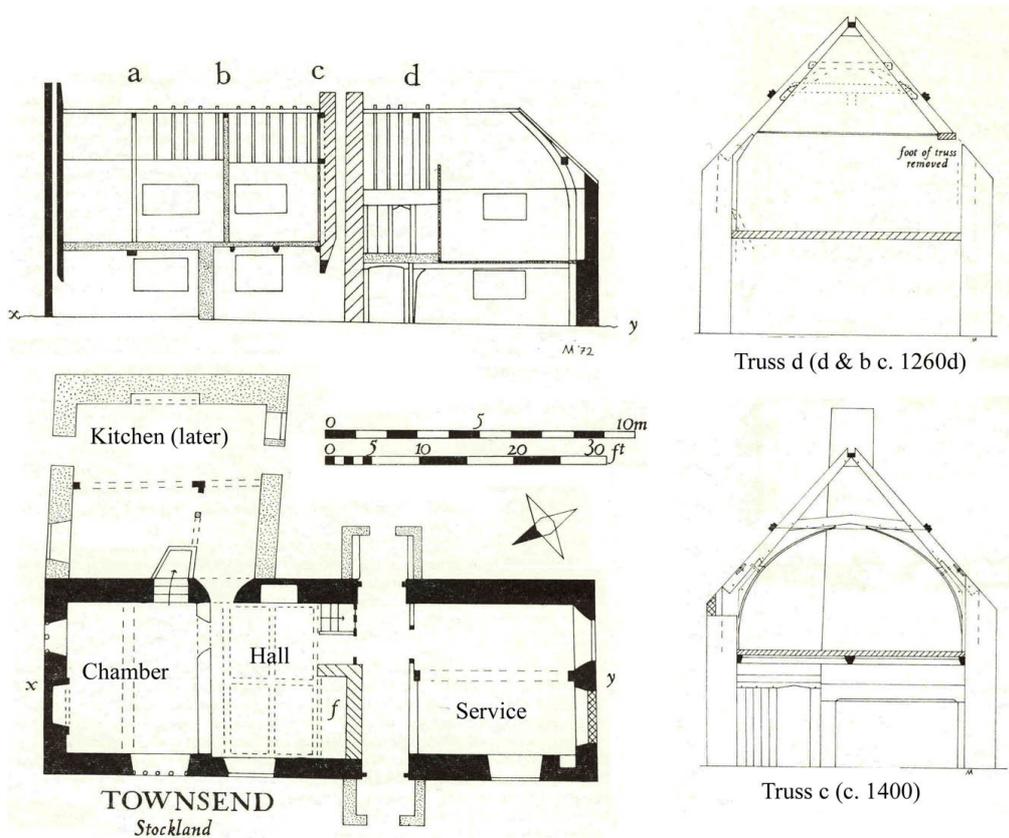


Fig. 12. Townsend, Stockland: plan; long section; truss d (early trusses d & b, dated to c. 1260d); later truss c (dated by typology to c. 1400) (NWA).



Fig. 13. Jointed-cruck trusses: a) Clerks, Spaxton, Somerset; b) comparative section drawings (NWA).

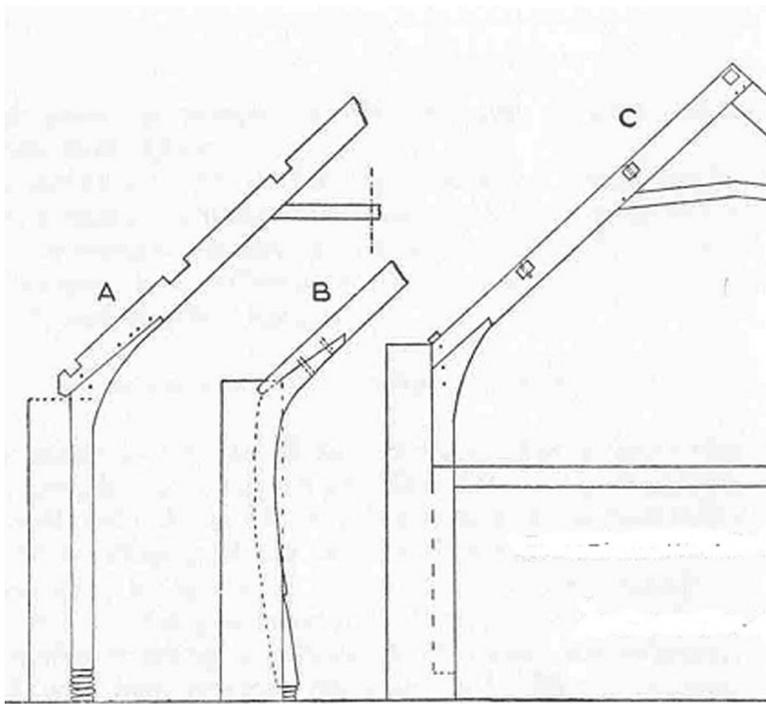




Fig. 14. Townsend, Stockland: interior of roof, showing halved-joint matrix for removed brace, later sooted partition, and sooted roof beyond partition (NWA).

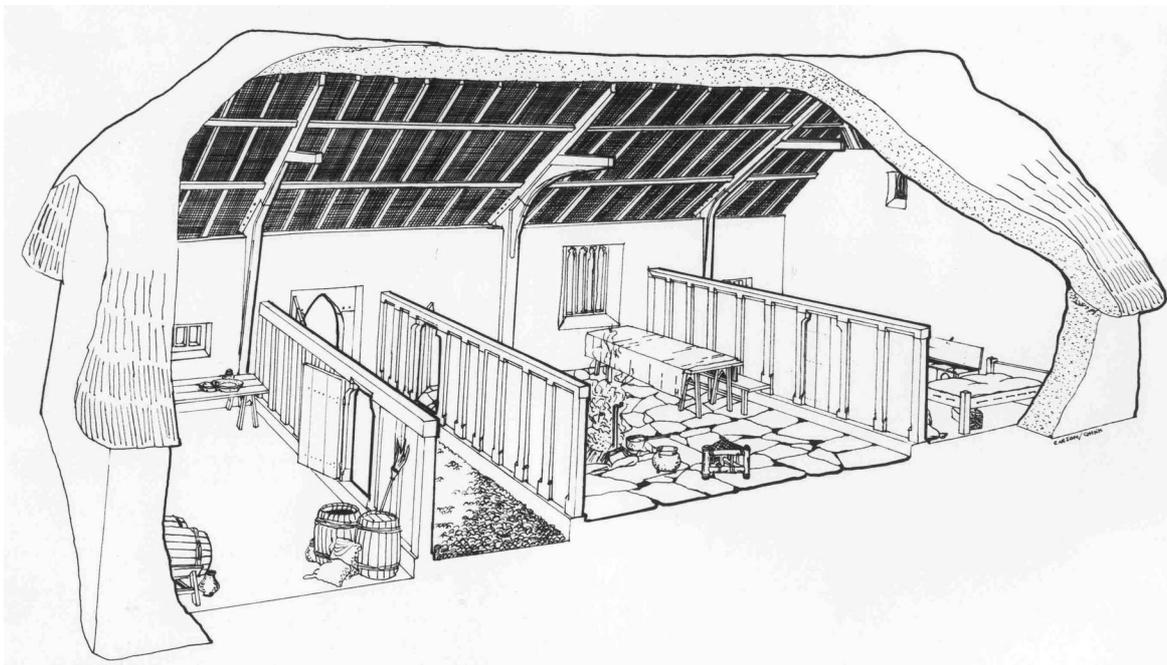


Fig. 15. Re-creation of a medieval Devon farm (drawing by Cary Carson).

Fig. 16. Lower Chilverton, Coldridge, Devon -c. 1495d (NWA).

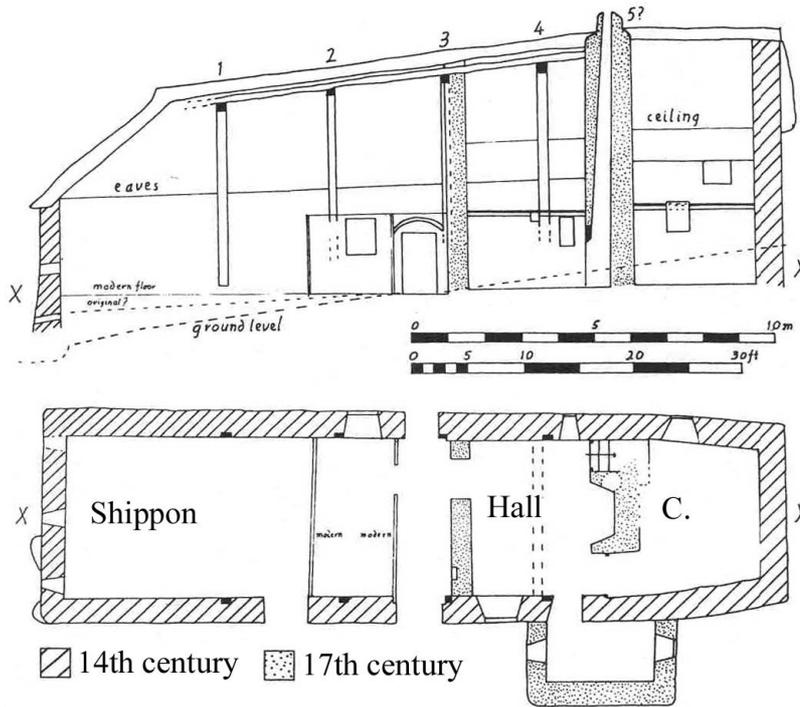


Fig. 17. Lower Chilverton, Coldridge, Devon: interior of roof showing thatch (NWA).





Fig. 18. Elley, Colebrooke, Devon (cf. Fig. 5): The interior of the roof, showing the rafters, thatch, lath and tie (NWA).



## Higher Tor, Widecombe

Fig. 19. Higher Tor, Widecombe, a 'long-house' dating from c. 1300: a) general view; b) long section and plan (NWA).



Fig. 20. Higher Tor, Widecombe: interior of roof (NWA).