The Insect Remains

Method

Evaluation samples were extracted from distinct stratigraphic zones which could be related to the archaeology of the site as described above. 1kg sub-samples from eight contexts were processed for evaluation and gave the results as detailed below. Samples were washed through a 300µm sieve to remove any silt, and the remaining sediment was treated with paraffin and cold floated three times. Each flot was stored in ethanol and sorted under a x15 stereoscopic microscope to obtain insect remains. This is the standard technique for paraffin floatation as devised by Coope & Osborne (1968) and described by Buckland & Coope (1985). Floatation provides a sub-set which contains a larger proportion of insect remains than the original sample.

The state of insect preservation was noted and recorded in accordance with the accompanying `Scale of preservation' devised by N Whitehouse an T Roper (see end of section).

Evaluation of Samples

Context	Residue weight (dry g)	Insect preservation (see end)	Further notes on contents
3		Very poor 1	Clay daub; Bone; Burnt bone; Pot; Shell; Charcoal; Charred seeds (oats, barley, weeds); Well preserved *Sambucus* seeds; Insect preservation very poor - no id's.
16	230	Very poor 1	Clay daub; Bone; Burnt bone; Slag; Charcoal; Charred seeds (oats, barley, weeds); Well preserved *Sambucus* seeds; A few testaceous insect remains - no id's.
9	130	Very poor 1	Charred oats; Charcoal; Well preserved *Sambucus* seeds; Insect preservation very poor - no id's.
20	114	Very poor 1	Bone; Burnt bone; Charcoal; Pot; Insects fragmentary and testaceous - id's useless.
32	121	Moderate 3	Clay daub; Charcoal; Wood; Feather; Seed preservation poor to good (esp. *Sambucus*); Insect abundant, preservation poor to good - id's possible.
35	272	Poor 2	Clay daub; Very much bone; Burnt bone; Shell; Pot; Insects testaceous to reasonable - available id's not useful.
36	230	Poor 2	Bone; Pot; Shell; Charcoal; Insects testaceous to reasonable - a few id's but of no use.
ET2		Poor 2	Pot; Burnt pot; Charcoal; Evidence of very high temperatures - silver sheen on soot particles, Burnt straw residues; Insect preservation very poor to good, but rare and fragmentary, no id's.

All samples contained `glassy' concretions (0.4-4mm) which occasionally filled seed bodies, but mostly seemed to be self structuring. These may have reduced the preservation level of the seeds, and the process involved could have something to do with the poor general preservation. They may also be an indication of contemporary industry, but further analysis is

lacking. Possibly the chemicals released during the concrete capping of the site may be responsible for their creation.

One sample provided sufficiently abundant and moderately preserved insect remains to warrant further analysis. A 5 litre sample from Context 32 was processed as above. Identified remains from which are listed below, taxonomy follows Lucht (1981).

Context 32

Species list

		Count	Possible supporting environment types (see below)
COLEOPTERA			
CARABIDAE			
Clivina	sp.	1	V M
HYDROPHILIDAE			
Helophorus	*grandis* Ill. /*aequalis* Thoms.	1	E
Cercyon	spp.	8	V F Wd C E D
Cryptopleurum	*crenatum* (Kug.)	1	V E D
HISTERIDAE			
Acritus	*nigricornis* (Hoff.)	4	V H N Wd WB
PTILIIDAE			
Ptiliidae	*indet.*	4	
STAPHYLINIDAE			
Phyllodrepa	*floralis* (Payk.)	1	V H F N Wb M
Omalium	*rivulare* (Payk.)	1	V H F C
Omalium	sp.	1	
Xylodromus	*concinnus* (Marsh.)	77	G V H S N M
Carpelimus	spp.	2	
Anotylus	*rugosus* (F.)	3	S F D
Anotylus	*nitidulus* (Grav.)	1	C E D
Anotylus	*complanatus* (Er.)	1	D
Platystethus	*nitens* (Sahl.)	1	E
Platystethus	sp.	1	
Stenus	sp.	1	
Xantholinus	*linearis* (Ol.)	4	H M
Xantholinus	spp.	12	
Philonthus	sp.	1	
Aleochara	spp.	8	E
Aleocharinae	gen. indet.	18	E D
ELATERIDAE			
Agrypnus	*murinus* (L.)	1	V
CUCUJIDAE			
Oryzaephilus	*surinamensis* (L.)	1	G V H F Wb
CRYPTOPHAGIDAE			
Cryptophagus	*distinguendus Strm.*	1	G V H N M
Cryptophagus	*scutellatus Newm.*	2	G V H N Wd
C. cf.	*scutelatus*	22	
Cryptophagus	sp. (large)	6	
Atomaria	sp	3	
LATHRIDIIDAE			
Lathridius	*minutus* (L.) (group)	8	G V H F N Wb D M
Corticariinae	indet.	1	
COLYDIIDAE			
Aglenus	*brunneus* (Gyll.)	162	G V H S F D
ANOBIIDAE			
Xestobium	*rufovillosum* (Deg.)	2	F Wg Wd Wb
Anobium	*punctatum* (Deg.)	5	F Wg Wd Wb
PTINIDAE			

Ptinus	*fur* (L.)	3	G V H N Wd C
ANTHICIDAE			
Anthicus	*formicarius* (L.)	6	G V H D
SCARABAEIDAE			
Trox	*scaber* (L.)	1	N C D
Aphodius	sp.	1	
HYMENOPTERA			
FORMICIDAE			
Myrmica	sp.	1	M
CERAPHRONTIDAE			
Lagyriodes	sp.	1	M
POMPILIDAE			
Pompilidae	indet.	3	M

Key to environment types used in this report:

G = Granary V = Vegetation decaying (general) H = Hay refuse (damp) S = Straw
F = Fungi/mouldy places N = Nests/animal houses W = Wood(g=good/structural; d=decaying; b=under bark)
C = Carrion E = Wet/mud/marshy D = Dung/manure (moist) M = Meadow

Analysis

For the purpose of this report it was decided not to classify the species into distinct environmental groups, such as shown by Hall et al. (1983), as only one sample was available for interpretation. If more samples had proved of value in terms of insect remains then classification would have been considered as a useful tool, especially to study the changing insect fauna within stratigraphic continuity. However, with such a small data set, the positioning of species into mutually exclusive or broad overlapping classes would detract resolution from the data, and hence be of little use to the detailed interpretation of one sample. The method applied here is to take into account all environments that could support prolonged survival of a particular species, and to count that species into several groups representing reasonably specific habitats. The groups used do overlap and, to avoid artificially narrowing habitat ranges, the positioning of a species into a class did not mean its exclusion from any of the others. For example, *Aglenus brunneus* was included in: Dung/manure; Vegetation decaying; Hay refuse; Straw; Granary; and Fungi/mouldy places. With the species established into groups the minimum number of individuals observed for each species in each group were totalled. The percentage calculated shows the maximum possible proportion of the assemblage that each group could represent. In this way it is possible to assess the relative importance of the assemblage components, and so infer detailed environmental information.

The method may make cross comparison of samples more laborious, and the groupings in this case are undoubtedly biased towards this particular assemblage. However, as the groups are never mutually exclusive, the method allows for the addition of extra groupings to fit particular sites. It hence provides an extremely versatile and expandable framework for assemblage analysis.

Environment	**Numbers able to live within environment**		
	Species	Max. pos. no. of Individuals	max. pos. % of tot. individuals*
Granary (dryish)	8	260	68
Vegetation decaying(general)	14	286	75
Hay refuse (damp)	12	266	70

Straw	3	240	63
Fungi/mouldy places	9	202	53
Nests/animal houses	7	89	23
Wood:			
Good/structural	2	7	2
Decaying	4	22	6
under Bark (hibernation)	6	21	5
Carrion	5	14	4
Wet/marshy/mud	5	36	9
Dung/Manure (moist)	9	208	54
Meadow	6	92	24

*Total of 38 Coleopteran species and 382 individuals. See above text for a description of the classification and calculation method.

The assemblage is impressively dominated by feeders on, or occupiers of, decaying plant material and species favouring environments created by the accumulation of plant debris, such as of hay refuse. Of these species the most abundant are those favouring damp or drier, as opposed to moist or foul conditions *(*eg. *Xylodromus concinnus, Cryptophagus sp., Lathridius minutus, Aglenus brunneus),* accounting for up to 71% of the 382 individuals evident. However 208 (up to 55% of total) of these would be as likely to occur in damper conditions such as manure and barn refuse. Also several individuals which prefer damp conditions (including dung and mud) were found *(Cercyon* spp., *Anotylus* spp., and Aleocharinae*)* totalling 36 individuals (up to 10%), which, in this case at least, is unlikely to be background on an urban site.

Discussion

The overwhelming dominance of the two species *Xylodromus concinnus* (20% of individuals) and *Aglenus brunneus* (43% of individuals), along with the presence of wood boring species which are often found in good structural timbers *(Xestobium rufovillosum and Anobium punctatum)* suggest an indoor situation. Similar assemblages have frequently been recorded in `indoor' samples from York (see Hall et al., 1983), *X concinnus* and *A brunneus* being 'typical' archaeological York species (Kenward, 1975). The assemblage does not follow the pattern of the more multimodal lists from the Irish rath site at Deer Park Farms, which Kenward and Allison (1994) suggest are similar to York urban deposits. Another useful comparison is that of a sample from Christ Church Place, Dublin (Coope, 1981), which also has an extreme dominance of *A. brunneus.* There is little doubt that these two dominants were breeding on site, especially with the large numbers of `pale' individuals found, and could therefore be the most important indicators of the general characteristics of the sampled environment. *A. brunneus* is blind and flightless and so unlikely to occur in such numbers far from its ideal habitats. Other species suggest inputs from the outside world, there are six possible meadow species and five Hymenoptera, including one ant *myrmica* sp. and two species of parasitic wasp which are most likely to have come in with vegetation.

Kenward (in Hall et al 1983) has argued that the fauna of stored grain, including *Oryzaephilus* sp., were not present during the post Roman period and only became re-established with the rise of medieval trading connections. The assemblage is present in Iceland, however, by the eleventh century (Amorosi et al. 1992) and it is likely to have been current in Anglo-Scandinavian York. Charred grain occurs throughout the other samples from the excavation and grain storage is a possibility as eight of the species (up to 68% of individuals) have been recorded from granaries. The greater part of the assemblage does not favour the damp conditions of permanent hay storage and the suggestions of the West Stow Environmental Archaeology Group

(in Coope, 1981) seem more likely, a room floored with decaying hay/vegetable matter to provide insulation and heat. Also the absence of great numbers of fly puparia lead one to believe this was not an area frequented by herbivores (and hence not a barn or stable), as puparia would be expected in far greater abundance than the beetles which enjoy dung/manure, as would the more specific dung beetles such as *Aphodius* (Coope, 1981). No animal parasites were found, but this may be a reflection of the poor overall preservation. The few specimens of carrion feeders (eg. *Trox scaber*) may have been here in their predatory capacity or as background incidentals, but there numbers are too few to suggest animal remains.

Decay and fungal activity is strongly apparent as several species prefer to have fungi attack vegetation before they can feed. This again supports the 'thermal floor hypothesis'. A further twenty two other individuals (four species) can also be found in wood.

Conclusion

The assemblage indicating deep rotting plant debris in an indoor situation is similar to that found especially abundant in samples from probable archaeological cesspits (Osborne, 1983), and since they represent 10% of the total number of individuals their importance cannot be dismissed. This does seem to contradict the above implied (relative) dryness, but we should be reminded of the variety of environments that one room, especially in medieval times, can provide.

The possibility that the pit lay within a dwelling room is also a fairly reasonable explanation for the fauna. Animal bones and feathers were found, and some of the more polyphagous insects would feed on animal remains, but there is insufficient invertebrate evidence of living animals.

Context 32 is from within a pit surrounded by hard floor layers. If the stratigraphy is considered in connection with the above, one gets the impression of an incident when the floor was swept clear of its useful, yet pungent covering. The pit, whatever its previous use, became a useful place to put all this residue building it up to the level of the surrounding floor. Note that *Aglenus brunneus* with its burrowing ability could also have inhabited the pit shortly after filling if it was not too greatly compacted.

Preservation Index for Coleoptera Remians

A six point scale of preservation of insect material, as devised by T Roper & N Whitehouse in collaboration with Dr P C Buckland, Dr J Sadler & Dr M Dinnin.

0	**Blank**	No insect remains present in sample.
1	**Very poor**	Only the most robust, highly sclerotised taxa present, and these eroded and testaceous. Identification can be expected only to genus level.
2	**Poor**	Testaceous, even more robust groups, and the more sclerotised taxa eroded. Some identification to species level may be expected.
3	**Moderate**	Poorly sclerotised groups are testaceous and there will be some erosion of chitin but identification to species level usually possible. Diptera puparia present. Setae may be in evidence on pubescent species.
4	**Good**	Well sclerotised with little evidence of erosion but large or brittle alytra still fragmented. Setae preserved on pubescent species. A range of Diptera preserved, including wings.

5	**Excellent**	Complete, well sclerotised remains often with some parts still articulated. Complete elytra may be expected even in larger specimens. Good preservation of colouring and setae.

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