

# **Insect Remains from the Annetwell Street site, Carlisle\***

## **REPORT 1**

### **Selected samples from Level X**

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[NB: This report was scanned and reformatted on 5<sup>th</sup> March 2008. The only changes made to the text have been to preserve internal consistency and to correct typographical errors. HK. The original was an archive report deposited at Environmental Archaeology Unit, Carlisle Archaeology Unit and Ancient Monuments Laboratory, and allocated *post hoc* as *Reports from the Environmental Archaeology Unit, York* **86/20**.]

## Summary

This is strictly a technical working report, primarily designed to be used internally by the archaeologists and environmental archaeologists working on the project and also to make full data available for other specialists. All but one of the samples from this group have been taken from a second century timber building and while they give a reasonable amount of information, cannot be used to make a full interpretation until further samples from the area have been analysed. The building appears to have been essentially clean, with small amounts of litter. The pit samples suggest that vegetation may have been cut and imported into the building for use, or disposal, in the pit, but there is no evidence that the material was foul. Botanical investigation of these samples would certainly help to explain the purpose of the pit.

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## **1. General Introduction**

The Annetwell Street site in Carlisle is situated NW of the Cathedral and south of the ring road and castle. Miss D. Charlesworth began excavations in 1973 and continued until 1979. Her work was mainly concentrated in the S/W area of the site, already exposed to the Flavian period, where two of her major discoveries were a turf and timber rampart and a timber gate. From 1980-84 Carlisle Excavation Unit took over the site, but with the extra work of recording modern and medieval levels before reaching any Roman deposits.

Phasing for the site has yet to be finalised, but is currently divided into twelve levels from XII through to 1, and this will be adopted as a provisional system for this report. Levels XII to VIII include Roman timber features, VII to V Roman stone features and levels IV to I range from medieval features through to the nineteenth and twentieth centuries.

The present sample group are from Level X, which probably relates to a timber fort of the second century. A large number of other samples are also from this level and will be dealt with in a future report.

The first two groups of samples to be examined were processed and recorded in detail, but as confidence in the scan-recording technique grew (Kenward 1986, Kenward *et al.* 1986, Kenward forthcoming a) all subsequent samples were treated as 'priority one' and have been scanned. On completion of recording and report-writing for scan samples, selection for detailed work will take place in the light of entomological and other biological and archaeological information.

The insect remains from Annetwell Street will be described in a series of archive reports, of which this is the first. The purpose of these reports is not to present a final statement, but to put material on record for future reference by those working on the projects and to make full data available for other specialists.

## **2. Practical methods**

Methods for insect extraction followed those described by Kenward *et al.* (1980).

Mounted fossils were compared with HKK's reference collection or with reliably named fossil material for identification. Data were recorded and processed using computer systems outlined in the appendix.

All the samples received were assigned as "priority one" by Carlisle Excavation Unit and have been examined in the groups in which they were sent.

## **3. Interpretative methods**

Interpretation is broadly discussed by Kenward (1978a); this account has been brought up to date by Kenward (forthcoming a, b). The methods are based on (a) species composition (b) main statistics such as concentration, "diversity", and the proportions of

certain ecological groups and (c) population structure, as revealed by rank order and cumulative frequency curves.

#### **4. Results of the analyses**

[Revised 2008. Data for this project are can now be viewed in:

Kenward, H. (1999). Data archive: Insect assemblages from Annetwell Street, Carlisle (revised edition). *Reports from the Environmental Archaeology Unit, York* **99/32**, 126 pp.

The original edition of these reports included a large paper data archive. This has largely been omitted from the present version, but the following diagrams have been reproduced in separate files for the larger assemblages: (1) A cumulative frequency curve with, for comparison, a distribution based on that predicted by the theoretical Broken stick distribution of MacArthur (1957). This, it must be emphasised, is used only as a standard and there is no intended implication that assemblages should conform to it. (2) A plot of deviations of observed cumulative frequency from that predicted by MacArthur's model.]

#### **5. Discussion of the sample assemblages**

The samples are all from Level X, second century AD, and all but sample 226 are from building 2006. The assemblages are considered in natural groups rather than in sample number order. Three kilograms of material was processed from each sample with the exception of sample 226 from which only 2.2 kg was used.

##### ***5.1 Samples from floor and occupation build-up***

###### ***5.1.1 Sample 234, Context 2786***

This floor sample was mostly of a mineral nature. In addition to beetle and bug remains the floats included mites, an ant and small fragments of puparia and adult fly. The dried residue contained a field mouse (*Apodemus sylvaticus*) pelvis, a few scraps of wood and charcoal and a small piece of glass.

The 3 kg subsample gave a modest assemblage of 120 individuals (MNI), including 59 species. Diversity is intermediate at 46 (SE = 7). The more abundant species was a mixture of grain pests (NG = 22) and species associated with rather decaying matter, often indoors. Grain pests are not sufficiently abundant to provide evidence that they bred. Outdoor species make up 37 of the list, and outdoor individuals are quite abundant (N OB =20). One third of the outdoor component is made up by phytophages. The decomposer element is not particularly large (41, 52 after subtraction of grain pests). Most of the assemblage could be made up by insects which strayed into the building and were trampled into the floor. As there is good preservation it may be deduced that the building provided few habitats for insects, and species such as *Lathridius minutus* group

and *Xylodromus concinnus* may have bred in small accumulations of litter or even in nests.

#### 5.1.2 Sample 237, Context 2812

The matrix of this floor sample was mostly mineral. There were some mites in the floats, and the residue contained a pig metapodial, one rodent mandible with tooth, and quite a lot of charcoal.

The sample material processed gave only a very small assemblage of beetles (36 individuals - 12 per kilogram; 30 species). Any deductions from such a small assemblage must be made with great care but there is little doubt that it has a broad similarity to sample 234; it gives no evidence for any insect habitats within the building.

#### 5.1.3 Sample 239, Context 2908

This floor sample consisted mainly of mineral sediment. Apart from beetles and bugs, the only invertebrates in the float were a few mites. The dried residue contained a piece of toad or frog bone, a fowl bone, a pig phalanx, the end of a pig metapodial, fragments of wood and nutshell (*Corylus*) and many small pieces of charcoal.

The subsample processed gave a quite small assemblage of 101 individuals including 45 taxa (34 individuals per kg). Diversity is rather low ( $\alpha = 31$ ; SE = 5), but estimates for such small samples may be distorted by MNI effects (Kenward forthcoming a). Grain pests are relatively unimportant (15 individuals; %NG = 15). The most abundant species is *Carpelimus bilineatus* (13 individuals, 12.9%), difficult to interpret in view of its habitat range and likely abundance in background fauna (Hall *et al.* 1983, Kenward forthcoming a). Diversity is still fairly low after subtraction of *C. bilineatus* ( $\alpha = 35$ ; SE = 2). The outdoor component is moderately large (%N OB = 17) and makes up 27 of the species. The assemblage is probably background fauna mixed with a small breeding component associated with mouldering organic matter; this habitat did not necessarily occur in large quantities.

#### 5.1.4 Sample 181, Context 2233

The material was taken from a clay spread and contained no obvious organic matter. A few scraps of charcoal and burnt mammal bone were found in the residue. This sample provided only 17 individuals of 9 species (8 individuals per kg). Diversity is low, depressed by the presence of 5 individuals each of *Cryptolestes ferrugineus* and *Oryzaephilus surinamensis*; these, and the remaining fauna, are probably background fauna, or derived from an overlying layer, having been trampled into the clay.

#### 5.1.5 Sample 233, Context 2770

This material was taken from an occupation layer and was mostly mineral. The residue contained fragments of wood, charcoal, mammal bone and a fragment of fish bone. Some mites also came up in the floats.

The processed sub-sample gave a modest assemblage with 62 species and 173 individuals (58 individuals per kg). Diversity is quite low ( $\alpha = 35$ ; SE = 4). The most abundant species are a mixture of grain pests and taxa associated with mouldering matter. The list as a whole shows a variety of decomposers suggesting conditions were a little damp but certainly not foul (%N RT = 51; 64% after subtraction of grain pests, and %N RD = 19; 24% after correction for grain pests, but %N RF = 4 - still 4% after correction for grain pests). The outdoor component and some of the decomposers are doubtless background fauna, but it seems likely (from the low diversity and the cumulative frequency curve) that insects colonised slightly damp litter on the floor.

## ***5.2 Hearth samples***

### *5.2.1 Sample 177, Context 2225*

This sample was taken from a hearth and contained barely any organic matter. The dried residue contained much charcoal, some fragments of brick or tile, nutshell and mammal bone fragments.

A small assemblage of 45 individuals (25 species) was extracted; concentration is thus rather low at 15 individuals per kg. There is nothing to distinguish this small group from those in the floors or build-up and they may just be stray insects.

### *5.2.2 Sample 178, Context 2227*

This hearth sample was mainly sand and charcoal with a few fragments of mammal bone (some burnt) and a piece of cow calcaneum.

The deposit gave only 5 individuals of 4 species, concentration being extremely low at 2 per kg. Such an assemblage is obviously uninterpretable, although the fact that these remains were quite well preserved suggests low input of insects rather than post-depositional loss. The insects were not present during burning, as they are uncharred.

### *5.2.3 Sample 202, Context 2443*

This sample was from an area of "burning", consisting of charcoal, sand, rubble resembling brick or tile, and burnt fragments of mammal bone.

Few insects were recovered; 37 individuals of 22 species. The assemblage has the broad character of those from the floor and build-up.

## ***5.3 Samples from pit-fills***

### *5.3.1 Sample 207, Context 2451.4*

A sample rich in organic matter, with wood, charcoal, bone and puparia in the residue. Insects found in the floats (in addition to Coleoptera and Hemiptera) were: ants, scale

insects and puparia (identified by J. Phipps as 2 *Musca domestica*, 2 Sepsidae sp. and some *Leptocera* sp.).

This sample was rich in insect remains, yielding 229 individuals (79 taxa), the concentration being 76 individuals per kg. Alpha is moderate at 43 (SE = 5). The outdoor component makes up 16 of the individuals; quite high in view of the presence of the abundant decomposers. A third of the taxa are classified as outdoor, and 62% of these are phytophages. In terms of individuals, the phytophages account for 11% of the assemblage and 69 of the outdoor component.

Inspection of the cumulative frequency graph and the species lists indicates the presence of a strong breeding decomposer component. The more abundant species are *Lathridius minutus* group (21 individuals; 9.2%), *Cryptophagus* sp. (19, 8.3%), *Anthicus formicarius* (13, 5.7%), *Corticaria* sp. (10, 4.4%), a *Ptenidium* sp. close to *pusillum* (9, 3.9%), *Xylodromus concinnus* (9, 3.9%), *Ptinus ?fur* (9, 3.9%) and *Monotoma bicolor* (9, 3.9%). While *P ?fur* might have lived in nests or other fairly dry litter, this group and some others of which several individuals are present suggest a quite large accumulation of plant remains which were mouldy and actively decaying but not too wet. The evidence from the decomposer component and the phytophages suggests that cut plant remains, perhaps resembling hay, were thrown into the pit. It is unfortunate that the extreme fragmentation of the majority of the phytophages precludes precise identification. Analysis of plant remains may cast light on the problem.

### 5.3.2 Sample 208, Context 2452.3

A basically mineral sample, with much charcoal and some wood in the residue. Other remains include a few seeds, some brick/tile, mammal bone scraps (some burnt), one hind limb of a mouse, and a fragment of oyster shell. Pieces of puparia, adult flies and many mites were recorded from the floats.

This deposit gave an assemblage of 245 individuals and 76 species (82 individuals per kg). Diversity is quite low (alpha = 38; SE = 4). About one quarter of the species are outdoor (%S OB = 26) but only 11 of the individuals are thus classified. This is brought about by the swamping effect of several abundant grain pests and decomposer species. The grain component is quite large (%NG = 34, 28 per kg). The composition of this group is quite unusual, *Oryzaephilus surinamensis* (51 individuals, 21%) being proportionally unusually abundant, while *Cryptolestes ferrugineus* is represented by only 7 individuals, *Sitophilus granarius* by 9 and *Palorus ratzeburgi* by 6. It is possible that this distribution of numbers was the result of breeding within the building; *O. surinamensis* may have been exploiting an atypical habitat. Other abundant species are much the same as in the other sample from this structure, as are the rarer species and background fauna.

This sample is remarkable for the presence of the remains of 5 *Phyllopertha horticola*, (the 'garden chafer', usually, however, very much more abundant in marginal grazing land). This species occurs in great numbers in some localities in some years and so may

have flown into the building, but importation in plant material cannot be ruled out. It is sometimes very abundant on bracken fronds. (References to the biology of *P.horticola* are given by Kenward 1985-, part 9.) If this was a latrine pit then insects may have fallen in from surrounding buildings, but as there is no insect evidence for a foul pit, botanical investigation is essential.

#### **5.4 Sample from E/W road**

##### **5.4.1 Sample 226, Context 2547**

Only 2.2 kg of material was available for processing and the whole sample was used. The sample consisted of fairly organic matter taken from a layer of silt on the edge of the E/W road. The residue contained scraps of wood, charcoal, mammal bone, shellfish, and a fish vertebra. A scale insect and fragments of small puparia and adult flies were also found in the floats.

A minimum number of 133 individuals were extracted from this material; 66 taxa were identified. Concentration was quite high at 61. Diversity is moderately high ( $\alpha = 52$ ;  $SE = 8$ ). Over one third of the taxa (36) are classified as outdoor, and make up 21 of the assemblage (30 after subtraction of grain beetles). The three most abundant species are the grain pests *Oryzaephilus surinamensis*, *Cryptolestes ferrugineus* and *Sitophilus granarius*. Apart from these, only *Lathridius minutus* group is particularly common (10 individuals). The remaining fauna is somewhat similar to that from building 2006, lending credence to the proposition that the deposits within the structure include abundant background fauna. Decomposers are rare in the present group and there is no evidence for any autochthones. The *Scolytus* sp. and the unidentified scolytid may have originated from the adjacent wattling.

## **6. Discussion**

This group of samples has given a considerable amount of information about building 2006. The made floors probably only contain a few insect corpses which were trampled into them; these insects may have been largely background fauna, with a few species which bred in fairly dry litter. The overlying occupation deposit indicates fairly dry conditions, probably a floor on which some plant litter accumulated and mouldered.

The hearths and 'burning' all contain few insects which could be strays from decomposer habitats such as those represented by sample 233 or they could be more generalised background fauna.

The pit within this structure contained abundant insect remains and somewhat damper conditions are indicated. The fill of the pit cannot be fully elucidated from the insect remains but it may be suspected that cut vegetation containing insects formed at least a part of the fill. Investigation of plant remains and parasite eggs is essential; this pit may prove to have been a latrine or to have received animal bedding. The external deposit 226 appears to have accumulated in an area essentially devoid of insect habitats; the fauna is strongly suggestive of a component which the remaining groups hold in



common and which probably represents the background fauna of the site. Reconstruction of the general environment of the site is made difficult by the probable importation of some insects. It seems likely that there was some weedy vegetation nearby and of course the constant presence of grain beetles demonstrates that either grain was stored within a few hundred metres, or that grain containing beetles was used on the site. However, the grain beetles are almost always present or abundant in Roman deposits and can normally be seen as a part of the background fauna.

## **7. Further action required**

For a more complete interpretation of some assemblages, the results of botanical investigations is essential. This is particularly true of samples 207 and 208, but all samples should be at least scanned for plant remains. Work on parasite eggs is also necessary.

## **8. Acknowledgements**

Thanks are due to Mike McCarthy and Ian Caruana for supplying help and information, to John Phipps for identification of flies, and to Terry O'Connor, Sally Scott and Andrew Jones for identifying some of the bones found in the residues.

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*Table 1. Annetwell Street, Carlisle. Samples dealt with in this report, in sample number (and, co-incidentally, context number) order.*

Sample Number	Context number	Level	Weight of sample processed
177	2225	X	3Kg
178	2227	X	3Kg
181	2233	X	3Kg
202	2443	X	3Kg
207	2451.4	X	3Kg
208	2452	X	3Kg
226	2547	X	2.2Kg
233	2770	X	3Kg
234	2786	X	3Kg
237	2812	X	3Kg
239	2908	X	3Kg

*Table 2. Annetwell Street, Carlisle. Descriptions of the sample material. Water state was moist unless otherwise indicated.*

Sample number	Context number	Description
177	2225	Sandy clay silt, mottled from dark brown to bright orange. Ashy smell. Organic content low. A few bone fragments and small pebbles. Wet.
178	2227	Sandy clay silt, mottled and banded with light pink/brown clay. Many charcoal fragments and small stones.
181	2233	Sandy silty clay, bright pinkish brown. Some charcoal and many stones.
202	2443	Sandy silt with cemented and brittle patches and lumps of paler silt. Mid brown and yellow. Low organic content. Fragments of brick/tile, wood and bone.
207	2451.4	Mainly organic, with patches of organic silt and layered organic matter. Dark brown. One patch of ? micaceous sandstone. One stone.
208	2452	Sticky sandy clay silt. Mid-dark brown. Slightly sulphurous smell. Many small pebbles. Wet.
226	2547	Organic clay silt. Dark yellow-grey brown. Some wood chips and abundant pebbles.

233	2770	Slightly sandy silt. Mid chocolate brown. Very crumbly and structureless. Many small pebbles.
234	2786	Gingery brown silt with light ginger brown patches. A few wood fragments and many small stones.
237	2812	Clay silt, mid-dark orange/brown. Some lumps light reddish brown internally. Some parts friable with more organic material and some parts plastic. Trace of slightly mineralized wood.
239	2908	Sandy silt. Dark gingery brown with pale ginger brown in places. Some gritty patches, some small stones.