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A Roman Fort on the Antonine Wall

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Chapter 17

INSECT REMAINS

JOHN LOCKE

17.1 INTRODUCTION

Insect remains from various parts of the Antonine fort have been examined, with particular reference to the beetles. Insects were examined from the following features:

1. East annexe ditch
2. Inner west ditch
3. Middle west ditch
4. Outer west ditch
5. South ditch
6. Depression south of building 7
7. Building 7

They were identified using the insect collections at the Royal Scottish Museum and Doncaster Museum and Art Gallery. The species-lists are represented in tables 17.1–17.7, with the nomenclature following that of Kloet and Hincks (1977). The lists are not strictly comparable with one another because of the different methods by which the insects were extracted. Most of the assemblages were obtained during the course of sorting samples for botanical macrofossils. Generally one requires larger samples to obtain sufficient insects. In addition, many of the insects are an order of magnitude smaller than the plant remains and thus less easy to recognise.

This was made apparent when two small samples from the east annexe ditch which had already been sorted for plant and insect remains were subjected to paraffin flotation. The number of beetles obtained by the latter method was several times that obtained from sorting the whole residue. In addition the insect assemblages obtained from the botanical samples showed a bias towards larger, more easily recognised fragments, particularly larval cases of Caddis-flies.

17.2 ANALYSIS

17.2.1 East annexe ditch

Seven small sub-samples were taken from the main column, at depths of 300mm–400mm, 400–500mm, 500–600mm, 700mm–800mm, 800–900mm, 1.4m–1.5m and 1.5m–1.6m. Each measured 500mm × 100mm deep and weighed 0.5kg.

These samples were subsequently processed at the Environmental Archaeology Unit, York University. The samples were carefully disaggregated in water and then the insect remains were extracted using the paraffin flotation methods described by Coope and Osborne (1967). Some impression of the relative efficiency of this method may be gained by comparing the species-list from this feature (table 17.1) with those from other features at the site (tables 17.2–17.7).

Over 130 taxa of Coleoptera were identified, numbering just under 1,000 beetles. Although the remains of other insects were found eg Trichoptera (Caddis-flies), Diptera (true fl ies) and Hymenoptera (bees, ants, etc), these were insignificant in comparison with the number and diversity of the beetle remains and yield relatively little information about the depositional processes taking place within the ditch.

The sub-samples represent two very distinct faunas, with the sample from 500mm–600mm appearing to be intermediate. One faunal group corresponds to layer A and the other to layers B and C combined. The 500mm–600mm sub-sample appears intermediate between the two simply because it comprises the bottom of layer B and the top of layer A, the break apparently occurring at about 520mm and represents the abandonment of the fort. Thus this fraction contains two distinct faunal groups. The two faunal groups are discussed below.

Layer A, 520mm–1.8m

This layer represents the occupation of the site as evidenced by the presence of large numbers of beetles with strong synanthropic associations. The synanthropic beetles fall into two clear groups; obligate synanthropes (species which can only survive in this country in association with man), and opportunist synanthropes (species occurring in the wild in this country but able to take advantage of habitats created by man).

The four species of grain beetle present, *Cryptolestes* (= *Laemophloeus) ferrugineus*, the Saw-Toothed Grain Beetle *Oryzaephilus surinamensis*, *Palorus ratzeburgi* and the Grain Weevil, *Sitophilus granarius* make up the first group, with a single specimen of the Human Flea *Pulex irritans*. The second, more diffuse, group is made up of species associated with the waste products of human occupation, namely the dung of domestic animals, rotting vegetation ('compost'), and mouldering vegetation such as is found in hay and straw-stacks.

Table 17.1
East Annexe Ditch: Coleoptera

Taxon	*Sample-Depth (cm)*							
	30–40	*40–50*	*50–60*	*70–80*	*80–90*	*140–50*	*150–60*	*Rampart*
Notiophilus biguttatus (F.)	*	*		*	*	1	*	*
Pterostichus cupreus (L.)	*	*	*	1	*	*	*	*
Pterostichus minor (Gyll.)	*	*	*	*	*	*	1	*
Haliplus sp	1	*	*	*	*	*	*	*
Coelambus sp	*	*	*	*	1	*	*	*
Hydroporus memnonius Nicolai	1	*	*	*	*	*	*	*
Hydroporus pubescens (Gyll.)	1	*	*	*	*	*	*	*
Hydroporus spp	4	2	4	1	*	*	2	*
Agabus sturmi (Gyll.)	1	*	*	1	*	*	*	*
Helophorus brevipalpis (Bed.)	*	1	4	*	*	*	*	*
Helophorus grandis (Ill.)	*	*	1	1	*	*	*	*
Helophorus granularis (L.)	*	*	1	*	*	*	*	*
Helophorus spp	1	1	2	3	*	2	2	1
Cercyon analis (Payk.)	*	1	3	4	1	1	1	*
Cercyon atricapillus (Marsh.)	*	*	1	*	*	1	*	*
Cercyon haemorrhoidalis (F.)	*	*	*	1	*	*	1	*
Cercyon melanocephalus (L.)	*	*	*	*	1	*	*	*
Megasternum obscurum (Marsh.)	*	2	1	*	*	*	*	*
Cercyon sp	*	*	*	*	1	1	*	*
Hydrobius fuscipes (L.)	*	*	2	*	*	*	*	*
Anacaena globulus (Payk.)	3	1	*	*	*	*	*	*
Laccobius sp	*	*	2	*	*	*	*	*
Octhebius minimus (F.)	*	3	*	*	*	*	*	*
Octhebius pusillus Steph.	*	1	*	*	*	*	*	*
Hydraena britteni Joy	32	3	3	*	*	*	*	*
Hydraena spp	*	3	4	*	*	*	*	*
Ptiliidae spp	4	2	3	*	2	4	1	*
Acrotrichis sp	*	*	1	*	*	*	*	*
Nargus velox (Spence)	2	*	*	*	*	*	*	*
Nargus sp	2	*	*	*	*	*	*	*
Catops sp	*	*	*	1	1	*	*	*
Nicrophorus investigator Zetterstedt	*	*	1	*	*	*	*	*
Neuraphes sp	1	*	*	*	*	*	*	*

Table 17.1 (continued)

Taxon	*Sample-Depth (cm)*							
	30–40	*40–50*	*50–60*	*70–80*	*80–90*	*140–50*	*150–60*	*Rampart*
Euconnus sp	*	*	*	*	*	1	*	*
Micropeplus fulvus (Gr.)	*	*	*	*	1	*	*	*
Micropeplus staphylinoides (Marsh.)	1	1	*	*	*	1	*	*
Micropeplus sp	*	*	1	*	*	*	*	*
Anthobium atrocephalum (Gyll.)	*	*	*	*	*	1	*	*
Olophrum fuscum (Gr.)	*	1	3	*	*	*	*	*
Olophrum piceum (Gyll.)	1	*	*	*	*	*	*	*
Acidota cruentata Man.	*	1	1	*	*	*	*	*
Lesteva heeri Fauvel	5	2	1	*	1	*	*	*
Lesteva longoelytrata (Goeze)	1	*	*	*	*	*	*	*
Lesteva punctata (Gr.)	1	2	*	*	*	*	*	*
Lesteva sp	1	*	*	*	*	*	*	*
Anthophagus alpinus (Payk.)	*	1	*	*	*	*	*	*
Eusphalerum sorbi (Gyll.)	6	*	*	*	*	*	*	*
Eusphalerum torquatum (Marsh.)	3	1	*	*	*	*	*	*
Omalium caesum (Gr.)	*	*	1	1	*	*	1	*
Omalium italicum Bernhauer	*	*	*	*	1	*	*	*
Xylodromus concinnus (Marsh.)	*	*	*	2	1	*	*	*
Philorinum sordidum (Steph.)	1	*	*	*	*	*	*	*
Carpelimus spp	*	*	*	*	1	*	*	*
Platystethus arenarius (Fourc.)	*	*	1	1	1	*	1	*
Anotylus nitidulus (Gr.)	*	*	*	*	2	*	*	*
Anotylus rugosus (F.)	1	*	*	1	*	1	*	*
Anotylus sculpturatus (Gr.)	*	1	1	*	1	*	*	*
Anotylus sp	1	*	*	*	*	*	*	*
Oxytelus fulvipes (Gr.)	1	*	*	*	*	*	*	*
Oxytelus laqueatus (Marsh.)	*	1	*	*	*	*	*	*
Oxytelus sculptus (Gr.)	*	*	*	*	*	1	*	*
Oxytelus spp	*	*	*	*	*	1	*	*
Stenus bimaculatus (Gyll.)	1	*	*	*	*	*	*	*
Hemistenus nitidiusculus (Steph.)	*	1	*	*	*	*	*	*
Stenus spp	5	5	6	*	2	*	*	*
Euaesthetus ruficapillus Boisduval and Lacordair	*	*	*	2	*	*	*	*

Table 17.1 (continued)

Taxon	*Sample-Depth (cm)*							
	30–40	*40–50*	*50–60*	*70–80*	*80–90*	*140–50*	*150–60*	*Rampart*
Lathrobium elongatum (L.)	1	2	*	*	*	*	1	*
Lathrobium irnpressura Heer	*	*	*	*	1	*	*	*
Lathrobium longulum (Gr.)	*	*	*	1	1	*	*	*
Lithocharis sp	*	*	*	1	*	*	*	*
Othius angustus (Steph.)	1	*	*	*	*	*	*	*
Othius sp	1	*	*	*	*	*	*	*
Leptacinus pusillus (Steph.)	*	*	*	*	*	1	*	*
Gyrohypnus fracticornis (Muller, O.F.)	*	*	1	1	1	*	*	*
Gyrohypnus punctulatus (Payk.)	*	*	*	*	*	1	*	*
Xantholinus longiventris Heer	*	3	*	*	*	1	*	*
Philonthus spp	*	*	*	*	*	1	*	*
Tachyporus hypnorum (F.)	*	*	1	*	*	*	*	*
Tachyporus transversalis (Gr.)	*	*	1	*	*	*	*	*
Tachinus subterraneus (L.)	*	*	*	*	1	*	*	*
Aleocharinae spp	14	7	16	7	10	2	3	*
Bythinus macropalpus Aube	2	1	*	*	*	*	*	*
Brachygluta fossulata (Reichenbach)	1	*	2	*	*	*	*	*
Geotrupes stercorosus (L.)	1	*	*	*	*	*	*	*
Colobopterus haemorrhoidalis (L.)	*	*	1	*	*	*	*	*
Aphodius ater (Deg.)	1	*	*	*	*	*	*	*
Aphodius contaminatus (Hbst.)	*	*	4	1	1	*	*	*
Aphodius spp	*	*	*	*	*	1	1	*
Calyptomerus dubius (Marsh.)	*	*	2	*	*	*	*	*
Clambus sp	*	*	2	*	*	1	*	*
Cyphon spp	32	15	2	1	*	1	*	*
Athous vittatus (F.)	*	1	*	*	*	*	*	*
Agriotes obscurus (L.)	*	*	2	*	*	*	*	*
Dalopius marginatus (L.)	1	1	*	*	*	*	*	*
Cantharis livida (L.)	*	*	4	*	*	*	*	*
Kateretes pedicularius (L.)	*	2	*	*	*	*	*	*
Kateretes sp	1	*	1	*	*	*	*	*
Meligethes spp	7	*	*	*	1	*	*	*
Aspidiphorus orbiculatus (Gyll.)	*	*	*	*	*	1	*	*

Table 17.1 (continued)

Taxon	*Sample-Depth (cm)*							
	30–40	*40–50*	*50–60*	*70–80*	*80–90*	*140–50*	*150–60*	*Rampart*
Cryptolestes ferrugineus (Steph.)	*	1	38	57	65	34	28	*
Oryzaephilus surinamensis (L.)	*	*	15	36	39	16	22	*
Henoticus serratus (Gyll.)	*	*	1	*	*	*	*	*
Cryptophagus spp	*	1	1	5	3	*	2	*
Atomaria spp	*	*	2	*	*	2	1	*
Ephistemus globulus (Payk.)	*	*	1	*	3	*	*	*
Aridius bifasciatus (Reitt.)	*	*	*	*	2	*	*	*
Lathridius consimilis (Man.)	*	*	*	1	*	*	*	*
Lathridius pseudominutus (Strand)	*	*	3	2	1	2	*	*
Eniecmus spp	*	*	*	1	2	*	*	*
Corticaria sp	*	*	2	*	1	1	2	*
Phylan gibbus (F.)	*	*	*	*	1	*	*	*
Palorus ratzeburgi (Wiss.)	*	*	8	6	5	3	1	*
Anthicus floralis (L.)	*	*	1	1	*	*	1	*
Plateumaris discolor (Kunze)	*	*	*	*	*	*	*	1
Chrysolina varians (Schaller)	*	*	2	*	*	*	*	*
Hydrothassa marginella (L.)	*	*	1	*	*	*	*	*
Prasocuris junci (Brahm)	*	*	1	*	*	*	*	*
Phyllotreta nemorum (L.)	*	*	*	1	*	*	*	*
Apion spp	3	*	*	*	*	*	*	*
Sitophilus granarius (L.)	*	*	15	23	20	11	18	*

GRAIN-BEETLES

The general archaeological significance of the grain-beetles is discussed in a later section. This section is addressed to the problem of how large numbers of grain-beetles came to be in the fill of the east annexe ditch.

The graph of 'percentage composition' plotted against 'sample-depth' (table 17.2 shows a remarkable consistency in the relative proportions of the four species to one another in a layer of over 1m deep).

The implication of this is that the grain-beetles in this layer represent a single infestation, particularly interesting in that the most abundant is *Cryptolestes ferrugineus*. At all other archaeological sites from which similar infestations have been recorded *Oryzaephilus* predominates (Kenward & Williams 1979; Hall et al 1980). At these sites steps had clearly been taken either to prevent further infestation, as at the Coney Street site in york, where a layer of clay seal was laid down over the remains of a major infestation, and at Skeldergate, York, where damaged grain was dumped in the shaft of a disused well (Hall et al 1980). A layer of carbonised infested grain at Droitwich (Osborne 1977) may represent deliberate burning of damaged grain to prevent subsequent infestation of unaffected stocks.

Thus it is possible that the presence of the grain-beetles is a consequence of the dumping of damaged grain well away from the main granaries in the fort. This is the 'active dumping' hypothesis'.

STACK-DWELLING INSECTS

Further evidence for the 'active dumping' hypothesis comes from the presence in this layer of a number of species commonly associated with mouldering hay and straw which disappear at the end of the period of occupation. These are *Xylodromus*

concinnus, and species of the genera *Cryptophagus*, *Corticaria*, *Lathridius* and *Atomaria*. These fall into the group of opportunist synanthropic species. These are more likely to have been feeding on animal bedding than on grain.

ROTTING VEGETATION AND DUNG

Rotting vegetation and dung are not dissimilar in composition and many of the species recovered from this layer are found in either. These include all the species of *Cercyon* listed in table 17.1 and many of the Oxyteline genera *Anotylus* and *Oxytelus*. Some species show more marked preferences; *Megasternum obscurum*, the two species of *Micropeplus* and *Euaesthetus ruficapillus* prefer rotting vegetation while *Platystethus arenarius* is usually found on dung.

There are specialist dung-beetles present (*Aphodius* spp). These are not usually associated with human excrement but with the dung of large herbivores. *Aphodius contaminatus* is associated with horses, though it may also be found on cow dung (Landin 1961).

The above groups of insects provide information as to the nature of the deposit and its origins. They strongly suggest that the ditch fill comprises refuse from within the fort, the refuse being for the most part damaged grain, but also some straw refuse and rotting vegetation. The small numbers of dung-beetles preclude definitive statements as to the large herbivores in the vicinity of the site. Nor can one say whether the animals were within the site or outside the ditches as dung-beetles are remarkable adventitious species.

Other insects give clues to the environment of the ditch itself. These are the hygrophilous carabid beetles *Pterostichus cupreus* and *P. minor* which indicate sparse vegetation in the vicinity of water.

This sparse vegetation changes dramatically in layers B and C.

Layers B and C

These represent the slow infilling of the ditch after the fort had been abandoned. By this time the ditch had filled with water as evidenced by the different water-beetles present. The several species of *Hydroporus* indicate the presence of relatively clean acid water, as does *Agabus sturmi*. Members of the genus *Laccobius* prefer still water with a coating of algae on the bottom, as do *Hydrobius fuscipes* and *Anacaena globosus*. The presence of larvae of *Eristalis* (drone-fly) and of Trichoptera (caddis-flies) confirm this picture. However, the insect fauna is dominated by species feeding on waterside vegetation. *Octhebius*

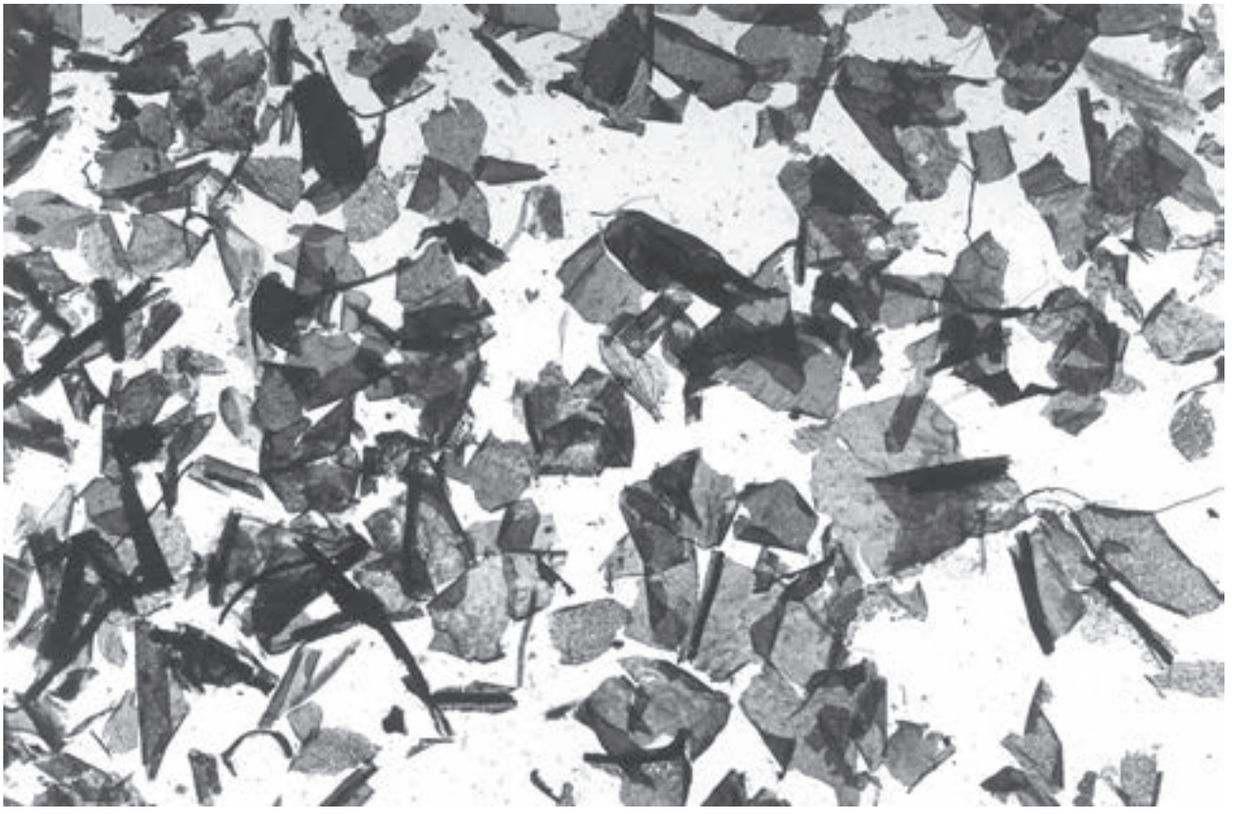

Illustration 17.1
Fragments of grain skins from the sewage in the east annexe ditch. In the centre is the wing of a psychodid fly, an insect associated with sewage.

Table 17.2
Inner West Ditch: Coleoptera (Combined data from column samples AA and AAB)

Taxon	*Sample-Depth (cm)*							
	14–17	*20–3*	*24–6*	*26–9*	*30–4*	*34–7*	*38–40*	*48–50*
Nebria salina Fairmaire and Laboulbene	*	*	*	*	*	1	*	*
Notiophilus biguttatus (F.)	*	*	*	*	1	*	*	*
Trechus quadristriatus (Schrank)	*	*	*	*	*	*	*	1
Pterostichus strenuus (Panzer)	*	*	*	*	*	*	*	1
Hydroporus spp	*	*	*	*	*	*	*	3
Ilybius aenescens Thomson, C.G.	*	*	*	*	1	*	*	*
Helophorus spp	*	*	*	*	*	1	1	*
Coleostoma orbiculare (F.)	*	*	*	*	*	*	*	1
Cercyon haemorrhoidalis (F.)	*	*	*	*	1	*	1	*
Megasternum obscurum (Marsh.)	*	*	*	*	2	1	*	*
Hydrobius fuscipes (L.)	*	*	*	*	1	*	*	1
Anacaena globulus (Payk.)	*	*	*	*	*	*	*	3
Laccobius sp	*	*	*	*	*	*	1	1
Hydraena spp	*	*	*	*	*	*	*	6
Ptiliidae spp	*	*	*	*	*	*	1	*
Olophrum piceum (Gyll.)	*	*	*	*	1	1	*	*
Lesteva heeri Fauvel	*	*	*	*	1	*	*	1
Carpelimus spp	*	*	1	*	*	*	*	*
Anotylus rugosus (F.)	*	*	*	*	*	*	*	1
Stenus spp	*	*	*	*	*	*	1	1
Lathrobium elongaturo (L.)	*	*	*	*	*	*	*	1
*Stenus bimacuiatus (*Gyll.)	*	*	*	*	*	*	*	1
Lathrobium impressurn Heer	*	1	*	*	*	*	*	*
Gyrohypnus fracticornis (Muller, O.F.)	*	*	*	1	1	*	*	*
Philonthus sp	*	*	*	*	*	1	*	*
Platydracus pubescens (Deg.)	*	*	*	*	*	*	1	*
Tachinus laticollis (Gr.)	*	*	*	*	*	*	*	1
Tachinus signatus (Gr.)	*	*	*	*	1	*	*	*
Aleocharinae spp	*	1	*	1	*	*	*	*
Aphodius contaminatus (Hbst.)	*	*	*	1	*	*	*	*
Aphodius lapponum (Gyll.)	*	*	*	*	*	*	1	*
Aphodius prodomus (Brahm)	*	*	*	1	*	*	*	*
Aphodius spp	*	*	1	*	*	1	*	*

Table 17.2 (continued)

Taxon	*Sample-Depth (cm)*							
	14–17	*20–3*	*24–6*	*26–9*	*30–4*	*34–7*	*38–40*	*48–50*
Cyphon spp	*	*	*	*	*	1	*	1
Limnichus pygmaeus (Sturm)	*	*	*	*	*	*	*	2
Oulimnius tuberculatus (Muller, P.J.W.)	*	*	*	*	*	1	1	*
Rhugonycha fulva (Scop.)	*	*	*	*	*	*	*	1
Malthinus frontalis (Marsh.)	*	*	*	*	*	*	*	1
Meligethes spp	*	*	*	*	1	*	*	1
Cryptolestes ferrugineus (Steph.)	*	1	*	1	1	*	*	*
Telmatophilus caricis (Olivier)	*	*	*	*	1	*	*	*
Plateumaris sp	*	*	*	1	*	*	*	*
Apion sp	*	*	1	*	*	*	*	*
Strophoscmus capitatus (Deg.)	*	*	*	*	*	*	*	1
Sitona suturalis (Steph.)	*	1	*	*	*	*	*	*
Sitophilus granarius (L.)	*	*	*	*	*	4	*	*
Limnobaris t-album (L.)	1	*	*	*	*	*	*	*

Table 17.3
Middle West Ditch: Coleoptera

Taxon	*Sample*	
	Mid	*Top*
Anacaena globulus (Payk.)	1	1
Laccobius striatulus (F.)	1	*
Thanatophilus dispar (Hbst.)	1	*
Omalium rivulare (Payk.)	1	*
Carpelimus sp	1	*
Stenus sp	1	*
Lathrobium longulum (Gr.)	1	*
Aphodius sp	1	*
Aphodius constans Duftschmidt	*	1
Cyphon sp	1	*
Niptus hololeucus (Faldermann)	1	*
Cryptolestes ferrugineus (Steph.)	1	*
Oryzaephilus surinamensis (L.)	1	*
Cryptophagus sp	1	*
Sitophilus granarius (L.)	1	*

Table 17.4
Cuter West Ditch: Coleoptera

Taxon	*Sample*	
	0–3	*3–6*
Haliplus sp	1	*
Cryptopleururn minutum (F.)	*	1
Hemistenus nitidiusculus (Steph.)	*	1
Aleocharinae spp	1	1
Oryzaephilus surinamensis (L.)	*	1
Plateumaris sericea (L.)	1	*

spp and *Hydraena* spp are found in still water, clambering amongst vegetation or living in the mud at the edge, as do *Helophorus* spp and *Stenus* spp. The three species of *Cyphon* present feed on rushes in their larval stages. Other species associated with marsh plants are *Prasocuris junci* (*Veronica beccabungae*), *Hydrothassa marginata* (on Ranunculaceae) and *Kateretes pedicularius*.

The remaining species are for the most part characteristic of damp mossy places. The Omalines *Olophrum fuscum* and *O. piceum* are typical in this respect as are the species of *Lesteva*. The two species of *Olophrum* are frequently found in plant debris under Salix scrub and so may indicate the presence of willow.

Insects from more distant habitats are also present, albeit in small numbers. The 'dor' beetle, *Geotrupes stercorarius*, is found on pasture land in cow dung. Also from pasture land comes the 'click' beetles *Athous vittatus* and *Agriotes obscurus*, the larvae of which feed on the roots of grasses.

There are a number of species found on flowering plants. They include *Eusphalerum torquatum*, *E. sorbi*, *Meligethes* spp and *Philorinum sordidum* which is found on gorse. *Chrysolina varians* is found on *Hypericum*.

There are also species indicative of woodland. These are *Dalopius margiatuns*, another 'click' beetle; *Cantharis livida* and *Henoticus serratus* which is regarded as being a species diagnostic of old forests (Hammond 1979).

In many respects the insect assemblages from this layer are very similar to those recorded from Pleistocene sites. The grain-beetles found in layer A are absent, with the exception of a single specimen of Cryptolestes. This may owe its presence to the bioturbation of the interface between layers A and B by the insect larvae described above.

THE NATURE OF THE TRANSITION

At about 520mm the insect fauna changes dramatically. There is no blending of the fauna of layer A with that of layer B. Layer A was not water-covered during its deposition, which appears to have been quite rapid. Layer B represents a period when the ditch contained a permanent body of water. This suggests that layer A was deposited just before the fort was abandoned.

17.2.2 Inner west ditch

The species-list from this feature is given in table 17.2, combining the data for the column samples AA and AAB.

Occupation of the site, as evidenced by the presence of the obligate *synanthrope S. granarius*, appears to have ceased at some point in the 340–370mm fraction. Prior to this the fauna of the ditch is restricted, possibly because the ditch was kept clear. The only beetles present are incidental soil-dwelling Staphylinids such as *Lathrobium impressum* and *Gyrohypus fracticornis*, dung-beetles (*Aphodius* spp) and the grain beetle *C. ferrugineus*.

At 300mm–303mm the first evidence for flooding of the ditch is seen. Water-beetles such as *Ilybius aenescens* and *Hydrobius fuscipes* appear. Subsequently species associated with waterside vegetation appear (*Cyphon* spp, *Telmatophilus caricis*) as do species associated with leaf litter and moss (*Coelostoma orbiculare*, *Olophrum piceum*) and species found in rotting vegetation (*Megasternum obscurum* and *Anotylus rugosus*).

It is apparent even from the limited evidence available that the same process occurred here as took place in the east annexe ditch during the deposition of layers B and C.

Again, species of pasture (*Meligethes* spp, *Rhagonycha fulva*) are present, as are species associated with trees. *Malthinus frontalis* is found in woodland, while *Strophosomus capitatus* feeds on birch.

The Elmid beetle *Oulimnius tuberculatus* is interesting in that it is usually found on the stony beds of large rivers (Holland 1972). Its presence here is thus something of a anomaly. However, it has a widespread distribution in the Clyde Valley today (Holland 1972).

Table 17.5
South Ditch: Coleoptera

Taxon	*Sample-Depth*	
	101–5	*106–10*
Megasternum obscurum (Marsh.)	1	1
Anucaena globulus (Payk.)	*	1
Hydraena spp	1	2
Hydraena britteni Joy	*	1
Catops sp	*	2
Anthobium atrocephalum (Gyll.)	1	*
Cyphon spp	1	1
Agriotes sp	*	1
Ips typographus (L.)	*	1

Table 17.6
Depression W33: Coleoptera

Taxon	*Sample-depth (cm)*				
	13–16	*19–22*	*30–2*	*33–5*	*35–7*
Trechus obtusus (Gr.)	1	*	*	*	*
Pterostichus sp	1	*	*	*	*
Hydroporus sp	*	1	*	*	*
Helophorus sp	*	*	1	*	1
Megasternum obscuruin (Marsh.)	2	*	*	*	*
Stenus bimaculatus (Gyll.)	1	*	*	*	*
Xantholinus linearis (Olivier)	1	*	*	*	*
Aleocharinae sp	*	*	*	1	*
Aphodius sp	*	1	*	*	*
Cyphon sp	1	*	*	*	*
Cryptolestes ferrugineus (Steph.)	1	*	*	1	*
Oryzaephilus surinamensis (L.)	*	*	*	1	*
Barynotus squamosus Germar	*	*	1	*	*
Sitophilus granarius (L.)	*	*	*	1	*

17.2.3 Middle west ditch

Two samples were examined, the first a 2kg bulk sample which was washed down in the manner described for the east annexe ditch samples. This came from the middle of the silt fill and contained much evidence of occupational debris. The second assemblage, from the top silt, came from small botanical samples and thus has a much more restricted fauna.

The middle silt contained three of the four species of grain pest found in the east annexe ditch, but in much lower concentrations. The absence of *Palorus ratzeburgi* is not significant. As table 17.3 shows, these species occur together in fixed proportions. One would have to wash down about 10kg of this layer before one would expect to find a single individual of *Palorus*.

Much the most interesting specimen from this layer, and indeed from the site itself, is the single individual of *Niptus holoeucus*, the Golden Spider Beetle. Although it is a common domestic pest today, it has only been recorded from one other archaeological site in Britain, that of the Church Street Roman sewer in york (Buckland 1976a). This record strongly supports Buckland's interpretation that it is a species introduced by the Romans (Buckland 1976b).

Also noteworthy is *Thanatophilus dispar,* a Silphid beetle feeding on carrion. This has frequently been found in Interglacial deposits but is much rarer today.

17.2.4 Outer west ditch

Two samples available gave an extremely limited fauna on which it is impossible to place a firm interpretation other than to note the presence of *Oryzaephilus surinamensis* in the lower sample, indicating that this represents deposition during, or immediately after, the period of occupation.

17.2.5 South ditch

Again this yielded only a very restricted fauna, comprising species which would be perfectly at home in a ditch, with the exception of *Ips typhographus*, a bark beetle feeding on spruce, not native to Britain unless feeding also on pine.

17.2.6 Depression in fort

On the evidence of the insect assemblages, this was at least a damp marshy place during the occupation of the site. It may even have been water-filled. It is the only feature where aquatic and waterside species are found associated with grain beetles, the three common grain beetles being present.

17.2.7 Building 7

This sample yielded one specimen each of the more common grain-beetles, *C. ferrugineus* and *O. surinamensis*. Considering

Table 17.7
Building 7: Coleoptera

Taxon	
Cryptolestes ferrugineus (Steph.)	1
Oryzaephilus surinamensis (L.)	1

the widespread distribution of these species across the site, there is little significance in their presence there.

17.3 GENERAL IMPLICATIONS OF THE GRAIN-BEETLES

Buckland (1981) has suggested that *Crytolestes ferrugineus* may have been a British species before the Roman occupation as it is capable of surviving in the wild. However, it has not been recorded from a pre-Roman site and the evidence points to it having been imported in association with *Sitophilus granarius* and *Oryzaephilus surinamensis* and *Palorus ratzeburgi*. This supports Kenward's view that the Romans were importing considerable quantities of grain to the north of Britain (Kenward & Williams 1979). The most similar assemblages come from northern military establishments at York and Carlisle. Small numbers of grain-beetles have been found on Roman sites in the south of Britain, at Barnsley Park, Gloucestershire (Coope & Osborne 1967) and Fishbourne (Osborne 1971).

The assemblage from Bearden is outstanding in view of its geographical location at the north-western edge of the Roman empire and it says a great deal for the Roman transport system that within a century of occupying Britain they had introduced Near-Eastern beetles to southern Scotland.

17.4 CLIMATOLOGICAL IMPLICATIONS OF THE FAUNA

The fauna contains no exotic species indicative of a climate markedly harsher or milder than that prevailing in the area today. There are a number of species with definite northern affinities such as the Omalines *Olophrum fuscum*, *Anthophagus alpinus*, *Acidota cruentata* and the weevil *Barynotus squamosus*, but all of these have been recorded from Scotland in the past hundred years. Given the northerly latitude of the site little can be said, except that the climate experienced by the Romans during their occupancy of the fort was noticeably cooler than that of the English Midlands today.

The numerical dominance of *Cryptolestes ferrugineus* over *Oryzaephilus surinamensis* was mentioned earlier. This may reflect the temperature as *Cryptolestes* is less susceptible to low temperatures (Howe 1965). This would imply that conditions were considerably cooler than those prevailing in the north of England at this time.