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**Invertebrate remains from a burned-out reconstructed Anglo-Saxon  
building at West Stow, Suffolk**

by

Harry Kenward

Centre for Human Palaeoecology, Department of Archaeology, University of York, The  
King's Manor, York YO1 7EP

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Harry Kenward

c/o Department of Archaeology, University of York, The King's Manor, York YO1 7EP  
Email: [hkk1@york.ac.uk](mailto:hkk1@york.ac.uk)

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## **Abstract**

Carbonised ('charred'), apparently heat-altered ('toasted') and unaltered insect remains from a series of samples from a burned-out reconstruction of an Anglo-Saxon house and West Stow, Suffolk, have been recorded. Many in each category were identifiable to species, though the degree of alteration of carbonised remains was variable, a substantial proportion being too modified for close identification. While 'domestic' insects, and others likely to have invaded the building, were present, there were also considerable numbers of beetles and bugs which must have originated outside the structure. These 'outdoor' forms were present equally in samples from within and beyond its outline.

**Key words:** Modern parallels; Anglo-Saxon houses; insects; carbonised; toasted; taphonomy; interpretation

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# **Invertebrate remains from a burned-out reconstructed Anglo-Saxon building at West Stow, Suffolk**

Harry Kenward

c/o Department of Archaeology, University of York, The King's Manor, York YO1 7EP

## **Introduction**

The archaeological site of West Stow was excavated between 1965 and 1972 under the direction of Stanley West (West 1985) in one of the first substantial investigations of an early Anglo-Saxon settlement, dated to the fifth to early eighth centuries AD. The site is now an invaluable resource for the public and researchers alike, with a series of reconstructions of Anglo-Saxon buildings in the position of original ones. One of these buildings was burned down in 2005, and the opportunity was taken to excavate and sample the debris as an analogue to archaeological remains. Samples were initially supplied to Gill Campbell, English Heritage, for botanical analysis, and during sorting for plants she recovered numerous insect and other invertebrate remains, described here. This site was regarded as a parallel to non-waterlogged archaeological sites where 'delicate' remains (*sensu* Kenward and Hall 2000) such as insects would not survive, so that carbonised material, if present, would take on a particular importance in reconstructing the human past.

A programme of pitfall trapping has already been carried out in the extant reconstructed buildings at the site (Kenward and Tipper 2008), work which, together with a study of the local insect fauna, is continuing together with David Smith (University of Birmingham). The data from this work are providing invaluable comparanda for those from the burned-out structure.

Insect and other invertebrate remains preserved by carbonisation have been found in archaeological deposits on a number of occasions, but may have been substantially under-recorded. Simple laboratory experiments have shown that carbonised beetles showing very detailed surface structure can be produced at moderate temperatures (200-400 C), and that recognisable remains may survive up to 500 C and sometimes be specifically identifiable (Kenward *et al.* 2008). This leads us to ask why more carbonised remains are not recovered from archaeological deposits. It seems possible that most such remains are destroyed during excavation and sample processing, breaking up into fragments which are too small to recognise, or which pass through the sieve meshes. The issue will be discussed in more detail elsewhere.

## **Methods**

The invertebrate remains were sorted by Gill Campbell from various fractions of the sieved residues of samples collected during the excavation. They were supplied to HK dry in glass vials. For identification they were laid out on damp filter paper and subsequently stored in IMS. Identification was carried out using the references collections held in the Department of Archaeology, and standard reference works including reliable web resources. Adult beetles and bugs were recorded fully quantitatively, other remains on a semi-quantitative scale

(counts for 1-3 individuals, 'several' for an estimate of 4-9, 'many' for 10 or more, and an order of magnitude for vary large numbers, see Kenward 1992).

## Results

Notes on the deposits from which insect remains were recovered (from information supplied by Gill Campbell) are given in the Appendix. Substantial numbers of insects were recovered. Some remains were carbonised, but many were clearly not, while a few appeared to have been heated sufficiently to have been modified, but not fully carbonised; these are referred to as 'toasted'. A substantial proportion of the carbonised remains were in good condition, not showing too much distortion, and resembling oven-carbonised specimens (Kenward *et al.* 2008 and unpublished results). Such remains were generally identifiable to genus, and often to species. On the other hand, many of the carbonised remains were very fragmentary, and most of those which consisted of more-or-less entire bodies were very fragile and had generally lost the appendages. Some of the specimens were so delicate that they broke during handling even with a soft paintbrush. A few seem to have formed 'char' and to be rather more substantial. It seems likely that these were still alive at the time of the fire, with tissues which boiled during heating and carbonisation, while the already dried-out corpses and dissociated sclerites simply carbonised.

Many identifications were straightforward, either because the remains were in excellent condition, or because they were so damaged that it would be unwise to attempt close identification. Some specimens were in good condition but lacked diagnostic characters. All of the remains of *Anobium* species are assumed to be *A. punctatum*, which is abundant in the buildings at West Stow. *Euophryum* weevils are all recorded as *E. confine*, but distinction from *E. rufum* (Broun) is very difficult in material such as this.

The full records are listed by sample in the Appendix, with minimum numbers of individuals (MNIs) based on the recovered fragments. The results are summarised for the combined assemblages in Table 1.

### *Groups from outside the building outline*

Four groups of insects were recovered from samples of burned thatch from beyond the outline of the building pit (Contexts 0073, 0076, 0085, 0107). Each was small. The first three were predominantly carbonised remains, the last mostly uncharred. The total MNI of carbonised beetles and bugs from these contexts was only seven. The identifiable taxa were a mixture of mould feeders (all typical of dryish plant material and mouldy wood and perhaps, but not necessarily, originating in the building) and 'outdoor' forms. One of the latter, the nettlebug *Heterogaster urticae*, may have entered thatch to hibernate. The uncharred insects from these samples included only four beetles, all from outdoor habitats (two ground beetles, a ladybird and a ground-living weevil).

### *Groups from within the building outline*

Samples from within the outline of the structure can be divided into three groups: those comprising primarily uncharred remains (0374, 0423, 0603, 0767, though these also gave some charred fragments); those which were predominantly carbonised, but with some uncharred remains (0651, 0726, 0761), and one (0600) which appeared to be dominated by

'toasted' insects, i.e. giving the appearance of having been heated and visibly altered to some extent, but not converted into charcoal.

#### The predominantly uncharred assemblages

Allowing for variations in assemblage size the uncharred groups can be regarded as essentially similar, with a few 'other orders' (i.e. not beetles or bugs), and assemblages of beetles dominated by outdoor forms and with only a few beetles categorised as house fauna or likely to have facultatively occupied habitats within a building. There were ground beetles (those identified being a *Calathus* species and *Syntomium ?truncatellus*), various generalist decomposers (e.g. *Megasternum obscurum*, *Cercyon analis*, *Anotylus complanatus* and *Gyrophypnus angustatus*), ground living weevils (*Otiorhynchus ovatus*, *Philopodon plagiatus*), and plant feeders (*Simplocaria semistriata*, *Subcoccinella vigintiquatuor punctata*, *Crepidodera* sp., *Sitona lineatus*, *Ceutorhynchus* sp., *?Gymnetron* sp.). There were in addition some dung beetles (*Aphodius* and *Onthophagus* sp.), which at this site can certainly be regarded as of outdoor origin. A few taxa almost certainly originated within the building: the woodworm beetle *Anobium punctatum*, the wood-boring weevil *Euophryum confine*, and *Stegobium paniceum*. The carbonised insects in these assemblages included 'outdoor' insects, though these, like the uncharred examples, had in all probability simply strayed into the structure before its destruction. Charred remains of beetles likely to have lived in the structure included *Laemostenus terricola*, *Anobium punctatum*, and *Euophryum confine*.

#### The 'toasted' remains

The assemblage of apparently 'toasted' insects - from Context 0600 - was again dominated by outdoor forms, beetles (*Oulema melanopa*, *Chaetocnema arida* group, *?Coeliodes* sp. and *Cidnorhinus quadrimaculatus*). There were some beetles which probably originated in the structure, namely *Mycetaea hirta* and *Euophryum confine*. The few charred insects included plant-feeding bugs forms such as the cuckoo-spit froghopper *Philaenus spumarius* and the nettlebug *Heterogaster urticae*, and some 'outdoor' beetles, as well as two *Euophrum confine*. None of the fauna would be surprising within a building, bearing in mind the small numbers recovered and the mobility of most insects.

#### The carbonised remains

The records of carbonised remains are combined in Table 2. Viewed subjectively the carbonised groups differed little from the uncharred and toasted ones, but because the assemblage from Context 0761 was very much the largest from the site, the range of taxa was greater. There were various ground beetles, mostly single individuals, but at least two *Nebria brevicollis* and four *Calathus fuscipes*, both common in disturbed environments and caught in pitfall traps in the buildings as West Stow. All the remaining carabs might be found in open areas, providing there was some plant litter for *Dromius linearis* to shelter in. Plant-associated beetles included the chafer *Phyllopertha horticola*, the click beetle *Prosternon tessellatum*, and the weevils *Sitona ?lineatus* and *?Gymnetron*. Another weevil, *Strophosomus ?melanogrammus* (almost certainly this species) is most commonly found on shrubs and trees.

There were some species found in decomposing matter, some normally in fairly foul conditions (*Gyrophypnus ?angustatus*, *Coprophilus striatulus*, though the latter appears to be part of a subterranean community in archaeological assemblages, Carrott and Kenward 2001),

and some in drier matter and mouldy wood (*Cryptophagus* spp, *Aridius nodifer*, *Lathridius minutus* group, *Corticaria* spp.). The second group probably lived within the building, as probably did *Ptinus* sp., probably the common *P. fur*. The record of *Tribolium castaneum* is notable as it is a stored products beetle. It may have been brought in some foodstuffs, or possibly in cereal that retaining caryopses which had been previously stored for some time (two other 'grain pests', *Sitophilus granarius* (Linnaeus) and *Cryptolestes ferrugineus* (Stephens) have been caught in pitfall traps at West Stow and are thought to have originated in this way). Also likely to have lived in the structure were some of the wood-borers: *Anobium punctatum*, *Euophryum confine*, *?Gracilia minuta*, and *Phymatodes* sp.). There were, in addition, fragments of timber beetles much more likely to have originated in rotting wood further afield (the small stag beetle *Sinodendron cylindricum*, *Rhizophagus* sp., and *?Trixagus* sp.). In contrast, the bark beetle *Dryocoetes villosus* may have been brought under the bark of the timbers used to construct the building, or have invaded them after construction. Heat-altered remains were rare in the assemblage from Context 0761, the beetles being represented only by two which were possibly 'toasted'.

### **An interpretation of the charred remains**

This investigation had two main objectives; to establish whether charred invertebrate, especially insect, remains are likely to have entered deposits in the past, and to determine whether such fossils would be useful in interpreting living conditions, activity, and resources. To this end, the following interpretation of the remains is offered, and compared with the known information.

The carbonised remains are the only ones at all likely to have survived archaeologically on a site in freely draining sand. Those from within the building outline were very mixed ecologically, with abundant outdoor forms as well as some species likely to have originated within a structure. The range of strong synanthropes was very limited, only one (*Tribolium castaneum*) being unlikely to occur in natural habitats. (*Laemostenus terricola* is best known as a synanthrope, but can be found in the open, even as far north as Yorkshire, as is active at quite low temperatures, Author unpublished.) A number of the recorded taxa are common in low-grade buildings, notably the woodworm *Anobium punctatum*, which was present in moderate numbers, and *Lathridius minutus* group, *Corticaria* spp. and *Cryptophagus* spp., but it would be foolish to divine the use of a structure on the basis of small numbers of such fauna. The remains in the burned building were much less characteristic of structures than those recorded from pitfall traps by Kenward and Tipper (2008). The safest interpretation from the charred remains would be that it was the fauna of a semi-natural, disturbed, environment with stray synanthropes or dumping from nearby occupation. The non-charred and 'toasted' remains, which might survive in a waterlogged version of the deposit, would have given a similar reconstruction.

Two species have been ignored in the reconstruction as they are recently imported aliens: *Aridius nodifer* and *Euophryum confine*.

The fauna of the series of reconstructed buildings at West Stow have previously been investigated by pitfall trapping (Kenward and Tipper 2008; data for a further year's trapping are yet to be published, Kenward and Smith forthcoming). Comparison can usefully be made with these records from the pitfall traps within the buildings, although it will be necessary to complete recording of the second phase of trapping before this can be finalised. Pitfall traps

are selective in their representation of taxa, of course, favouring those which are more mobile and those which are less able to prevent themselves falling off vertical edges. Nevertheless, and where comparable levels of identification were feasible, most of the taxa for which more than one or two individuals were recorded from pitfalls were found charred and *vice versa*. The alien introduction *Lithostygnus serripennis*, abundant in the pitfalls, was not found charred, but it is a very small beetle whose remains might easily be overlooked; alternatively it may have invaded the remaining buildings subsequent to the fire. Those smaller species ('vs' and 's' in Table 2) which were abundant in the traps were generally considerably rarer in the charred assemblage, *Lathridius minutus* group and *Cryptophagus* species especially being surprisingly poorly represented. Taxa with a length above 2mm were generally about equally represented, within the expected variation between structures. Regarding the charred material, and allowing for mobility and problems of identification, it appears that these have probably provided a useful, if somewhat skewed, representation of the fauna, but that the fauna was dominated by outdoor forms.

Obviously insects must have been carbonised in various ways in the past, not least in mishaps similar to that at West Stow as well as in everyday fires in the past. They should thus survive in non-waterlogged archaeological deposits, yet (with the exception of a few records from bulks of burned grain) they have not been recovered from them. This *may* be because they are destroyed in the ground over time, being very fragile, but this surely will not always have happened. Perhaps they are broken into fine fragments during excavation, as sediments are stressed by machinery, excavators' feet, the shock and shears of sediment removal. Any recognisable fossils which survive this may be destroyed during sieving ('flotation'), being reduced to fragments which are overlooked or small enough to pass through sieve meshes. Only very careful excavation and processing of samples from sites with no record of compression from machinery will resolve this.

## Acknowledgements

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Table 1. Complete list of taxa from the samples from the burned-out building at West Stow. The data from all the sub-samples have been combined. Numbers are summed MNIs, including semiquantitative estimates: ‘many’ converted to 15, ‘several’ to 6 (see text).

Key: *c* - charred (some probably not fully carbonised); *f* - fresh (clearly uncharred and with no evidence of heating); *l* - length in mm (given for adult beetles and bugs, from Freude et al. 1964-1983 and Southwood and Leston 1959); *pf* - recorded in pitfall traps within buildings at West Stow (+ - present; ++ - at least moderately abundant; dash - not recorded in those traps so far recorded (not all data from the unpublished second study have been taken into account); *t* - ‘toasted’ (apparently heated but clearly not fully carbonised).

Numbers formatted e.g. ‘1?’ indicate uncertainty as to state; ‘spp. indet.’ indicates may include taxa listed above. Size categories: *vs* - very small, >1-2 mm; *small*, *s* - >2-5 mm; *medium-sized*, *m* - >5-10 mm; *large*, *l* - >10 mm. For some higher taxa, the size refers to the type(s) represented by the recovered remains, and for some species the extremes of length have been ignored. In some cases species only recorded in pitfall traps have been subsumed in higher categories (e.g. *Harpalus* ?*anxius* (Duftschmidt) within *Harpalus* spp.).

Taxon	c	t	f	pf	l
? <i>Heterodera</i> sp. (cysts)	1	0	51	-	-
<i>Oligochaeta</i> spp. (egg capsules)	1	6	21	-	-
<i>Isopoda</i> sp.	1	0	0	++	-
? <i>Isopoda</i> sp. (faecal pellets)	15	0	0	-	-
<i>Diplopoda</i> sp.	1	1	3	+	-
<i>Forficula auricularia</i> Linnaeus	2	6	2	+	-
<i>Heterogaster urticae</i> (Fabricius)	4	0	0	-	m
<i>Lygaeidae</i> sp.	0	1	1	-	s-m
<i>Empicoris</i> sp. (nymph)	0	0	0	+	-
<i>Heteroptera</i> sp. (nymph)	0	0	1	-	-
<i>Philaenus spumarius</i> (Linnaeus)	1	0	0	-	s
<i>Cicadellidae</i> sp.	1	0	1	+	vs-s
<i>Aphidoidea</i> spp.	0	0	0	++	-
<i>Lepidoptera</i> sp. (larva)	2	0	0	+	-
<i>Lepidoptera</i> sp. (pupa)	1	0	0	+	-
<i>Bibionidae</i> sp.	0	0	1	-	-
<i>Diptera</i> sp. (adult)	9	1	31	++	-
<i>Diptera</i> sp. (larva)	1	0	0	+	-
<i>Diptera</i> sp. (puparium)	5?1	6	29	-	-
<i>Siphonaptera</i> sp.	1	0	0	+	-
<i>Cychnus rostratus</i> (Linnaeus)	0	0	0	+	l
<i>Leistus</i> sp.	1	0	0	-	m
<i>Nebria brevicollis</i> (Fabricius)	2	0	0	+	l
<i>Pterostichus melanarius</i> (Illiger)	0	0	0	+	l
<i>Calathus fuscipes</i> (Goeze)	4	0	0	+	m-l
<i>Calathus</i> sp. (not <i>fuscipes</i> )	1	0	2	+	m-l
<i>Laemostenus terricola</i> (Herbst)	1	0	0	+	l
<i>Amara aenea</i> (Degeer)	0	0	1	-	m
<i>Amara tibialis</i> (Paykull)	1	0	0	-	m
<i>Amara</i> (s. lat.) sp?p. indet.	1	1	?1	+	m
<i>Harpalus</i> spp.	3	0	0	++	m-l
? <i>Acupalpus</i> sp.	1	0	0	-	s
<i>Dromius linearis</i> (Olivier)	1	0	0	-	s
<i>Syntomus</i> ( <i>Metabletus</i> ) ? <i>truncatellus</i> (Linnaeus)	0	0	1	-	s

<i>Syntomus (Metabletus) foveatus</i> (Fourcroy)	0	0	1	-	s
Carabidae spp.	2	0	3	-	s-l
?Hydroporinae sp.	1	0	0	-	s
<i>Cercyon analis</i> (Paykull)	0	0	1	-	s
<i>Cercyon</i> sp.	0	0	1	-	s
<i>Megasternum obscurum</i> (Marsham)	0	2	7	+	s
<i>Carcinops pumilio</i> (Erichson)	0	0	0	+	s
<i>Kissister minima</i> (Aubé)	1	0	0	+	vs
<i>Nargus</i> sp.	0	0	0	+	s
<i>Catops</i> spp.	6	0	0	+	s
<i>Micropeplus ?staphylinoides</i> (Marsham)	1	0	0	-	s
<i>Proteinus ovalis</i> Stephens	0	0	0	+	s
<i>Omalius rivulare</i> (Paykull)	0	0	0	+	s
<i>Dropephylla vilis</i> (Erichson)	0	0	0	+	s
<i>Coprophilus striatulus</i> (Fabricius)	1	0	0	+	m
<i>Bledius</i> sp?p.	0	0	2	-	s-m
<i>Anotylus complanatus</i> (Erichson)	0	0	1	-	s
<i>Anotylus sculpturatus</i> group	0	1	0	-	s
<i>Rugilus rufipes</i> Germar	0	0	0	+	m
<i>Othius</i> sp.	0	0	1	-	s
<i>Gyrophypnus ?angustatus</i> Stephens	6	0	1	-	m
<i>Xantholinus</i> sp.	2	3	1	+	m
<i>Staphylinus ater</i> Gravenhorst	0	0	0	+	l
<i>Philonthus</i> sp.	0	0	1	-	m
<i>Quedius</i> spp.	0	0	0	+	m-l
Staphylininae sp.	0	0	1	+	m
<i>Tachyporus</i> spp.	2	0	2	-	s
<i>Sepedophilus ?lusitanicus</i> Hammond	0	0	0	+	s
<i>Crataraea suturalis</i> (Mannerheim)	0	0	0	+	s
Aleocharinae spp.	1	0	1	++	s
Pselaphidae sp.	0	0	1	+	vs
<i>Sinodendron cylindricum</i> (Linnaeus)	1	0	0	-	l
<i>Geotrupes</i> sp.	1	0	0	-	l
<i>Aphodius</i> spp.	4	0	2	-	m
<i>Aphodius sphacelatus</i> (Panzer)	0	0	1	-	m-l
<i>Onthophagus</i> sp.	0	0	1	-	m
<i>Phyllopertha horticola</i> (Linnaeus)	1	0	0	-	m-l
<i>Simpliocaria semistriata</i> (Fabricius)	0	0	1	-	s
<i>Prosternon tessellatum</i> (Linnaeus)	1	0	0	-	l
<i>Agrypnus murinus</i> (larva)	0	0	1	-	-
Elateridae sp.	?1	1	0	-	m
<i>Anthrenus</i> sp.	1	0	0	-	s
<i>Clambus pubescens</i> Redtenbacher	0	0	0	+	vs
<i>Anobium punctatum</i> (Degeer)	11	0	2	++	s
<i>Stegobium paniceum</i> (Linnaeus)	0	0	1	-	s
<i>Ptinus fur</i> (Linnaeus)	?1	0	1	++	s
<i>Carpophilus</i> sp.	1	0	0	-	s
<i>Meligethes</i> sp.	0	0	1	-	s
<i>Epurea</i> sp.	1	0	0	-	s
? <i>Triaxagus</i> sp.	1	0	0	-	s
<i>Rhizophagus</i> sp.	0	1	0	-	s
<i>Cryptophagus</i> spp.	3	0	0	++	vs-s
Phalacridae sp.	1	0	0	-	s
<i>Subcoccinella vigintiquattuorpunctata</i> (Linnaeus)	0	0	1	-	s
<i>Tythaspis (Micraspis) sedecimpunctata</i> (Linnaeus)	0	0	1	-	s
Coccinellidae sp.	?1	0	1	-	s
<i>Mycetaea hirta</i> (Marsham)	0	1	0	-	s

<i>Aridius nodifer</i> (Westwood)	2	0	0	++	vs
<i>Dienerella elongata</i> (Curtis)	0	0	0	+	vs
<i>Lathridius minutus</i> group	2	0	0	++	vs-s
<i>Lithostygnus serripennis</i> Broun	0	0	0	++	vs
<i>Corticaria ?elongata</i> (Gyllenhal)	2	0	0	-	vs
<i>Corticaria ?punctulata</i> Marsham	1	0	1	-	s
<i>Corticaria</i> sp.	1	0	0	+	s
Lathridiidae sp.	1	0	0	-	s
<i>Tribolium castaneum</i> (Herbst)	1	0	0	-	s
<i>Anthicus floralis</i> (Linnaeus)	2	0	0	-	s
? <i>Gracilia minuta</i> (Fabricius)	0	0	0	-	s-m
<i>Phymatodes</i> sp.	1	0	0	-	m-l
<i>Oulema melanopa</i> (Linnaeus)	0	1	0	-	s
<i>Crepidodera</i> sp.	0	0	1	-	s
<i>Phyllotreta</i> sp.	0	0	1	-	s
<i>Chaetocnema arida</i> group	0	1	0	+	s
<i>Otiorhynchus ovatus</i> (Linnaeus)	1?1	0	2	-	m
<i>Philopodon plagiatus</i> (Schaller)	1	0	4	-	m
<i>Strophosomus ?melanogrammus</i> (Forster)	1	0	0	-	s-m
<i>Sitona lineatus</i> (Linnaeus)	?2	0	1	-	s
<i>Sitona</i> sp. indet.	1	0	0	-	s
<i>Euophryum confine</i> (Broun)	62	5	5	++	s
? <i>Coeliodes</i> sp.	0	1	0	-	s
<i>Cidnorhinus quadrimaculatus</i> (Linnaeus)	0	1	0	-	s
<i>Ceutorhynchus</i> sp.	0	0	1	-	s
? <i>Mecinus</i> sp.	0	0	1	-	s
? <i>Gymnetron</i> sp.	1	0	1	-	s
Curculionidae sp.	3	0	0	-	s
<i>Dryocoetes villosus</i> (Fabricius)	2	0	0	-	s
Coleoptera spp.	8	0	2	-	-
Coleoptera sp. indet. (larva)	2	0	2	-	-
Parasitica sp.	2	0	0	-	-
?Chrysopidae sp.	0	0	0	-	-
?Apoidea sp.	0	0	1	-	-
Aculeata sp.	0	0	2	-	-
Formicidae sp.	10	1	8	-	-
Hymenoptera sp.	3	0	4	-	-
Insecta sp.	1	0	15	-	-
Insecta sp. (cocoon)	0	1	5	-	-
Insecta sp. (larva)	5	0	1	-	-
Insecta sp. (pupa)	2	0	0	-	-
Acarina spp.	31	1	14	-	-
Aranae sp.	2	1	2	-	-
Aranae sp. (ecdysed cuticle)	0	0	1	-	-
Arthropoda sp.	0	0	1	-	-
Gastropoda spp.	6	5	0	-	-

Table 2. Records of charred invertebrate remains from the burned-out reconstructed building at West Stow. Key: MNI - minimum number of individuals based on the recovered remains; m - 'many'; s - 'several' (see text).

Taxon	MNI
? <i>Heterodera</i> sp. (egg capsule)	1
<i>Oligochaeta</i> sp. (egg capsule)	1
<i>Isopoda</i> sp.	1
? <i>Isopoda</i> (faecal pellets)	m
<i>Diplopoda</i> sp.	1
<i>Forficula auricularia</i>	2
<i>Heterogaster urticae</i>	4
<i>Philaenus spumarius</i>	1
<i>Cicadellidae</i> sp.	1
<i>Lepidoptera</i> sp. (pupa)	1
<i>Lepidoptera</i> sp. (larva)	2
<i>Diptera</i> sp. (puparium)	s
<i>Diptera</i> sp. (larva)	1
<i>Diptera</i> sp. (adult)	s
<i>Siphonaptera</i> sp.	1
<i>Nebria brevicollis</i>	2
<i>Leistus</i> sp.	1
<i>Laemostenus terricola</i>	1
<i>Calathus fuscipes</i>	4
<i>Calathus</i> sp.	1
<i>Amara</i> sp.	1
<i>Amara tibialis</i>	1
<i>Harpalus</i> spp.	3
? <i>Acupalpus</i> sp.	1
<i>Dromius linearis</i>	1
<i>Carabidae</i> sp.	2
? <i>Hydroporinae</i> sp.	1
<i>Catops</i> spp.	6
<i>Kissister minima</i>	1
<i>Micropeplus ?staphylinoides</i>	1
<i>Coprophilus striatulus</i>	1
<i>Gyrophypnus ?angustatus</i>	6
<i>Xantholinus</i> sp.	2
<i>Tachyporus</i> sp.	2
<i>Aleocharinae</i> sp.	1
<i>Sinodendron cylindricum</i>	1
<i>Geotrupes</i> sp.	1
<i>Aphodius</i> spp. A	4
<i>Phyllopertha horticola</i>	1
? <i>Elateridae</i> sp.	1
<i>Anthrenus</i> sp.	1
<i>Carpophilus</i> sp.	1
<i>Epurea</i> sp.	1
? <i>Trixagus</i> sp.	1
<i>Prosternon tessellatum</i>	1
<i>Ptinus</i> sp.	1
<i>Anobium punctatum</i>	11

<i>Cryptophagus</i> spp.	3
?Coccinellidae sp.	1
Phalacridae sp.	1
<i>Aridius nodifer</i>	2
Lathridiidae sp.	1
<i>Lathridius minutus</i> group	2
<i>Corticaria ?elongata</i>	2
<i>Corticaria</i> sp.	1
<i>Corticaria ?punctulata</i>	1
<i>Anthicus floralis</i>	2
<i>Tribolium castaneum</i>	1
<i>Phymatodes</i> sp.	1
<i>Otiorhynchus ovatus</i>	1?1
<i>Philopedon plagiatus</i>	1
<i>Sitona ?lineatus</i>	2
<i>Sitona</i> sp. indet.	2
<i>Strophosomus ?melanogrammus</i>	1
<i>Euophryum confine</i>	e60
? <i>Gymnetron</i> sp.	1
Curculionidae spp.	3
<i>Dryocoetes villosus</i>	2
Coleoptera spp.	8
Coleoptera sp. (larva)	2
Parasitica sp.	2
Formicidae sp.	10
Hymenoptera spp.	3
Insecta sp.	1
Insecta sp. (larva)	3
Insecta sp. (pupa)	2
Aranae sp.	2
Acarina sp.	m
Gastropoda spp.	s

**Appendix.** Insect remains from the burned-out building at West Stow listed by sample. Key: c - 'charred' (some probably not fully carbonised); f - fresh (clearly uncharred and with no evidence of heating); t - apparently 'toasted' (clearly not fully carbonised). The data from all the sub-samples have been combined. Numbers are MNIs. Quantification: m - 'many'; s - 'several' (see text). Numbers formatted e.g. '1?' indicate uncertainty as to state.

Context	Taxon	c	t	f	Notes
0073: Outside pit, fire level, 1 litre sample of the thatch ash and charcoal from southern side of the remains (outside the wall line on the surface), to the west of the doorway.					
0073	<i>Amara aenea</i>			1	entire apart from distal segments of appendages
0073	<i>Cryptophagus</i> sp.	1			almost entire
0073	<i>Lathridius minutus</i> group	1			
0073	<i>Corticaria</i> sp.	1			
0073	Coleoptera sp.	1			
0073	Diptera sp. (adult)	s			one almost entire
0073	Acarina sp.	m			
0076: Outside pit, fire level, 1 litre sample of the thatch ash and charcoal from south-west corner of the remains preserved below charred wall-plank [67] (outside the wall line on the surface). The thatch ash showed a much higher level of preservation where it had been protected from the element.					
0076	Diptera sp. (adult)	3			** check were charred!
0076	Lathridiidae sp.	1			** do
0085: Outside pit, fire level, 1 litre sample of the thatch ash and charcoal from south-east corner of the remains (outside the wall line on the surface).					
0085	<i>Heterogaster urticae</i>	1			
0085	Diptera sp. (larva)	1			
0085	Diptera sp. (puparium)	1			
0107: Outside pit, fire level, 1 litre sample of the thatch ash, charcoal and burnt sand from (southern) western side of the remains (outside the wall line on the surface).					
0107	<i>Forficula auricularia</i>			1	
0107	<i>Syntomus foveatus</i>			1	
0107	<i>Kissister minima</i>	1			
0107	<i>Tytthaspis (Micraspis) sedecimpunctata</i>			1	
0107	<i>Philopodon plagiatus</i>			1	
0107	Formicidae sp.			1	
0107	Hymenoptera sp.			1	
0107	Insecta sp.	1			

Context	Taxon	c	t	f	Notes
0107	Acarina sp.			2	
0374: SW, fire/post fire, Side collapse in SW quadrant. 20 litre environmental sample.					
0374	?Heterodera sp. (cysts)			m	
0374	Oligochaeta spp. (egg capsules)			m	more than one kind
0374	Diplopoda sp.			1	
0374	Dermaptera sp.			1	
0374	Heteroptera sp. (nymph)			1	
0374	Cicadellidae sp.	1			
0374	Diptera sp. (adult)			s	
0374	Diptera sp. (puparium)	1		s	
0374	?Amara sp.			1	
0374	<i>Calathus</i> sp.	1		1	
0374	<i>Syntomus ?truncatellus</i>			1	
0374	<i>Megasternum obscurum</i>			4	
0374	<i>Cercyon analis</i>			1	
0374	<i>Anotylus complanatus</i>			1	
0374	<i>Bledius</i> sp?p.			2	one larger, one smaller
0374	<i>Stenus</i> sp.			1	
0374	<i>Othius</i> sp.			1	
0374	<i>Gyrohypnus ?angustus</i>			1	
0374	<i>Xantholinus</i> sp.			1	
0374	<i>Tachyporus</i> sp. A			1	
0374	<i>Tachyporus</i> sp. B			1	
0374	Aleocharinae sp.			1	
0374	<i>Aphodius</i> sp.			1	
0374	<i>Onthophagus</i> sp.			1	
0374	<i>Meligethes</i> sp.			1	
0374	<i>Simplocaria semistriata</i>			1	
0374	<i>Anobium punctatum</i>	2		2	
0374	<i>Corticaria ?pubescens</i>			1	
0374	<i>Crepidodera</i> sp.			1	
0374	<i>Otiorhynchus ovatus</i>			1	

Context	Taxon	c	t	f	Notes
0374	<i>Philopodon plagiatus</i>			1	
0374	<i>Sitona lineatus</i>			1	
0374	<i>Sitona</i> sp. indet.	1			
0374	<i>Euophryum confine</i>	2		2	
0374	<i>Ceutorhynchus</i> sp.			1	
0374	? <i>Gymnetron</i> sp.			1	
0374	Coleoptera sp.	1			
0374	Coleoptera sp. (larva)			2	
0374	Formicidae sp.			2	
0374	Hymenoptera sp.	1		2	
0374	Insecta sp. (larva)	1			
0374	Insecta sp. (cocoon)			1	sand-coated
0374	Acarina spp.			s	
0374	Gastropoda sp.		3?		
0423: NE, fire/post fire, Mixed collapsed orange and yellow burnt sand (with charcoal fragments) layer covering entire area of NE quadrant (containing sieved finds). Appears to be the last layer of collapse in the NE quadrant. Overlies [603].					
0423	Oligochaeta sp. (egg capsules)			s	
0423	Diptera sp. (adult)			m	two kinds
0423	Diptera sp. (puparium)			3	
0423	Carabidae sp. A			1	
0423	Carabidae sp. B			1	cf <i>Harpalus</i> , <i>Amara</i>
0423	Pselaphidae sp.			1	
0423	<i>Geotrupes</i> sp.	1			
0423	<i>Aphodius</i> sp.			1	cf <i>granarius</i>
0423	<i>Subcoccinella vigintiquatuorpunctata</i>			1	
0423	<i>Phyllotreta</i> sp.			1	
0423	<i>Otiorhynchus ovatus</i>	1			
0423	<i>Philopodon plagiatus</i>	1		2	
0423	<i>Euophryum confine</i>			2	
0423	? <i>Mecinus</i> sp.			1	
0423	Formicidae sp.			2	



Context	Taxon	c	t	f	Notes
0423	Hymenoptera sp.	1		1	
0423	Insecta sp. (cocoon)			3	sand-coated; one contained a hymenopteran
0423	Aranae sp.			1	
0423	Acarina sp.	3		1	
0600: NE, fire/post fire, Dark brown (burnt) sand layer below [423] and above [603] collapse, NE quadrant. Sampled. Not visible in section.					
0600	? <i>Heterodera</i> sp. (cyst)	1			
0600	<i>Oligochaeta</i> sp. (egg capsule)	1	s	1	
0600	<i>Forficula auricularia</i>		1		
0600	<i>Heterogaster urticae</i>	1			entire apart from wings and appendages
0600	Lygaeidae sp.		1		
0600	<i>Philaenus spumarius</i>	1			
0600	Dipera sp. (adult)		1		
0600	Diptera sp. (puparium)		s	1	
0600	<i>Amara</i> sp.		1		
0600	<i>Harpalus</i> sp.	1			
0600	<i>Megasternum obscurum</i>		2		
0600	<i>Anotylus sculpturatus</i> group		1		
0600	<i>Xantholinus</i> sp.		2		
0600	Elateridae sp.		1		
0600	<i>Mycetaea hirta</i>		1		
0600	<i>Oulema melanopa</i>		1		
0600	<i>Chaetocnema arida</i> group		1		
0600	<i>Euophryum confine</i>	2	5		one entire minus appendages
0600	? <i>Coeliodes</i> sp.		1		
0600	<i>Cidnorhinus quadrimaculatus</i>		1		
0600	Curculionidae sp.	1			
0600	Coleoptera sp.	1			
0600	Formicidae sp.		1		
0600	Insecta sp. (cocoon)		1	1	
0600	Acarina sp.		1		
0603: NE, fire, Mid brown sand layer under [600], in NE quadrant, largely unburnt. Appears to have collapsed in from outside the cellar lining (backfill around the original lined cellar) after the collapse of the					

Context	Taxon	c	t	f	Notes
cellar lining. Note that [603] refers to both the collapsed backfill and also the in situ backfill. Sampled. Same as [868] in SW quad. But note that [868] refers only to in situ unburnt backfill material behind the plank lining while [559] refers to the collapsed unburnt backfill. Same as [980]?					
0603	? <i>Heterodera</i> sp. (cyst)			m	
0603	<i>Oligochaeta</i> sp. (egg capsule)			s	
0603	Diptera sp. (adult)			2	more than one type
0603	Diptera sp. (puparium)			s	more than one type
0603	<i>Calathus</i> sp.			1	
0603	Carabidae sp.			1	
0603	<i>Cercyon</i> sp.			1	
0603	<i>Megasternum obscurum</i>			3	
0603	<i>Stenus</i> sp.			1	
0603	<i>Philonthus</i> sp.			1	
0603	Staphylininae sp.			1	
0603	<i>Aphodius sphaelatus</i>			1	
0603	<i>Agrypnus murinus</i> (larva)			1	
0603	<i>Ptinus fur</i>			1	
0603	Coccinellidae sp.			1	
0603	<i>Otiorhynchus ovatus</i>			1	
0603	<i>Euophryum confine</i>	1		1	
0603	Coleoptera sp.			1	
0603	Aculeata sp.			1	
0603	Insecta sp. (cocoon)			1	
0603	Insecta sp.			m	unidentifiable cuticle fragments
0603	Acarina sp.			2	
0651: NE, fire layer, Mixed orange and black burnt sand layer in NE quadrant. Same as [1015]?					
0651	<i>Heterogaster urticae</i>	1			various sclerites
0651	Cicadellidae sp.			1	forewing
0651	<i>Aphodius</i> sp.	1			part charred ra + us fragment
0651	<i>Euophryum confine</i>	2			le + hd
0651	Coleoptera sp. (larva)	1			fragments
0651	? <i>Apoidea</i> sp.			1	as
0651	Insecta sp. (larva)	1			cf Lepidoptera, Symphyta

Context	Taxon	c	t	f	Notes
0651	Acarina sp.	s		1?	
0651	Gastropoda sp.		2?		1+fragments
0726: NE, fire layer, Burnt dark brown sand under collapsed plank lining [580]/[649] and also [654], NE quadrant. Same as [1062]?					
0726	Oligochaeta sp. (egg capsule)			1	
0726	?Diptera sp. (puparium)	1			
0726	Carabidae sp.	1			
0726	<i>Euophryum confine</i>	2			
0726	Acarina sp.	1			
0726	Arthropoda sp.			1	indeterminate fragments of cuticle
0761: NE, use accumulation, 'Burnt dark brown sand layer with patches of black sand overlying it at base of pit (NE quadrant). Continues cross entire quadrant, below [766] (is this a mistake?). This layer is only thin, c. 1cm thick. Possible burning of pit base - appears to burning of silted layer rather than original excavated pit base. Contour survey done on top of this layer. Same as [808] in SW quadrant, [1184] in SE quadrant and [1187] in NW quadrant?					
0761	Isopoda sp.	1			fragments, brown and very fragile, perhaps only calcareous part of cuticle remains?
0761	Diplopoda sp.	1	1	1	
0761	<i>Forficula auricularia</i>	2			cerci
0761	<i>Heterogaster urticae</i>	1			
0761	?Chrysopidae sp.				?lacewing egg capsule stalk
0761	Lepidoptera sp. (larva)	2			almost entire
0761	Lepidoptera sp. (pupa)	1			posterior end only
0761	Siphonaptera sp.	1			entire minus appendages
0761	<i>Nebria brevicollis</i>	2			
0761	<i>Leistus</i> sp.	1			
0761	<i>Calathus fuscipes</i>	4			
0761	<i>Amara tibialis</i>	1			
0761	<i>Amara</i> sp.	1			
0761	<i>Harpalus</i> sp. A	1			
0761	<i>Harpalus</i> sp. B	1			
0761	? <i>Acupalpus</i> sp.	1			
0761	<i>Dromius linearis</i>	1			
0761	Carabidae sp.	1			fragments
0761	?Hydroporinae sp.	1			

Context	Taxon	c	t	f	Notes
0761	<i>Coprophilus striatulus</i>	1			
0761	<i>Gyrophypnus ?angustatus</i>	6			mostly heads
0761	<i>Xantholinus</i> sp.	2	1?		?toasted re
0761	<i>Tachyporus</i> sp.	2			
0761	Aleocharinae sp.	1			
0761	<i>Catops</i> spp.	6			probably two spp
0761	<i>Sinodendron cylindricum</i>	1			
0761	<i>Aphodius</i> sp. A	2			
0761	<i>Aphodius</i> sp. B	1			
0761	<i>Phyllopertha horticola</i>	1			hind tibia
0761	<i>Prosternon tessellatum</i>	1			
0761	?Elateridae sp.	1			
0761	<i>Anthrenus</i> sp.	1			entire minus appendages
0761	? <i>Trixagus</i> sp.	1			
0761	<i>Anobium punctatum</i>	9			
0761	<i>Ptinus</i> sp.	1			probably <i>P. fur</i>
0761	<i>Carpophilus</i> sp.	1			
0761	<i>Epurea</i> sp.	1			
0761	<i>Cryptophagus</i> sp. A	1			
0761	<i>Cryptophagus</i> sp. B	1			
0761	<i>Aridius nodifer</i>	2			
0761	<i>Lathridius minutus</i> group	1			
0761	<i>Corticaria ?elongata</i>	2			
0761	<i>Corticaria ?punctulata</i>	1			
0761	<i>Rhizophagus</i> sp.		1		
0761	?Coccinellidae sp.	1			
0761	Phalacridae sp.	1			
0761	<i>Anthicus floralis</i>	2			
0761	<i>Tribolium castaneum</i>	1			
0761	<i>Phymatodes</i> sp.	1			
0761	? <i>Gracilia minuta</i>				leg segments
0761	<i>Otiorhynchus ?ovatus</i>	1			fragments

Context	Taxon	c	t	f	Notes
0761	<i>Strophosomus ?melanogrammus</i>	1			
0761	<i>Sitona ?lineatus</i>	2			
0761	<i>Euophryum confine</i>	e50			many entire apart from appendages
0761	? <i>Gymnetron</i> sp.	1			
0761	Curculionidae sp.	2			scales; cf <i>Phyllobius</i> and <i>Polydrusus</i> , probably 2 spp
0761	<i>Dryocoetes villosus</i>	2			
0761	Coleoptera sp. A	1			
0761	Coleoptera sp. B	1			
0761	Coleoptera sp. C	1			
0761	Coleoptera sp. D	1			
0761	Coleoptera sp. F	1			
0761	Coleoptera sp. (larva)	1			
0761	Diptera sp. (puparium)	3			
0761	Parasitica sp.	2			
0761	Formicidae sp.	9		1	probably three spp
0761	Hymenoptera sp.	1			
0761	Insecta sp. (larva)	3		1?	1? = cuticle fragments
0761	Insecta sp. (pupa)	2			
0761	Aranae sp. (ecdysed cuticle)			1	
0761	Aranae sp.	2	1	1	fragments
0761	Acarina spp.	s			
0761	Gastropoda spp.	s			
0767: NE, fire layer, Layer of sand and ash and charcoal. Surrounds and extends below floor planks [764], [765] and [788] on eastern side of NE quadrant.					
0767	?Isopoda (faecal pellets)	m			
0767	Bibionidae sp.			1	
0767	Diptera sp. (adult)			2	
0767	<i>Laemostenus terricola</i>	1			
0767	<i>Stegobium paniceum</i>			1	very fresh, with appendages
0767	<i>Euophryum confine</i>	2			
0912: NE, use accumulation, Reddened (burnt) sand layer on base of pit in NE quadrant, directly under layer [761]. Extends across entire quadrant within area defined by cellar lining. Not planned. Same as [1195] in SE					

Context	Taxon	c	t	f	Notes
quadrant, and probably [860] in the SW quadrant.					
0912	? <i>Heterodera</i> sp. (egg capsule)			m	
0912	Oligochaeta sp. (egg capsule)			2	
0912	Diplopoda sp.			1	
0912	Lygaeidae sp.			1	
0912	Diptera sp. (adult)			s	more than one kind
0912	Diptera sp. (puparium)			2	
0912	? <i>Cercyon</i> sp.			1	
0912	<i>Micropeplus</i> ? <i>staphylinoides</i>	1			
0912	? <i>Sitona</i> sp.	1			
0912	<i>Euophryum confine</i>	1			
0912	Coleoptera sp.			1	
0912	Formicidae sp.	1		2	
0912	Aculeata sp.			1	
0912	Acarina sp.			2	