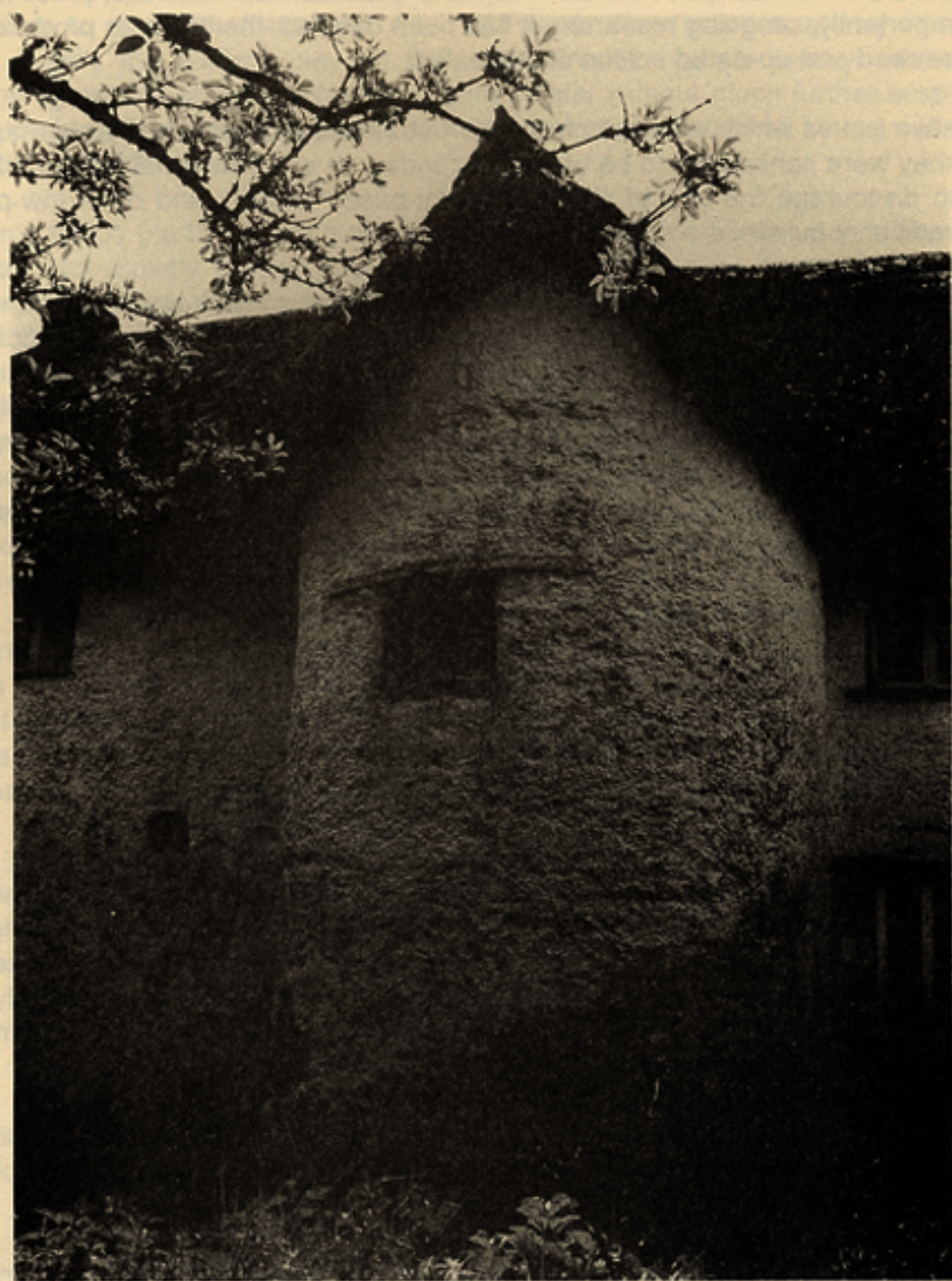


**DE
BA** **DEVON EARTH
BUILDING
ASSOCIATION**



**Newsletter 4
Summer 1997**

DEBA PLASTERS AND RENDERS LEAFLET

This leaflet, which most members are probably familiar with, has, since its publication in July 1993, been remarkably successful. Well in excess of 4,000 copies have been either sold or otherwise distributed, not just locally but nationally (through SPAB for example), raising awareness of the benefits of lime-based finishes and bringing in some useful revenue to the Association's modest working fund.

However, like any technical publication, it has become somewhat dated and in some ways no longer reflects the current 'state of the art' in terms of practice, raw materials, product availability and, most importantly, on-going research. It has been decided, therefore, to produce a second, completely revised and up-dated edition of the leaflet.

There were two issues which received no mention at all in the original leaflet; perhaps because at the time they were considered to be of only secondary or even marginal interest, the principal aim being to discourage the use of strong, cement-based tenders and other low-permeability finishes in traditional buildings.

The first issue concerns the use of hydraulic lime in conservation work and the second relates to the maintenance, repair and replacement of the traditional and ubiquitous 'mud' or 'loam' plaster.

Four to five years ago little was known about the practical use, characteristics and performance of hydraulic limes, despite the fact that they had been in common and widespread use from the early 19th century up to the 1940's. There was, and still is, no British Standard covering the manufacture and use of hydraulic limes, and the only material available was produced in France and imported through the Cathedral Works Organisation in Chichester.

Perhaps because of various problems associated with the use, or mis-use, of pure (non-hydraulic) limes, there is now a revival of interest in hydraulic lime. Received wisdom now has it that, contrary to popular belief, the characteristics and performance of hydraulic lime are very far removed from those of Portland cement; nevertheless the material provides most of the benefits of pure lime - cohesiveness, flexibility and high porosity - without its disadvantages - slow setting and gain in strength as well as problems associated with shrinkage and surface cracking when used for external renders.

Research into hydraulic limes is being carried out by English Heritage and Bristol University. Dr Rex Harries of Plymouth University (Dept. of Geological Sciences) has started researching the subject and further research is planned. Hopefully, data derived from these research programmes will clarify and dispel, rather than add to, the confusion that currently seems to exist concerning the material and its use. Hydraulic lime is now being produced in the south west of England and is available through several sources in Devon.

The Association would welcome any comments on this topic, in particular from practitioners who have experience of using the material as a substitute for pure lime in either internal plastering or external renders.

The issue of mud plasters was probably not dealt with in the leaflet because this type of finish is confined almost entirely to internal walls and ceilings in traditional buildings. In fact, loam/hair plasters were in almost universal use, alongside lime/sand/hair plasters, from the earliest times up to the end of the 19th century, in high status buildings as well as rural cottages. Mud plasters are easy to mix and apply, are extremely durable and ideally suited to cob walls. Their conservation and use in new construction should, therefore, be encouraged.

L. Keefe

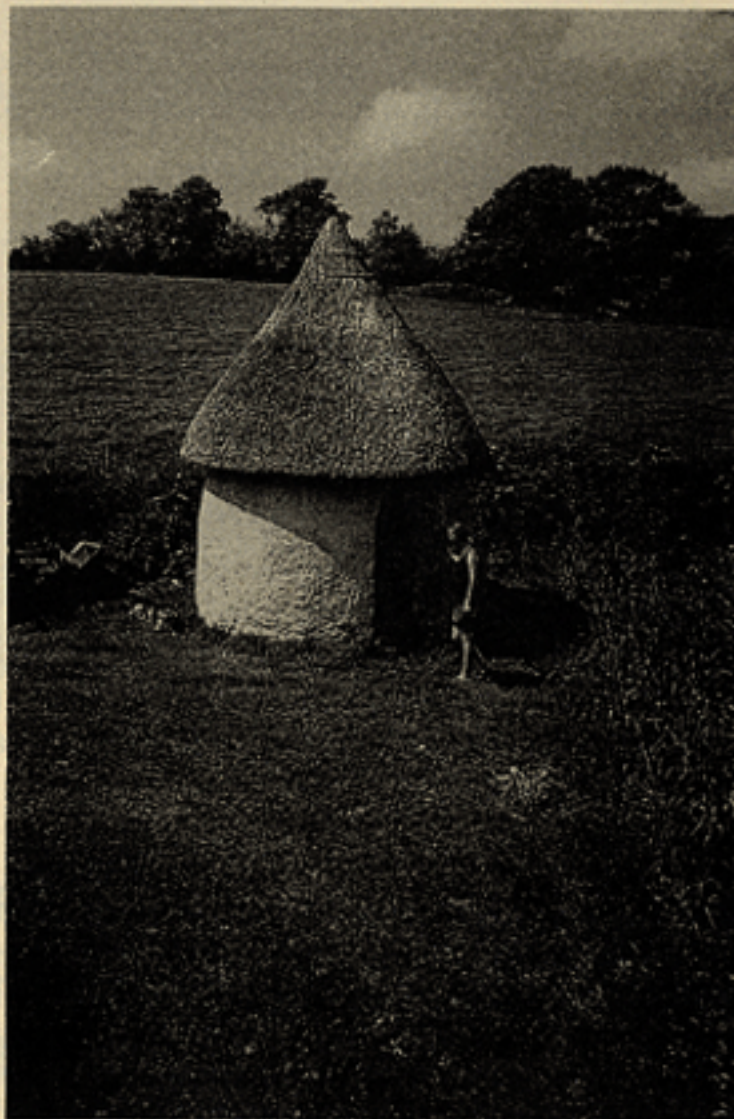
Cover picture - Cob Stair Turret at Lake Farm, Monkokehampston (Barry Honeysett)

REPORT ON WEATHERING OF RECENTLY CONSTRUCTED COB BUILDINGS

Lower Tricombe, new build completed in September 1993.

Initial erosion of clay on the surface was quite apparent after the first winter, though not at all alarming, and as one might expect, largely confined to the prevailing weather sides. After the second winter, there seemed to be little change. I thought that I would have time to cast on a lime render to these (south and west) elevations before their third winter and prepared the way by fixing stainless steel riblath to the oak lintels. As it turned out, pressure of work meant that I did not get time to render that autumn. After last winter there was remarkably little change; it seems that initially the surface clay on the newly finished cob is readily washed off thus exposing aggregate and straw which sheds further water without much further erosion. I have again been too busy to render this autumn but I am not at all concerned by my walls remaining unprotected for a fourth winter.

Erosion on my tholos (no this is not a medical condition - see Newsletter No. 2) has been more troublesome. Not exactly erosion, but deterioration of the render due to the very exposed nature of the walls and possibly compounded by being forced to render the same autumn that I completed the egg shaped building. Substrate movement caused hairline cracking which of course invited more water in thus softening and expanding the cob below, which in turn opened up the hairline cracks thus creating a vicious circle. Several attempts at lime slurring the cracks (normally very successful in a vertical situation) proved ultimately unsuccessful. Although the building stood up fine without added protection despite these problems, I have decided to admit defeat early on this one as it is a very useful building to me and I don't want it to suffer unduly in its early years. I have therefore recently completed a thatched roof which has been crooked onto the cob with extra long crooks, which means we have no timber roof structure at all.



THOLOS AT LOWER TRICOMBE

NEW WORK THIS YEAR

My own buildings: two storey workshop/store and an open fronted cart shed, have gone very well, although again pressure of having to earn a living has meant that I have not had time to finish both, I have managed just to get a roof on the cartshed. I have tried to design both buildings along traditional vernacular lines as well as fitting in harmoniously with their immediate environment. I have also managed to incorporate one or two slightly radical ideas such as a five and a half feet catenary arch over my workshop double doors, and an eight feet high two feet wide cob pillar supporting the main roof truss on my cartshed. The cob work proved visually pleasing and economical as expected.



LOWER TRICOMBE

Other work this year at Pottlelake near Shute in east Devon, has again been very successful. This included a single storey extension to a listed grade 2 (partly cob) cottage. Due to the site conditions and client requirements from the new room we had an interesting task designing a shape to make the most of all the relevant criteria not least of which was obtaining listed building consent. We ended up with a rather organic off-set voluptuous lump for which cob was the ideal medium. My client has a particular fondness for cows: the cottage containing hundreds of them in various forms and representations, mostly humorous. She asked part in jest if I could build her one in cob. I thought about it for a while and came up with idea of a jelly-mould type relief and so it was we went ahead; there not being room for a full size Friesian, we are calling the result a Dexter (in fact she has been called Rose but I won't go into all of that). We were both pleased with the slightly understated result.

As well as this slate roofed monopitched extension we have extended and partially rebuilt an outbuilding to create a warm and secure workshop and a separate almost Mediterranean-feeling "evening room" in the garden. This has incorporated several arches (formed with shuttering) a cob block dividing wall and the construction of a new traditional bread oven at the side of a fireplace which will serve also as a barbecue.

Altogether it has been a very rewarding summer for new cob work and I am hopeful that new build can continue to be a growing proportion of my overall business, which is still predominantly traditional building repair.

Kevin McCabe



POTTLELAKE



WIDER GROUP MEETING

The 1997 Wider Group Meeting will be held at Lapford, half way between Barnstaple and Crediton, on Thursday October 2nd at 10.00. The recent repairs to the cob farm buildings at Bury Barton, Lapford will be the principle subject of the morning discussion, followed by a visit to these buildings in the afternoon. Further details will be sent out in due course.

COMPOSITE COB AND TIMBER WALLS

1. East Devon Oddity, Barn at Gittisham Farm, Gittisham

This is essentially a timber framed building of post and beam construction, with two 'A' frame trusses set on eaves level cross-beams. The timber frame has no diagonal or horizontal cross-bracing between the wall posts to prevent or restrain movement in the structure. All the vertical posts are 'earth fast', that is, they are set in post-holes dug into the ground rather than being placed on a sole plate or stone plinth.

Between the main, 200mm sq. oak posts are set intermediate posts of smaller scantling, about 100mm sq., which serve to support the wall plates. In the lower part of the north wall, which is assumed to be original (as constructed) a half-brick wall, average height 1.20m set on a narrow rubblestone footing, fills the area between the posts. The fairly soft, hand-made bricks, which may have come from the nearby East Hill brickworks at Ottery St. Mary, are variable in size but on average around 240 x 120 x 65mm.

From the brickwork up to the wall plate, average height around 1.40m, is found the building's most interesting feature - slender panels of cob, varying from 100 to 150mm in thickness, set between horizontal 'rails' formed from rustic (un-trimmed) split poles, probably some kind of pine. Only one other such building has been noted in Devon, near Sidmouth, six or seven miles south of Gittisham. However, one of the farm-hands at Gittisham Farm claims to have seen a shippon of similar construction at St. Dominick in east Cornwall (now demolished).

Details of the composite cob/timber panels (also shown in sketch) are as follows: The main oak posts have chamfers (70 to 80mm wide) on each corner, giving a flat surface of approx. 120mm., equal to the width of a brick. The timber rails, which are very irregular in shape and vary in dia. From 50 to 100mm., have their flat (riven) surfaces facing inwards and are fixed to both the main and intermediate posts with iron nails. At the central wall post what may have been the original form of jointing can still be seen. Here the timber rails have had their ends cut at an angle to fit the chamfers on the post, where they are butt-jointed and nailed. Elsewhere the rails are nailed to the flat surfaces of the posts. This is probably what accounts for the variations noted in the thickness of the cob.

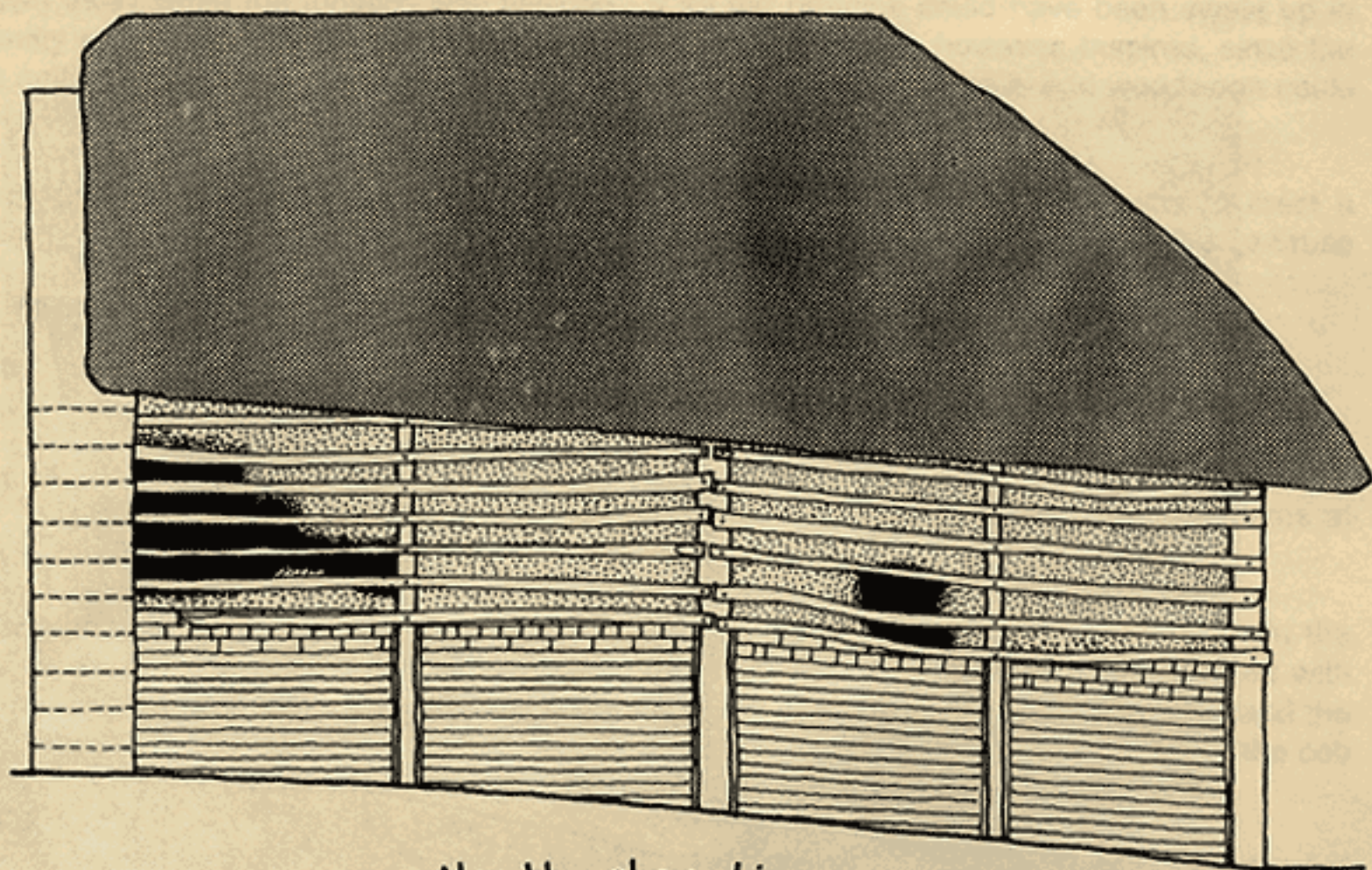
The panels were most probably built in stages. The bottom rails are placed directly above the top course of bricks, slightly overlapping them in order to contain the cob, each pair of rails acting as form of shuttering. The cob would have been placed from above, in lumps which were then rammed down, forcing the material through the gaps between the rails, where it was spread and then floated to provide a relatively smooth, flat surface. Strictly speaking, the rails are not set in pairs but are offset, so that in the north wall there are, over most of its length, seven rails externally and six internally.

The function of the building is unclear, but it may originally have been intended to house animals as the brick and cob walls would have been quite draught-proof, every effort having been made to fill the panelling with cob right up to eaves level. Between the top rails and the eaves the cob is sloped off internally and rammed around the wall plate/eaves purlin in order to fill any gaps between it and the underside of the thatch. There are some traces of lime plaster on the internal face of the north wall.

As is often the case in Devon, the roof pitches are rather shallower than is normally considered appropriate. However, wheat reed for thatching has always been grown on the estate, and still is, so fairly frequent replacement would have presented no problem.

The building must have been constructed some time between 1840 and 1885. Most of the timber used, apart from numerous replacement rafters and thatching battens, is rough-hewn and far from straight or uniform in size. This was clearly a building erected at minimum cost to a

BARN at GITTISHAM FARM



North elevation

very low specification. The only exceptions to this are the two surviving roof trusses, which were clearly salvaged from an earlier building (probably of early 17th century date).

2. 'Jerry Building' in Teignmouth

During the period from 1815 to around 1830, the coastal towns of south-east Devon experienced considerable expansion as demand for houses and villas for retirement and summer letting greatly increased. In Teignmouth and Shaldon local builders responded to this demand, in many cases, by putting up houses whose smart and elegant outward appearance belied their sub-standard materials and insubstantial construction.

Numerous examples have been noted, in both Teignmouth and Shaldon, of a form of composite timber and cob construction normally used only for internal partitions. A typical example was recorded at Albion Street, Shaldon (see photo). This small, two storey house, built on land reclaimed from the Teign estuary around 1828-9, has a box frame of softwood timber built off a low rubble-stone plinth. Between the vertical posts, which are 100mm square and placed about 600mm apart, a standard cob mix is placed. Riven laths are then nailed to the posts at 200mm vertical intervals - to contain the damp cob perhaps, and to provide an armature to which a lime/sand and hair plaster is applied, both internally and externally. The resulting wall is very slender, no more than about 150mm thick.

This building method was sometimes used to form a second or third storey, above mass cob or random stone ground/first floor walls. What is surprising, given this rather gimcrack form of construction, is that serious structural failures are comparatively rare.

L. Keefe

Articles and drawings relating to Gittisham Farm reproduced with the permission of Devon County Council Environment Department.



The timber used, apart from some posts, was clearly of a very low specification and far from straight or uniform in size. This was clearly a building erected at minimal cost to a

SLATE HANGING ON COB

10 THE BEACON, EXMOUTH

This property is a three-storied terraced Georgian house, believed to have been built around 1792. The Beacon has a magnificent outlook over the Exe Estuary, and the terrace was built as the first phase of a plan to turn Exmouth into a fashionable resort. These genteel houses soon attracted visitors and tenants such as Lady Nelson and Lady Byron, and their fashionable success encouraged the further development of Exmouth as a watering place.

The terrace is now "listed" and stands within the conservation area of Exmouth.

The whole rear elevation of No. 10 is slate hung. By 1995 the property needed complete re roofing (the old roof having been "turnerised"), and it was agreed the rear elevation should also be renovated.

Initial investigations prior to re roofing had shown the top of the rear wall was of brick. The walls of the properties each side were of bricks, and it was assumed that a three-storied building of this nature would also be of brick. It was only when a few of the old slates were removed that it was found the rear wall was of cob! The top of the wall was finished with 5 courses of brickwork: the base of the wall up to the floor of the first floor (there being a basement under) was of stone.

The original slates on the rear elevation were found to be fixed in a most original manner : they were hung on pegs, which were formed from old clay pipe stems, and then mortared with lime mortar containing hair onto the cob. It appeared that the pegs had been pushed into the cob, and the slates mortared on while the cob was still moist.

Where such a large supply of white clay pipe stems came from remains a mystery. I am told that when public houses then sold tobacco, they supplied a free pipe, so perhaps the pipe was thrown away when the tobacco was finished. If so the remains could have been swept up in quantity every day. The choice of clay pipe stems as pegs was, however, inspired, since the peg neither rusted, rotted nor corroded, a fire would not have damaged it, and woodworm could never be a problem!

I received a number of suggestions how to renew the slate hanging. One was to erect a wooden frame against the cob, and hang the new slates on battens. I dismissed this because of:

- a) the difficulty of securing the frame to the cob.
- b) the slates might "chatter" in a gale.
- c) It would add several inches to the thickness of the wall, with consequent problems at eaves and reveals.

Another was to fix Expamet Rib Lath to the cob, and fix the slates to that. Once again the problem of fixing the lath to the cob arose. I have unhappy memories of cob rendered with cement mortar on metal lath or chickenwire (which I do not recommend as a method), and the vision of several tons of slates and lath peeling away from a three storied building due to the cob not being able to hold it kept me awake at night.

I eventually decided that if the old slates had stayed in position 200 years, the original method of fixing must have been a sound one, and should be repeated, if possible.

The re roofing was therefore carried out in 1995, and the slate rehangng deferred until 1996, by which time the support of both Devon County Council and East Devon District Council was obtained, and grants promised.

In the spring of 1996 a test area of approximately 2 square metres was stripped and rehung. The mortar mix used was:-

- 1 part white cement
- 3 parts putty lime
- 12 parts sand (3 parts coarse to 9 parts fine)
- A cup of hair was added to each mix

Each slate was "battered" with mortar, then pressed into position, and secured with two 100mm galvanised slab nails. It was soon found that the mortar provided the main adhesion; the pegs only provide support while the mortar hardens. The addition of white cement to the mix speeded drying - pure lime mortar dries very slowly. The cob must be dampened before the mortar is applied.

The test area was successful, and work started in earnest in mid August. Once the old slates were stripped, the cob was found to be in excellent condition generally, with only a few window reveals needing attention.

The builder carrying out the work (Richard Ward) enjoys a challenge, and carried out the work with enthusiasm. I cannot recommend his workmanship too highly. The contract was made more difficult by the conversion carried out to the property post World War II, when it was converted to flats, which meant the necessity to rationalise the hotch potch of asbestos, iron and plastic pipes for rainwater, soil and wastes. Window reveals were clad with cut slates to match the old, and finished with lead. Lead flashings under eaves and sills were scalloped by Ben Ward (Richard's son) to provide a nice finishing touch.

The finished job shows what an enthusiastic builder prepared to be flexible in his methods can achieve, and I hope will stand the test of time as well as the original.

Philip Greenhow



BRUSHFORD BARTON

COB REPAIRS AT BRUSHFORD BARTON, BRUSHFORD

Last summer provided our first opportunity to do some substantial cob building. We had done a few bits and pieces - stitching, patching etc. but not a decent sized lump of wall.

The first project was to rebuild a section of collapsed wall forming the front of an outbuilding. The second was to extend a garden wall. Both jobs went very smoothly [aided no doubt by the very dry weather] and, although not massive projects, provided the opportunity to use a variety of techniques eg. joining new cob to old, building-in lintels, and experimenting with various cob mixes.

For butt joints we used a loose oak tenon chased into the old work and built into the new. For a vertical butt joint at a corner we used strips of EML built into the new work and set into chases and pockets in the old. For lintels we used old oak found on site. We used sections of timber similar to those of existing lintels that seemed to have stood the test of time! For our cob we used three different mixes - 1. "Neat" demolished cob 2. Very stony "as dug" sub soil 3. A combination of 1. and 2. No. 1 [the demolished cob] was fairly high in clay and low in stones with a tendency to bulge on the wall. Water content was absolutely critical and even a perfect mix would go up a little more than 2 ft. in a day without becoming unstable. However, when cutting back, a near perfect finish was easily achieved. No. 2 mix was like using wet 803 roadstone and the straw was absolutely vital in order to form a cohesive mass. However it compacted beautifully with hardly any spread. In fact, with this mix, a 3ft. lift was no problem at all. [We could probably have achieved 4ft. but we lost our nerve!] The downside was that the mix was nightmare to cut back. Without a disproportionate amount of effort only a poor standard of finish was possible. No. 3 was voted the best - it was easy to place, spread very little, and allowed a reasonable standard of finish. None of these mixes suffered from any shrinkage cracking within the new work. Vertical butt joints however, have opened a little as the new cob has dried.

Questions and conclusions

1. We are all a bit mystified by the dire warnings of shrinkage cracking. Were we just lucky?
2. Cob building is extremely hard work - very satisfying, but still extremely hard work.
3. We wonder whether straw is more important as a binder during building operations rather than for any other purpose. Without straw any cob mix is difficult to pick up and place without losing half of it on the way.
4. With a range of soil types available on most sites we would definitely choose a stony one for any future work. It seems like a much better material all round and logically must be less likely to form shrinkage cracks. Why is it then that our ancestors seemed to go for a soil low in stone content? We can only assume that, with only hand tools, a clayey relatively stone free soil would be less like hard work. Who knows? It is easy to forget things like that when you can just jump in a JCB!

Mike Jefferies

Cob Walls.

The employment of cob—*i.e.*, of earth mixed with straw, for the construction of walls—has for many years been abandoned in Devonshire, and it is questionable whether a good cob-waller could now be found. Moreover, the use of thatch, the customary roofing of cob houses, is gradually passing into desuetude. The following expenses incurred in erecting a churchyard wall at Woodbury three centuries ago, are interesting for pointing out two essential features of cob-construction; viz., a roofing of thatch to keep out the rain, and a foundation of stones to prevent damp rising.

1592-3.	pd toe Androwe German for beatinge of Earthe & for carriage of Stones for the fundatione of the Church yeard wall at seuerall tymes	xiiij ^d
	pd toe the ploughmen for carryenge earthe toe the wall and for Drinke for them	viiij ^d
	pd toe Thomas Ballemant for his mare toe carrye earth Twoe Daies	viiij ^d
	pd toe Lawrence Elliott for his woorke toe carrye earth the same Two Daies	xij ^d
	pd to Androwe German for choppinge the strawe for the walle	viiij ^d
	pd toe Richard Hill for Threshinge y ^e same	xviiij ^d
	pd toe John Pylle for the carringe of y ^e same	ij ^d
	pd toe Androwe German for carringe of stones and for beating of earth an other tyme	xij ^d
	pd toe the widoe German for Reede toe thache the same wall	iiij ^s
	pd toe Thomas Ballemant for makinge and Thetchinge the same wall	xvij ^s v ^d ob.

Brushfield, T.N., 'The Church of All Saints, East Budleigh.' in Transactions of The Devonshire Association, Vol. 26, 1894, p.285. (Article reprinted by kind permission of the Devonshire Association for the Advancement of Science, Literature and The Arts).