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THE FIRST COTTAGE OF CLAY BATS?

JOHN MCCANN

It is commonly believed that the technique of building with earth which is called *clay bat* in Cambridgeshire, *clay lump* in Norfolk, is an ancient vernacular tradition in the eastern counties of England, and some eminent writers have gone on record as saying that it has been used in Norfolk for at least three hundred years.¹ Recent research has questioned this belief, and has shown that the evidence for its antiquity in Britain is much less convincing than has been accepted. Early twentieth-century writers such as C.F. Innocent, Clough Williams-Ellis and Claude Messent found ageing cottages and farm buildings of this material in East Anglia, and encountered a verbal tradition among the older inhabitants of rural areas of how they had been built; and in the climate of opinion of the time, they assumed this was the lingering remnant of an ancient folk tradition.² It now seems that the buildings they observed were no more than a century old at the time, and that this building technique was first used in England at the extreme end of the eighteenth century.³ Messent named and sketched some farmhouses in Norfolk which he said were built of clay lump in the seventeenth century or earlier; some were reported to display dates. Later writers have quoted the same examples with remarkable unanimity;⁴ but it is something of a mystery that no more clay lump buildings of equivalent antiquity have been found since. The study of vernacular architecture has blossomed in that time,

and large numbers of clay lump buildings have been recorded, and they continue to turn up, but they are usually ascribed to the early nineteenth century, or the late eighteenth century; even this dating is usually more a matter of subjective judgement than hard evidence. Dirk Bouwens has re-examined the buildings Messent quoted, and has found that the clay lump occurs only as a late addition to much earlier structures of timber framing.⁵ At this date no standing buildings *structurally composed of clay lump* are known in Britain earlier than the nineteenth century. Why have no earlier buildings of this process survived? If the earlier examples have all disappeared by natural decay, why should they be so much more short-lived than the earth buildings of the West Country, or other parts of England? No satisfactory answer is apparent.

The earlier documentary evidence which is claimed to refer to this technique in East Anglia is distinctly unconvincing. M.W. Barley found references to 'unburnt bricks' in early probate inventories, which he interpreted as meaning clay lump.⁶ It was a normal part of the process of brick manufacture to stack 'green' bricks to dry for many weeks before firing. If the brickmaker died prematurely large quantities of unfired bricks would be found in his yard, and these would be listed among his assets in the probate inventory, just as the unharvested crops of a farmer were listed. All this item indicates is unfinished production. George Ewart Evans quoted

1 M.W. Barley, *The English Farmhouse and Cottage* (Routledge and Kegan Paul 1961), 202.
Alec Clifton-Taylor, *The Pattern of English Building* (Faber 1972), 292.
Eric Mercer, *English Vernacular Houses* (H.M.S.O. 1975), 135.
2 C.F. Innocent, *The Development of English Building Construction* (Cambridge 1916), 155.
C. Williams-Ellis, *Cottage Building in Cob, Pisé, Chalk and Clay, a Renaissance* (Country Life 1919), 110.

C.J.W. Messent, *The Old Cottages and Farmhouses of Norfolk* (Norwich 1928), 71.

3 J. McCann, 'Is Clay Lump a Traditional Building Material?', *Vernacular Architecture* 18 (1987).
4 Messent, *op. cit.* in Note 2, 72, 76, 79, 93, 95, 107.
Barley and Mercer, as Note 1.
R.J. Brown, *English Farmhouses* (Robert Hale 1982), 195.
5 'Reflections on Clay Lump', *Vernacular Architecture* 19 (1988).
6 As Note 1.

from an eighteenth-century account book a payment of £1-10-0 for 'Lump', connected with a farm at Bacton, Suffolk, and interpreted it as referring to clay lump.⁷ Other payments for 'Lump' occur in the same book, but are greatly outnumbered by others for more familiar building materials and work – bricks and bricklaying, daubing, thatching, nails, etc. At the same period William Marshall published a glossary of Norfolk 'provincialisms' in which 'Lumps' were defined as 'barn-floor bricks'; and we have other descriptions of these 'lumps' – thick fired paving tiles made of fine white clay, used for the threshing floors of barns.⁸ That is about the sum of all the evidence published which professes to show that the clay lump process is earlier than the 1790s. Some archaeological evidence has been claimed for the use of clay lumps in Norwich in the sixteenth century or earlier, but this too begins to look very unconvincing when subjected to critical examination.⁹

The earliest firm evidence of the clay lump or clay bat process in Britain goes back only to 1792 in eastern Scotland,¹⁰ and 1791 in England. We have a number of published accounts of the process, from then until the 1840s, all of which describe it in the same terms one would use of a recent innovation, a cheap substitute for bricks (which were taxed from 1784), still sounding rather experimental. These early accounts come from Perthshire, Cambridgeshire, Suffolk and Sussex; Norfolk is not mentioned in them until 1838.¹¹ It now begins to look as if Norfolk builders adopted in the early nineteenth century a building technique which had been developed elsewhere; although in the special economic conditions of an agricultural boom in an area deficient in other building materials it was used on a greater scale there than in any other part of Britain. Now that the search is on for earlier standing buildings of clay lump, or earlier documentary evidence, we may have to revise our ideas again; but all the informa-

tion available at present indicates that the earliest cottage built of clay bats anywhere in England was at Great Shelford, Cambridgeshire. It has been demolished, but much is known about it and its builder, Joseph Austin.

In March 1801 the Reverend James Plumtree of Hinxton wrote a detailed account of how this cottage had been built, which was published in a Report of the Society for Bettering the Condition of the Poor in that year.¹² The Society was a paternalistic voluntary body, entirely funded by the contributions of its members, and its main concern was a public campaign to persuade rural landowners to allow farm labourers allotments of cultivable land sufficient to support them, without recourse to parish relief, when other employment failed. Most of its Reports were devoted to this end, but it also offered labourers advice on how to conduct their lives with sobriety and piety, and occasionally, more practical advice on gardening, cooking, and other aspects of domestic economy. Plumtree's article was a notable exception, and is worth quoting at some length:

A little beyond the 51st mile-stone, on the road from London to Cambridge by Epping, where the road from Great Shelford to Cherry-hinton crosses it at right angles, and on the left hand side, stands a COTTAGE, which has always attracted my notice, in my walks between Hinxton and Cambridge. It is erected on what is called *Lord's Waste*; the whole occupying about 20 poles of ground [605 sq m]. The house is built of clay, two stories high; with a very flat tiled roof, and projecting a good way over the walls, somewhat in the Swiss style. A chimney rises from the centre, with open work towards the top, from bricks being left out; and a smaller part is attached to the north end of the building, with another chimney at the end. The garden is surrounded with willows and poplars. Part of it

7 *The Pattern under the Plough* (Faber 1966), 45–6. Suffolk Record Office (Ipswich) HA 119: 562/2, covering the period 1759–88.

8 *The Rural Economy of Norfolk* (London 1787), I, 86–92; II, 383. *Oxford English Dictionary* (Oxford 1933), 499, 7b. Arthur Young, *General View of the Agriculture of the County of Norfolk* (London 1804), 23.

9 M.W. Atkin and A. Carter, 'Excavations in Norwich, 1976/7', *Norfolk Archaeology* 36 (1977), 297–8. Also as Note 3.

10 Sir John Sinclair (ed), *The Statistical Report on Scotland* (Edinburgh 1792), IV, 490, quoted at length in McCann, *op. cit.* in Note 3.

11 *The Labourers' Friend* (London 1838), IV, 163.

12 Report 83, III, 174–85.

is inclosed by a dead fence upon a bank, part by a mud wall, and with paling in front.

The singularity of its construction, and the neatness of its appearance, declare the architect to be no uncommon genius. I had seen it rising by degrees to its present magnitude, and increasing in the beauty of its appearance: and I had once or twice made enquiries about the house and the owner, but without success. At length, on the 27th of January last, passing by to Cambridge, I observed the owner and his son at work at it, drawing it over with a thin coat of clay. I was determined not to lose the opportunity; and immediately accosted the man, who answered me in a very civil manner, and seemed pleased at having his house so noticed. Conversation increased confidence, and he soon gave me the history of himself and his house, to the following effect.

His name is JOSEPH AUSTIN; and he is, by trade, a bricklayer. He has a brother and two half brothers, at Little Shelford; all of whom follow the same trade. Before he built his house, having 4 children, he lived with his brother; and, as he says, '*often used to come and look at this spot, and thought what a nice place it would be for building a house*'; – and, as soon as he got to sleep of a night, he always used to begin building'. At length he applied to the Manor-court and got a verbal leave for that purpose. Two of his neighbours, however, 'moved by envy', said, that if he began they would either pull, or burn it, down; upon which he again applied to the Court the following year, and obtained a legal permission, with the assent of all the copyholders; paying for the entry of his name on the Court Rolls, together with sixpence a year quit-rent.

In the mean time, he had been preparing what he calls his *bats*, during his leisure hours at home. They are made of a white clay and straw beat together, in the form of large bricks, and not burnt, but dried in the sun; they are 18 inches long, 12 wide, and 4 deep [0.46 × 0.30 × 0.10 m]. He had however, when he began building, only 14 shillings in pocket; and he had a wife and 4 children to maintain. This was but an indifferent property, wherewith to begin building a house. One of his masters, however, with whom he usually worked at harvest work, sold him an old cottage for 9

guineas; the amount of which he was to work out, and which he accordingly did in about 3 years. With the old materials, and with his *bats*, he set to work; and, on the 5th of June, 1791, being then about 42 years of age, he laid the first brick of his intended house. It was to consist of two rooms. The foundation, or what is called the *underpinning* and the chimneys are of brick, which he had from the old cottage. The underpinning is two feet high [0.61 m], in order to raise the clay bats a sufficient height from the ground; for were they once to get wet, they would soon be undermined, and give way. On this account it is, that the roof is made to project so much; to prevent the wet from falling, or splashing against the walls. Upon this foundation he set the bats, flat and length ways; cementing them with clay, and making a wall one foot thick. When he had raised his walls one story high, he was informed by the carpenter, that, upon farther examination, the timber from the old cottage would not serve for *so large* a place.

Not overcome by this disheartening difficulty, he determined to relinquish that part of his plan for the present; and immediately set about constructing a smaller place, in the same manner, at the end of it, for the reception of his wife and family; which he finished against Michaelmas; so as for them to get in on the 3rd of October. He used to work at this, when his day's work was over; and has often, as he told me, gone on by moonlight, and heard the clock strike twelve before he gave over; and was up again at four the next morning; having to go to Cambridge, nearly five miles, to work, and return in the evening. His brother occasionally assisted him. The other part of the building was then merely covered over with a few loads of *haum*, against a more favourable time. Five years after this he raised the walls another story, still covering it with *haum*; and, after the harvest, 1799, he had it tiled in with pantiles; but he does not consider that the outside was completely finished, till he had coated it on January the 30th, 1801.

Austin let one room to raise money for materials, and occupied the remainder. He had a quantity of bats left over, with which he proposed to build an outhouse; but at this stage he had still to buy casements and wood

for flooring part of the main house. He reckoned he had spent about £50 in all, not including his own labour and that of his family. He told Plumtree that it was cheaper to tile the roof, at a low pitch, than to use thatch, which would have required a steep pitch and therefore more timber.

Another great saving would have been, if he had from the first discovered, that *clay* was to be had near the spot. All his first materials were brought from a distance, at a considerable expense of labour and carriage. – The building cottages with *clay bats*, instead of lath and plaister with a coating of clay, produces a great saving of wood (as neither posts or studs are required, the beams resting solely upon the walls), and gives a greater thickness and strength to the walls, and makes the house warmer.

Plumtree described Austin's well-stocked garden, and followed with a typical homily on the benefits of hard work and good management, and then returned to the practical theme:

It is true that he possessed one advantage in his trade, which few others in comparison can enjoy; but I see no reason why *any clever man, of whatever trade*, may not erect a cottage upon similar principles. He might begin with a little, and get on by degrees, improving in his work; till his *mansion*, if not in size, at least in workmanship and appearance, might rival this. There are few spots which cannot furnish some kind of clay for the purpose, either near or within a short distance.

Several points emerge from this account. Italics were used for *bats*, implying that they were unfamiliar, but normal type was used for the mud wall on the boundary, indicating that Plumtree found this unremarkable. There is abundant evidence that mud has been used as a building material from the earliest times of

which we have records, but this was usually what R. W. Brunskill has called 'slow process' construction.¹³ Sub-soil containing clay was dug, sometimes left out for one winter to weather, and then was thoroughly trodden with water and straw; sometimes oxen or horses were used, but often the treading was done by men. When sufficiently worked it was laid, a small forkful at a time, on a raised plinth of rough stone or rubble, and pressed into position with the foot. This continued until a layer had been built up, as high as it would stand without slumping. In some areas this might be as much as 3–4 feet (0.91–1.22 m), but more commonly work stopped at a height of only 12 inches (0.30 m), and it was left to dry for a week or two while work continued elsewhere. When it was dry enough to be set firm, another course was laid on in the same way, and left to dry. The sides were pared down with a special tool, like a baker's peel but made of iron, or with any sharp tool. In the West Country this building material is called 'cob', in Buckinghamshire it is called 'wichert', and other local names are recorded, but in most parts of the country it was simply described as mud or clay. The technique is by no means as simple as it sounds, for all clay soils expand when moistened and shrink as they dry. If badly executed the walls could develop deep cracks, allowing the weather to penetrate, and structural failure would follow. Well executed, walls of this material can give good service for hundreds of years, as surviving medieval houses of cob in Devon confirm.¹⁴ All clay sub-soils contain a substantial volume of other materials – silt, sand and gravel – exceeding the volume of pure clay. J. R. Harrison has shown that to avoid troublesome shrinkage the walling material should contain aggregates to about four times the volume of clay, and these aggregates should be evenly graded in particle size from silt to fine gravel. Effectively the clay becomes a 'binder', consolidating the inert aggregates much as cement does in concrete, although clay offers much less adhesion.¹⁵ In some fortunate districts the natural sub-soil already

13 *Illustrated Handbook of Vernacular Architecture* (Faber 1971), 48–9.

14 N.W. Alcock and C. Hulland, 'Some Medieval Houses in East and North Devon', *Trans. Devonshire Association* 107 (1971), 35–56, and 112 (1980), 127–70.

15 'The Mud Wall in England at the Close of the Vernacular Era', *Trans. Ancient Monuments Society* (1984), 154–74.

contains aggregates in the desired proportions and particle sizes. For instance, Ernest Gimson wrote of a cob house he built in 1911 at Budleigh Salterton, Devon: 'The cob was made of stiff sand found on the site; this was mixed with water and a great quantity of long wheat straw trodden into it'.¹⁶ Elsewhere it was necessary to find suitable aggregates from local sources and to mix them with the natural sub-soil in the correct proportions. For instance, Richard Elsam wrote in 1816: 'Mud walls made in the common manner, with clay well tempered and mixed with sharp grit sand, will last for many years'.¹⁷ The Reverend Copinger Hill described the same operation in Suffolk in 1843: 'Clay for building should be a clay-marl. If the clay is not good, chalk and road-grit should be mixed with it. The proportions of clay and chalk may depend on the goodness of the clay, and the facility of procuring chalk. With moderate clay, say seven-tenths clay, two-tenths chalk, and one-tenth road-grit'.¹⁸ The selection of appropriate aggregates and their addition in the right quantities is a traditional skill, dependent upon an intimate knowledge of the performance of local materials as learned and handed down by earlier generations.

Forming the material into blocks and allowing them to complete the shrinkage before they were incorporated in the building was therefore an important technical advance. If dried unevenly the blocks tended to distort, so there was a certain amount of technique even in the drying. The clay and straw mixture was formed in a wooden mould, open at top and bottom, as used for bricks but much larger. The mould was lifted off, leaving the blocks standing on hard ground, as close together as the mould would allow; they were left for a few days until firm enough to be moved, and were then tipped on one side. Modern experience shows that they are vulnerable to rain for only two days after moulding; the quantity required was such that they could rarely be made under cover. After some days in one position they were tipped on to another side, and so moved and dried in various positions

for perhaps four weeks. They were then stacked in an open pattern under cover to complete the drying, what a brickmaker would call a 'hack'. The mortar used for building with them was of similar material, but sieved to exclude stones, and with the straw cut into short lengths. One writer advocated adding lime to the mortar to assist setting, but this was not essential.¹⁹

It is significant that Austin at first transported his materials from a distance, and only later found that he could obtain clay nearer the site, for this implies unfamiliarity with the process, and a period of experimentation. Later it became standard practice to dig the clay for a cottage in its own plot, leaving the pit to become a pond for water supply.²⁰ It is a matter of observation that such a pond is nearly always found within a very short distance. Indeed, it was one of the main economic merits of this form of construction that it virtually eliminated transport costs. Unlike 'slow process' walling, the quality of sub-soil was not critical, so long as it contained some clay, and it was unnecessary to find and transport additional aggregates from another source. J.M. Proctor has analysed samples of clay lump from widely separated villages in Cambridgeshire and Suffolk, and has shown that they varied 'from nearly pure chalk to quite a sandy material – and show how very wide a range of subsoil was used; hardly any one of them approaches a material suitable for making baked bricks'.²¹ Clay bats of later construction, made of the clay available on site, may be seen in a long boundary wall at no. 16 High Green, Great Shelford, 700 metres to the north. The material is distinctly yellow, whereas Plumtree described Austin's as white, confirming that he went to some trouble to transport chalky clay from elsewhere. It appears that he did not know at that time that any glacial clay sub-soil was suitable.

Plumtree's report was picked up in Norfolk by Edmund Bartell, a medical practitioner of Holt, who was an enthusiast for the Picturesque movement of landscape design

16 Exhibition catalogue, *Ernest Gimson* (Leicester Museums 1969), 5.

17 *Hints for Improving the Condition of the Peasantry* (London 1816), 16.

18 'On the Construction of Cottages', *Journal of the Royal Agricultural Society* 3 (1843), 360.

19 As Note 11.

20 Charles Poppy of Witnesham, in W. and H. Raynbird, *On the Agriculture of Suffolk* (London 1849), 249.

21 *East Anglian Cottages* (Providence Press, Ely, 1979), 21.

pioneered by Sir Uvedale Price. In 1804 Bartell published *Hints for Picturesque Improvements in Cottages and their Scenery*; the caption of one design for an ornamental cottage included the suggestion 'Clay formed into bats mixed with cut straw, built upon a brick under-pinning, would be a good method of construction'. He specifically acknowledged the report no. 83 of the Society for Bettering the Condition of the Poor, and though he had been in practice in Norfolk for over twenty years, and said that it took him daily into 'the habitations of the poor', he seemed not to know of this form of construction at first hand.²² At present there is no evidence that his suggestion was taken up in Norfolk until much later.

A report published in Edinburgh in 1792 records that the villagers of Errol, Perthshire, where all the older cottages were of 'slow process' clay construction, had lately adopted 'a plan of building, much more agreeable to the eye and certainly no less useful for accomodation, moulding the mortar into bricks and with these forming their dwellings'. The writer, William Herdman, assistant to the Minister of the parish, surmised that 'the people have now in some measure lost the art of preparing the materials, and compacting them together, so to give the clay-houses the solidity they had in past times'. His report on the agriculture of Errol showed that it had 'undergone an entire revolution within these 40 years', owing to the draining of the Carse of Gowrie.²³ Major agricultural change, accompanied by movement of population and destruction of older ways of living, was also the context in which clay lump construction was to be adopted in Norfolk and Suffolk in the nineteenth century.²⁴ One cannot exclude the possibility that Austin discussed clay bat construction with an Errol mason whom he encountered in Cambridge; then as always, there were plenty of Scots seeking occupational advancement in England. Ultimately the idea probably derived from contact with the Mediterranean *adobe* tradition, and was adopted in Britain as a response to economic conditions. These were, essentially, a new tax from 1784 amounting to something like 15 per cent on the cost of common bricks, and a steep rise in the price of all building materials

(Austin said the cost of his bought-in materials rose by 25 per cent even while he was saving for them). When once an important idea for reducing building costs had been tested and found to be practicable, the benevolent intentions of the Reverend Plumtree and his like would soon spread the word to others.

In *The Quarterly Review* of April 1816 Robert Southey introduced Plumtree's account of Austin's cottage to a wider readership, and again he used the word 'bats' in italics. The degree of technical detail supplied was sufficient to catch the eye of benevolent landlords, but perhaps not quite enough to enable a newcomer to start building satisfactorily with the process. One suspects that Austin and his sons were the means by which the practical techniques of forming, drying and using the bats were transmitted; anyone wanting to adopt the process had only to employ them. By 1821 the process had been taken up on a substantial scale in Cambridgeshire, for the social campaigner John Denson wrote in *The Cambridge Chronicle*: 'It may not be altogether uninteresting to you, and the friends of the cottage system in general, to inform you that where clay is readily procured, most excellent cottages are built principally with clay lumps'.²⁵ This is the first appearance of the word 'lumps' in this connection, and the size advocated had increased to a depth of 6 inches (0.15 m). Bricks were being used more sparingly than in Austin's cottage – 'a few layers of bricks . . . to prevent the lumps contracting a damp from the earth' – and for the lining of the fireplace, but not the chimney itself. He added: 'Cow-houses, sheds, garden walls and partition fences, are formed in the same materials; but in all cases the tops are covered with straw, which the thatchers perform in a very neat manner'. Denson repeated this account in *The Labourer's Friend and Handicraft's Chronicle* two months later and in *A Peasant's Voice to Landowners* in 1830.²⁶ From there it was picked up by J.C. Loudon and quoted in full in his *Encyclopaedia of Cottage, Farm and Villa Architecture* of 1833, subsequently re-issued many times. He headed Denson's account 'Mode of building the Mud Walls of Cottages in Cambridgeshire', implying that at this date

22 103, 140. *The Medical Register* (London 1780), 124.

23 As Note 10.

24 As Note 3.

25 14 September 1821.

26 November 1821. (Cambridge 1830), 28–9, being reprinted by the Society.

this form of construction was not familiar elsewhere.²⁷ Denson lived at Waterbeach, 14km from Great Shelford. A.J. Green, a Sudbury bricklayer writing in 1847, described a barn of unfired clay blocks he had worked on 'upwards of thirty years ago', but he did not say where it was. By his own account he was employed by 'a very eccentric character' to finish building the barn, which other bricklayers had refused to work on any longer, owing to 'the hardness of the work'. The blocks provided were 2 feet long, one foot wide, and 9 inches deep (0.61 × 0.30 × 0.23 m); these would have had a dry weight of 150 lbs (68 kg), which clarifies the difficulty. He wrote as if the process had been still in the experimental stage, and made suggestions on how it could be improved.²⁸

The earliest report we have at present which records clay lump building in Norfolk was published in the *Sussex Express* in 1838, headed 'Home-made bricks' and unsigned: 'The following is a process of making the bricks which are much used in Norfolk for building cottages, walls and farm buildings, on account of their cheapness'.²⁹ How long they had been used in Norfolk the writer did not say, but the tone of his report is more to do with news than history. He described how they were made and used, adopting a size almost as large as those reported by Green, and said that they were taxed at one shilling per hundred, irrespective of size. No doubt this was the reason for the large size, but it is somewhat surprising, for later reports written in Kent in 1846 and Suffolk in 1849 state that they were untaxed.³⁰ Whether there were inconsistencies in how the tax was applied, or whether the gradual phasing out of the Brick Tax exempted unfired bricks before fired bricks, is not clear, but one can see that it would have been difficult to apply excise duty to such a transitory operation without massive evasion.

The formation of the Royal Agricultural Society in 1838 acted as a catalyst to encourage all new developments connected with farming, and reports of the clay lump process occur more frequently in the 1840s. There is no doubt that by this time it was being used on a major scale in the heavy clay districts of

Norfolk and Suffolk for cottages, farmhouses and farm buildings.³¹ There were special problems; enclosure of commons and the conversion of pasture to arable had destroyed the local sources of wood fuel for burning bricks and lime, large numbers of new buildings were required in connection with the changing needs of agriculture, and in the watershed area between the west-flowing and east-flowing rivers the only way of transporting heavy materials was with horse-drawn waggons on unsurfaced roads. In these conditions the clay lump process was adopted with alacrity. This is the reason why there is a heavy concentration of clay lump buildings to the south and south-west of Norwich, extending over the county border into Suffolk; on the coast, and where navigable rivers were at hand, most of the new buildings of the period were of brickwork or flint rubble. It is this concentration, in an area which later changed very little, which has generated the myth that clay lump is an indigenous building material in East Anglia. When one looks for firm evidence of the date of construction of these buildings it is difficult to find any which can be ascribed even to the early decades of the nineteenth century; no reliable reports have been published which take them back to the eighteenth century. Until other evidence can be produced, it certainly seems that Joseph Austin was the innovator of this building revolution.

His contribution was not to invent clay bats, for almost certainly he had encountered them before, but to realise that they could be used to build a cottage. A footnote to Plumtree's description of Austin's clay bats states 'This is the manner in which the inside of dovecotes is generally made, and the outside walls frequently constructed'; it may have been added by the editor. James Deane, a Colchester builder who lived from 1699 to 1765, compiled a notebook in which he kept designs, specifications and costs of typical buildings he was able to undertake. One was for an octagonal dovecote: 'A design for a Pigeon House with an Estimation of the Charge of Building in brick with Clay lockers on the inside . . . the Inside of the House Done with Clay Lockers by reason that the pigeons like Clay better

27 (Loudon 1833), p. 77.

28 Letter in *The Builder*, 31 July 1847, 364.

29 As Note 11.

30 F.W. Etheredge, 'On the cheapest and best method of establishing a Tile-yard', *Journal of the Royal*

Agricultural Society 6 (1846), 468. *Op. cit.* in Note 20, 283.

31 As Note 20, 283-4. Letter in *The Builder*, 14 August 1847, 388.

than they do Brick Lockers'.³² Dovecotes using clay bats survive in the vicinity of Little Shelford, where Austin lived from 1777. At Home Farm, Newton (TL 436494) immediately to the south-west, there is a round dovecote originally composed of clay and straw blocks 18 inches long \times 7 \times inches wide \times 5 inches high (0.61 \times 0.19 \times 0.14 m). The nesting boxes are constructed separately in three different forms: (1) in blocks of the same size but set on edge, with alighting ledges of tile supported by clay daub; the floors are made of laths and clay daub (2) of thinner bats of more chalky clay, 3 inches (0.09 m) deep, forming the walls and floors and projecting to form the alighting ledges (3) of bats moulded to shape, each front wall having an entrance hole shaped like an inverted U. The base is of brickwork to a height of about 4 feet (1.22 m). None of these phases are datable, but there is plenty of evidence of experimentation, at least in the various ways of forming the nesting holes. It is not beyond the bounds of possibility that Joseph Austin worked on this dovecote at some stage, and it is very likely that he knew it – but whether it pre-dates his cottage is not ascertainable.³³ At The Manor, Toft (TL 364563), 10 km to the north-west, there is a square dovecote, structurally a timber-framed building, now weatherboarded but originally plastered, in which the nesting boxes are moulded of chalky clay in pre-formed sections about 5 feet (1.52 m) long on a lower base wall.³⁴ At Blois Farm, Steeple Bumpstead, Essex (TL 686415), 25 km to the south-east, there is another timber-framed square dovecote in which the nesting boxes and alighting ledges are made of thin slabs of chalky clay, even thinner than those at Newton. There are dovecotes at Great and Little Shelford, but they have been converted to other purposes, and the nesting boxes have not survived. None of these are firmly dated, but we have James Deane's evidence that clay nesting boxes in dovecotes of other materials were in established use much earlier, and the footnote of 1801 that dovecotes with external walls of clay bats were already familiar by that date.

On present information it would seem that Joseph Austin – whom Plumtree described

as 'no uncommon genius' – was familiar through his trade with clay bats in dovecotes, and that he conceived the idea of building a cottage with them. His motive was simply that he could not afford to use conventional materials, but clearly he had energy and initiative, and he did not count the cost of his own labour. The generation of the idea can be taken back at least to June 1790, for by his own account it was then that he first applied to the manor court for permission to build on the waste. Difficulties with the insecurity of his title, and the opposition of his neighbours, prevented him from building until a year later, but by that time his bats were already prepared. The basic details of his existence are on record, both in Plumtree's account and other sources. Joseph and Ann 'Oston' are first recorded in the parish register of Little Shelford in 1777, when their daughter Ann was baptised. This is the only occasion on which the surname was so spelled, implying that they were newcomers to the parish. The register records the baptism of William in 1779 (who died a year later), John in 1784 (who was the son who was helping his father with the rendering coat when Plumtree accosted them), James in 1787, and Tabitha in 1790 (who was buried at Great Shelford in 1793). For no apparent reason another son, Joseph, was baptised in 1782 at Great Shelford.

The burial of Tabitha, and the baptisms of two more children at Great Shelford (a daughter in 1794 and a son in 1797), confirm the move into the cottage in October 1791. This is not exactly the family as described by Plumtree, but he was not the local vicar, and he may have misreported the details given to him verbally by Austin; at any rate, they agree that there were eight children in all, of whom some died young. Joseph Austin's death at the age of 82 was recorded in 1830, a year after his wife's death at the age of 76; both were buried at Little Shelford. The burial of a William Austin, described as a bricklayer, at Little Shelford in 1808, probably indicates the brother with whom Joseph lived earlier, and who helped him to build the cottage. That this family was very active in the building industry becomes extremely obvious in the period 1813 to 1830, when at least eight Austins, all

32 Essex Record Office, D/DRc Z27, 9. The notebook is not dated.

33 One side has been damaged, apparently by a falling tree, and rebuilt with bricks and clunch, faced externally with flint; the same damage may have led to the reconstruction of some of the nesting boxes.

See also E.M. Davis, *P.C.A.S. LXXV* (1986), pp. 77, 79.

34 Illustrated in R.C.H.M. *Cambridgeshire I* (1968), 209, and J. McCann, *Clay and Cob Buildings* (Shire 1983), 28, and *P.C.A.S. LXXV* (1986), pp. 80–81.

described in the register as bricklayers, of whom three could be Joseph's sons, appear with bewildering frequency as the baptisms of their children are recorded.³⁵ The permission to build on the waste is not recorded in the court rolls, but they are extremely brief at this period; Joseph Austin is mentioned in a quitrent of c. 1820.³⁶ Plumtree identified the site of the cottage precisely. An enclosure map of 1835 shows a rectangular plot to the south of the junction of London Road and Woollard's Lane, on the narrow strip of waste between the highway and enclosed land to the rear (Figure 1). It appears to be more like 30 poles than 20, but the scale is extremely small, and the roadside boundary projects slightly, as if Austin had encroached a little. On this plot is shown a large cottage and two free-standing outhouses.³⁷ The next evidence of the plot is the first edition 1/2500 Ordnance map surveyed in 1885, which shows an entirely different range of buildings, and nothing on the site of the former cottage. Photographs dated 1915 and 1952 show a substantial Victorian house on the plot.³⁸ It was demolished before 1960, and the site is now a public garden.

It is very unlikely that Austin's cottage suffered any major structural failure, for the foundations were higher and the walls were thicker than those of others which have survived to this day; a common wall thickness is 9 inches (0.23 m). Many clay lump cottages developed cracks in the render because it was applied too soon, before the blocks had finished drying and settling *in situ*;³⁹ but Austin anticipated this difficulty and allowed sixteen months to pass after completing the roof, before rendering the walls. That he and his wife were buried in Little Shelford perhaps implies that they had already moved away from it. In 1801 Plumtree had expressed the hope that the cottage 'would continue his, and his son's, and his son's son's . . . for many generations', and that it would be 'a *monument* at his death – nay, during his life, to all passers-by – of the extraordinary powers of a good character, of industry, and ingenuity – which may vie with the sculptured marbles of

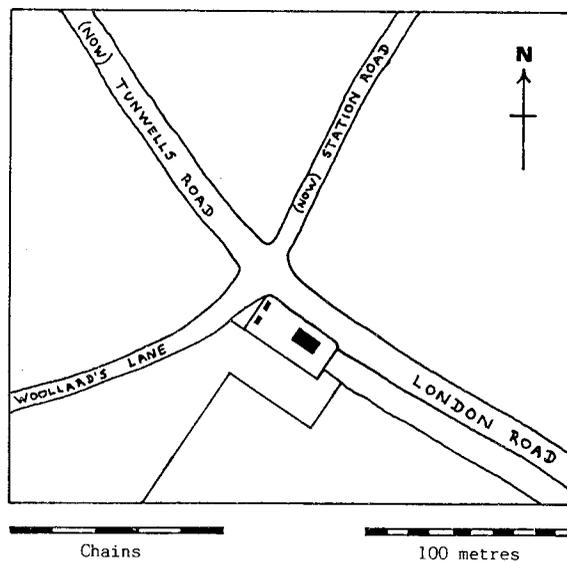


Figure 1. Position of Joseph Austin's cottage in Great Shelford. From the enclosure map of 1835

statesmen and warriors'. It was probably swept away by the economic changes which followed the building of the railway in 1842. His more enduring monument is the heritage of clay-bat cottages in Cambridgeshire, and their later counterparts in Norfolk, Suffolk and Essex, which derived from his innovation. The bicentenary of his beginning construction at Great Shelford will occur on 5th June 1991, and might be appropriately observed by the erection on site of a modest reminder of Joseph Austin's contribution to building technology and social progress.

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35 C.R.O., parish registers transcribed by T.P.R. Layng.

36 Granhams manor, Shelford (personal communication from M. Underwood, archivist of St. John's College, Cambridge, 22 July 1986).

37 C.R.O., Q/RDc 50. Numerals on the plot are damaged by a fold.

38 Cambridge Public Library, Cambridgeshire Collec-

tion Y. She. Kl. 13589 (postcard postmarked 1915, taken earlier); C.R.O., C/Planning Z.92.

39 P.H. Frere of Cambridge, *Journal of the Royal Agricultural Society* 23 (1863), 569; Vitruvius, *The Ten Books on Architecture*, transl. M.H. Morgan (Dover Publications, New York 1960), Book II, Chapter 3, 43.

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