PROCEEDINGS

OF THE

CAMBRIDGE ANTIQUARIAN SOCIETY

(INCORPORATING THE CAMBS & HUNTS ARCHAEOLOGICAL SOCIETY)

VOLUME LXXII

for 1982 and 1983

IMRAY LAURIE NORIE AND WILSON

1984

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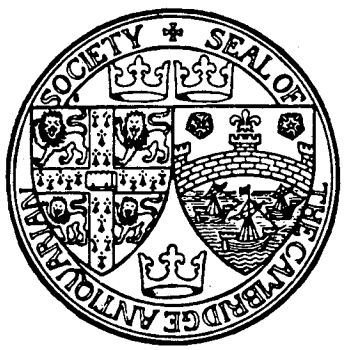

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1. The Editor welcomes the submission of articles on the history and archaeology of the County for publication in the *Proceedings,* but in order to avoid disappointment potential contributors are advised to write to the Editor, to enquire whether the subject is likely to be of interest to the Society, before submitting a final text. The Editor, if necessary with the advice of the editorial committee, reserves the right to refuse to publish any papers even when an earlier approval of the subject has been given.
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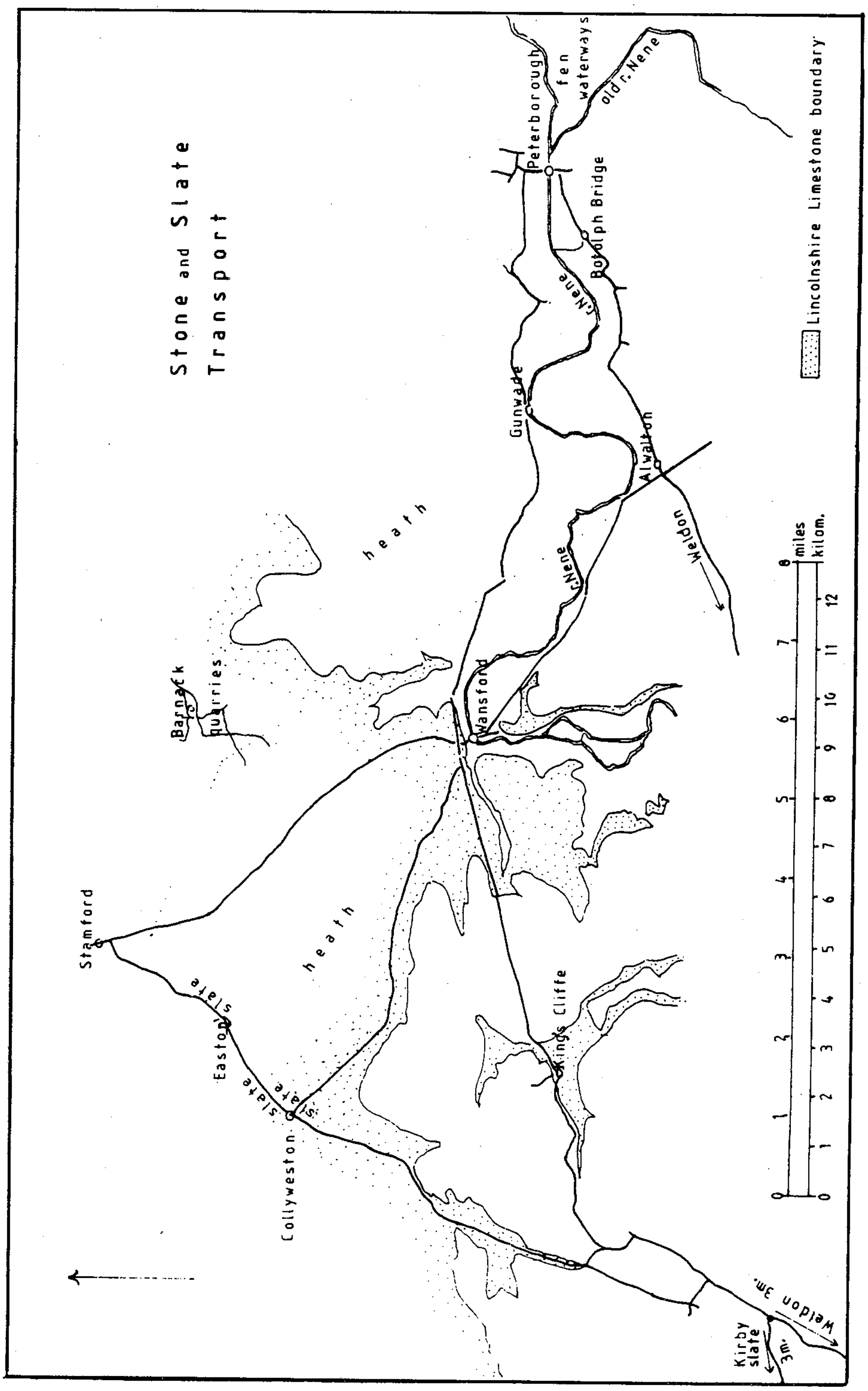
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fen waterways
old r. Nene
Botolph Bridge
r. Nene
Gunwade
Alwalton
heath
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Barnack quarries
Wansford
Stamford
slate
Easton
slate
Collyweston
King's Cliffe
Kirby slate
3m.
Weldon 3m.
miles
kilom.
Lincolnshire Limestone boundary

Fig. 1

STONE AT CAMBRIDGE CASTLE - AN EARLY USE OF COLLYWESTON STONE SLATE

H. B. SHARP

The use of fissile stone as a roof-covering material, when split according to its nature into slabs or slates, is recognised in several parts of England, most obviously in the Cotswolds and the Pennines. The discussion that follows is concerned with the early history of the use of such material originating in north Northamptonshire. (In the county there are two sources, petrologically quite distinct; only the one in the northern tip is relevant here.) The material for the stone slating of this area, and also for neighbouring South Lincolnshire and Rutland, has always come principally from the fields around Collyweston (Northants. SK 9903), although up to the end of the nineteenth century there were other nearby slate beds in the same stratum. The name of the village has become a convenient generic, much as 'Stonesfield' has for the Cotswold varieties.

The earliest documented reference to Collyweston slate by name occurs in the Rockingham (Northants. SP 8691) castle accounts for 1375: *Et in ix^{ml} et di. petris tegulis...Et in dictis carientis de Colynweston usque dictum castrum.*[1] This was a substantial amount, sufficient to cover 1900 sq.ft.[2] As in 1383 Oakham (Rutland, Leics. SK 8509) castle bought five thousand (covering 1000 sq.ft.) and Rockingham a further four and a half thousand in 1390[3] it is clear that by 1375 the Collyweston slate industry was well-established, for no supervisor with his master mason working on royal buildings would experiment on this scale with untried materials; nor would the industry have risen to the export market had not the product acquired some reputation for reliability, durability, initial costs and maintenance costs - with the implication that time had necessarily to elapse for its performance to be measured against that of thatch, shingle, and lead. This would surely have taken at least fifty years; the following paragraphs attempt to show that this figure might well be extended to one hundred years.

The only documents known that further the inquiry are connected with the rebuilding of Cambridge castle, but before these are considered an explanation of the provenance of the stone as well as the slatestone transported to the castle is necessary. Two sources (from this area) of stone and slate are mentioned in the accounts - Barnack and Peterborough.

1. *Barnack* (Northants., Soke of Peterborough, now Cambs. TF 0705). The stone was used from Saxon times for the monastic buildings of the area, and that the quarries yielded enormous quantities is evident today. Cambridge castle certainly had its share: the accounts surviving are largely made up of lists of payments for this and other stone.[4] Barnack quarries yielded three beds: one of freestone which would have been used for the finer parts that needed moulding and carving; a shallow ragstone bed for rubble walling and for the internal facing of roofed buildings; and a deep extensive bed of shelly fossiliferous stone - the Barnack rag.[5] The three are clearly differentiated in the accounts: the scribe uses (a) *lapis* for the fine-grained stone suitable for moulding and carving (note 17), *petra* for the other two beds - (b) *petra magna,* the Barnack rag, not a fine-grained stone, but dressing well for smooth walling, piers and the like, durable to weather and also weight-bearing; the very large blocks, averaging 4ft. by 4ft. and weighing two to three tons, would provide in bulk the large stones necessary for abbey and church building,[6] (c) *petra* - rubblestone, used for general walling when supported by freestone jambs, sills and lintels, and buttresses, for the inner facings of the walls of roofed buildings faced externally with rag or freestone. A fourth class may be added - not from real quarry beds but from the over-burden - fragmented stone good for the kiln and locally called 'cale'. The accounts note William and John 'le kaoler'/'caoler'/'cayler', and the supplying of this stone, probably including lime-burning and the supplying of burnt-lime, must have been the family's original occupation. William by this time was also supplying ready-cut quoins and the like (note 17). These varieties of stone had to be conveyed by land from the quarries to the nearest navigable point on the Nene, whence they would proceed by water as far as the wharf constructed for the purpose near the bridge over the Cam a short distance from the castle.[7] The water route can never be exactly determined as the fen watermen would have their own flood level and low level cuts, but clearly the rivers (whose courses even where they exist today were different before the Bedford drainage schemes) would afford the best channels. Whittlesey Dyke, or the Old Nene through Whittlesey Mere, Ugg Mere and Ramsey Mere would be possibilities. The Ouse would be joined at Earith and the Cam at Stretham or Waterbeach; a glance at Saxton who, though inaccurate in detail does show the general flow of the rivers and their places of debouchment, is sufficient. Speculation on unverifiable detail is unprofitable. What one would really like to know is the build and strength of the transport craft and the size and shape of their loads.[8]

The initial part of the journey, by land from the Barnack quarries to the Nene wharf at Gunwade, is

not known (though aerial photos might show a trackway), but a line between the two largely across heath (some of which still persists, as marked on the sketch map) would have been practicable and sensible, using a level limestone plateau right to the river edge, which is of course why this point was chosen, for just briefly here the river buts up to the limestone scarp before meandering away again.[9] A bridleway from the heath debouches on to the road near Robin Hood and Little John, the original S.Edmundsbury right of way markers still in position.[10] Until the exhaustion of the Barnack quarries in the 1450s (King's College Chapel, Cambridge, had for instance to use Weldon stone from 1480) Gunwade was jealously guarded as the keelement point for Barnack stone,[11] though later it was used for freestone from other sources.[12] This exclusive use of Gunwade for Barnack stone is important in the present essay, for it explains why the Collyweston/Easton/Lincolnshire Limestone slatestone was dealt with by the Peterborough factors from their own wharves downstream, and so denominated, and possibly thought of, as from Peterborough.

2. *'Peterborough'stone and slatestone.*

The term 'Peterborough' is generic: it indicates the wharfage point for stone other than Barnack, and for the slate, but not necessarily the location of those materials. In the case of the stone one can only work from the nineteenth century geologists, but for the slate the coarse shelly great oolite of this district would never have provided the hard, fine-grained stone that would split into tensile sheets. The nearest slatestone would be therefore from the Lincolnshire Limestone.[13] The building stone however could have come from the area around Peterborough where the geological maps[14] show the presence of cornbrash and great oolite. The former might have provided some rough rubble for random walling, but more likely the material for the cores of ragstone walls and piers, and certainly for lime-burning. This may be the 'rowe' (rough) stone appearing twice in the accounts.[15] The great oolite in the area must have been good enough as a rubble walling stone, though because of its coarse texture it would not have dressed as a freestone.[16] It could however have been used for walls well supported by freestone quoins, jambs and buttresses.[17]

As the nature of the great oolite and cornbrash in this area shows that their strata could not have provided slate, it was a matter of going eight to twelve miles to the west of Peterborough to find the Lincolnshire Limestone slate pits, probably at Collyweston and Easton. Road transport to Wansford and thence by the south bank of the Nene to Peterborough wharves was direct and as easy as one could expect: a descent from 300ft. to 75ft. over limestone plateau to Wansford, from where the road contours the plain just safely above flood level to Peterborough. Though there must have been several embargement points on the Nene for the fen waterways, only one is known by name – that at Botoloph ('Bottle') Bridge (Hunts. now Cambs. TL 175975).[18] This would have taken stone coming from beyond Alwalton, e.g. Weldon, King's Cliffe, Wansford, and the slatestone.[19] Gunwade being solely for Barnack stone at this time, the slatestone was negotiated through a Peterborough factor and keeled from the Peterborough wharves, thus gaining its misleading epithet. Knowledge of the material would have been gained during the quarterly visits to Peterborough and Barnack by the supervisors, one of whom dealt with slate, and the master mason.[20] They would from the start have had the roof-cover material in mind, and could have both heard of it, if not in Cambridge, then from Reginald in Peterborough, William Puff in Barnack, or seen it in use at either place, especially at Barnack, only four miles from Easton and Collyweston.

The history of Cambridge castle has been fully treated,[21] and here only the period of Edward I's rebuilding (1284-1298) and Edward III's maintenance (1327-1370) are considered. From the large sums expended by Edward I it is clear that it was intended that Cambridge should have a strong castle; in a position on the edge of the fens commanding the east-west route from E.Anglia to the midlands this plan would seem sound.[22] However, though much was done (the work from 1284-1298 costing some £2,630), the King's works were never completed. Comparatively small sums were spent on maintenance during Edward III's reign; by 1441 the buildings were in ruins.

The great hall, curtain walls, and postern were the first concern. In the two years up to midsummer 1286 £408 was spent.[23] Though the detailed rolls for this period have not survived, the roof must have been covered so that interior work could commence. Entries in the succeeding roll for 1286-7[24] support this: e.g. in July 1287 a plasterer (*daubator*) was employed for the walls of the hall and for corbels in the hall and solar, also a whitewasher (*dealbator)* and apprentice, and in August two windows were glazed, with more glass in July 1288.[25] By 1286, therefore, the roof-cover would have been finished and references to it would be in the now missing detailed accounts for those first two years. Fortunately there

is just enough material to substantiate the claim that stone slate (and that obtained from the factor at Peterborough) was used on the great hall from the beginning.[26] First, the accounts entry for the carriage of the last delivered load of slatestone in the 1284-6 period (ending Michaelmas) was held over and appears in the details for November 1286: *Item eidem Willelmo et socio eius pro cariagio petre de Burgo sancti Petri qui vocatur Sclatestone per aquam usque ad pontem Cantebryg' xxviijs vd*[27]. As the only roofed building mentioned in the first period is the great hall, and as in the next period (Nov. 1286-7) the only roofed building mentioned (the gatehouse) was leaded,[28] it is possible that this slate delivery was for the completion of the great hall slating. When, on looking ahead eighty years to 1370, one finds that slaters were repairing the hall roof, that is in itself enough confirmation that the original cover was of slate, for one well-made (including in addition to slating skills the use of oak heart-lath) can last, with maintenance, a century and more before stripping and re-slating is necessary.[29] The only objection to this argument is that the cover medium might have been changed following a major catastrophe such as fire e.g. a roof originally leaded might later have been slated.

Fortunately this eighty year period is divided into halves by a survey of 1327[30] (the new king Edward III causing his defences to be examined) which amounts to a continuity document. For the first half (1286-1327) the sheriff's claims for expenses from 1298 (when work on the castle ceased) onwards represent only minor maintenance work. Had anything as major as a new roof been necessary, the account would have shown it. For the second half (1327-70) the survey of the former year allots only £5 to the hall, kitchen and brewhouse repairs, and only £63 to the whole complex. Edward III did little to the castle; small sums were spent intermittently and not until 1370 was attention directed to the hall and constable's chamber over the great gate. Repairs to the hall slating were carried out, and, it must be concluded, to the original slate cover of 1285-6. (See note 2 for statistics.)

To return to chronology and 1286. A mixture of roof-cover materials was used, and a mention of them all puts the large hall slating project into proportion.

In June-July 1287 the masons' workshop *(hastillaria)* was reed-thatched *(ros* is used for 'rush', in this case fen-sedge as opposed to reed).[31] In the last quarter of 1287 rush-thatching of the walls, unfinished great gate and (unspecified) houses was effected as a preventative against winter weather until work could be resumed in the spring.[32] In the summer of 1288 the great gate was leaded, involving a journey for master mason Thomas this time to King's Lynn.[33] As no mention is made of the *domus* that had been thatched before the winter, either they were allowed to remain thus or they were slated with the two amounts that were bought in the new year:

Item Reginaldo de Burgo pro lapide qui vocatur Sclate ab eo empto. Et pro cariagio eiusdem lapidis de Burgo sancti Petri usque Cantebr' lxs. (E101/552/1; 1288: 12 Jan-9 Feb; membr.1, second 'particulars'.) Four months later the order was repeated:

Item liberatum Reginaldo de Burgo pro lapide qui vocatur Sclate et cariago lxs. (ibid.; 1288: 5 April-15 May; membr.1, fourth 'particulars'.) No specific use for the slate is mentioned.

In the six weeks from August to mid-September 1288 a second payment was made towards leading the great gate (a third was made in October) and also to the rear of the hall chamber (?solar)[34]; to John the carpenter for making a house in the barbican[35] which was covered by Roger of Withersfield: *Item liberatum Rogero de Wether' pro coopertura domus in barbicano xijs jd*[36]. Although *cooperare* can apply to any cover medium, here the house was most probably slated for no straw/rush purchase appears in the accounts immediately before or after this time, and slate had been bought in April-May, most possibly with this use in mind. The carpenter made also a garderobe mentioned in connection with the *domus* and this was again for the same reason most possibly slated by the same Roger in October: *Item liberatum Rogero de Wether' pro coopertura garderobe di mar.* [6s.8d][37]. In the spring of 1289 another slightly smaller load of slatestone was delivered: *Item Reginaldo de Burgo pro sclatston xls.*[38] The detailed account continues to October 1289, with constant imports of stone and of course many more entries about wood and ironwork as parts of the castle were being fitted after roofs and covers had been made.

At this point detailed accounts cease for five and a half years. For November 1289 to May 1295 (no work in 1290-1) the only records are those of the Pipe Rolls 19-23 Edward I, which show an average annual expenditure of £200. As this sum is comparable to the amounts spent in 1284-5-6, 1287-8-9, and half that spent in 1286-7, for the two latter of which detailed rolls exist, one can gain an idea of the considerable work continuing over these five and a half years. Nevertheless, there is such activity in the six months June-November 1295 that one feels that orders have come from Westminster to finish rather than be content to continue, and the impression is strengthened by the grant of a considerably increased

allocation. Michael Wolward appears as supervisor in place of Roger of Withersfield, and an attempt is made to contract a workforce with assured employment, each member accountable week by week even for odd days' absences. The account (E101/459/16) is much more varied than the previous ones as more finishing work was done, chiefly on refitting a stable and the kitchen, and on *de novo* stone work for a turret near the hall as well as the walls. The masons' and labourers' numbers are considerably increased – master mason and 34 *cymentarii,* 16 *cubatores* and 34 *operatorii* being engaged for the period June to Michaelmas, followed by an extension to November when the work still unfinished was thatched down for the winter. In addition to the contracted and named workforce there were the *ad hoc* engagements for carpenter, plumber, slater, and the like. The total spent was £302.16s.1d., and still there was work for the following year.

Again the impetus slackened: nothing was done for two years until the 1297-8 season, in which over £104 was spent on a new kitchen and bakehouse (Pipe Roll 27 Edward I). All work then ceased and the plans were apparently never completed.

In the whole of this 1295 spurt of activity there is only one slating reference. The stable was refitted in an existing building, similarly the kitchen; only the tower was new and so, with the walls, was temporarily covered for the winter. However, the original hall garderobe of 1284-6 (not to be confused with that in the barbican mentioned above) was clearly considered not fit for a king. The old one was taken down and a new one built. The old one, since the slate was removed and the cover not replaced in any medium,must have been dismantled and had therefore been external to the hall, since no structural alterations are recorded. The new one, since it never had to be roofed (had it merely been unfinished it would have been mentioned in the thatching-down operations) must have been an enclosure within an existing building, as here for instance the hall or solar was. Its progress can be traced briefly. In the second week of June (memb. 2, partic.1): *Item Roberto le Tylere per ij dies deponendam coperturam de sclat de veteri garderoba aule vjd.* That this task, most probably on a pent-roof, took two days indicates that the slate was taken carefully, cleaned and stacked for further use. In the second week of August (memb.4, partic. 1) the carpenter started work, using ten new joists and 40 spars, which can be interpreted here as the main and intermediate timbers: *Item in x gistis emptis ad Nundinas* [fair] *sancte Radegund ad gistandam garderobam aule viijs. Item in xl sparris de alre* [alder] *emptis ibidem ad gistandam ijs vjd.* He continued in the next week: *Item Johanni le carpentar per iiij dies ad gistandam garderobam aule et ad faciend' le setle cloace de garderobe qui cepit per diem iiijd summa xvjd.* At the end of the month the work seemed to be complete with the payment for nails for the door of the new garderobe together with items in mid-September (memb. 5, partic. 2) for 11 pieces of iron for hinges and bars to be made for the windows (2s.9d.). However, further detailed work was ordered, for in the second and third weeks of November a screen was made in front of the seat, and as this also had a door, the screen must have made a complete enclosure within the enclosed garderobe which already had its own door (memb. 7, partics. 2 & 3).

Work on the scale of the years since 1284 was never resumed, and after 1298 there was only maintenance. During the reign of Edward II up to 1327 the sheriffs made only minor returns; the importance of the 1327 survey has been mentioned. In recommending that £5 only be spent on repairs of hall, kitchen, and brewhouse the roofs cannot have needed much attention up to that date. Edward III, in reviewing the state of his defences by ordering the survey, must have been advised that Cambridge castle was not as strategically important as his grandfather had thought, for only maintenance was continued, the new towers never being finished. The only roof-cover work was in 1367-8 and 1370, of which details survive (E101/553/2). In the 1367-8 season a compound of kitchen, stable and small room underwent a thorough reparation with works to floors, partitions, walls, fittings to doors and windows, the whole thatched *cum reed* by John Glangeron and his labourer Roger for a gross payment of £3.13s.4d., by far the most expensive item for this group. In 1370 work was done on the hall roof:...*Willelmo Sharp sclatiere pro reparacione magne aule...de latthes nayl sclat...in grosso xx li.* This is a large sum and to be expected after only maintenance over so long a period. The outside stairs to the great chamber of the hall and the porch (?at the top of the stairs) were remade by carpenter Geoffrey of Chesterton for a gross 18s., and the porch was slated, together with the outside stairs to the constable's chamber over the prison...*Willelmo sclatiere pro coopertura de la porche et greyinges* [gressus]*dicte camere in grosso xvs iiijd.* The timbers of this roof were repaired by the carpenter and leaded by William Plomer, (together with other lead repairs), for £5.

For the castle as such the story ends rather flatly. In 1441 permission was given for the hall to be

demolished that the stone and, one hopes, the slate, might be used in the new King's College. As one reads through these long lists of load after load of stone, and imagines a small army of masons at work, the effort seems wasted, though perhaps the material was put to better use. It was certainly a quarry of ready dressed stone; even the core material, which would have been mountainous, could all have been re-burnt for use as lime. However, it has been established that the history of the fissile beds of the Lincolnshire Limestone used for slate may be pushed back some eighty years.

NOTES

1. E101/481/3 (second part, items 1 & 2). All documents quoted are PRO.

2. Because a thousand of slate covers 200 sq.ft.

This 1900 sq.ft. noted in the text means more if presented thus: given a rectangular building, either roof-face would have a superficial area of 950 sq.ft., or (for example) a roof-cover of 15 ft. from eave to ridge by a length of 63 ft., implying a floor-area of 20 ft. by 63 ft. For a pent-roof, 1900 sq.ft. would be a very large area but (for example) two pent roofs of 950 sq.ft. each would provide two covers of 17 ft. eave to ridge by 56 ft. length.

Oakham castle, because now the great hall stands uncluttered and can be viewed as a whole from the wall-slopes, provides a good visual test for estimates of roof sizes, as well as a 'template' for likely rectangular floor spaces so covered. Oakham great hall has two aisles separately roofed, and at a slightly different angle, thus also providing a useful standard against which to set estimates of pent-roofs. Main roof of hall (at 50° pitch): length 73 ft., eave to ridge 21 ft.; area of one face 1570 sq.ft., which would need eight thousand of slate to cover; both faces of main roof would need together 16 thousand of slate. One aisle roof (at 45° pitch): length 73 ft., eave to wall 17 ft.; area 1250 sq.ft., needing six thousand of slate. Together both aisles would take 12 thousand of slate; the total for the complete roof 28 thousand. Cambridge castle great hall was slightly larger and the superficial roof area to be covered was 3159 sq.ft. (Oakham total 2811 sq.ft.), requiring about 32 thousand of slate. (The plans in *VCH Rutland* ii, 8-10, and *VCH Cambs.* iii, 116 have been used.) As the full building accounts of Trinity College Cambridge great hall (1605) are available (College muniments) stating ground and roof areas, thus enabling pitch to be calculated, the following table may be of use:

	ground		roof			no. of slates	
	length ft.	breadth ft.	one face = sq. ft.		pitch	one face	both faces
Trinity College	100	40	100x33	3300	55°	16½ thou.	33 thou.
Cambridge Castle	117	33	117x27	3159	52°	16 thou.	32 thou.
Oakham Castle							
main	73	26	73x21½	1570	50°	8 thou.	28 thou.
aisle	73	12	73x17	1241	45°	6 thou.	

3. Oakham Castle 1383: E101/478/23. Rockingham Castle 1390: *Et in iiij ml di. sclatstones emptis pro coopertura aliarum diversarum domorum ibidem pretium ml vjs viijd xxxs.* E101/481/12 (item 8).

4. Besides that from Barnack and Peterborough explained in the text, Reach (12 miles NE of Cambridge) supplied stone for lime-burning and 'white stone' – fine chalkstone known as 'clunch'; Burwell, near Reach, and the better-known of the two names, supplied stone for lime and later burnt lime to Cambridge, though generally it was known for its *lapis albus.* Harlton (6 miles SW of Cambridge and in the better-known Eversden-Barrington area, also supplied similar material but in less quantity and to Cambridge only up to 1287. (For these quarries see Purcell, chap.2 and plates 2b to 5b.)

The never-ceasing demands for stone appear so impressive in the accounts – Nov. 1286 to Nov. 1287 (E101/459/15); Nov. 1287 to Nov. 1289 (E101/552/1); June to Nov. 1295 (E101/459/16) – that they are presented in summary tabular form (including much other information) as an appendix to these notes.

5. Purcell text 29, 33; plates 8 a & b, 9a.

6. *VCH Northants.* ii, 301. What the term *magna* really signified is visually demonstrated at Engine Farm (Hunts. now Cambs. TL 233903) where are four blocks of Barnack Rag as it came from the quarry, destined for Ramsey, Sawtry or beyond, but never delivered. (Purcell, plates 47 a & b.)

7. E101/459/15, memb. 1, partic. 3, Mon. 10.3. to Mon. 5.4.1287: *pro uno cayo...di marce.* There all stone and lime from whatever source was deposited and a separate contractor was employed for the carriage *de ponte ad castrum* at some expense, as the appended tables show.

8. One may perhaps make too much of the Barnack cubes at Engine Farm cited in note 6 above. They may represent the first and last attempt at transport of stone in the most economical form from the masons' point of view. If this were the pattern of shipment of the *magna petra* then one would like to picture the hoisting and lowering gear at the wharves and the busy scenes thereat. There is the possibility that the stone used in the Plough Inn between Prickwillow and Ely was supplied in dressed form, its intended destination being the cathedral.

9. The river has just come over from the limestone scarp on the south side of the flood plain where it exposed the great oolite oyster beds forming the 'Alwalton marble'. (Purcell, plates 37b to 39a.)

The course of the track from Barnack can be roughly determined. (A seemingly obvious route south to Castor via Ermine Street would have been made unsuitable by the then unavoidable climb up the step scarp and down again to water edge.) Both the

beginning and the end are known: from Barnack the 'Gunwade Ferry Road' is shown on an open-field map of the area dated to before 1800 (Northants. Record Office Map 4040). This runs north of Southorpe in an east-west direction along the parish boundary between Southorpe and Ufford (TF 091033). Tracks and footpaths still confirm this. At the river end the St Edmundsbury right-of-way markers, Robin Hood and Little John, are *in situ*. (Note 10.) Between the two, the first edition of the O.S. (1824) shows several tracks across the heath, and the parish boundary between Castor and Milton is in part followed by a 'mere way' clearly shown on the 1846 map of Castor (Northants. Record Office Map T236). (The writer is indebted to Mr S. Upex for help with the above.)

10. Gover, 233. The authors describe the stones as 'covered with thorn-bushes' but they are now in pasture and as Purcell shows them in plate 37a.

11. *VCH Northants.* ii, 293ff.

12. Willis & Clark: i, 293 for King's Cliffe; i, 294 for Weldon, both from 'Gunwell' (1578); ii, 567 for 'Weldone' stone from 'Goonwoord'.

13. The Collyweston slates are split from blocks of stone after hard continuous frosting into ⅜in. sheets; they are slates, not slabs. The actual location of the earliest beds (i.e. before about 1300/1320) is not known, though most probably at Collyweston, the old furlong names providing indications. The writer has found large plates naturally frosted from exposed lumps in the Wansford quarries, but this does not mean that they would have provided durable slate, merely that the right area had been reached. Location of the quarries is not material, simply the recognition that the stratum must be the Lincolnshire Limestone.

14. OS geological 1 inch map 157; *VCH Northants.* i, plate 1.

15. E101/459/15. 1287:6 Jan.-10 Feb., membr.1: *pro petra empta de Burgo scilicet rowe stone viij li.* 1287: 22 Sept.-20 Oct., membr. 3, partic.3: *liberavit Roberto le Brewester de Burgo pro rowestone vijm* [£4.13s.4d.]. (*ibid*) As this 'rowestone' is only mentioned twice in this period, and as the amounts (from the price) are considerably larger, perhaps this material was solely for the limekiln, the rest of the 'Peterborough' stone for backing up the Barnack rag. Purcell (plate 9a) demonstrates the use of Barnack rubble for random walling.

16. *VCH Northants* i notes that the great oolite 'has been most extensively used in the county for building and for dry walls' (19), but this northern tip of the county is not typical of the great oolite and cornbrash of the main body. In *ibid* .ii Beeby Thompson cites great oolite useful for building only in the south of the county but makes a more general mention of cornbrash for walls (301). Woodward is more detailed on the Peterborough area (but naturally of the 19c.) and mentions plenty of pits of the great oolite (412, 415, 416) and the rubbly marl of the cornbrash burnt for lime at Peterborough (487). The 'rough' stone is still to be seen at Peterborough, e.g. in the parish church of S. John, supported of course by freestone, but interestingly much repaired, indicating the poorish quality of the original, and in some boundary walls in the north suburbs of Walton, which stone would have come from the New England pits (mentioned by Woodward) nearby. Just over the river from Alwalton at Orton Waterville the poor quality of the cornbrash is well demonstrated in the supporting and rebuilding of the 17c./18c. cottage walls. It is however quite clear why the 'Peterborough' and Barnack stone were used in much the same quantities: the ragstone/freestone needed either a core if the walls were external, or a facing if internal, and this frangible material mixed with properly made lime of good quality is as durable as the stone itself.

17. For example 1286: 11 Nov.-23 Dec., membr. 1, partic. 1: *Willelmo Puff pro magna petra et lapide libero ab eo empto de Bernac videlicet coyn, tabulis regis* [king's tables, ornamented corbel-tables or string-courses] *crestis et subcrestis* [the two courses capping the rubble walling and supporting the wallplate], *jambis et aliis lapide libero.* (E101/459/15).
1287: 12-24 May, membr.2, partic.1: *Willelmo Thede pro lapide albo scilicet coyn de Harleton* [6 miles sw of Cambridge; fine white chalk-stone]. (*ibid*)
1287: 30 June-28 July, membr.2, partic.3: *Willelmo Puff pro petra de Bernak scilicet coyn, crestis, tabullis regis. (ibid)*
1289: 12-26 Sept., membr.5, partic.1: *Willelmo le cayler pro iiij cent de coyn de petra de Barnag.* (E101/552/1).

18. The first 1" OS edition (1824) shows the position before the turn-pike road re-alignment, and the hatching method then in use is much more graphic in showing the cut from the bridge to the river, a deepening making use of a natural drainage rivulet in the pastures. The area is now overwhelmed by greater Peterborough, the stream piped, the bridge, no doubt part of the turnpike scheme, strong enough to take the then increased load of traffic, no more. The windows of the octagonal tollhouse adjacent had adequate vision provided by the re-alignment. The three front sides of the base of the octagon have been thoughtfully preserved in the garden of the bungalow on the site, and a road-name opposite also commemorates it.

19. From the contract for the slating of Corpus Christi chapel, Cambridge: '...also for the tolladge at bottle bridge off the cartes that shall carrye the sayd slate from the quarrye to the water syde...' (Willis & Clark, i, 312.)

20. The sheriff Thomas de Belhus had overall responsibility. He delegated to two supervisors, who consulted with the craftsmen, especially the master mason, whose wages were increased by 1s. a week. (For sheriffs and supervisors see *King's Works,* i, 51-55; 165). *Nov. 1286-Nov. 1287* (E101/459/15). Supervisors Geoffrey Andrew and Roger de Withersfield, both Cambridge burgesses, the latter paid in the journeys in the 1284-6 period. 14.4.-12.5.1287 period (memb.1, partic.4): G. Andrew and *magister* Thomas, mason, *ad Burgum sancti Petri et ad le Bernak pro petra emendanda.* Expenses 4s.1½d. 30.6-28. 7.1287 (membr.2, partic. 3): master Thomas *usque ad le Bernak.* Expenses 1s.1d. *Nov. 1287-Nov. 1289* (E101/552/1). The same supervisors. 9.2.-3.3.1288 period (membr.1, partic.3): *liberatum magistro Thome cimentario et Galfrido Andre pro expensis suis in eundo et redeundo ad Burgum sancti Petri iiijs viijd.* cf. note 33 for journey to Lynn. *4.7.-1.8.1289 (membr.4, partic.4.):* master Thomas to Peterborough, expenses 6s.8d. The master mason with the supervisors, were well rewarded towards the close of the 1286-1289 work: *pro tribus robis emptis ante Natale Domini ad opus magistri Thome cementarii, Rogeri de Wyther et Galfridi Andre lxs.* (E101/552/1, membr.3, partic.3, 14.3.-9.4.1289 period, for Christmas 1288.) £1 for a gown was equivalent to 8 weeks' wages for master Thomas at 2s.6d; for a mason at 1s.10d. the equivalent of 11 weeks' wages. For gowns: *King's Works,* many references, see Index ii, 1137, 'rewards of robes'. Salzman, many references, see Index 632, 'robes given to craftsmen'. *June-November 1295* (E101/459/16). Michael Wolward has become supervisor, Thomas not accompanying them (the factors at the various quarries and wharves being much the same, the kinds, and quality of stone would have been known). Week 8.8.-15.8.1295 (membr.4, partic.4): G. Andrew and M. Wolward made the return journey to Peterborough in three days, expenses 5s. Week 3.10-10.10.1295 (membr.6, partic.1): M. Wolward and Richard *clericus* did the same.

21. *King's Works* i, 233 and ii, 583-588.
22. From the west and north down Ermine Street to Godmanchester; thence the Via Devana to Cambridge; thence to Newmarket by joining the Icknield Way and into E. Anglia, the whole neatly contouring the fens. The end map in A.K. Astbury *The Black Fens* (1958) illustrates this graphically.
23. Pipe Roll 14 Edward I.
24. E101/459/15; details in note 25.
25. *...daubatori murorum dicte aule et corbellorum in aula et solario aule xvjs xd ob.* 1287 membr.2, partic.3, period 6 June-28 July. *...in stramine albo empto ad plastrandos predictos muros* [chopped straw used as a binder] *iijs vijd. (ibid) ...uni dealbatori et garcioni sui viijs xd. (ibid) ...Johanni le Verrur pro ij fenestris factis de verro ad aulam xjs* 1287, period 28 July-25 August, membr.3, partic.1. and from E101/552/1: 1288, 21 June-2 August, membr.2, partic.2: *...liberatum pro verura ste* [*ynata*] *ad fenestres camere in magna aula xxjs ijd.*
26. Naturally a large roof: see note 2 above.
27. E101/459/15. 1286, 11 Nov.-23 Dec. period, membr.1, partic.1.
28. note 33 below.
29. A 14c.-15c. confirmation is provided by the re-slating of the kitchen at Higham Ferrers (Northants.) castle: originally 1372-3 (DL 29/324/5298), re-slated 1462-3 (DL 29/342/5554).

The estimate of 100 years is conservative. Though this figure has been adhered to in the text, 200 years is accepted for the life-span of an 18c. roof-cover, given heart-oak *split* laths and due maintenance. Local architects called in to advise on listed buildings have confirmed this to the writer from their own observations. It is possible in the Stamford area to put the limits in another way: the railway connections arrived in 1846 (and therefore Welsh blue slate), and steam sawmills were installed in the station yard in 1849. Any stone roof cover stripped now revealing split laths will have been on for a least 130 years. Observation of the nailing of the laths to the rafters will immediately show whether the roof has been stripped before; coupled with a dating of the building, the estimate of 200 years has in several cases seemed just. It is therefore not at all extraordinary to expect that the slate put on Cambridge Castle hall in 1284-6 would last with maintenance until 1370.

30. E101/484/10, membr.3, (5.10.1327)
31. *Item in stramine empto scilicet ros ad coperiendam novam astillariam vijs xd. Item pro stipendio cooperatoris dicte astillarie iiijs vjd.* (E101/459/15. 1287, 30 June-28 July period, membr.2, partic.3.)
32. *Item pro stramine empto scilicet ros ad muros castri cooperiendos et ultra magnam portam et in coopertura domorum xvijs xjd ob.* (E101/552/1. 1287, 11 Nov.-23 Dec., membr.1, partic.1.)
33. *Item pro plumbo empto apud Len* [Lynn Regis] *ad cooperiendam magnam portam xiiij^{li}. Item magistro Thome cimentario in eundo et redeundo apud Len pro expensis suis vs. Item liberatum Thome le Plomer pro plumbo cubando ultra magnam portam vjs.* (E101/552/1. 21 June-2 August period, 1288; membr.2, partic 2.)
34. *Item liberatum Thome le Plomer pro plumbo cubando ultra magnam portam et retro cameram aule di mar* [6s.8d.] (*ibid*).: 1288, 2 Aug.-13 Sept. period, membr.3, partic.1.)
35. *Item Johanni le carpent' et sociis suis pro domo in barbekano et garderoba xxijs. (ibid)*
36. *ibid.*
37. *ibid.:* 1288, 4 Sept.-13 Nov. period, membr.3, partic.2.
38. *ibid.:* 1289, 14 March-9 April period, membr.3, partic.3.

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Tabulated summaries of the three expense accounts used in the text and referred to in note 4.

1. From the first and overall summary it will be seen that all but half of the total was spent on masons' wages, most of the rest on stone and lime, and what seems a remarkably small remainder on carpenter and timber, smith and iron/steel, plumber and lead/tin, and other small necessaries. Unfortunately the accounts for the building and roofing of the great hall in the first two years 1284-6 do not survive in detail. There the timber costs would have been interesting. It should have been possible to reconstruct the timbering, and the slating figures, although inclusive of carriage, would have given some indication of costs.

	Total Spent			Masons' Wages			Percent	Stone Lime Carriage			Percent	Carpenter, Wood Smith, Smithery Plumber, Lead Tin, Accessories			Percent
	£.	s.	d.	£.	s.	d.		£.	s.	d.		£.	s.	d.	
Nov 1286-Nov 1287	407	17	8½	169	13	2	41.6	185	0	9½	45.4	53	3	9	13.0
Nov 1287-Nov 1289	376	19	9	176	3	4½	46.7	156	6	5	41.5	44	9	11½	11.8
May 1295-Nov 1295	302	16	1	153	9	1	50.7	135	2	6	43.8	14	4	6	5.5
	1087	13	6½	499	5	7½	46.3	476	9	8½	43.6	111	18	2½	10.1

2. The tables then continue to break down the separate columns in the general summary.

(a) *Wages and organisation of the working year.* The masons had one *magister* in everyday charge (there were two other general supervisors); the bench-masons formed half the work-force, the other half split between the layer-masons and the labourers expressly employed to serve the masons, who would have dug sand, mixed the lime-mortar and generally fetched and carried for the builders. The wages are comparable to those obtaining at the time, except for the miserly extra shilling accorded to master Thomas (Salzman 70).

The *holiday breaks* are quite clear; the only single holy-days in the working week observed (once) were All Saints' and All Souls': in 1295 they occurred in the same week and according to custom the first was at the king's expense, so that only one day's wages were lost. If these or other separate holy-days were observed at other times there is no indication in the accounts. It was clearly more productive (and economical) to have complete stoppages for one or more weeks.

The *working week.* The clerk always clearly dated from Monday to Monday, by week, month, or period, implying a full six-day working week, for where the vigil of the major feasts was observed the clerk dated from Monday to Saturday, implying a five- or five and a half-day week. Payments were on a weekly basis – to the advantage of the employer, as the sums are not always divisible by six. On the other hand, there was more assurance of continuous employment. Salzman has much information about the working day (61-67) and shows that confusion caused by local practices led to the enactment of various statutes, all later than these Cambridge dates.

The three detailed accounts analysed here illustrate what must be the heart of the matter, the morale of the work-force, dependent then as now on management/labour relations, and wages. In the first of these accounts (1286-7) there is a remarkably steady crescendo of numbers employed (one two-week period has to be doubled mentally), reaching beyond the August peak period with no incentive bonuses necessary to counteract the (suggested) attraction of harvest labour. The cessation of the year's work at Martinmas was recognised from the beginning, and the figures of those employed reflect the winding-up for the year. New work that could not be finished would not have been initiated; where possible, work would have been finished off, where not it would have been levelled to make winter thatching possible and effective. A sense of busyness comes through in this account that is lacking in the succeeding one (1287-9) which shows a work-force of such fluctuating numbers that their inclusion in the table would have no significance (see Salzman 33, 59 on fluctuations in work-force numbers). Extra wages were given for six weeks August-September, significantly to the labourers who would be most attracted by better paid piece-work. A good harvest might promise better day-rates for unskilled labourers, but surely the craftsmen, anticipating their laying-off, would be on the move looking possibly to private enterprise to provide more stable and more comfortable work during the winter. Perhaps the total allocation for expenses at Cambridge was low, for the wages are only average, and there is clear evidence of bargaining

with the *cubatores* at this period, some settling for less than the normal rate. Salzman (68, 69) gives average wages before the Black Death, and on p.70 shows how wide the variations were. Cambridge paid only the lower rates, shutting down completely in the winter, and was only a little more generous in the peak six weeks of August-September in an attempt (as it seems, vain) to get the work significantly forward before the slowing down and paying off period. In 1278 at Builth the master mason received 3s.9d. weekly as against master Thomas's 2s.6d; some other rates were paid much more highly than master John. (*King's works*: i, 297 and i, 216-218.) At any rate this account gives a good idea of the sort of work, at much the same expenditure, that continued steadily until the summer of 1295. Then the allocation must have been increased. Possibly the supervisor Michael Wolward was then newly appointed; an attempt at a regular work-force was made. and Richard *clericus* produced meticulous weekly accounts.

ORGANISATION OF THE WORKING YEAR
Martinmas 1286 to Martinmas 1287

Masons Weekly	Cementarii: Banker-Bench-Masons Master 2s.6d Others 1s.6d				Cubatores: Layer-Masons 0 1 6				Cubatores: Layer-Masons 0 1 4				Cubatores: Layer-Masons 0 1 2				Munitionis Operarii Labourers 10½d				Total		
	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
6 weeks Mon. 11.11.1286 to Mon. 23.12.1286	3	18	0	(8)																	3	18	0
Christmas and New Year break - two weeks																							
5 weeks Mon. 6.1.1287 to Mon. 10.2.1287	4	0	0	(10)																	4	0	0
4 weeks Mon. 10.2.1287 to Mon. 10.3.1287	3	10	0	(11)					1	1	4	(4)	1	8	0	(6)	1	15	0	(10)	7	14	4
4 weeks Mon. 10.3.1287 to Sat. 5.4.1287	4	2	0	(13)					1	12	0	(6)	1	17	4	(8)	2	16	0	(16)	10	7	4
Easter break - one week																							
4 weeks Mon. 14.4.1287 to Mon. 12.5.1287	5	18	0	(19)	1	1	4	(4)	1	17	4	(7)	2	6	8	(10)	3	17	0	(22)	15	0	4
2 weeks Mon. 12.5.1287 to Sat. 24.5.1287	3	11	0	(23)	1	1	4	(6)					1	8	0	(12)	3	1	6	(26)	9	1	10
Whitsuntide Break - one week																							
4 weeks Mon. 2.6.1287 to Mon. 30.6.1287	7	14	0	(25)	2	2	8	(8)	2	13	4	(10)	3	14	8	(16)	5	5	0	(30)	21	9	8
4 weeks Mon. 30.6.1287 to Mon. 28.7.1287	8	18	0	(29)	2	2	8	(8)	2	13	4	(10)	3	14	8	(16)	6	13	0	(38)	24	1	8
4 weeks Mon. 28.7.1287 to Mon. 25.8.1287	9	10	0	(31)	2	2	8	(8)	2	13	4	(10)	3	14	8	(16)	6	13	0	(38)	24	13	8
4 weeks Mon. 25.8.1287 to Mon. 22.9.1287	8	18	0	(29)	2	2	8	(8)	2	13	4	(10)	3	14	8	(16)	6	13	0	(38)	24	1	8
4 weeks Mon. 22.9.1287 to Mon. 20.10.1287	5	18	0	(19)	1	1	4	(4)	1	1	4	(4)	2	6	8	(10)	3	3	0	(18)	13	10	4
4 weeks Mon. 20.10.1287 to Mon. 17.11.1287	5	18	0	(16)	1	1	4	(4)	1	12	0	(6)					3	3	0	(18)	11	14	4
	84	11	0						42	2	8						42	19	6		169	13	2
Percent	50								25								25				100		

Martinmas 1287 to Martinmas 1288

Masons	Cementarii	Cubatores		Operarii	Total
Weekly	Master 2s.6d				
	Others 1s.6d	0 1 6	0 1 4	0 0 8½	
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
5 weeks					
Mon. 17.11.1287 to					
Mon. 22.12.1287	5 2 6	0 4 6		1 8 4	6 15 4
		Christmas and New Year Break three weeks			
10 weeks					
Mon. 12.1.1288 to					
Sat. 20.3.1288	12 4 0	0 9 0	1 0 0	3 6 2	16 19 2
		Holy Week and Easter Week 1288			
6 weeks					
Mon. 5.4.1288 to					
Sat. 15.5.1288	6 3 0	3 3 0	1 12 0	3 8 0	14 6 0
		Whitsuntide one week			
10 weeks					
Mon. 24.5.1288 to					
Mon. 2.8.1288	11 18 0	6 0 0	3 1 4	7 8 9	28 8 1
Weekly	2s.6d + 1s.10d	0 1 10	0 1 8	0 1 2	
6 weeks					
Mon. 2.8.1288 to					
Mon. 13.9.1288	7 7 0	4 10 0	1 16 0	11 4 0	24 17 0
Weekly	2s.6d + 1s.6d	0 1 6	0 1 4	0 0 8½	
9 weeks					
Michaelmas to					
Martinmas					
and finish the year					
Mon. 13.9.1288 to					
Sat. 13.11.1288	5 12 6	3 4 6	0 16 0	3 7 3½	13 0 3½
		Winter break eight weeks			
	48 7 0	17 11 0	8 5 4	30 2 6½	104 5 10½
Percent	46	24		30	100

Epiphany 1289 to Martinmas 1289

Masons	Cementarii	Cubatores		Operarii	Total
Weekly	Master 2s.6d				
	Others 1s.6d	0 1 6	0 1 4	0 0 8½	
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
13 weeks					
Epiphany to Easter					
Mon. 10.1.1289 to					
Sat. 16.4.1289	9 5 6	3 1 6	1 5 4	3 14 10	17 7 2
		Eastertide 1289 one week			
6 weeks					
Mon. 18.4.1289 to					
Sat. 28.5.1289	5 11 0	5 11 0	0 10 8	4 5 5	15 18 1
		Whitsuntide 1289 one week			
8 weeks					
Mon. 6.6.1289 to					
Mon. 1.8.1289	6 8 0	4 17 6		4 0 9	15 6 3
Weekly	2s.6d + 1s.10d	0 1 10	0 1 8	0 1 2	
6 weeks					
Mon. 1.8.1289 to					
Mon. 12.9.1289	6 14 2	3 10 0		4 15 8	14 19 10
Weekly	2s.6d + 1s.6d	0 1 6	0 1 4	0 0 8½	
4 weeks to Martinmas					
Mon. 12.9.1289 to					
Mon. 10.10.1289	3 17 6	2 2 0	0 7 0	1 19 8	8 6 2
1289	31 6 2	19 2 0	2 3 0	18 16 4	71 17 6
Percent	43	31		26	100
1287-1289	80 3 2	36 13 0	10 8 4	48 18 10½	176 3 4½
Percent	45.3	26.7		28.0	100.0

Trinity to Martinmas 1295

Masons Weekly	Cementarii Master 2s.6d Others 1s.6d 1 + 34	Cubatores 0 1 6 16	Operaii 0 0 8½ 34	Totals
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
9 weeks Mon. 30.5.1295 to Mon. 1.8.1295	24 10 0	13 12 3	13 14 10	51 17 1
	2s.6d + 1s.10d	0 1 8	0 1 2	
6 weeks Mon. 1.8.1295 to Mon. 12.9.1295	19 17 3	11 8 4	16 2 0	47 7 7
	2s.6d + 1s.6d	0 1 6	0 0 8½	
9 weeks Mon. 12.9.1295 to Mon. 14.11.1295	23 19 0	15 1 3	14 9 8½	53 9 11½
finishing off 3 days Mon. 14.11.1295 to Wed. 16.11.1295	0 0 7½	0 5 7½		0 6 3
or 4 days Mon. 14.11.1295 to Thur.17.11.1295			0 8 2½	0 8 2½
	68 6 10½	40 7 5½	44 14 9	153 9 1
Percent	44.5	26.3	29.2	100.0

(b) *Stone and lime*

The table breaks down the amounts into sources, for these are instructive. The Barnack and Peterborough stone is explained at length in the text; the rest was made up from the fine white chalkstone in the Cambridge area. For this particular work mainly the Reach (better known by the name of its neighbour Burwell) quarries were used; the distance by fen-edge road is 12 miles NE of Cambridge. But water transport was employed, doubtless by lode to the Cam and so to join the final reaches of the fen system from Peterborough. Smaller amounts came from 6 miles SW of the town, from the Eversden-Barrington area, here at Harlton.

Lime was also provided from these quarries. In 1295 it would have been already burnt (as the exact measures in fothers, bushels and pounds are given), but before that date it must have been the lime-stone ready for the castle kiln. Lime-stone was also provided from Barnack, as is shown by the use of the trade-name 'kaoler'/'caoler'/'cayler'. 'Cale' is a local Northamptonshire description of the top layers of fragmented chalk/limestone, useless as part of the over-burden to be back-thrown, but very useful in form and content for the kiln. It can be seen immediately under the top-soil in exposed faces in this area. Only one mention is made of the castle kiln, but it would necessarily have been one of the first parts of construction and would have been itemised in the first years' accounts. There is no mention of a specialised lime-burner among the work-force.

STONE

	Barnack	Peterborough	Reach	Harlton	Carriage Cambridge Wharf to Castle	Totals
	Carriage from Source to Cambridge Wharf included					
Nov. 1286 to Nov. 1287	Wm. Puff; Wm. le Kaoler; Rbt. Smithson; Rbt. Smith	Reginald; Reg. Barker; Rbt. Brewer; Walter Beadle; Rbt. Brewster	Hugh; John Walterson; Simon; Hugh Crable; John Crable; John Williamson	Wm. Thede		
£. s. d.	68 11 2½	55 8 0½	42 11 0	5 11 9	12 17 9½	185 0 9½
percent	37	30	23	3	7	100
Nov. 1287 to Nov. 1289	Wm. Puff; Rbt. Smith; Rbt. Smithson; Wm. le Caoler	Reginald; Reg. Barker; Rbt. Brewster Walter Brewster.	Hugh; John Walterson; Alan Walterson; Walter Redeking.			
£. s. d.	56 15 6½	56 13 2	24 6 6½		18 11 2	156 6 5
percent	36.3	36.3	15.6		11.8	100
June to November 1295	John le Caoler	Reginald	Hugh 2 0 0 Lime (Burwell) Walter Redeking		8 15 0	
£. s. d.	39 6 0	56 10 0	28 11 6			135 2 6
percent	29	42	22.5		6.5	100
	164 12 9	168 11 2½	97 10 0½	5 11 9	40 3 11½	476 9 8½
	34.5	35.0	20.4	1.7	8.4	100

(c) *Other materials and tools.*

The contents of this section are relatively small and have only been sketched in. Perversely, these minor details are among the most interesting. It is surprising, for example, that the cooper, whose duties included the maintenance of all the carrying vessels – for mortar, sand, water and the like – only received the 1½d. daywage, the labourer's rather than the craftsman's pay. Perhaps the chief item of interest concerns the conditioning of masons' tools by Henry, the resident smith, whose forge was in the castle compound. In the first two accounts only one mention is made of this work, so that then presumably the masons had to pay Henry themselves, but in the 1295 account clearly some part of the contract was that masons should have their tools regularly serviced at exchequer expense, and possibly even provided for them. The work was not merely that of sharpening: steel was bought for welding on to the iron that good cutting edges might be made, and sometimes new tools were forged. The income from conditioning tools comes exactly overall to the smith's daywage of 2½d., or 1s.3d. weekly, but in addition there was enough work in making window bars, fastenings, hinges and the like to bring his income overall to 1s.8d. weekly, which was rather better than that of the masons.

Only two classes of tools, apart from the occasional pick and crow, are regularly mentioned: the axe and the scappling ('battering') hammer. Chisels seem not to have been in use (quoins, jambs, corbel-tables etc. were ordered direct from the quarry), but 'axe' is a very general term and there must have been several models adapted to their particular uses. One never sees the mediaeval Barnack rag treated other than as ashlar, and there was plenty of stone from other sources for squared coursed rubble.

OTHER MATERIALS

	Carpenter & Timber Master John daywage 4d others daywage 3d	Smith (Henry) and Smithery	Plumber (Thomas) and garcifer daywage 5d	Accessories	Totals
Nov 1286-Nov 1287	3 14 2 (wages) 18 5 8 (timber)	piecework		includes making stable, carts, journeys, forage, whitewashers, plasterers, and straw thatchers and reed.	
	21 19 10	4 14 10	5 1 6½	21 7 6½	53 3 9
Nov 1287-Nov 1289	2 16 4 (wages) 12 1 10½ (timber)	Harry (throughout) Arthur de Stansted, Roger Withers-field, Ralph, Geoffrey le Ferrour	1 1 0 (work) 14 0 0 (materials)	includes thatcher and reed, labour for digging foundations and cess pit; supervisors' journeys, necessaries	
	14 18 2½	4 8 2	15 1 0	10 2 7	44 9 11½
June to Nov 1295	0 15 1 (wages) 7 10 5 (timber)	piecework		includes cooper Norman, pannier Alexander for necessary repairs, slate, thatcher and reeds, supervisors' journeys	
Total	8 5 6 45 3 6½	3 6 5 12 9 5	0 3 4½ 20 5 11	2 9 2½ 33 19 4	14 4 6 111 18 2½
percent	40.4	11.2	18.1	30.3	100

3. *Mobility of Labour*

The 1295 account lists those contracted to work for the six-month period, and is meticulous in naming the replacements and additions. The distances the masons were prepared to travel for relative stability of work surprises until one realises that that must have been accepted by them as part of their way of life. The unskilled labour force was much more local, though even some of those seem to have been going the rounds.

A sketch-map (Fig. 2) is given as a visual aid to the factual list.

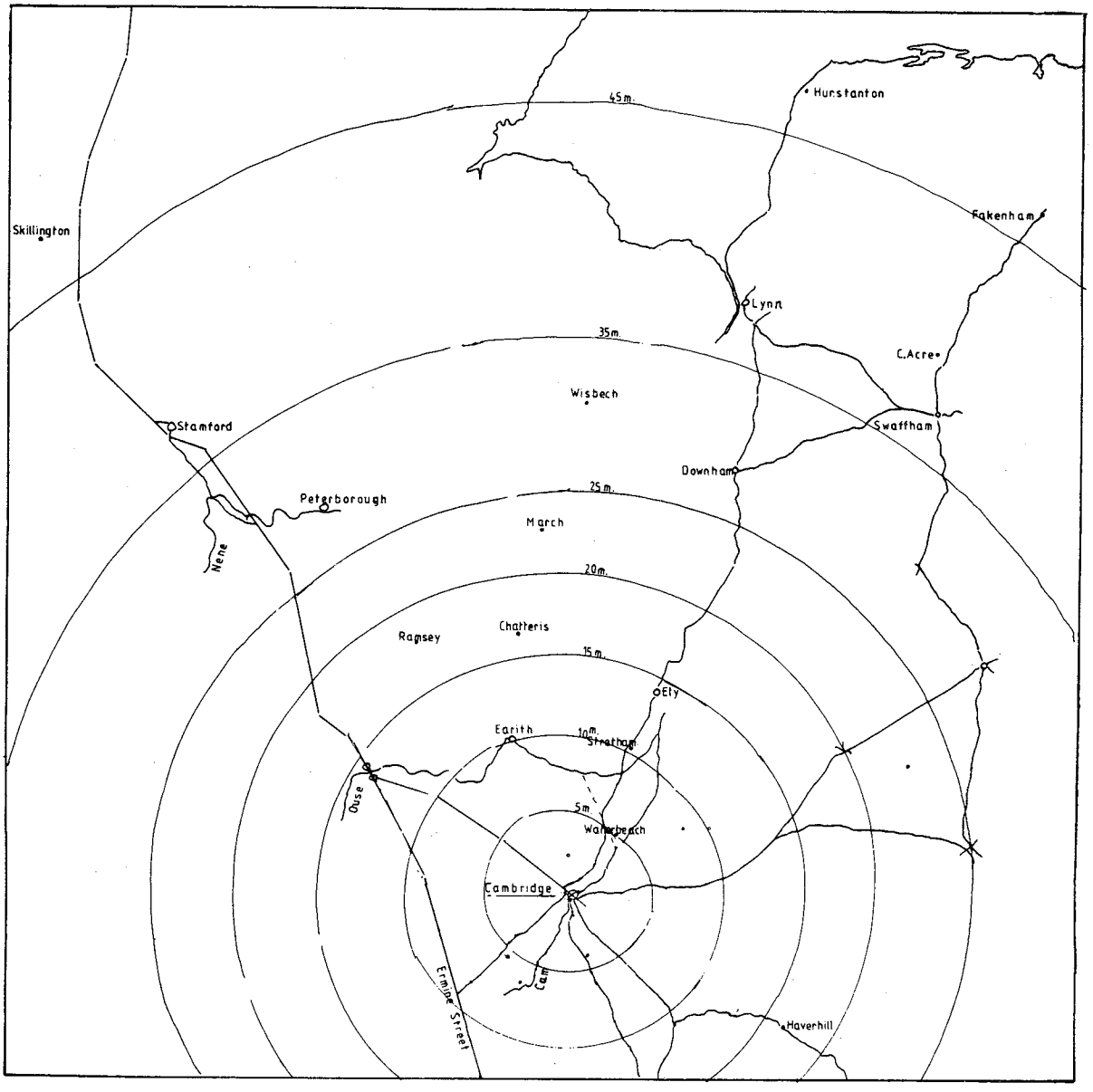

Fig. 2.

The map is to scale, but is diagrammatic only. The radii from Cambridge (in *miles)* are the most important, to be used as a visual aid in conjunction with the mileages given in the tabulations. Two roads are shown, but presumably the Lynn-Cambridge and the Peterborough-Cambridge water routes would have afforded methods of travel. The fen waterways are problematic between Peterborough and Earith and between Lynn and Ely, though they would have been in constant use at the time. Note 22 in Astbury and R. Evans in *Durobrivae* 7 (1979) give contours which graphically show the 'islands' and possible courses.

The detailed account for the renewed activity for six months in 1295 is the only one to have a pay-roll. It illustrates the roving nature of the skilled masons' life. Several of the longer distances from Norfolk are not in doubt. The rough mileage has been taken from roads that would probably have joined the fen waterway system at Lynn, Ely, Peterborough and intermediate wharves to Cambridge.

	Cementarii		Cubatores		Operaii	
At Cambridge	1 } 6	15	3 } 9	39	23 } 29	53
1-10 miles	5 }		6 }		6 }	
11-40	12	31	5	22	11	20
40 plus	12	31	3	13	4	7
unknown	9	23	6	26	11	20
totals and %	39	100	23	100	55	100

CEMENTARII

Adam de	Bernak	Barnack	Northants	TF 0705	40 nw
John de	Bernewell	Barnwell			
William de	..	..			
Nicholas de	Borewell	Burwell	Cambs	TL 5866	10 ne
William de	Cantebr'	Cambridge			
? de	Castleacre	Castle Acre	Norfolk	TF8115	52 ne
Richard de	Chatriz	Chatteris	Cambs.	TL 3986	20 nw
William de	Clare	Clare	Suffolk	TL 7645	28 se
Simon of	Ely	Ely	Cambs.	TL 5350	14 ne
Nicholas de	Ereswell	Eriswell	Suffolk	TL 7278	22 ne
John de	Fulburne	Fulbourn	Cambs	TL 5256	5 se
William de	Lyndeseye	Lindsey	Suffolk	TL 9744	42 se
Ralph de	Massingham	Massingham	Norfolk	TF 8025	52 ne
Matthew de	..	..	..	..	..
Nicholas de	Melleles	Mellis	Suffolk	TM 0974	48 ne
Gilbert de	Nassington	Nassington	Northants	TL 0696	36 nw
Adam de	Nedham	Needham	Norfolk	TM 2281	68 ne
		Needham Mkt.	Suffolk	TM 0855	48 e
Nicholas de	Offord	Offord	Hunts.	TL 2267	24 w
Walter de	Rameseye	Ramsey	Hunts	TL 2885	24 nw
John de	Sancto Neoto	St. Neots	Hunts	TL1860	16 w
Richard de	Sharbrok	Sharnbrook	Beds	SP 9959	32 w
Richard de	Shepereth	Shepreth	Cambs	TL 3947	9 sw
Thomas de	Skelington	Skillington	Lincs.	SK 8925	58 nw
Thomas Thomson	..	..	..	..	..
William de	Stapleford	Stapleford	Cambs	TL 4751	4 s
William Geoffrey de	Swynestede	Swinstead	Lincs.	TF 0122	48 nw
Baldwin de	Toft	Toft	Cambs	TL 3655	8 sw
William de	Walton	Walton	Suffolk	TM 2935	
		Walton on Naze	Essex	TM 2521	56 se
Roger de	Wytewell	Whitwell	Herts.	TL 1821	34 sw
		Whitwell	Rutland	SK 9208	54 nw

and William de Benner (?Benacre, Suffolk), Richard de Vaude (?Ford, many), Robert de la Lynde. Thomas de Stoke (many, Suffolk, Northants., Rutland, Norfolk, Bucks.), Walter de Stoke, Gilbert de Wyneton, Henry de Harleston (Norfolk, Suffolk, Northants.) William de Byssemed, Robert de Colevill, John de Lecote.

CUBATORES

Alexander de	Barenton	Barrington	Cambs	TL 3949	8 sw
Richard de	Clare	Clare	Suffolk	TL 7645	28 se
Henry de	Ereswell	Eriswell	Suffolk	TL 7278	22 ne
Laurence de	Foxton	Foxton	Cambs	TL 4148	8 sw
Richard de	Fulburne	Fulbourn	Cambs	TL 5256	5 se
Robert de	..	..	..	..	..
William de	Harleton	Harlton	Cambs	TL 3852	6 sw
William de	Lytlington	Litlington	Cambs	TL 3142	16 sw
Richard de	Olneye	Olney	Bucks	SP 8851	44 w
Hugh de	Rougham	Rougham	Norfolk	TF 8320	58 ne
		Rougham Green	..	TL 9061	36 e
Roger de	Sancto Neoto	St. Neots	Hunts	TL 1860	16 w
William de	Sharbrok	Sharnbrook	Beds	SP 9959	32 w
Stephen de	Skelington	Skillington	Lincs	SK 8925	58 nw
Hugh de	Swaffham	2 Swaffhams	Cambs	TL 5562	10 ne
				TL 5764	10 ne
		Swaffham	Norfolk	TF 8109	50 ne

and Gilbert de Caldecote (many in Cambs., Herts., Hunts., Northants., Rutland), John de Carlton (many in Beds., Cambs., Suffolk), Walter de Lidelton (many in Norfolk, Suffolk, Northants), Reginald de Polescroft. John de Rolleston (? Leics.), Hugh de Sothewell (? Southwell, Notts.). From Cambridge: Adam Cok, John le Feure, Nicholas le Wyte.

OPERARII

Nicholas de	Hynton	Cherry Hinton	Cambs	TL 4857	3 se
Adam de	Cestreton	Chesterton	Cambs	TL 4560	1 e
John de	Cestreton	Chesterton	Cambs	TL 4560	1 e
Robert de	Conyton	Conington	Cambs	TL 3266	10 nw
John de	Elesworth	Elsworth	Cambs	TL 3163	12 nw
Henry de	Fakenham	Fakenham	Norfolk	TF 9229	72 nne
William de	Flete	Fleet	Lincs	TF 3823	66 nw
Henry de	Fulburne	Fulbourn	Cambs	TL 5256	5 se
Richard de	Gamelegeye	Gamlingay	Cambs	TL 2452	16 sw
Roger de	Gamelegeye	Gamlingay	Cambs	TL 2452	16 sw
Hugh de	Haverl	Haverhill	Suffolk	TL 6745	18 se
John de	Honestanton	Hunstanton	Norfolk	TF 6741	64 ne
Walter de	Impyton	Impington	Cambs	TL 4463	4 n
Robert-Lyn-Nyn	Lynn-on-Nene	King's Lynn	Norfolk	TF 6220	48 n
Simon de	Mildenhale	Mildenhall	Suffolk	TF 7074	24 ne
Henry de	Ouerton	2 Ortons	Hunts	TL 1596	
		Peterborough		TL 1696	38 nw
William de	Rudham	2 Rudhams	Norfolk	TF 8228	
				TF 8127	64 nne
Eustace de	Shelford	Gt.Shelford	Cambs	TL 4652	
		Lt.Shelford		TL 4551	4 s
Philip de	Skelington	Skillington	Lincs	SK 8925	58 nw
John de	Thornton	Thornton	Bucks	SP 7535	60 sw
Gilbert de	Wrastlingworth	Wrestlingworth	Beds	TL 2547	16 sw

and Elias de Caldwell, William de Crandon, Philip de Eton, Robert de Herdwyk (Hardwick, many in Bucks., Cambs., Northants.), Stephen de Midelton (many see above), Richard de Oxeneford (? possibly many), John de Padbrok, Robert de Pynecote, Roger de Sibeston, Hamon de Tydeshale, John de Waledene. *From Cambridge* John Barlich, John le Blak, John Blaungeron, Alan le Clerk, Richard Clericus, David ad ?, Robert Ely, John Foy, John Freresman, William le Garlaunder, Thomas le Gous, Henry Grym, John le Long, William le Poleter, John le Pylchere, Nicholas le Rede, John Seman, Henry Serle, Henry Sherewynd, Ralph le Tanner, Thomas Vnderwode, William atte Welle, William le Walsh.