The Defences of Roman Alchester

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and appendices by B. J. Marples, H. P. Powell and Mark Robinson

SUMMARY

Two trenches were excavated across the eastern defences of Alchester in 1974 to determine the extent of plough damage and to establish the sequence of the Roman defences. It was shown that the earliest use of this part of the town was after the Conquest when attempts to drain the area were made. By the end of the first century there had been considerable dumping of material to raise the ground level and a building was perhaps constructed in the area of Trench I. This had gone out of use by the mid-second century and the defences, consisting of a contemporary stone facing-wall and rampart bank, followed on the site, probably by the end of the second century.

INTRODUCTION

'In Oxfordshire by Gravenhill wood
Stood Alchester so fair and good:
Allectus' walls are brought full low;
Where once they stood now corn doth grow.'[1]

THE Roman town of Alchester lies on a low gravel plateau at the junction of the north-south road, linking Towcester on Watling Street to Silchester, with Akeman Street going from Cirencester to Verulamium. It is one of the two small Roman towns of the upper Thames Valley, the other being 26 kms. to the south at Dorchester-on-Thames. Both towns are assumed to have begun as forts of the conquest period[2] and to have developed subsequently as small market centres.

The existence of the Roman site at Alchester was recognized as early as 1607 by Camden[3] and the town and its environs have subsequently been the subject of various investigations. The most prominent surviving features are still the defences, particularly on the east, which enclose an area of about 300 m. square, aligned on the cardinal points of the compass. Within the defences certain of the roads are still visible, though somewhat obscured by the pattern of later ridge and furrow. Outside the defences the only monument visible on the surface is the so-called 'Castle' mound, dug in 1766, and probably a bath-house. Buildings and other evidence of

[1] Anon., 'The History of Allchester (1622)' in W. Kennet, *Parochial Antiquities* (1818), 431.

[2] For Alchester see S. S. Frere, *Britannia* (1974), Fig. 2; note also that the most recent find of military equipment there was made well to the south of the town (G. Webster, *Oxoniensia*, XXXVIII (1973), 385–6). For Dorchester see *JRS*, LV (1964), 166; LV (1965), 210; *Britannia*, IV (1973), 297.

[3] For this and all work on Alchester up to 1936 see *VCH Oxon.*, I, 281–8.

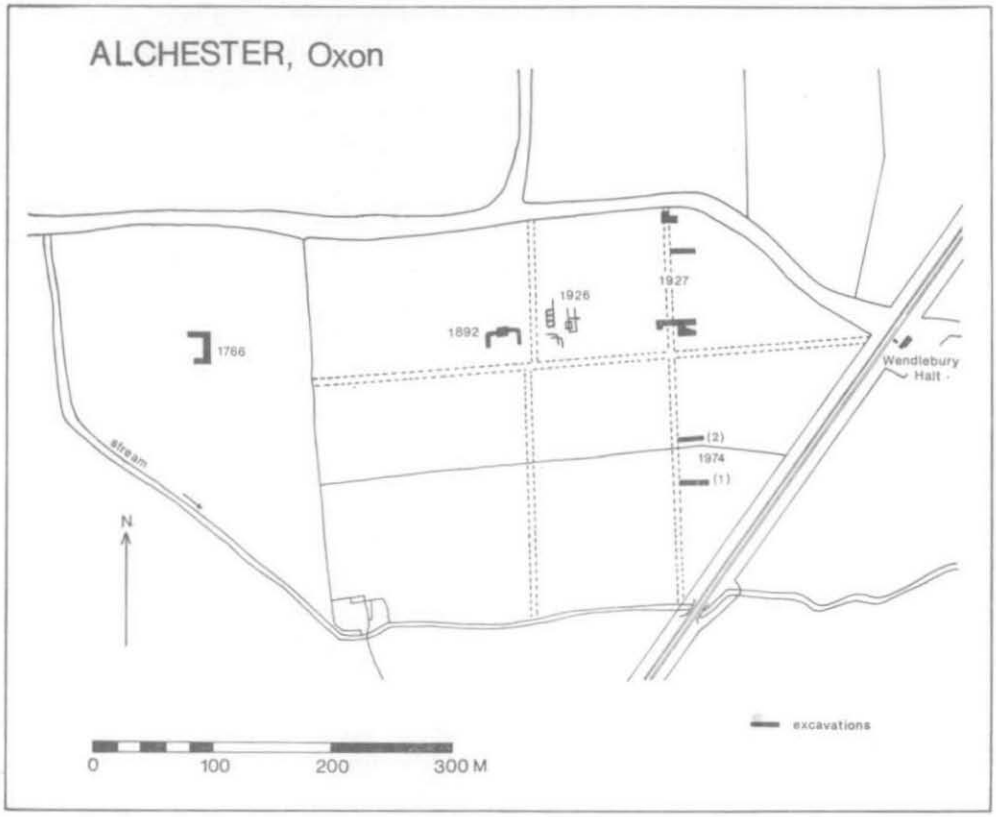

FIG. 1

Alchester, Oxon, site plan ; showing excavated sites 1766–1974.

settlement have been located north, east and west of the defences, giving a total settlement of at least 43·6 hectares (109 acres) (FIG. 1).

The site is totally free of modern development and is mostly under permanent pasture. The only ploughed field covers the northern part of the walled area. Since it was feared that cultivation was destroying Roman levels it was decided that an excavation was necessary to determine the extent of the damage. This took place in the summer of 1974 on behalf of the Department of the Environment, the Oxfordshire Archaeological Committee and the External Studies Department of the University of Oxford.[4] The best way to obtain the necessary evidence seemed to be to section the same feature twice, once in the ploughed and once in the pasture field. The obvious candidate for this experiment was the defences since their nature seemed likely to be uniform between the two sections (see also below, p. 157).

[4] Thanks are due to the landowner, Mr. Taylor, and the tenant, Mr. Deeley, for permission to do the work and for their co-operation ; Mr. Akam and Mr. A. Alexander acted as supervisors in Trenches I and II respectively and labour was provided by the Berkely and External Studies Department Summer Schools, to all of whom I am most grateful. I owe a special debt to Mrs. L. Rowley who drew Fig. 1 and to Mr. Alexander who drew Figs. 2 and 3, and to Messrs. T. G. Hassall and R. T. Rowley for their support. Professor Frere, Dr. G. Webster and Mr. J. S. Johnson have read parts of this report in draft and have suggested various improvements, for which I am most grateful. Any remaining errors are mine entirely.

The defences were sectioned previously in 1892, 1927, 1928 and 1929, all the sections being on the east side or north-east corner. The 1892 section established the existence of a gravel bank faced with rubble.[5] In all the sections dug in the 1920s the earliest features were two ditches, containing first-century pottery, interpreted at the time as being defensive. The main defences of the town overlay these. The published drawings are extremely confusing, and the interpretation of the various sections by the excavator suggested from the pattern of the defences along this one side differed considerably from place to place.[6]

The evidence from these sections is internally inconsistent and is also at variance with the 1892 evidence and with our general knowledge of Romano-British town defences. It was hoped therefore that new work on the defences would elucidate their nature and dating as well as determine the extent of plough damage.

THE SITE

There is already a marked difference in the appearance of the eastern defences north and south of the dividing east-west hedge. To the south, in a field apparently not ploughed since the nineteenth century, the medieval ridge and furrow forms well-preserved earthworks. The easternmost ridge, one of the most prominent in the field, marks the line of the rampart. Beyond this the ditch shows as a wide shallow depression. North of the hedge the line is still visible but much less prominent. The profile of the ditch has gone completely and the rampart shows only as a gentle slope.

The eastern defence was the most suitable for the planned excavation since it lies across both the arable and the pasture fields and is not, like the western line, covered by a modern track. Accordingly two trenches were cut through the east rampart, Trench I 25 metres south of the hedge, Trench II 5 metres north of it. Trench I was dug entirely by hand and Trench II, in the area of greater disturbance, was dug with a JCB IIIC under archaeological supervision. In both trenches between 1·5 and 2 metres of deposits overlay the natural gravel and marl. During excavation the water table was approximately level with the top of natural : this impeded the excavation of the deeper features.

THE EXCAVATION

Trench I (FIG. 2)

Trench I, as originally laid out, was 15 metres long and 3 metres wide. It had subsequently to be extended a further 5 metres to the west and, in order to finish the work in the time available, was reduced in width to 1·5 metres.

The earliest feature (146) was possibly a pit, filled with dirty brown gravel. It was not fully excavated. Elsewhere in the trench a grey clay deposit, identified by the environmental report as a marsh deposit, overlay natural except where subsequently removed. It was normally between 0·1 m. and 0·2 m. deep but in places was much deeper where it had filled underlying hollows. Pottery from this

[5] *VCH Oxon.*, I, 285.

[6] 1927 : J. H. Iliffe, ' Excavations at Alchester, 1927 ', *Antiq. J.*, IX (1929), 105–136 ; 1928 : ' Excavations at Alchester, 1928 ', *Antiq. J.*, XIII (1932), 35–67 ; 1929 : *JRS*, XIX (1929), 196. See below pp. 152–4.

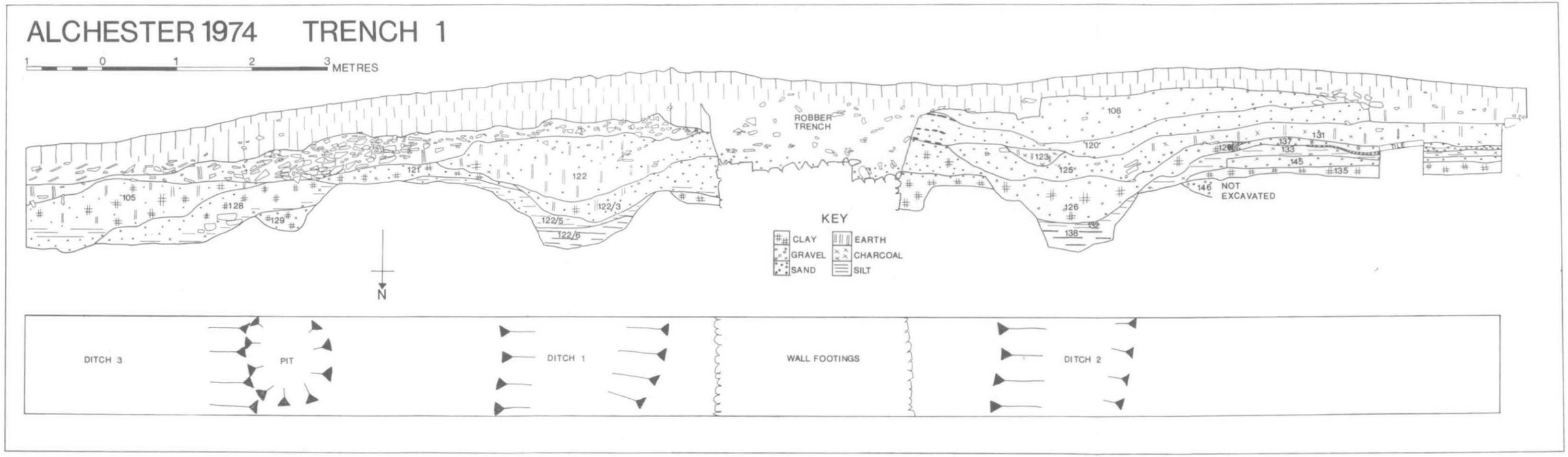

FIG. 2

Alchester, Oxon, 1974 ; Trench 1, plan and section.

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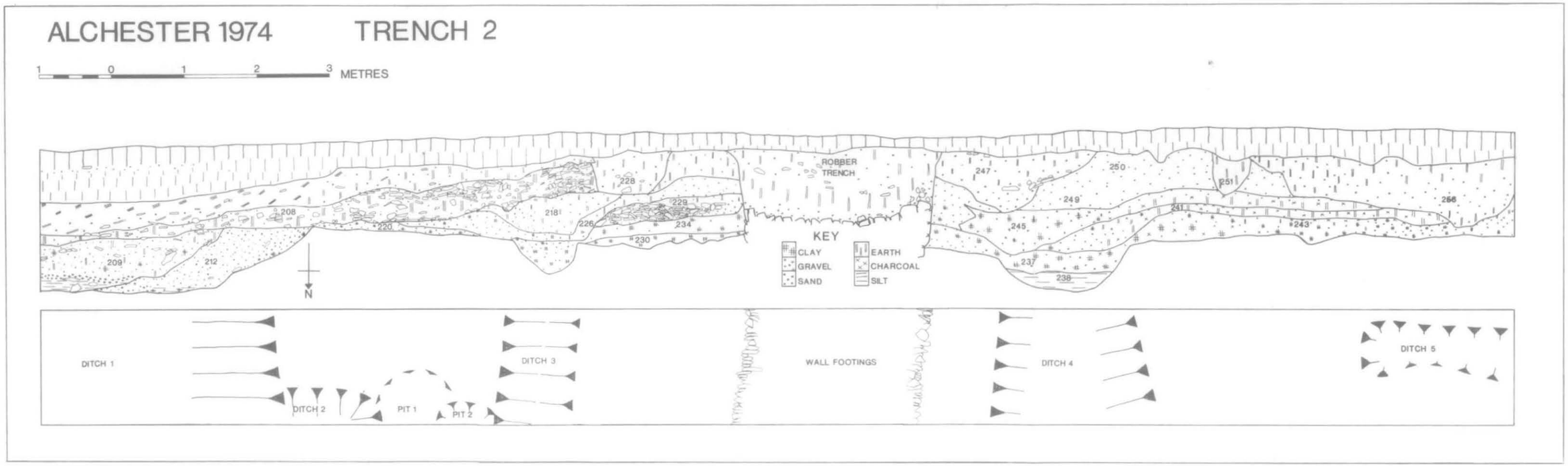

FIG. 3
Alchester, Oxon, 1974 ; Trench 2, plan and section.

marsh deposit and the pit was of Belgic type. The marsh deposit appeared to overlie the pit.

Cut into this deposit were two ditches, both about 0·8 m. deep. Ditch 1, on the east, was 2·2 m. wide and Ditch 2 1·8 m. wide. Although the direct stratigraphical links between them had been destroyed by the footings of the later rampart wall, both showed the same sequence of layers and contained pottery of the same date. On these grounds they have been treated as contemporary.

Both ditches remained open long enough for the accumulation of a considerable deposit of black, waterlogged silt, containing much pottery, bone and preserved timber. Between and to the west of the two ditches a gravel layer was deposited and over this, on the west edge of Ditch 2, a series of occupation layers, including one hearth, accumulated. Pottery from this layer (133) joined sherds in the primary silt of Ditch 2. Samian from 133 and from 132 (the secondary silt of Ditch 2) shows that these layers were still open after A.D. 70 ; as there was no recut it is likely that the ditches were dug after the Conquest. The environmental evidence shows that the ditches contained standing water at some times of the year.

The next stage was the deposit on the west edge of Ditch 2 of a number of gravel tips over the accumulated occupation debris. These were capped by a layer of clean gravel and an area of orange clay into which had been set one large floor tile, 0·6 m. square. The western edge of this was bounded by a possible timber-slot (127) parallel with Ditch 2. At the same time a large deposit of dark grey-brown turfy material, containing much charcoal, gravel bands and patches, pottery and some building material, was deposited in, over and between Ditches 1 and 2. Running along the axis of Ditch 1 in this material (126) were three cavities, preserved because their sides had been heavily iron-panned, which were apparently small post-holes.

This whole group of deposits represents a general tidying up and raising in level of this area. It is possible to argue that this may have included a timber structure, perhaps with a tile floor and a fence to the west of it. The quantity of roof and floor tile fragments in all these layers is also indicative of building activities in the vicinity. Pottery from the gravel layers dates to the last quarter of the first century but finds from the turfy layers 126 and 122/3 are uniformly earlier. These deposits must however be residual in content as 126 seals a layer containing samian of Flavian date. It suggests that the material had already been in use for some purpose rather than dug freshly for the levelling up of this area.

Layers of iron-panning in the turfy fill indicate that the general area was still very wet and considerable subsidence occurred along the line of both ditches. These depressions were filled with a similar turfy, sandy deposit containing pottery dating as late as the mid-second century. At about this time the whole area west of Ditch 2 was covered by a thick black deposit containing pottery of the same date. This dump perhaps represents another attempt to level up the site.

Over all this were the remains of the town defences, consisting of a dump rampart of gravel and sand tips faced by a stone wall. Wall and rampart body were of one build only, since the mortar construction levels immediately behind the wall faded without break into the main bulk of the rampart. The wall had been robbed out except for the bottom 0·75 m. of footings of which three courses of pitched

limestone slabs survived. The width of the footings was 2·4 m. but this would have been reduced by offsets above ground level.

The rampart itself was 6 metres wide and constructed entirely of dumps of dirty gravel and sand. The tail of the rampart finished abruptly with a vertical edge and some rear revetment must have existed. No trace of this survived except for a scatter of stones on the tail of the rampart. Pottery from the rampart dated its construction to the end of the second century.

Five metres in front of the rampart was a shallow ditch, about 7 metres wide, though not excavated fully. The ditch had been recut once. The original cut had partly removed a pit (129) of first- or second-century date, but the pottery from the ditch itself was not helpful for dating. The recut contained fourth-century material in its fill. The environmental report shows that the ditch was filled with slowly flowing water.

Above the ditch and in front of the wall was a thick layer of tumbled stone, partially sunken into the ditch silt. This must be the result of the total or partial collapse of the wall. Over the debris and the rampart was up to half a metre of soil of which at least 0·2 m. had accumulated before the wall was robbed. No dating evidence for the robbing was found. The only other post-Roman disturbance was a possible animal burrow (113) in the top of the rampart.

Trench II (FIG. 3)

Trench II was 20 metres long and lay 30 metres north of Trench I. As mentioned above it was dug by machine in order to confirm the general sequence of events in Trench I and to determine the extent to which this part of the site had been denuded by ploughing in comparison to the southern field. The sequence was in fact broadly similar to that of Trench I although the upper levels had suffered much more from post-Roman disturbances.

Once again most of the natural was covered by a grey marsh deposit. Cut through this were two north-south ditches, Ditches 3 and 4. Ditch 3 was 0·8 m. wide and 0·5 m. deep while Ditch 4 was 1·7 m. wide and 0·7 m. deep. The two ditches were just under 6 metres apart. Three metres to the west of Ditch 4 was the butt-end of Ditch 5 running off to the west and immediately east of Ditch 3 was a complex of two pits and the butt-end of a ditch running to the east. All these features contained first-century pottery. Ditches 3 and 4 were were the latest in this group of features since Ditch 3 cut Pit 2, itself cutting Pit 1, and the occupation layers associated with Ditch 4 sealed Ditch 5.

As with the north-south ditches in Trench I the stratigraphic links between 3 and 4 had been destroyed but the stratification in the two is so similar that it can be assumed that they were contemporary.

West of Ditch 4 was a series of alternating levels of gravel make-up and accumulated occupation debris, largely destroyed at the main section by a post-Roman disturbance. At some point during this process the two ditches were deliberately filled, largely with turfy material but also including tips of gravel and of loose stones. The effect of this, as in Trench I, was to raise the ground level considerably. There appeared to have been a secondary filling of the subsidence hollows over the ditches.

Finally a spread of gravel was laid down over much of the area west of the

ditches and the rampart was constructed on this. It was not so well preserved as in Trench I but was of the same construction of sand and gravel tips faced with a stone wall. The maximum surviving width of the rampart was 5 metres. The facing wall had been badly robbed so that only the lower courses of pitched limestone footings survived. The width of the footings at 2·5 m. was slightly wider than in Trench I. Below the base of the rampart there was a foundation trench, 0·5 m. wide, to within half a metre of the base of the footings.

5·8 m. in front of the wall was the ditch of the defences. As in Trench I this had been recut once. The original cut must have had a shallow U-shaped profile at least 4 metres across. The secondary ditch was probably about 7 metres wide though it was not totally excavated. Neither ditch was more than 0·8 m. deep.

Over the whole area in front of the wall, except where removed by a later disturbance, there was an extensive area of stone tumble, partially sunken into the silt of the recut ditch. Over the tumble was an accumulation of soil similar to that in Trench I. The wall itself had been robbed out and there were three pits of varying size cut into the area behind it. A deposit of soil in the hollow over the ditch has almost obscured it.

THE FINDS

This section of the report is devoted to the artefacts. Separate appendices on the animal bones, by Professor B. J. Marples, on the environmental evidence, by Mr. M.

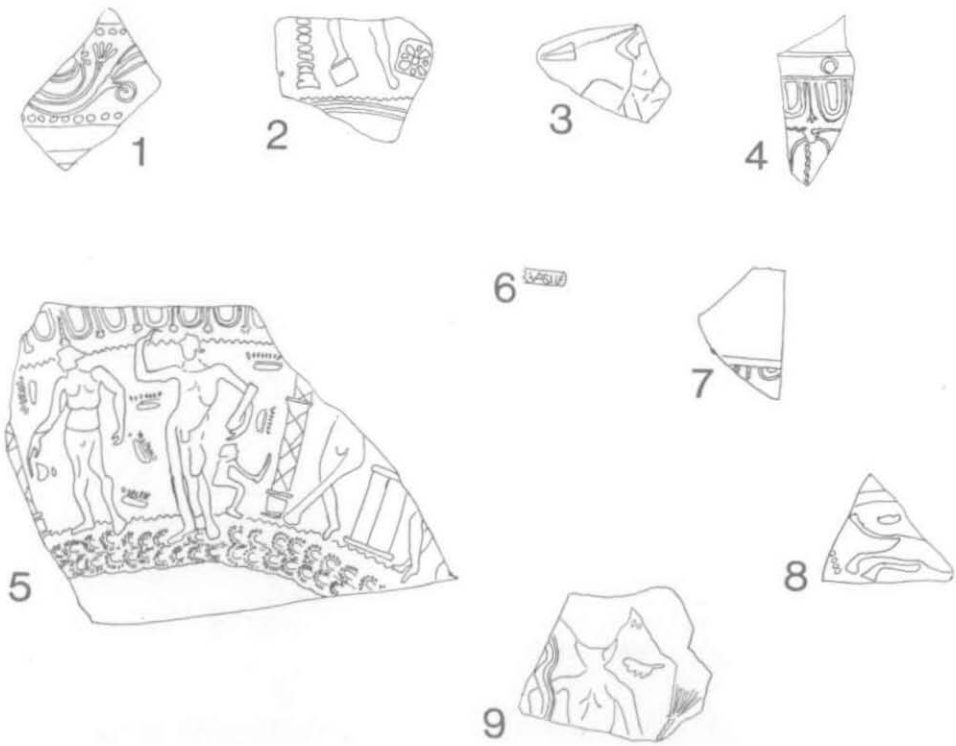

FIG. 4
Alchester, Oxon, 1974 ; decorated samian. Scale ½.

Robinson, and on the geological samples by Mr. H. P. Powell, to whom I am most grateful, will be found at the end of the report. Mrs. J. Bird, Miss D. Charlesworth and Dr. D. Peacock have reported respectively on the samian, glass and amphorae ; and their reports are incorporated into the body of the text. I would like to thank all of them for their assistance. There were few small finds and they have been listed in the catalogue according to the layers in which they were found.

The following abbreviations have been used :

Cowley	C. J. Young, ' The Roman Kiln Site at St Luke's Road, Cowley ', *Oxoniensia*, XXXVIII (1973), 215–232.
Dorchester	S. S. Frere, ' Excavations at Dorchester-on-Thames, 1962 ', *Archaeol. J.*, CXIX (1962), 114–149.
O. and *Oswald*	F. Oswald, *Index of Figure Types on Terra Sigillata (Samian Ware)* (1936–7).
Shakenoak II	A. C. C. Brodribb, A. R. Hands, D. R. Walker, *Excavations at Shakenoak* II (1971).
S and S	J. A. Stanfield, G. Simpson, *Central Gaulish Potters* (1968).
UTB	D. W. Harding, *The Iron Age in the Upper Thames Basin* (1972).

In this report the pottery from Trench I has been discussed in some detail to provide a series from Alchester comparable to that from Dorchester published by Professor Frere. Parallels have been quoted only for those coarse pottery types which have a relatively short life and have been confined to those from relatively close sites such as Dorchester, Shakenoak and Verulamium. As far as possible, where more than one group is illustrative of pottery types in use in a particular phase, those which are larger and the most representative have been published. All finds are deposited in the Oxford City and County Museum.

Trench I
Pit in marsh deposit
Layer 146 (FIG. 5)

1 Sandy grey ware with buff surfaces, white and grey tempering.
2 Shell-gritted grey ware with black/buff surfaces.
3 Sandy, orange ware, slightly micaceous, red and white temper.

Marsh deposit
Layer 135

4 Hard, sandy, micaceous grey ware.
5 Grey ware, burnished black surfaces, black and white inclusions, granular texture.

The types are all of the south-eastern Belgic tradition which was current in the upper Thames valley before and after the Conquest. The butt-beaker appeared in the region only shortly before the Conquest and continued in use long after it.

Early fill of Ditches 1 and 2
Layer 122/6

6 Fabric as 5, burnished.
7 Fabric as last.

Layer 122/5

8 Fabric as 2, grooved on girth.
9 Sandy, very heavily tempered grey ware with buff surfaces.

Non-ceramic : 1 oval gaming counter of brown glass, chipped ; two fragments of quern stone and 1 flint chip (Appendix 3 : Sample 1 a–c).

Layer 138

10 Fabric as 2, vertical smoothing marks. In ware, form and manufacturing techniques, this jar is closely paralleled by the cooking-pots of the pre-Belgic Iron Age (*UTB*, Pl. LXI, F). It is nearly complete and it seems for this reason unlikely to be residual.

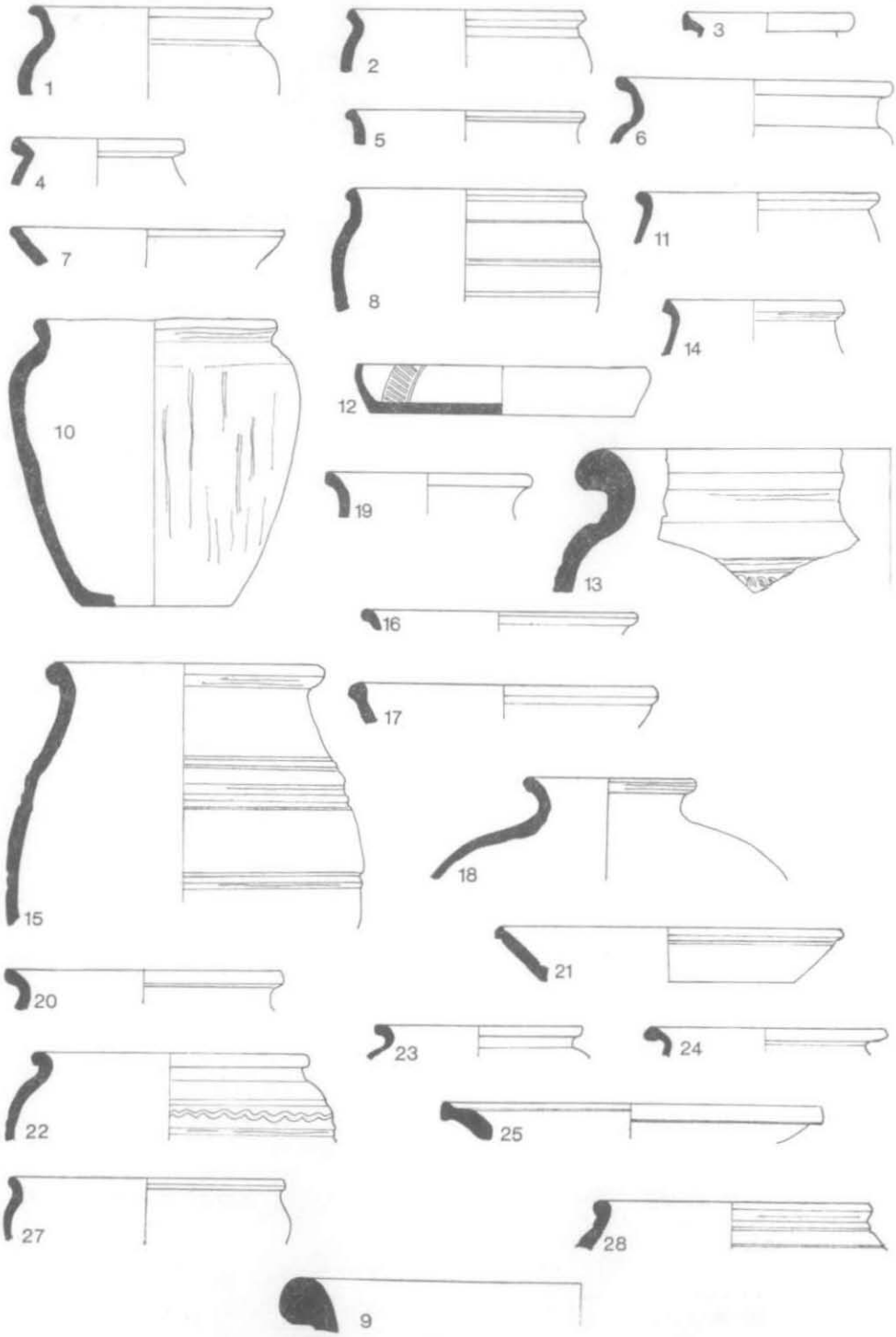

FIG. 5
Alchester, Oxon, 1974 ; coarse pottery, Nos. 1–25, 27–28. Scale ¼.

It is possible that such types may have continued in use for longer than normally suggested.
11 Fabric as 4.
12 Micaceous grey ware, white temper, with black surfaces, burnished. A joining sherd of this vessel came from 133.
13 Fabric as 9 but with darker surfaces. Stabbed decoration.
Non-ceramic : 1 iron nail with rectangular head.

Layer 132
Samian : From 37, South Gaul. The trident-tongued ovolo is characteristically Flavian.
Amphora : body sherd (see below, p. 151).
14 Hard, sandy grey ware, patchy white slip.
15 Fabric as 13.
16 Micaceous, fine, grey ware with dark grey surfaces. This ware was produced at Allen's Pit, Dorchester, and first appears at Dorchester in Flavian levels.[7]
17 Hard, sandy grey ware with red skin and black surfaces.
Non-ceramic : iron nail.

All the types in this group of layers are of Gallo-Belgic origin but continued long after the conquest. A joining sherd of 12 was found in 133 associated with Neronian/early Flavian samian. It is not attested in this ware before Flavian times. The silting cannot have started to accumulate much before *c.* A.D. 70.

Occupation layers associated with early fill of Ditch 1 and 2
Layer 145
18 Fabric as 15. *Cf. Dorchester*, 14.
19 Heavily tempered red ware with grey core and buff surfaces.

Layer 133
Samian : Form 18, South Gaul. Neronian-early Flavian probably.
20 Fabric as 19.
Not illustrated : sherd joining 12, sherd of butt-beaker with rouletted decoration.

Layer 142
21 Fabric as 19.
22 Fabric as 19. Grooved and stabbed decoration.
This material is of the same date range as that from the early ditch silts.

Turfy fill of Ditches 1 and 2
Layer 122/3
Samian : Form 29, South Gaul. Neatly modelled scroll with small palm leaf terminals. *c.* A.D. 45–60 (FIG. 4, 1).
Form 15/17R or 18R, South Gaul, Neronian.
Form 27, South Gaul, Neronian.
South Gaulish sherd, Claudian or Neronian.
23 Hard, sandy, micaceous pink-grey ware.
24 Fabric as 4.

Layer 126
Samian : Form 30, South Gaul, with groups of arrowheads. *c.* A.D. 45–60.
Form 18, South Gaul, Claudian.
Form 18, South Gaul, Claudio-Neronian.
Form 27, South Gaul, Claudio-Neronian.
South Gaulish sherd.
Amphora : 4 body sherds, all possibly from same vessel (see below p. 151).

[7] C. J. Young, *The Roman Pottery Industry of the Oxford Region*, in prep.

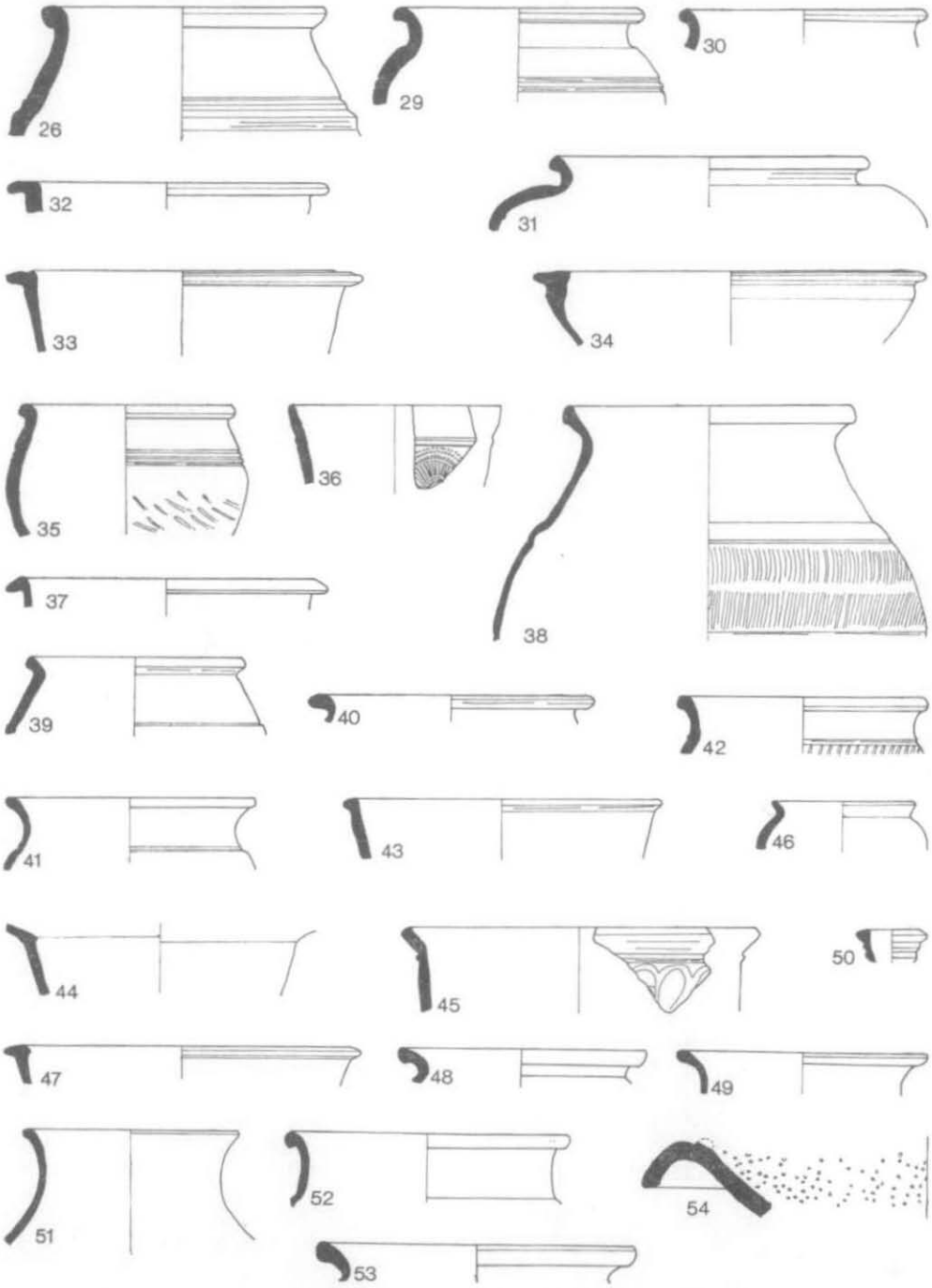

FIG. 6

Alchester, Oxon, 1974 ; coarse pottery, Nos. 26, 29–54. Scale ½.

25 Hard, sandy, micaceous grey ware with much black sand and darker grey surfaces.
26 Fabric as 15.
27 Grey ware, white temper, red skin and buff surfaces, exterior has had burnished black slip.
28 Fabric as 5, reddish-buff interior surface.

(FIG. 6)
29 Grey ware with orange surfaces ; girth grooves.
Non-ceramic : 2 iron nails, fragmentary whetstone (?).

Layer 130 (= Layer 126)
Samian : Form 18, South Gaul, Claudio-Neronian.
Form 18, South Gaul ; burnt. Probably Claudio-Neronian.
30 Light grey ware, black exterior, reddish-buff interior.
31 Hard, sandy, micaceous grey ware with red core.

The samian suggests a date before *c.* A.D. 70 and the coarse pottery need not be later than that. Since these deposits seal layers which are definitely later the pottery must be regarded as residual (see p. 152).

Occupation associated with turfy fill of Ditches 1 and 2
Layer 137
Samian : Rim, probably form 18 ; South Gaul. Neronian, or perhaps early Flavian.

Clay and gravel tip on E edge of Ditch 1
Layer 121
Samian : Form 37, Central Gaul. The figure is Vulcan (O·66 or 67) ; there is no parallel in *S and S* for the rosette inside a square, but the fabric and wavy-line round the base place this among the Hadrianic potters. *c.* A.D. 125–145 (FIG. 4, 2).
Form 18/31, Les Martres de Veyre. Trajanic-early Hadrianic.
32 Hard, sandy, grey ware, much black sand, black exterior.
33 Micaceous grey ware with darker grey surfaces ; reeded rim.
34 Fabric as 2 ; red interior surface.
35 Fabric as last ; grooved on shoulder, scratch-marked below.
Not illustrated : rim as 17.
First half of second century.

Turfy fill of subsidence hollows over Ditches 1 and 2
Layer 122
Samian : Form 37, in early ' micaceous ' Lezoux fabric. The horseman has no exact parallel in *Oswald*, but the fine beads of the spear are common at Les Martres. Probably Trajanic (FIG. 4, 3).
Form 15/17, South Gaul. Early Flavian.
Form 33 ; probably Lezoux, but the slip is matt and very micaceous. Hadrianic or early Antonine on form.
Amphora : 1 body sherd (see below p. 151).
36 Imitation Dr. 30 ; fine micaceous grey ware with pinkish grey skin and black surfaces ; impressed decoration ; probably a product of the Oxon kilns. *Cf. Verulamium*, 694–7, A.D. 130–150.
37 Sandy, micaceous red ware with white temper and grey surfaces.
38 Hard, sandy, light grey ware, much black sand, giving a speckled surface, rouletted on body.
39 Micaceous grey ware with red surfaces.
40 Fabric as 4.
41 Hard, sandy, micaceous grey ware, white and black inclusions.

42 Micaceous, sandy, grey ware with darker surfaces ; burnished lines on shoulder ; *Cf. Verulamium*, 149–155, 383–5, 435–40, 607–11, covering period A.D. 60–150.

Not illustrated : storage jar rim, flagon neck (probably Oxon kiln product), one sherd of rough-cast colour-coat beaker.
Non-ceramic : fragment of quern stone (Appendix 3, Sample 2).
First half of second century.

Layer 125
Samian : Form 29, probably ; South Gaul. Scroll winding over groups of arrowheads. Neronian.
Form 30, South Gaul ; rivet-hole for repair. Trident-tongued ovolo above panels with wavy-line saltire and scrolls. Flavian. (Probably = 120) (FIG. 4, 4).
Form 37 in the style of Potter X-2 of Les Martres de Veyre. The two broken figures are not certainly identifiable, but all the other motifs occur in his work : the latticed pillar, wreath, and wavy lines (*S and S*, Pl. 3, 21), the small figure with a stick, the ' crown ', and the ovolo (*S and S*, Pl. 4, 35), the altar and the figure with a scroll (*S and S*, Pl. 7, 93), and the Bacchus O.563 (*S and S*, Pl. 5, 53). *c.* A.D. 100–125 (Fig. 4, 5).
Form 18, South Gaul, Flavian.
Form 18/31, Les Martres, Trajanic-Hadrianic.
Form 27, probably late South Gaulish ware from Montans, and Trajanic.
Three South Gaulish sherds, late 1st century.
Amphora : 1 body sherd (see below p. 151)
43 Hard, sandy, off-white ware with grey core.
44 Sandy, micaceous ware, red and white inclusions. Rim incomplete.
45 Fabric as 36 ; patterned with trailed slip. See 36 for comments.
46 Hard, sandy, off-white/grey ware with black exterior and light grey interior.

Not illustrated : mortarium flange sherd (Oxford product. See *Cowley*, Fig. 4, H, for form).
Non-ceramic : iron spike with square head, length 124 mm. ; iron nail ; one fragment of green bottle glass, form unidentifiable, first or second century ; one fragment, form unidentifiable, of clear blue glass, not later than late first century ; small fragments of pumice stone (Appendix 3, Sample 3).
First half of second century.

Layers below rampart and above ditch fills and occupation layers
Layer 131
47 Grey ware with reddish-buff surfaces.
48 Very hard, sandy, grey ware.
49 Sandy grey ware, heavily tempered with white inclusions.

Layer 123
Samian : Form 27, South Gaul, Flavian.
Form 31, Central Gaul, Hadrianic-early Antonine.
50 Sandy, orange ware, traces of white slip.
51 Micaceous, sandy, light grey ware with dark grey/black surfaces.
52 Hard, sandy, micaceous grey ware with red core.
53 Fabric as 47.

Non-ceramic : lump of lead weighing 25 gms.
Second century, probably first half.

Layers within the Rampart
Layer 120
Samian : Form 18/31, Les Martres, stamped ( ) R.VASILF. *c.* 100–130 A.D. (FIG. 4, 6).
Form 30, South Gaul, Trident-tongued ovolo. Flavian. (*Cf.* FIG. 4, 4).
Form 37, Central Gaul. There is no close parallel in *S and S* for the curious single-bordered ovolo. Probably *c.* A.D. 125–150. (Burnt) (FIG. 4, 7).
Form 37, Central Gaul, with small figure of a warrior (perhaps O.213). Antonine.
Form 18, South Gaul, Flavian.
Form 27, in early ' micaceous ' Lezoux fabric. Probably Flavian.
At least three form 31s, Central Gaul, Antonine.
Form 33, Central Gaul, C2.
Form 36, probably ; Central Gaul, C2.
Two Form 37s, Central Gaul, Antonine.
Form 38, Central Gaul ; burnt, or perhaps overfired. Antonine.
One South Gaulish sherd, later C1.
Six Central Gaulish sherds, including one with rivet-hole and two from closed vessels C2.
Amphorae : 8 body sherds (see below p. 151).
54 Hard, sandy, off-white fabric with multicoloured quartzite grit ; Oxford kiln product ; *cf. Verulamium*, 1010, *c.* A.D. 150–155/160, type dated by Mrs. Hartley to early or mid-second century.

(FIG. 7)
55 Hard, sandy, off-white to grey fabric with sparse grey quartzite grit ; Oxford kiln product ; *cf. Verulamium*, 748, *c.* A.D. 130–150, type dated by Mrs. Hartley to *c.* A.D. 110–140.
56 Imitation Dr. 27, fabric as 36. Oxford kiln product, *cf. Dorchester*, 102, *c.* A.D. 135–145.
57 Fabric as last. Oxford kiln product.
58 Fabric as 47.
59 Fabric as last.
60 Hard, sandy, grey ware containing large flakes of mica and white inclusions ; reddish-brown surfaces, traces of mica-gilt on exterior ; *cf. Dorchester*, 147, late second century.
61 Hard, sandy, grey ware, red and white inclusions, with red surfaces ; lattice decoration on sides, wavy line decoration on bottom of base.
62 Sandy, micaceous, white inclusions, red ware with grey core and black exterior surface.
63 Fabric as 42 ; *cf. Dorchester*, 163, late second century.
64 Imitation Dr. 18 ; sandy, micaceous orange ware with thin grey core ; black inclusions. Oxford kiln product, *cf. Cowley*, 7.
65 Fabric as 57 ; *cf. Verulamium*, 858, A.D. 150/160 ; Oxford kiln product.
66 Micaceous, grey ware with red surfaces, black inclusions.
67 Fabric as 56 ; Oxford kiln product.
68 Fabric as 45 ; Oxford kiln product.
69 Hard, sandy, grey ware, white and black inclusions.
70 Sandy, micaceous, purple-black ware with black surfaces.
71 Hard, sandy, grey ware with black exterior.
72 Fabric as 70.
73 Grey shell-gritted ware with red surfaces ; hand-made.
74 Grey shell-gritted ware with black outer surface ; hand-made ; *cf. Shakenoak* II, 183–4.
Not illustrated : beaker as 45, base of imitation Dr. 18, ware as 64, with worn nonsense stamp (joining sherd from 131).

Layer 115
Samian : Form 15/17 or 18, South Gaul. Flavian probably.
75 Micaceous, grey ware with black inclusions : *cf. Dorchester*, 164, late second century.

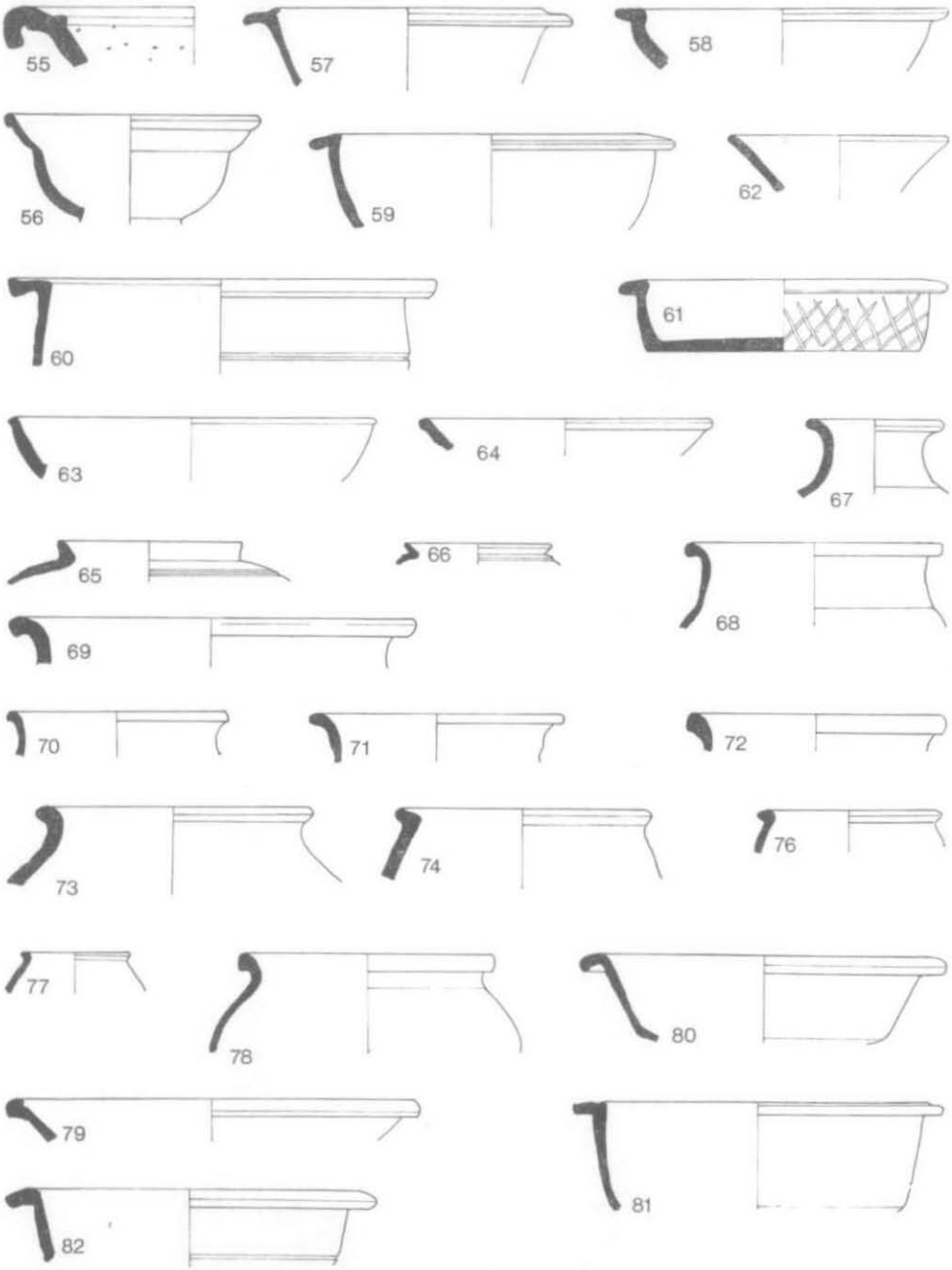

FIG. 7
Alchester, Oxon, 1974 ; coarse pottery, Nos. 55–82. Scale ¼.

76 Fine grey ware with burnished black exterior ; *cf. Verulamium*, 599, A.D. 130–150 ; Oxford kiln product.
77 Fine, white ware with pink-red core.
78 Fabric as 69.
79 Sandy, pink ware.

Layer 114
Samian : Form 37. Part of animal (probably a lion) and foliage in the style of the Cinnamus-Cerialis group at Lezoux. *c.* A.D. 150–180 (FIG. 4, 9).
Form 37 base, Central Gaul, probably Antonine.
Form 31, Central Gaul, Hadrianic-Antonine.
80 Fabric as 57 ; *cf. Dorchester*, 127, A.D. 130–150.
81 Fabric as 69.
82 Hard, sandy, micaceous ware with pink core and dark-grey surfaces.

Layer 108
Samian : Form 31, Central Gaul, Hadrianic-early Antonine.
Sherd, probably from form 31, Central or East Gaul, second half C2.

Pit sealed by ditch of town defences
Layer 129
Samian : South Gaulish sherd, later C1.

Ditch of town defences
Layer 128 Primary fill
Samian : Form 27, South Gaul, Neronian.

Layer 105 Fill of recut of ditch
Samian : Form 37, Central Gaul ; very abraded. The figure is probably Apollo (O·93), shared by several potters ; the decorative details are too fragmentary to assist attribution. *c.* A.D. 150–180 (FIG. 4, 9). Two Central Gaulish sherds, very abraded ; C2.

The quantity of coarse pottery from this layer was relatively small and none was worthy of illustration. It included late Roman red colour-coat ware, which indicates that the ditch was still open in the fourth century.
Non-ceramic : illegible coin, probably fourth century.

The date of the defences

As is usual with rampart sections a large proportion of the pottery is residual, as is clearly shown by the date range of the samian. The latest samian is dated to the second half of the second century and none of the coarse pottery from the body of the rampart is later than this. The total absence of pottery of any later date and the fact that 131, which lay immediately under the rampart, contained nothing later than the middle of the second century suggests that the defences cannot have been constructed later than the end of the second century.

Trench II

This trench was dug mechanically so that a smaller quantity of stratified material was recovered than was the case in Trench I. This did not alter the dating arrived at on the basis of the pottery from Trench I and added no new information to our knowledge of the pottery of the area. No material from this trench is illustrated here for these reasons.

The pottery from this excavation is a good range of the fabrics and types current in the Oxford region in the first and second centuries, being very similar to that found in the

Dorchester defence section dug by Professor Frere.[8] The association of Gallo-Belgic types with Neronian and Flavian samian shows clearly that the local pottery tradition continued with little change for several decades after the Conquest. Small kiln sites of this period have been found at Hanborough,[9] Cassington,[10] and the Churchill Hospital, Headington[11] but the Alchester material does not come from any of these sources.

From the early second century much of the pottery was drawn from the main group of Oxford kiln sites. Pieces which can be identified definitely as products of this industry include the mortaria (nos. 54 and 55), the samian imitations and other vessels in fine grey wares (e.g. nos. 36, 45, 46, 51, 56, 57, 67, 68, 76, 80). The bulk of the other grey wares could also come from the Oxford kilns but it is certain that at this date other centres were still in production.[12] A good example of this is provided here by the hand-made shell-gritted ware, nos. 73 and 74, found also at Shakenoak.

The imported wares from this excavation produced few surprises, the vast bulk being samian of Southern and Central Gaulish manufacture. Of some little note is the occurrence of one sherd of the not very common early micaceous Lezoux fabric. In post-Roman contexts were discovered two sherds of pre-Flavian colour-coated cups produced at Lyons.[13] Dr. Peacock comments that all the amphorae were globular, of Spanish origin, being produced in the area of the river Guadalquivir, between Seville and Cordoba in the Roman province of Baetica.

DISCUSSION

Despite the restricted scope of the excavation we have been able to add quite considerably to our knowledge of Roman Alchester. First, there was very little evidence for pre-Roman occupation of the site apart from the possible pit in Trench I. Even if this were indicative of large scale pre-Roman occupation a period of marsh growth preceded the first Roman occupation. Similar marsh deposits seem to be recognizable in all the earlier defence sections but not in the trenches dug in the centre of the town. The environmental evidence indicates severe drainage problems throughout the Roman period in this part of the town.

When it was first occupied extensive drainage operations must have been necessary. This presumably was the function of the two ditches which appear to run over 230 metres on approximately the line of the later defences. The presence nearby of open grassland (see below p. 166) indicates that the ditches were on the edge of the occupied area at this period and perhaps marked some kind of boundary between settlement and agricultural land. The fact that the later defences also followed this line suggests that it continued to be significant for some time, perhaps as a property boundary. It has been suggested that these ditches themselves could have been defensive,[14] but this cannot be correct. Not only were they irregular in shape and size, but also the gap between them varies from 1 metre (1927 Site 2) to 6 metres (1974 Trench II) giving them a somewhat sinuous course. Also, in 1929[15]

[8] S. S. Frere, 'Excavations at Dorchester-on-Thames, 1962', *Archaeol. J.*, CXIX (1962), 114–149.
[9] D. Sturdy, C. J. Young, 'The early Roman Kiln site at Hanborough, Oxon', in prep.
[10] C. J. Young, *The Roman Pottery Industry of the Oxford Region*, in prep.
[11] C. J. Young, 'Excavations at the Churchill Hospital, 1973, Interim Report', *Oxoniensia*, XXXIX (1974), 1–11.
[12] E. Harris, C. J. Young, 'The Roman Kiln Site at Boars Hill, Near Oxford', *Oxoniensia*, XXXIX (1974), 12–25.
[13] K. T. Greene, *Guide to Pre-Flavian Fine Wares* (1972), 1–2, Fig. 2, type 5. I am grateful to Mr. Greene for commenting on these sherds.
[14] J. S. Wacher, *Archaeol. J.*, CXIX (1962), 106.
[15] J. H. Iliffe, *Antiq. J.*, IX (1929), 107, 114.

a ditch was found running into one of them at the north-east corner of the town while the 1974 trenches showed that contemporary occupation levels ran up to the edge of the western ditch. These were still open in Flavian times and it is difficult to see that they could have remained open in such waterlogged conditions for more than a decade. In this context it is worth remembering that Trench II showed more than one phase of ditching cut through the marsh.

The provision of drainage ditches cannot have solved the problem completely since before the end of the first century it was necessary to fill in the ditches and raise the ground level considerably by dumping. To judge by the quantity of residual pottery in the predominantly turfy deposits the latter were re-used material, perhaps from an old rampart of the possible military occupation. This turfy material was the only indication of such an occupation and it is as well to remember that the most recent find of military equipment was made 600 metres south of the town.[16]

The occupation following the raising of the ground level lasted long enough for subsidence hollows to occur over the ditches and the resulting hollows be filled with material containing pottery of the first half of the second century. It was followed by the construction of the defences which the 1974 sections showed to consist of a contemporary wall and rampart with a total width of 8·5 metres, the wall itself being *c.* 2·5 metres wide.

Beyond a berm 5 metres wide was a shallow ditch recut and probably widened at a later date. The rampart was not built before the last quarter of the second century. This interpretation is not entirely consistent with the claimed results of earlier excavations.

Four previous investigations have been made :

(1) In 1892 a section of the defences showed them to consist of a gravel bank faced by rubble, fronted by a recut ditch (FIG. 8).[17]

(2) 1927, in the area of the east gate. The excavator claimed to have found two periods of defences. The first of these was formed by the two early ditches shown above to have been drainage channels and by a rampart formed of ' gravel and cement layers '. It is likely that these were simple make-up and occupation layers of the type encountered in 1974 and that the appearance of a rampart profile was caused by subsidence into the filled-in ditch. The main structure was a footing of pitched stone slabs 19½ ft. (*c.* 6 m.) wide. The front half of this was covered by a gravel bank which extended 4 ft. (1·22 m.) beyond its front edge. The rear part of the footing was overlaid by a sequence of occupation layers. It was traced for a length of 40 ft. (12·2 m.) and found to have a masonry footing at least 8 ft. (2·44 m.) square adjoining its rear face. The top of the footing varied in depth below ground surface from 4 to 7 ft. suggesting a considerable degree of robbing, although none is mentioned in the report.[18]

(3) 1927, mid-way between east gate and north-east angle. A footing of pitched slabs was found 2½ ft. below the surface. It was 7 ft. (2·3 m.) wide. East of

[16] G. Webster, *Oxoniensia*, XXXVIII (1973), 385–6.
[17] *VCH Oxon* I, 285.
[18] Iliffe, *op. cit.* note 15, 113–8.

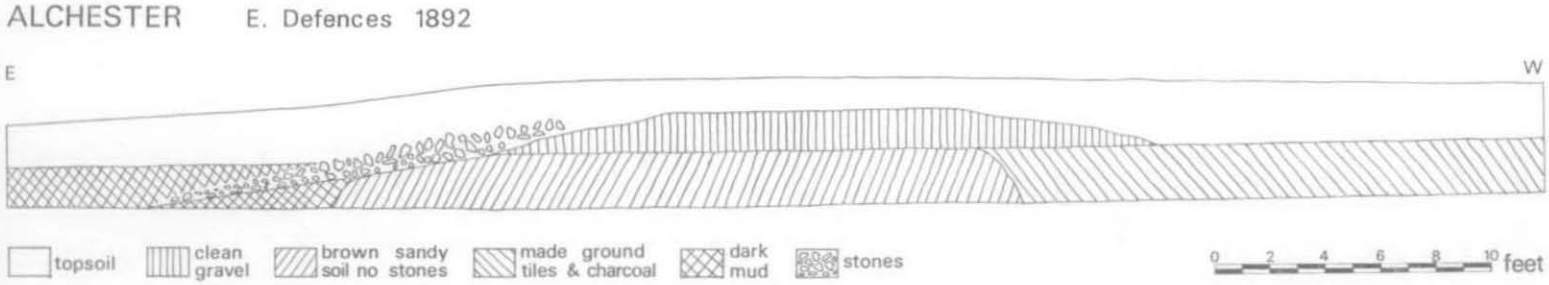

FIG. 8

Alchester, Oxon ; the 1892 section through the defences *after an original drawing in the Haverfield MSS, Ashmolean Museum.*

this (i.e. in front) was an area of loose stones in dark earth fronted by the slight foundations of a wall 3 ft. (1 m.) wide. This was claimed to be the rampart.[19]

(4) 1927–9, the north-east corner. The most prominent feature was a massive stone footing from which both the north and east walls of the town seemed to run. A section south of this was claimed to show a rampart, built of alternate bands of gravel and dark soil, in front of the stone wall and itself fronted by a shallow ditch. Ditch and rampart both contained first-century pottery.[19]

(1) matches well the results of the 1974 work but (2), (3) and (4) give a somewhat different picture. Before evaluating this it is worth noting that those walls found at great depth must have been robbed if they had anything to do with town defences for the latter in other places (e.g. (3) above, and 1974 Trenches I and II) came very close to the surface ; no robbing is noted in the published accounts while the drawn sections are not clear enough to show whether or not such trenches existed. If Iliffe did not recognize robber trenches he may well have been misled by the apparent depth of the defence wall into looking for the rampart at too great a depth.

If we bear this in mind it is clear that (2) and (4) both produced remains of great interest. (2) was in the area of the east gate and it is likely that the 6 metre footing was the robbed out foundation of that gate. (4) clearly included an internal angle tower. The supposed external bank to the south of this could easily have been a build-up of occupation levels and deliberate ground raising like that found in 1974. In this case the ditch associated with it would have been just another drainage ditch like so many others of first-century date on this site. The alleged rampart in (3) seems from its description to have been tumble from the collapsed wall. The footing at its front edge could have been merely a piece of wall which had fallen more or less as one piece.

The 1974 trenches would seem to present the most reliable picture of the main defences. A synthesis of their evidence and that from the earlier section would suggest that the defences consisted of a bank faced with a stone wall, perhaps with angle and internal towers and substantial masonry gates. If they were of this nature, they possessed two features which were unusual in the general context of Romano-British town defences. First the shallow U-profile of the original ditch is unusual for a second-century defensive feature. It can perhaps be accounted for by the extreme wetness of the site. Since the environmental report shows the ditch to have contained water permanently it may have been undesirable or difficult to dig it to any greater depth.

Secondly, the contemporaneity of construction of the rampart and wall is unusual, the more normal sequence being an earth bank of the late second century, faced at a later date with a stone wall.[20] Other examples of contemporary walls and banks have been known to occur only at Canterbury and Verulamium.[21] This is particularly odd in that Dorchester-on-Thames, the other Roman town of the upper Thames valley, produced the more normal sequence of ramparts. The re-cutting and widening of the ditch is of uncertain date. Such events are normally associated

[19] *Idem*, 118–9.
[20] *Idem*, 119–120 ; *Antiq. J.*, XII (1932), 40–48.
[21] S. S. Frere, *Britannia* (1974), 286.

with the Theodosian reconstruction of town defences but as yet no trace of external bastions, a development also commonly associated with this period, has been found at Alchester.

PLOUGHING AT ALCHESTER

By GEORGE LAMBRICK

Alchester lies in the former Common Field of Wendlebury which was enclosed by an award of 1800. The enclosure divided the defended area fairly equally into two fields, one to the north and the other to the south. Of these the southern one seems not to have been ploughed since, though the northern has continued to be cultivated up to the present day. Before enclosure the whole area seems to have been ploughed. Ridge and furrow is still clearly visible in the southern field which is under permanent pasture, while air photographs show faint traces of ridge and furrow in the northern field. This seems to be corroborated by pre-enclosure observations. The anonymous author of ' A History of Alchester ' written in 1622 says that ' The place where Alchester stood is now a ploughed plat of ground . . . reasonably fertile, well meadowed about it .'[22] Stukeley too says ' The city now called Aldchester is a parcel of ploughed field . . . It stands in the middle of a meadow '[23] and records that ' every one [the inhabitants of Wendlebury] has a certain little portion of it to plough up '.[24] R. Davis' map of the county[25] dating from 1797 shows that the whole area was then under plough. The ridges of the streets and defences were used as headlands for the ridge and furrow. Again this is clearly visible in the pasture field where the north-south ridges of the east and west defences and the north-south street divide up the east-west lines of ridge and furrow. The air photographs suggest that this may have been the case in the north field also, and Stukeley noted that ' The track of the way that passes the city in the middle from south to north, is still very high raised '.[26] In the 1850's the Rev. W. L. Brown considered that the ridges might be headlands alone without any underlying features, saying that

> ' it must be remembered in reference to these ridges that they are not always indications either of roads or of foundations beneath. The turning places of the plough usually called headlands are often considerably raised by the accumulation of soil driven up in wet weather by the plough '.[27]

The excavation of one ridge (it is not recorded where) apparently produced only 4 ft. of ' black mould 'resting on natural gravel. It may be possible that the headlands of the ridge and furrow could have exaggerated the existing ridges to some extent, though as we shall see, Stukeley believed the opposite to be true.

[22] Anon, *op. cit.* note 1, 417.
[23] W. Stukeley, *Itinerarium Curiosum centuria* I (1724), 39.
[24] *Ibid.*, 39.
[25] R. Davis, *A new map of Oxfordshire* (1797).
[26] Stukeley, *op. cit.* note 23, 40.
[27] *Transactions of the Archaeological and Natural History Society of North Oxfordshire* (1857–58), 135.

The pre-enclosure ploughing certainly seems to have been fairly damaging. The furrows must have cut some way into the archaeological levels and again the pre-enclosure writers have left valuable comments. In 1622 we learn that 'one Fynmore, a husbandman of Wendlebury, ploughing very deep, lighted upon a rough round stone which being digged out was found to be hollow within . . . '[28] Stukeley gives quite a long account of what he observed :

> 'Every one has a little portion of it to plough up ; whence we may well imagine the land is racked to the last extremity and no great care taken in the management of it : yet it bears very good crops of wheat. As I traversed the spot at every step I saw pieces of pots and vessels, of all sorts of coloured earth . . . I perceived them strown very thick over the whole field together with bits of bricks of all sorts : the husbandmen told me they frequently break their ploughs against foundations of hewn stone and brick ; and we saw upon the spot many paving stones with a smooth face, and laid in a very good bed of gravel, till they draw them all up by degrees, when the plough chances to go a little deeper than ordinary. '[29]

He goes on to speak of the defences thus :

> 'the vallum and ditch are sufficiently visible, though both have met with equal change ; the vallum from the plough which levels it to a certain quantity every year ; and the inundation of the meadow raises the ditch '.[30]

This suggests that the use of existing earthworks as headlands may have been fairly damaging rather than affording them protection.

The enclosure of the field probably changed its treatment fairly dramatically in terms of its cultivation. The southern field appears not to have been ploughed since then, or at any rate cannot have been cultivated more than a very few times. Between the fields a hedge was planted and a ditch dug, during which operation various foundations, stones, tiles and pieces of pottery were noticed. In 1816 Dunkin records :

> 'The ditch in front of the hedge is cut through the foundations of several brick edifices, but whether they formed parts of small streets cannot be ascertained. The wall on the eastern part of the city passed through the middle of this field . . . Part of the foundation of this wall may be seen in the ditch before mentioned which is cut through the angle of some building projecting beyond it. '[31]

In the northern field the cultivation technique seems likely to have changed with the enclosure. Ridge and furrow is still visible on neighbouring Otmoor and presumably must post-date the moor's first drainage in about 1814, but its use there might reasonably be regarded as exceptional and not indicative of a general survival of the technique in the area. At Alchester there is some indication that ridge and furrow was abandoned at the time of the enclosure. The actual enclosure of the area seems not entirely to have respected the old furlongs, for in at least one place the new field

[28] Anon, *op. cit.* note 1, 429.
[29] Stukeley, *op. cit.* note 23, 39.
[30] *Ibid.*, 39–40.
[31] J. Dunkin, *History of Bicester and Alchester* (1816), 197.

boundary cut through the ridge and furrow. A paper by the Rev. J. Marshall recalled the position immediately after enclosure :

> ' Though inclosure of Wendlebury Field, A.D. 1800, and the consequent improved cultivation of the soil, combined with the intersection of quick fence, and the natural growth of timber in the hedgerows, have gradually worn away the rough traces which did exist to mark the spot where Alchester stood ; still the prodigious blackness and richness of the earth spoken of by Stukeley is apparent in places. '[32]

The Rev. W. L. Brown in the same volume criticizes Stukeley's illustrations of the site and his own plan for over-emphasizing the earthworks, saying that ' the slopes are generally so gradual as to make it difficult to exhibit them on paper without exaggeration '.[33] It is not entirely unlikely that apart from possible exaggeration a positive levelling had already taken place in the period between Stukeley's observation of the site and the Rev. Mr. Brown's.

After 1858 no more was written about ploughing on the site until the publication of the 1928 excavations. But some information has survived from the intervening period in the form of the previously unpublished section drawing (FIG. 8)[34] of the 1892 trench through the eastern defences, and though it is too simple to give a reliable picture of the stratigraphy, it does appear to give a good idea of the earthworks' profile affording an interesting comparison with the latest trenches. The 1929 report stated simply, ' It should not be forgotten, however, that continued ploughing to say nothing of robbing has caused much disturbance in the later material at Alchester. '[35] Although sections were published of the cuttings through the eastern defences they are too diagrammatic to enable a fair comparison to be made with the earlier or later excavations. The excavations in the interior of the town however might provide useful comparisons were such excavations to be repeated. More recently still, visits to the site have occasioned further comments on the cultivation threat. For instance D. B. Harden in 1936 commented ' the fields by constant ploughing and various excavations have tended to get considerably cut about '.[36] Fears of plough damage and suspicions of actual damage have continued to be entertained to the present day and it was to try to produce some more definite evidence that the 1974 excavations were undertaken.

Currently the main reason for suspecting damage has been the very obvious contrast in the profile of the eastern defences between the ploughed and unploughed parts of the site, and to a lesser extent the levelling of other earthworks such as the north-south street. The mere existence of pottery and rubble scatters cannot be considered as grounds for suspecting damage since the material has probably been turned over within the plough soil for centuries, as all the antiquaries commented. The finds scatters were not examined for fresh breaks as a possible indication of damage. The ' fresh breaks ' theory makes various assumptions about cultivation techniques and about the survival of pottery and the freshness of the breaks which

[32] *Trans. Arch. and Nat. Hist. Soc. of North Oxfordshire* (1857–58), 129

[33] *Ibid.*, 135.

[34] MS. in Haverfield Library, Ashmolean Museum. We are grateful for permission to reproduce this drawing.

[35] *Antiquaries Journal*, IX (1929), 110.

[36] MS. note in Ashmolean Museum file on Alchester.

have yet to be tested fully on a site where damage can be proved on other grounds. At Alchester the areas which seemed most likely to be suffering were the surviving earthworks. Here even ploughing the same depth of soil could lead to an increase in the effective penetration of the plough. That erosion had already taken place was clear from the contrasting profiles of the defences either side of the hedge, but it was felt necessary to excavate them to assess exactly what had been done and what likely effect continued ploughing might have. It was therefore decided that the excavations should be sited on an earthwork and it seemed sensible to use one of the linear earthworks available in each field so that a trench each side of the field boundary would allow a comparison of the condition of the feature in each case to be made. There were two possibilities—the eastern defences and the central north-south road, neither of which was hampered by later field boundaries. Each seemed likely to provide the linear stratification necessary, but the road might well have presented considerable problems if much patching had interfered with the basic stratigraphy. Furthermore the defences as the more definite earthwork seemed more likely to be endangered by the effects of ploughing and erosion. Apart from this the defences were of more interest archaeologically. Thus the 1974 trenches were sited either side of the east-west field boundary on the line of the eastern defences.

The anticipated continuity of stratification unfortunately was found not to exist where the trenches were opened and their usefulness was thereby greatly diminished. Nevertheless the comparison was interesting and the existence of the 1892 profile provided an informative intermediate stage. Detailed comparison of the two trenches is problematic.

It cannot be based on an absolute datum since this would not allow for local variation in the post-Roman, pre-cultivation ground relief. This cannot be deduced from the present land surface. The undisturbed surface of the natural soil would give a better idea of comparable levels but this does not allow for variation in the build-up and subsequent denudation of archaeological deposits.

For this reason it was desirable that continuous layers should have existed to act as a datum. Their absence in Trench II means that the comparison has to be based on the level of the very few areas of undisturbed natural or on the level of the bottom of the wall, neither of which is a reliable datum. Conclusions must therefore be tentative. It appears that the change of profile exhibited by Trench II has been caused not by a general lowering of the ground level but by its flattening. It is clear that on each side of the wall there has been a build-up of soil. This is considerable over the main ditch (F 209 and F 212) in Trench II, where the extra accumulation of soil is about 60 cms. At the western end of the trench the furrow which appears at the end of Trench I has to a large extent been filled in, presumably affording extra protection to the layers beneath. Comparing the top of the earthwork it appears that the two slight ridges either side of the wall have been removed, and the depth of soil over the robber trench itself has diminished by about 10 cms. The critical measurement of the comparative level of the *bottom* of ploughing is unfortunately almost impossible to make accurately because of the lack of an easily established datum for the reasons discussed above, which results from disturbances in Trench II. The bottom of the wall which is one of the few undisturbed levels clearly varies in depth from side to side and may well vary along its length also. A

comparison using this highly dubious datum or the almost equally dubious one based on what little remains of the top of the gravel, suggests that the *lowest* level of ploughing on top of the earthwork averaged about the *same* in each trench. Doubt may be cast on such comparisons if the large amount of material which has accumulated either side of the ridge is compared with the small amount apparently lost from on top. However, the effective width of the ridge may have varied and been slightly greater than the width of the ditch thus enabling a greater depth to accumulate. It is also not impossible that the ridge also varied in height and was higher in the area of Trench II, nor is it impossible that soil was dumped in the ditch from elsewhere to level it up, though we have no evidence of this having happened. Conclusions either way with regard to the comparison of the two trenches cannot be firm.

The simplest comparison, that of the plain profile, however, is clear enough and comparison with the 1892 profile shows that the levelling process now nearly complete was well under way by the end of the 19th century, and may have slowed down considerably since then. Unfortunately the 1927–28 sections do not show the profile sufficiently convincingly to be trusted, so that an assessment of any variation in the rate of change is not really possible.

So far only the past treatment of the site has been discussed and the current potential threat has yet to be assessed. The evidence of the past treatment of the site has been used to demonstrate that the threat is not a new one, and that it is possible that a great deal more change has already been done by ploughing (not to mention unrecorded robbing, looting and excavating) than is likely to be done in the future. Currently[37] the site is cultivated using a conventional mouldboard plough working to 6 ins. or 8 ins. followed by two or three passes of harrowing. The soil is extremely fertile as was attested by the antiquarian observers and is also very well structured. As a result subsoiling and pan-busting have never been done. Nor has deliberate levelling of earthworks been done to the farmer's knowledge. The excellence of the soil makes it easily worked requiring a minimum of passes, and this coupled with its fertility has allowed continual cropping for at least eight years. The farmer says that the field is one of the very best and cultivation is therefore undoubtedly likely to continue. Subsoiling or pan-busting will certainly not be used as they would in no way improve the land and would merely cause extra expense. If any change occurs it is more likely to be towards shallower cultivation or direct drilling, but only if such methods will substantially reduce costs. Since the soil is very easily worked, the main advantages of direct drilling do not apply. The farmer actually uses direct drilling to some extent but never at Alchester. Thus the site is likely to continue to be ploughed in the same way if agricultural considerations alone dictate cultivation policy.

The effect on the site of continued cultivation of the same type is difficult to assess. The rate of change in the profile of the defences appears to be fairly slow if the 1892 section is reliable. This evidence is not very sound however since it does not make allowances for unrecorded changes in cultivation technique, etc., which might make a difference. Nevertheless it seems logical that the flatter the profile becomes the slower erosion will become, since slope is a critical factor in determining the rate of soil movement. Accurate measurements of changes of profile taken over

[37] I am most grateful to the tenant, Mr. Deeley, for supplying this information.

a long period of time, at least five or six years and probably more, need to be made and related to soil type and method, type and frequency of ploughing before a true picture could be established. It is certainly not possible to say now whether continued ploughing will cause serious damage. Conclusions concerning the interior of the town are impossible : a similar operation conducted on the main north-south street might prove more conclusive than the defences excavation. The final answer to the question of plough-damage at Alchester has not been provided by the 1974 trenches which have been unfortunately and perhaps unluckily inconclusive. To some extent the degree of past damage has been shown, but in terms of what may be predicted for the future we are not much further forward. It seems fair to expect that the rate of damage may have greatly diminished, perhaps to a level at which damage is negligible, but this cannot be proved without further investigation.

APPENDIX I

REPORT ON THE ANIMAL BONES FROM ALCHESTER, 1974. By B. J. MARPLES

Almost all the bones belonged to either Horse, Ox, Sheep or Pig. They were in a very fragmentary condition, and out of 669 only 191 were identified. Each bone, tooth or fragment was counted individually. In addition to these bones of the large domestic animals there were 3 only belonging to Dog and 1 to Hare. Nine bones of Raven, belonging to at least 2 individuals, were found, and a single one of Partridge. Oyster shells occurred throughout, 54 in all.

The samples were arranged in six groups. Group 1 contained the material from the early pit (136), Group 2 that from the silting of Ditches 1 and 2 and the associated occupation layers, Group 3 that from the turf fill of Ditches 1 and 2, Group 4 that from the occupation levels associated with the turf fill, Group 5 that from the turfy fill of the subsidence hollows over Ditches 1 and 2, Group 6 that from the rampart bank and the earliest cut of the defence ditch.

Group 1 contained only 1 fragmentary sheep's bone, 2 pig's teeth and 8 fragments, and so was not considered.

Group 2 The numbers belonging to the 4 species were : Horse 2 ; Ox 13 of which 3 were immature ; Sheep 24 of which 3 were immature ; Pig 6. Of 122 fragments 5 were burnt, 4 were cut and 4 were chewed, presumably by dogs.

Group 3 Horse 2 ; Ox 9 ; Sheep 18 of which 2 were immature ; Pig 4.

Group 4 Horse 4 ; Ox 6 ; Sheep 10 of which 2 were immature ; Pig 4.

Group 5 Ox 25 ; Sheep 26 of which 3 were immature ; Pig 8 of which 1 was immature. Also present were Dog 3 ; Hare 1 ; Partridge 1.

Group 6 Ox 15 of which 1 was immature ; Sheep 11 of which 1 was immature ; Pig 3. Also present were Raven 2.

There seems to be no striking change in the relative frequencies of the species during the period covered by these groups, but the samples of course are small, between only 24 and 59. There were no Horse bones in Groups 5 and 6. The Ox bones, as percentage of those of the four species, increased from 28 to 51 between Groups 2 and 6, while those of Sheep decreased from 53 to 37. The percentage of Pig showed little change. The presence of Raven is interesting, though it has been recorded from a number of Roman sites including the nearby Middleton Stoney.

APPENDIX 2

THE ENVIRONMENT OF THE ROMAN DEFENCES AT ALCHESTER AND ITS IMPLICATIONS

By MARK ROBINSON

INTRODUCTION

The sections across the defences of Roman Alchester were suitable for environmental studies for two reasons. Firstly, sealed beneath the layers of Roman occupation and build-up was an old ground surface with a calcareous soil. Secondly, due to the low lying nature of the site, any feature cut below this old ground surface was below the water table.

Therefore samples were taken in Trench I from the old ground surface, layer 135, each of the late 1st-century ditches, layers 138 and 122/6, and the late Roman silting of the town ditch, 105. These were subjected to analysis for plant, insect and molluscan remains.

I am grateful to Miss J. S. Cockett for her drawings, Dr. J. G. Evans for his comments on the molluscan fauna of layer 135, Professor G. C. Varley for allowing me the use of the collections in the Hope Department of Entomology, Oxford, and provision of working facilities, and Mrs. R. G. Wilson for use of the seed reference collection in the Botany School, Cambridge, and all the instruction she has given me in seed identification.

METHODS

The Nature of the Deposits Sampled

Layer 135

This was an old ground surface on top of the natural limestone gravel and sealed beneath the build-up of the Roman town. It consisted of a brownish-grey clayey loam and was just above the water table.

Layer 138

This was the bottom layer of a late 1st-century ditch and was below the water table. It consisted of black rather gritty silt with lenses of brown peat consisting of partially decayed plant remains.

Layer 122/6

This was the bottom of a late 1st-century ditch similar to layer 138, also below the water table. It consisted of black rather gritty silt.

Layer 105

This was the bottom layer of the late Roman silting of the town ditch and was below the water table. It consisted of a fine grey silt with many fragments of molluscan shell, some white clay and lenses of black organic material.

Extraction

It was decided that there was only time to examine 5 lb. of each sample. Whilst this is sufficient to give a useful number of molluscs and seeds, about 5 to 10 times as much is the optimum amount for insects.

Each sample was water-washed through a stack of sieves down to an aperture size of 0·5 mm. Extreme care was needed with the sample from layer 105 because the molluscan remains were in a very fragile condition. This sample was picked apart by hand before washing thus enabling many of the molluscs to be recovered undamaged and some of the bivalves in an articulated state. In future it would be advisable to sieve down to a smaller mesh size, for although 0·5 mm. is sufficiently small for the recovery of all useful molluscan and most identifiable insect parts, some seeds will have been lost. This is the likely reason why no *Juncus* seeds were recovered rather than a true absence of this group.

After sieving, the still wet contents of each sieve were shaken with paraffin in a jar and water added. Insect remains which floated to the surface were skimmed off, washed, and fresh water added until no more bits of insect floated. The residues were washed,

then sorted for molluscs, seeds and those insect fragments which had not floated. The only reason for the paraffin treatment is that it speeds the extraction process. It is not sufficient only to examine the insect fragments and those seeds and molluscs which are included in this flotant. The seeds and insects recovered were stored in absolute alcohol, the molluscs being dried, to await identification.

Identification

It is essential that identification is carried out by direct comparison under the microscope with reference material and that an identification is only regarded as secure when all reasonable possibilities have been exhausted, not simply when a match is obtained. To this end insect identifications were made using the British Reference and General Collections in the Hope Department of Entomology, Oxford, and seed identifications with the reference collection in the Quaternary Sub-Department in the Botany School, Cambridge. Mollusca were identified using the collection of the O.A.U. This collection is by no means complete and for this reason definite identifications of *Valvata cristata* and *Hygromia liberta* were not possible, likewise the separation of *Cochlicopa* into species.

RESULTS

Apart from a single mite, layer 135 only contained molluscan remains. The other features produced all three groups, but the seeds from layer 122/6 were not identified. They are presented in tabular form giving the number of individuals of each species present from each deposit. In addition a short description of their habitat or food is given. It must be emphasized that many of the species can live in a number of different habitats and their presence could indicate any one of them. When drawing ecological conclusions all the species present must be considered. Unlikely minor habitats have been left out of the tables.

The nomenclature for the Mollusca (Table 1) follows that of Ellis.[38] Habitat information has been taken from Sparks[39] for freshwater molluscs. Slum species are those able to live in water subject to stagnation, drying up and large temperature variations. Catholic species can tolerate a wide range of conditions except the worst slums. Ditch species require clean slowly moving water often with abundant aquatic plants. Moving water species require no more than a clean stream a few yards wide and flowing slowly. In most cases it is the lack of ability to tolerate adverse conditions which is the limiting factor and the tolerant species will also occur where conditions are better. Marsh snails have been divided into those which are obligatory marsh dwellers and those terrestrial species which to a greater or lesser extent occur in marshes and flood refuse in accordance with the lists given by Boycott[40] and Evans.[41] Finally there are the purely terrestrial species.

Numbers for each species represent the minimum number of individuals present, normally based on a count of shell opices, but in the case of *Bithynia tentaculata* from layer 135, on the number of opercula and for the bivalves, on the number of right or left valves, whichever was greater.

The nomenclature for the plants and habitat information (TABLE 2) has been taken from Clapham, Tutin and Warburg.[42] Additional habitat information is from the *Journal of Ecology*.[43] Where the plants have genuine English names, they have been given as well, because the archaeological reader is likely to be familiar with many of them. The types of habitats which have been given are aquatic, marsh, grassland, disturbed ground, scrub and woodland with an additional group occurring particularly on riverbanks and the like.

[38] A. E. Ellis, 'Census of the Distribution of British Non-Marine Mollusca', *J. Conch.*, 23 (1951), 171–243.
[39] B. W. Sparks, 'The Ecological Interpretation of Quaternary Non-Marine Mollusca', *Proc. Linn. Soc. Lond.*, 172 (1959–60), 76.
[40] A. E. Boycott, 'The Habitats of Land Mollusca in Britain', *J. Ecol.*, 22 (1934), 13–14.
[41] J. G. Evans, *Land Snails in Archaeology* (1972), 199–200.
[42] A. R. Clapham, T. G. Tutin & E. F. Warburg, *Flora of the British Isles* (1962).
[43] 'The Biological Flora of the British Isles,' *J. Ecol.* (various issues).

TABLE 1

The Mollusca and their habitats (F, flowing water ; D, ' ditch ; C, ' catholic ' ; ' slum ' ; M, obligate marsh dweller ; (M), can live in marshes ; T, terrestrial. All aquatic groups after Sparks (see text p. 162)).

Mollusca	Number of Individuals				Habitat
	Layer 135	Layer 138	Layer 122/6	Layer 105	
GASTROPODA					
Prosobranchia					
Valvatidae					
?Valvata cristata Müll	13	1	5	40	D.
Hydrobiidae					
Bithynia tentaculata (L.)	13	—	—	31	F.
Pulmonata					
Ellobiidae					
Carychium minimum Müll.	82	—	5	15	(M.)
C. cf. *tridentatum* (Riss.)	2	1	—	—	(M.)
Limnaeidae					
Lymnaea truncatula (Müll.)	81	1	3	—	S.M.
L. palustris (Müll.)	2	—	—	6	C.M.
L. stagnalis (L.)	—	—	—	9	F.
L. peregra (Müll.)	—	2	—	2	C.
Physidae					
Aplexa hypnorum (L.)	—	35	10	—	S.
Planorbidae					
Planorbis planorbis (L.)	—	1	—	118	C.
P. vortex (L.)	—	—	—	78	D.
P. leucostoma Milt.	7	1	10	11	S.
P. crista (L.)	—	—	—	49	C.
P. contortus (L.)	1	—	—	40	C.
Segmentina complanata (L.)	—	—	—	26	D.
Succineidae					
Succinea sp.	7	2	—	17	M.
Cochlicopidae					
Cochlicopa sp.	11	—	—	14	(M.)
Vertiginidae					
Vertigo antivertigo (Drp.)	17	—	—	2	M.
V. pygmaea (Drp.)	61	—	1	—	(M.)
V. angustior Jeff.	24	—	—	—	M.
Pupilla muscorum (L.)	32	1	—	—	T.
Valloniidae					
Vallonia costata (Müll.)	—	2	—	6	T.
V. pulchella (Müll.)	91	3	4	8	(M.)
Helicidae					
Helix nemoralis L.	2	—	—	—	(M.)
Cepaea sp.	—	—	1	—	(M.)
Helix aspersa Müll.	—	—	—	1	T.
Hygromia hispida (L.)	68	3	2	15	(M.)
H. cf. *liberta* (Wester.)	—	—	—	3	(M.)
Endodontidae					
Punctum pygmaeum (Drp.)	6	—	—	—	(M.)
Discus rotundatus (Müll.)	1	—	—	18	T.
Arionidae					
Arion sp.—numerous granules	√	—	—	—	(M.)
Zonitidae					
Vitrea sp.	—	—	—	1	(M.)
Oxychilus cellarius (Müll.)	—	—	—	5	T.
Retinella radiatula (Ald.)	1	—	—	—	(M.)
R. nitidula (Drp.)	1	—	—	—	T.
Zonitoides nitidus (Müll.)	5	1	3	2	M.
Limacidae					
Limax or *Agriolimax*	25	—	—	—	M. (M.)
BIVALVIA					
Sphaeriidae					
Sphaerium corneum (L.)	—	—	—	16	C.
Pisidium spp.	3	—	—	20	M.S.D.C.F.
Total	556	54	44	553	

The difficulties of such divisions are manifold. The denizen of a frequently ploughed field such as corncockle (*Agrostemma githago*) comes under the same heading of disturbed ground as one of the habitats of elder (*Sambucus nigra*) which colonizes rather infrequently disturbed ground associated with human habitation. It must also be remembered that a hedge at the side of a ditch may contain most of the above habitats. There are also some paradoxes. Whilst certain plants can be taken as indicative of grassland, grasses not identified to species cannot!

Except in the case of *Trifolium*, numbers for each species refer to the seed unit which gives rise to a single plant ; it has been though pointless to divide them up into seeds, fruits, nutlets, etc. In the case of *Trifolium* a calyx and a capsule lid were identified.

Apart from a carbonized grain each of spelt and *Bromus*, identified by Mr. M. Jones, all the plant remains had been preserved by waterlogging.

In the species list of insects (TABLE 3) the nomenclature follows that of Kloet and Hincks[44] with the exception of the Scarabaeoidea where that of the R.E.S. Handbook is followed.[45] Habitat and food information is from Balfour-Browne, Freude *et al.*, Joy, Hoffmann, and Paulian.[46] Many of the insects fall into the following groups : inhabitants of or feeders on mammal dung, inhabitants of decaying vegetable material, aquatic insects and those which are plant feeders, mostly on plants of disturbed ground and grassland.

Numbers give the minimum number of individuals represented by the various disarticulated pieces of insect identified from each layer, mostly heads, pronota and elytra. All the insect remains had been preserved by waterlogging.

In addition to the two major groups of invertebrates, valves of ostracods, *Daphnia* ephippia and mites were also recovered (TABLE 4).

TABLE 4
Other invertebrates

	Number of Individuals				Habitat
	Layer 135	Layer 138	Layer 122/6	Layer 105	
ARACHNIDA					
Acarina (Mites)	1	4	—	2	
CRUSTACEA					
Branchiopoda—*Daphnia*	—	Numerous	Some	—	Aquatic
Ostracoda	—	Numerous	Numerous	Few	Aquatic

The Illustrations

A selection of the fossils has been drawn (FIG. 9) to show the techniques by which identifications have been made and for general interest. The raised parts of a modern coriander seed (2) disappear on treatment with concentrated potassium hydroxide and it takes on the eroded appearance of 1. The cell pattern of part of the surface of the *Eleocharis uniglumis* seed (4) has been shown because the coarser cell pattern is a factor separating it from *E. palustris*. The elytron of *Apion urticarium* (9) is brown whilst the broader scales are white and the narrower pink. In some areas where no scales have been shown are very fine brown hair-like scales.

INTERPRETATION

The analysis of the samples from Alchester produced 153 different groups of organism, mostly identified to species. Each of them will have its own set of requirements from the

[44] G. S. Kloet and W. D. Hincks, *A Check List of British Insects* (1945).

[45] Royal Entomological Society Handbook V, part II, *Coleoptera Scarabaeoidea* (1956).

[46] F. Balfour-Browne, ' British Water Beetles, I, ' *The Ray Soc. Lond.* (1940). H. Freude, K. W. Harde and G. A. Lohse, *Die Käfer Mitteleuropas*, Krefeld, various volumes (1964–74). N. H. Joy, *A Practical Handbook of British Beetles* (1932). A. Hoffman, ' Coléoptères Curculionides ', *Faune Fr.*, 52, 59, 62. Paris (1950–58). R. Paulian, ' Coléoptères Scarabeides ', *Faune Fr.*, 63. Paris (1959).

TABLE 2

The plants and their habitats (A, aquatic ; M, marsh, G, grassland ; D, disturbed ground ; S, scrub and hedge ; W, woodland ; B, riverbank).

Plants		Number of Seeds		Habitat
		Layer 138	Layer 105	
Ranunculaceae				
Ranunculus cf. *acris* L.	Buttercup	1	—	G.
R. repens L.	Buttercup	14	1	D. G. W.
R. parviflorus L.	Buttercup	2	—	G.
R. flammula L. or *reptans* L.	Lesser Spearwort	2	—	M.
R. sceleratus L.		—	28	B. A.—Slow-flowing, muddy
Ranunculus S. *Batrachium* sp.	Water Crowfoot	1	16	A.
Thalictrum flavum L.	Meadow Rue	2	—	G. damp meadow
Ceratophyllaceae				
Ceratophyllum demursum L.	Horn-wort	—	1	A.
Cruciferae				
Rorippa nasturtium-aquaticum (L.) Hayek	Watercress	—	2	A.—moving
Cruciferae sp.		—	2	
Violaceae				
Viola sp.	Violet	—	1	M. G. S. W.
Caryophyllaceae				
Agrostemma githago L.	Corn Cockle	1	—	D.—Cornfield weed
Stellaria media (L.) Vill.	Chickweed	2	—	D.
Chenopodiaceae				
Chenopodium album L.	Fat Hen	4	2	D.
Chenopodium sp.		—	1	D.
Atriplex sp. (p.)		1	4	D.
Linaceae				
Linum catharticum L.	White Flax	1	—	G.
Papilionaceae				
Trifolium sp.	Clover	1	—	G.
Rosaceae				
Rubus fruticosus agg.	Blackberry	—	15	S. D.
Potentilla anserina L.	Silverweed	2	—	G. D.
Umbelliferae				
Anthriscus caucalis Bieb.		2	—	D.
Coriandrum sativum L.	Coriander	1	—	Introduced
Conium maculatum L.	Hemlock	—	42	Damp places, open woods, near water
Apium nodiflorum (L.) Lag.	Fool's Watercress	—	20	A.
Berula erecta (Huds.) Coville	Water Parsnip	—	26	M. A.
Oenanthe aquatica (L.) Pior.	Water Dropwort	—	61	A.
Cucurbitaceae				
Bryonia dioica Jacq.	White Bryony	—	2	S.
Polygonaceae				
Polygonum aviculare L.	Knotgrass	7	—	D.
P. persicaria L.	Red Shank	6	—	D. B.
P. lapathifolium L. or *P. nodosum* Pers.		1	1	D. B.
Rumex cf. *crispus* L.	Dock	1	—	G. D.
R. cf. *conglomeratus* Murr.	Dock	5	—	G. W.
Rumex spp.	Dock or Sorrel	8	1	D. G. M. B. W.
Urticaceae				
Urtica urens L.	Small Nettle	1	—	D.
U. dioica L.	Stinging Nettle	28	99	D. W. S. B.
Corylaceae				
Corylus avellana L.	Haze	—	1	S. W.
Solanaceae				
Atropa bella-donna L.	Deadly Nightshade	—	1	Well-drained calcareous soil with some shade
Solanum dulcamara L.	Woody Nightshade	—	6	D. S. W. B.
S. nigrum L.		4	—	D.
Scrophulariaceae				
Veronica sp.		1	—	
Rhinanthus cf. *minor* L.	Yellow Rattle	3	—	G.
Labiatae				
Lycopus europaeus L.	Gypsy-wort	—	19	B. M.
Prunella vulgaris L.	Self-heal	6	—	G.
Lamium sp.	Deadnettle	1	—	D.
Galeopsis tetrahit agg.	Hemp-nettle	—	5	D.
Caprifoliaceae				
Sambucus nigra L.	Elder	—	6	D. S. W.
Compositae				
Cirsium sp. (p.)	Thistle	—	4	G. D. S.
Carduus or *Cirsium* spp.	Thistle	1	11	G. D. S.
Lapsana communis L.	Nipplewort	—	1	D.
Sonchus asper (L.) Hill	Sow-thistle	—	11	D.
Leontodon sp.	Hawkbit	—	1	G.
Alismataceae				
Alisma sp.	Water-plantain	—	3	B. A.
Potamogetonaceae				
Potamogeton crispus L.	Pondweed	—	4	A.
Potamogeton sp.	Pondweed	—	5	A.
Zannichelliaceae				
Zannichellia palustris L.		—	6	A.
Sparganiaceae				
Sparganium erectum L.	Bur-reed	—	23	A. M.—ungrazed
Cyperaceae				
Eleocharis palustris ssp. *palustris* (L.) Roem and Schult		—	1	M. A.
E. uniglumis (Link) Schult		49	2	M. open vegetation
Carex spp.	Sedges	7	5	
Gramineae				
Triticum spelta L.	Spelt Wheat	1	—	cultivated
Bromus sp.		1	—	G. D. S.
Gramineae spp.	Grasses	4	14	
Total		172	454	

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TABLE 3

The Insecta and their habitats or food. (A, aquatic ; D, dung ; V. decaying vegetable material ; C, carrion ; P, phytophagous, mainly on grassland herbs and weeds of disturbed ground).

Insecta	Minimum No. of Individuals			Habitat or Food
	Layer 138	Layer 122/6	Layer 105	
HEMIPTERA				
Heteroptera				
Cimicidae—Anthocrinae sp.	2	—	—	
Homoptera				
Aphididae sp.	2	—	—	
COLEOPTERA				
Carabidae				
Carabus nemoralis M.	—	—	1	
Leistus fulvibarbis Dej	—	—	1	
Bembidion cf. *ustulatum* (L.)	1	—	—	
B. cf. *guttula* (F.)	—	—	1	
Harpalus aeneus (F.)	1	—	—	
Amara sp.	—	—	1	
Metabletus foveatus (Geof. in Fourc.)	1	—	—	
Dytiscidae				
Hygrotus inaequalis (F.)	—	—	1	A. still water with plant detritus
Hydroporus sp.	—	—	1	A.
Colymbetini sp.	—	—	1	A.
Hydrophilidae				
Helophorus spp.	3	—	7	A.
Sphaeridium bipustulatum F.	1	1	—	D. V.
Cercyon unipuntatus (L.)	—	—	1	D. V.
Cercyon spp.	2	1	5	D. V.
Hydrobius fuscipes (L.)	1	—	1	A. still water with plant detritus
Laccobius sp.	—	—	1	A.
Hydrophilus piceus (L.)	—	—	2	A.
Silphidae				
Sipha tristis Ill.	—	—	1	C.
Choleva or Catops sp.	—	—	1	V. C.
Staphylinidae				
Oxytelus rugosus (F.)	2	—	1	D. V.
Oxytelus sp.	—	—	1	D. V.
Platystethus cornutus (Gr.)	2	—	1	D. V.
Platystethus sp.	1	—	—	D. V.
Philonthus intermedius Bois and Lac. or *laminatus* (Cr.)	1	—	—	D. V.
Philonthus sp.	1	—	—	D. V.
Cantharidae				
Cantharis sp.	—	—	1	On flowers esp. Umbelliferae
Cantharidae sp.	1	—	—	On flowers esp. Umbelliferae
Elateridae				
Athous hirtus (Hbst.)	—	—	1	Grassland
Dryopidae				
Dryops ernesti Des G.	—	—	1	In or near water
Nitidulidae				
Meligithes sp.	—	—	2	P.
Lathridiidae				
Lathridiidae spp.	3	—	4	
Anobiidae				
Stegobium paniceum (L.)	1	—	—	Grain, flour, etc.
Scarabaeidae				
Oxyomus sylvestris (Scop.)	1	—	—	D. V. C. and fungi
Aphodius contaminatus (Hbst.)	—	1	1	D.
A. prodromus (Brahm.)	1	—	—	D.—horse, sheep, human, rare in cow
A. sphacelatus (Pz.)	2	1	2	D.
A. aestivalis F. or *scybalarius* (F.)	3	1	—	D. V.
A. cf. *niger* (Pz.)	2	1	—	D.
Aphodius sp.	1	—	—	D.
Chrysomelidae				
Donacia cf. *vulgaris* Zsch.	—	—	1	*Sparganium* sp.
Donacia sp.	—	—	1	Water plants
Prasocuris phellandrii (L.)	—	—	3	Aquatic Umbelliferae
Chaetocnema concinna (Marsh.)	1	—	—	*Polygonum* esp. *P. aviculare*
Curculionidae				
Apion urticarium (Hbst.)	2	—	—	*Urtica* spp. (nettles)
A. virens Hbst.	—	—	1	P.—esp. *Trifolium pratense* L.
Apion spp.	2	—	—	P.
Phyllobius sp.	1	—	—	P. esp. trees
Micrelus ericae (Gyll.)	1	—	—	*Calluna* and *Erica spp.* (*Ling and heather*)
Ceuthorhynchinae sp.	3	1	2	P.
HYMENOPTERA				
Chalcidoidea sp.	1	—	—	
Total	47	7	49	

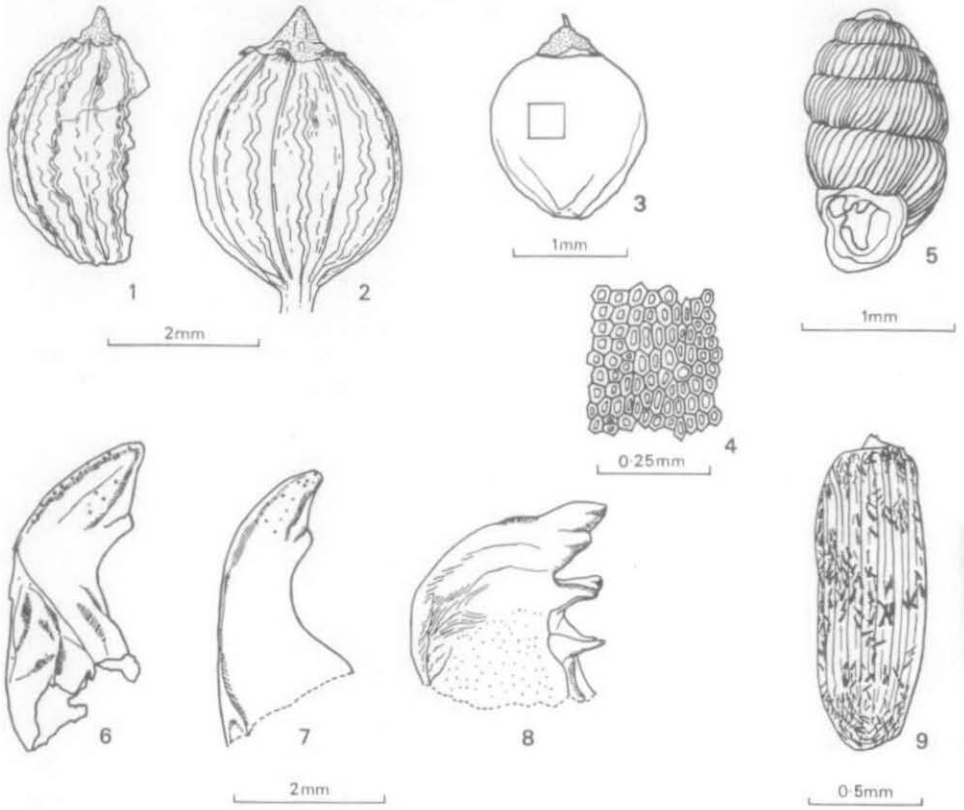

FIG. 9

1, 2 Fossil (l) and modern (r) seeds of coriander (*Coriandrum sativum*). 3, 4 Seed (nut) of *Eleocharis uniglumis* with detail of cell pattern. 5 Fossil *Vertigo angustior*. 6, 7 Fossil (l) and Modern (r) left larval mandibles of *Hydrophilus piceus*. 8 Modern adult left mandible of *H piceus*. 9 Elytron of fossil *Apion urticarium*.

environment in some way different from those of the rest. Therefore it ought to be possible to tell a great deal about the environmental setting of the Alchester defences. The different groups of organisms, from their very nature, will give different types of evidence. The molluscs, with poor dispersive powers, mainly give information about the features themselves, where they would have lived. The seeds, however, will include those from the vicinity of the features as well as those plants which lived in the ditches. In addition, some of them are likely to have been brought to the site by man. Finally the insects have potentially the greatest dispersive power at their disposal, but the size of the samples examined is not large enough for them to play their full part in the drawing of ecological inferences. Therefore, the molluscs will be considered first to give the conditions in the features themselves, then the plants will be used to fill in details of the feature and also give the background environment, and finally the insects will provide additional information.

Layer 135

There can be no doubt that this represents a marsh deposit. From over 500 molluscs, excluding the problem of *Pupilla muscorum* which will be dealt with later, there are only the single individuals of *Discus rotundatus* and *Retinella nitidula* which do not normally occur in marshes or water. The marsh is likely to have been quite open for *Zonitoides nitidus*,

Vertigo antivertigo, *V. pygmaea* and *Vallonia pulchella* do not like shady habitats.[47] Pools of water would have been required by some of those marsh species which are also members of the freshwater slum group. In addition there are two species characteristic of clean permanent water, *Bithynia tentaculata* and *Valvata cristata*, which would not have been living in the company of many of the more common marsh species in this group. It is likely that their shells were deposited on the marsh by flooding.

Pupilla muscorum now normally occurs in dry habitats but during the cold conditions of Zone II of the late Weichselian (about 9000 B.C.) occurred in marsh faunas as well.[48] Late glacial specimens are generally larger and more parallel-sided than post-glacial ones, but those from layer 135, whilst including some large individuals are more the size and shape of modern ones. Also, some of the other species would be out of context in a late-glacial assemblage : *Carychium*, *Helix nemoralis*, *Discus* and *Retinella nitidula*.[49]

Also of interest are the numbers of the rare marsh species *Vertigo angustior* (FIG. 9, 5).[50] More common in the Atlantic period (5000–3000 B.C.), the activities of man in draining marshes have been blamed as a possible reason for its decline.[51]

Layer 138

The majority of snails from this ditch belong to the freshwater slum group described above (p. 162). In particular it has been suggested that the most numerous snail, *Aplexa hypnorum*, has a preference for slum conditions and dislikes gently moving water.[52] There is a small number of snails belonging to the catholic group and possibly one which belongs to the ditch group. Finally there are those few terrestrial snails which have fallen in from the side. The mollusca can be interpreted as showing that conditions approached a slum. Perhaps for some of the year flowing water enabled the more conservative species to establish themselves, but in the summer the flow stopped and in the drying pools of water there were blooms of ostracods and *Daphnia* whilst the amphibious snails flourished.

The seeds are in complete agreement with the above interpretation. There is only a single one from an aquatic plant, water crowfoot (*Ranunculus S. Batrachium*), to serve as a reminder that water flowing along the ditch can have deposited things from elsewhere. The plants likely to have lived in the ditch are the marsh species. The most numerous seeds are of *Eleocharis uniglumis* (FIG. 9, 3, 4), but also represented are several species of sedge (*Carex*) and the lesser spearwort (*Ranunculus flammula* or *reptans*).

Apart from two crop seeds the others can be split into two groups, those from plants of rather damp grassland and those from plants of disturbed habitat. Typical of the grassland plants are meadow rue (*Thalictrum flavum*), buttercup (*Ranunculus acris* and *repens*), yellow rattle (*Rhinanthus* cf. *minor*), and self heal (*Prunella vulgaris*) as well as perhaps *Eleocharis* and *Carex*. There are not sufficient species or numbers present to attempt to suggest whether the grassland was pasture or meadow but the species list agrees well with those given for damp basic grassland by Tansley.[53]

The ditch can perhaps be seen running through this grassland with its growth of *Eleocharis* and probably subject to the same mowing or grazing of it. *Eleocharis uniglumis* is indeed a useful ecological indicator. Excluding its saline coastal habitats it requires calcareous marsh or wet grassland, tolerating little competition from tall growing species. Intolerance of shade is one of its most important limiting factors causing its absence from reedswamp. This means that it is a good indicator of mowing or grazing and can be a

[47] J. G. Evans, *Land Snails in Archaeology* (1972), 143, 161, 200.

[48] M. P. Kerney, E. H. Brown and T. J. Chandler, ' The Late-Glacial and Post-Glacial History of the Chalk Escarpment near Brook ', *Phil. Trans. R. Soc.* (B), 248 (1964), 145, 160–1.

[49] Information from Dr. J. Evans, also Evans (1972), 57.

[50] M. A. Robinson, ' Grim's Ditch, the Molluscan Remains ', *Oxoniensia*, XL (1975), pp. 129–132. The single specimen from Grim's Ditch may have been redeposited from a geological deposit. It has been recorded from Shakenoak by J. Clatfield in a wet Roman context.

[51] M. P. Keney, ' Snails and Man in Britain ', *J. Conch.*, 26 (1966), 7.

[52] A. E. Boycott, ' The Habitats of Fresh-Water Mollusca in Britain ', *J. An. Ecol.*, 5 (1936), 167.

[53] A. G. Tansley, *The British Isles and their Vegetation*, II (1965), 568–74.

non-flowering constituent of short turf. It grows badly in water unless it is very shallow. It has been recorded from few inland counties, but Oxfordshire is one of them.[54]

The plants of disturbed habitat may be from some form of arable agriculture but they could be weeds from gardens, building sites, etc., associated with the town. Some of them, along with some from layer 105, are thought to be Roman introductions but further work is likely to show many of them to be earlier introductions or native.[55]

Of the two cultivated plants a grain of spelt wheat is hardly surprising and is in agreement with the grain beetle *Stegobium paniceum* from this layer. The other, a single menicarp of a Mediterranean plant, coriander (*Coriandrum sativum*), is more interesting (FIG. 9, 1). It has been recorded before from Roman contents in Britain : Silchester, Caerwent,[56] Lancaster (information from R. G. Wilson), and recently a pot containing some seeds was found near Hertford (Robinson, unpublished), but it is not native. Umbelliferae seeds were much valued in classical times for flavouring, and Apicius had a recipe for flamingo cooked with coriander.[57] More reasonably, Pliny has a recipe for barley porridge sweetened with linseed and flavoured with coriander.[58] It also had medicinal uses, being one of the ingredients in a cure for epilepsy.[59] It was certainly a familiar plant, for throughout his *Natural History*, Pliny, when describing a plant, frequently compares or contrasts it to coriander.

The insects from 138 are predominantly beetles inhabiting decaying plant remains and dung. The decaying plant remains are just what would be expected in the ditch after winter floodwaters had subsided. In agreement with the above interpretation there are few aquatic beetles compared with 105. Dung beetles are well represented and are probably associated with domestic mammals on the grassland. As with the seeds, there is no evidence of woodland, all the phytophagous beetles feeding on grassland herbs and weeds of disturbed ground. In general, there is good agreement with the seeds, with *Chaetocnema concinna* feeding on *Polygonum* and *Apion urticarium* on nettles. The heathland element, in the form of *Micrelus ericae* which feeds on ling and heather (*Calluna* and *Erica* spp.), is rather surprising. They do not occur in the vicinity today.[60] Of particular interest are two individuals of *Apion urticarium* (FIG. 9, 9), both represented by their distinctive left elytra. This is a rare southern English species, occurring no further north than Leicestershire, but common in France.[61] Most of the specimens in the Hope Department are from Kent, but there is a good group from Streatley, Berks. It is interesting that it has also been found from two Roman contexts at Appleford[62] and Barnsley Park, Glos.[63]

Layer 122/6

The mollusca of this ditch form a similar group to those from layer 138 and the same conclusions may be drawn from them. Due to lack of time the seeds from this layer were not examined in detail, but as with 138 *Eleocharis* was predominant. There were few insects but their interpretation does not disagree with that for layer 138.

Layer 122/6 was very likely to have been a similar ditch to layer 138 with an identical setting.

Layer 105

The molluscs, seeds and insects show this late Roman recut of the ditch to be very different from the late 1st-century ditches. The Mollusca show that the ditch contained

[54] S. M. Walters, ' Eleocharis ', *J. Ecol.*, 37 (1949), 192–206.
[55] H. Godwin, *The History of the British Flora* (1956), 342–3.
[56] *Ibid.*, 134. The Bronze Age record from Minnis Bay can be discounted.
[57] Apicius, *The Art of Cooking*, VI, vi.
[58] Pliny, *Natural History*, XVIII, xiv.
[59] *Ibid.*, XXV, LXX.
[60] F. H. Perring and S. M. Walter (eds.), *Atlas of the British Flora* (1962), 194–5.
[61] N. H. Joy, *A Practical Handbook of British Beetles* (1932), 164. A. Hoffman, ' Coléoptères Curculionides ', *Faune Fr.*, 62 Paris (1958), 1538.
[62] M. A. Robinson, unpublished.
[63] G. R. Coope and P. J. Osborne, ' Report on the Coleopterous Fauna of the Roman Well at Barnsley Park, Gloucestershire ', *Trans. Bris. and Gloucs. Arch. Soc.*, 86 (1968), 86.

permanent clean moving water. The ' ditch ' group of species (see p. 162) is well represented and there are even significant numbers of two of the ' moving water ' species, *Bithynia tentaculata* and *Lymnaea stagnalis*. *B. tentaculata* never occurs in closed, stagnant water and apart from lakes lives exclusively in running water. *L. stagnalis* likes roomy habitats occurring neither in fast flowing water nor small ponds.[64] That snail which prefers slum conditions and does not like moving water, *Aplexa hypnorum*, is absent. The presence of snails like *Planorbis vortex* is in full agreement with the seed evidence in suggesting plenty of aquatic vegetation.[65]

The seeds build up a colourful picture of the vegetation in the ditch, with the deeper water aquatics, such as water crowfoot (*Ranunculus* S. *Batrachium*) and pondweed (*Potamogeton* spp.) growing in the centre, only surfacing to flower. In the shallower water towards the edge would have been a dense growth of bur-reed (*Sparganium erectum*) with patches of watercress (*Rorpippa nasturtium-aquaticum*) and aquatic Umbelliferae : fool's watercress (*Apium nodiflorum*), water parsnip (*Berula erecta*) and water dropwort (*Oenanthe aquatica*) with their distinctive white flower heads. This was no ditch of temporary water with its vegetation grazed or cropped, as *Sparganium erectum* is found in or by permanent water, often slowly moving, and cannot stand grazing.[66] The watercress agrees with the molluscs in indicating that the water was moving and not stagnant.[67] The plant community living in the ditch agrees well with those given by Tansley for slowly moving rivers and may even have looked rather similar to his photographs 265 and 271 without the water-lilies.[68]

Growing on the bank of the ditch seem to have been the marsh plants and those plants which specialize in bankside habitat ; *Ranunculus sceleratus*, violet (*Viola* sp.), hemlock (*Conium maculatum*), gipsy-wort (*Lycopus europaeus*), water-plantain (*Alisma* sp.), sedges (*Carex* sp.) and stinging nettles (*Urtica dioica*). There is a scrub element not present in the earlier ditches and it is likely that in places the ditch was overhung by elder (*Sambucus nigra*) and hazel (*Corylus avellana*), with woody nightshade (*Solanum dulcamara*) underneath. There was also a tangle of blackberry (*Rubus fruticosus*) and white bryony (*Bryonia dioica*) scrambling up them.

The grassland group of plants present in the earlier ditch seems to be completely absent here. This absence may be genuine, perhaps with marsh replacing grassland, or it may be due to their seeds being swamped by the numerous seeds from plants in the ditch. The plants of disturbed ground remain and the same conclusions can be drawn from them. Many of the scrub plants may have been growing in unkempt back yards.

One interesting plant that was present is deadly nightshade (*Atropa belladonna*). It is predominantly a plant of well drained calcareous soils with some shade and a damp atmosphere, not the conditions around Alchester, although it may have been growing in the town.[69] Pliny describes a ' white mandrake ' which may have been *Atropa* that was dangerous but could be used as a sleeping draught or an anaesthetic.[70] Reid suggests that at Silchester deadly nightshade may have been used as a cosmetic.[71]

As before, the insects are in close agreement with plants. There is a good number of water beetles and those that have a specialized habitat, *Hygrotus inaequalis* and *Hydrobius fuscipes*, need still or only just moving water with plant detritus on the bottom, the sort of conditions there would be expected towards the edge of the ditch.[72] As with the seeds, the grassland element, in the form of dung beetles, is much reduced. There is also good agreement between the phytophagous beetles and the plants with *Donacia vulgaris* which feeds on *Sparganium* and *Prasocuris phellandrii*, described by Mohr as feeding on various

[64] A. E. Boycott, ' The Habitats of Fresh Water Mollusca in Britain ', *J. An. Ecol.*, 5 (1936), 139–40, 143.
[65] *Ibid.*, 144.
[66] C. D. K. Cook, ' Sparganium erectum ', *J. Ecol.*, 50 (1962), 248, 251.
[67] H. W. Howard and A. G. Lyon, ' Nasturtium officinale ', *J. Ecol.*, 40 (1952), 230.
[68] A. G. Tansley, *The British Isles and their Vegetation*, II (1965), 628–631, Photo 265, p. 583, Photo 271, p. 677.
[69] R. W. Butcher, ' Atropa belladonna ', *J. Ecol.*, 34 (1947), 345–7.
[70] Pliny, *Natural History*, XXV, xciv.
[71] C. Reid, ' Excavations on the site of the Roman city at Silchester, Hants, in 1902 ', *Archaeologia*, 58 part 2 (1903), 427.
[72] F. Balfour-Browne, *British Water Beetles*, I, The Ray Soc. Lond. (1940), 87–88.

aquatic Umbelliferae and Joy on *Oenanthe aquatica*, water dropwort, which was present.[73]

There is one species of beetle worthy of special mention, *Hydrophilus piceus*, the great silver beetle. It is represented by a right elytron, part of a pronotum, various bits of legs and a left larval mandible (FIG. 9, 6). The larval mandible means that this water beetle was breeding in the ditch, where the larvae would certainly have plenty of their food, snails, mostly *Lymnaea* spp. It does not now live in Oxfordshire, there being a breeding population in the Somerset levels whilst immigration from the continent is said to maintain the populations in Kent and Essex.[74]

CONCLUSIONS

This work has given much useful information about the environs of Alchester. The Roman town was built on the site of a marsh and one of the most numerous snails living in that marsh, *Lymnaea truncatula*, carries the liver fluke *Fasciola hepatica* which is so injurious, especially to sheep, and also to cattle.[75] The late 1st-century ditches did not have permanent water in them and were set in cut or grazed grassland. The late Roman ditch around the town, however, was a true moat with permanent slowly flowing water, with a mass of ungrazed vegetation at its sides. A moat around a Roman town is by no means unique. At Dorchester the list of molluscs from the outer ditch suggests that it certainly held permanent water, as also perhaps the inner one.[76] A disturbed ground element is present in the plants from both Roman phases and is likely to represent the gardens and disturbed ground in the town itself. Information about the habits of the people of Alchester is given by the seeds of coriander and perhaps deadly nightshade.

The environmental evidence can be taken further. It is strange that Alchester should be sited on a marsh when there is high ground nearby at Bicester. It is also curious that the Roman road from Dorchester should cross the marsh of Otmoor when it could easily have skirted it. Does this mean that the Romans drained Otmoor, thus giving the drier conditions indicated by the late 1st-century ditch, layer 138? The one inch O.S. map shows that the River Ray leaves Otmoor through a small gap in the land above 200 feet O.D. (at S.P. 549 142) which otherwise tends to surround Otmoor.[77] If this cut were man-made it would have drained not only Otmoor but further up the course of the River Ray. Certainly the Romans took on much larger drainage schemes in the fens of East Anglia and they were under way by an early date.[78]

Between the late 1st and the 3rd/4th centuries there must have been a local rise in the water table, for although both sets of ditches were the same depth, there was only permanent water in the later one. It would be tempting to suggest that there was a general rise occurring which resulted in the rapid build-up of ground level in the town in an attempt to combat it and eventual desertion. The effect, however, could be local and perhaps due to the damming of the ditch for a millpool or fishpond.

The two rare southern species of beetle might suggest that the climate was warmer during the Roman period at Alchester than at present. Growing in the late Roman ditch in which *Hydrophilus piceus* was living was hornwort (*Ceratophyllum demursum*), a plant which now requires warm summers to set seed whereas its fruits are an abundant fossil from the Boreal.[79] There is another archaeological record of *H. piceus* living outside its modern range, found in a late Iron Age context in a ditch with a similar molluscan population to Alchester in East Yorkshire.[80] Other factors seem to have caused this beetle's decline though, and the fruit of hornwort could be the result of one hot summer

[73] K. H. Mohr in H. Freude, K. W. Harde and G. A. Lohse, *Die Käfer Mitteleuropas*, 9 Krefeld (1966), 179. N. H. Joy, *A Practical Handbook of British Beetles* (1932), 391.

[74] F. Balfour-Browne, *British Water Beetles*, III, The Ray Soc. Lond. (1958), 3–14.

[75] A. E. Boycott, 'The Habitats of Freshwater Mollusca in Britain', *J. An. Ecol.*, 5 (1936), 143.

[76] A. S. Kennard, 'Mollusca', in A. H. A. Hogg and C. E. Stevens, 'The Defences of Roman Dorchester', *Oxoniensia*, II (1937), 70–71.

[77] Ordnance Survey, Banbury, Sheet 145 one inch Map (1968).

[78] S. S. Frere, *Britannia* (1967), 275–7.

[79] H. Godwin, *The History of the British Flora* (1956), 325.

[80] D. E. Kimmins in M. Wheeler, *The Stanwick Fortifications*, Society of Antiquaries, Lond. (1954), 58.

out of many cold. The range of *H. piceus* declined in Britain during the 19th century,[81] and has also suffered a recent decline in Germany.[82] It may be that a successful breeding population requires a large area of undisturbed marshland, and drainage schemes caused their decline. A decline in the weevil *Apion urticarium* can hardly be due to disappearance of habitat though. According to Fowler it feeds on both kinds of British stinging nettle, *Urtica urens* and *Urtica dioica*.[83] Another nettle feeder, the bug *Heterogaster urticae*, has been found in a Viking context at York where it no longer occurs.[84]

Finally, this site has demonstrated the value of an integrated approach to its environmental archaeology, not just a study of one group of preserved organisms. It is also important to be able to discuss the different groups together, in a single report. At Alchester the seeds, molluscs and insects have each been able to illustrate different aspects of the environment and have been in full agreement, but they need not always agree.

An even better picture of the environment could have been obtained if finer sieves had been used for the seeds, larger samples taken for the insects, and pollen analysis undertaken.

APPENDIX 3

THE STONE SAMPLES. By H. P. POWELL

Sample 1 (a) Coarse, quartz-grit, composed of poorly-rounded (many crystal faces can be seen), and poorly-sorted grains (a few pebbles are as much as 6 mm. long). About ?3% pink and white feldspar and about ?20% interstitial clay minerals. ? Millstone Grit.

(b) Similar specimen but with a higher proportion of larger pebbles. These reach up to 16 mm. long. Also, less feldspar and clay. ? Millstone Grit, or bed of similar lithology from other formation, e.g. Old Red Sandstone.

(c) Fragment of deeply weathered flint or chert.

Sample 2 Tinpure, clayey, coarse-grained limestone composed of ooliths and bands of shell-fragments in a matrix of dark finely crystalline calcite. A Middle Jurassic Rock, probably Forest Marble from Oxfordshire.

Sample 3 Highly vesicular volcanic rock. Intermediate (Dacite) to acidic (rhyolite) in composition. A sort of pumice. Source?

The Society acknowledges with gratitude a grant from the Department of the Environment for this paper.

[81] F. Balfour-Browne, *British Water Beetles* III, The Ray Soc. Lond. (1958), 3–14.

[82] A. Horion, *Faunistik Der Mitteleuropäischen Käfer*, II, Frankfurt (1949), 71. H. Freude, K. W. Harde, and G. H. Lohse, *Die Käfer Mitteleuropas*, 3 Krefeld (1971), 155.

[83] W. W. Fowler, *The Coleoptea of the British Islands* V (1891), 142.

[84] P. C. Buckland, ' Archaeology and Environment in York ', *J. Archaeological Science*, I (1974), 313.