ANALYSIS OF INSECTS FROM MIDDLE BRONZE AGE TO ROMAN DEPOSITS FROM PERRY OAKS

by Mark Robinson

Introduction

Extensive archaeological excavation was undertaken on the sludgeworks at Perry Oaks following its decommissioning. Amongst the numerous archaeological features found were waterlogged pits, wells and waterholes with deposits suitable for the preservation of insect remains. They were mostly either of middle to late Bronze Age in date, being associated with small ditched middle Bronze Age enclosures, or of Roman date, being associated with a settlement and field system.

Of the order of 175 samples from potentially waterlogged deposits were assessed for insect and waterlogged macroscopic plant remains. Ten samples were identified as suitable for full-scale insect analysis.

Methods

Samples of 10 litres were washed over onto a 0.25mm mesh to recover waterlogged macroscopic biological remains. These flots were then drained and subjected to paraffin flotation to extract insect remains. The paraffin flots were washed in detergent and sorted in water with the aid of a binocular microscope at x12 magnification for insect fragments. Depending on the concentration of insect remains, either the full flot or a fraction of it was sorted. Specimens were identified with reference to the Hope Entomological Collections at the Oxford University Museum of Natural History, at magnification of up to x100.

Results

The results have been given in Table 1 for Coleoptera (beetles) and Table 2 for other insects. The tables either record the minimum number of individuals represented by the fragments identified from a sample or show presence / absence. Nomenclature follows Kloet and Hincks (1964; 1977; 1978). The tables also give sample volumes.

The results for the Coleoptera have also been displayed in Fig. 1, as species groups expressed as percentages of the minimum number of individuals of terrestrial Coleoptera in each assemblage. Aquatic Coleoptera have been excluded from the total because the assemblages accumulated under water and it enables some of the differences due to the environments of the deposits to be eliminated. The species groups used follow Robinson (1991, 278-81) and the members of each group are indicated in Table 1. Fig. 1 is intended as a starting point for the interpretation, rather than a comprehensive explanation of the results and not all the Coleoptera have been classified into categories.

Noteworthy Species Records

Hister quadrimaculatus L. A pronotum of *H. quadrimaculatus* was recovered from Sample

856 from Feature 178108, a middle / late Bronze Age pit. It is a predator, which occurs in dung and carrion, that is now very rare in Britain. Its present British distribution is on or near the South coast, rarely being found inland (Hyman 1992, 339). It was also recorded from a Roman context at Farmoor, Oxon (Lambrick and Robinson 1979, 107).

Onthophagus nutans (F.) This scarabaeoid dung beetle was represented by a left elytron from Sample 229 from Feature 135071 and a male head from Sample 277 from Feature 141024, both middle Bronze Age waterholes. It is now regarded as extinct in Britain, although several reliable 19th century and one early 20th century captures are known (Allen 1965). There appears to have been a thriving population of *O. nutans* in the Stanton Harcourt area of the upper Thames Valley during the Iron Age (Robinson 1990, 71) and it was also identified from the middle Bronze Age shaft at Wilsford (Osborne 1989, 98). *O. nutans* feeds on the dung of large herbivorous mammals on permanent pasture, making tunnels into the soil near the edge of the droppings which are stocked with dung for its larvae (Paulian 1959, 53).

Onthophagus taurus (Schreb.) *O. taurus* was identified from a right elytron in Sample 229 from Feature 135071, a middle Bronze Age waterhole, a male and a female head in Sample 277 from Feature 141024, another middle Bronze Age waterhole and a short-horned male head in Sample 227 from Feature 156031, a late Bronze Age or earlier well. It is another scarabaeoid dung beetle which is now extinct in Britain. It has been identified from several Neolithic and Bronze Age insect assemblages in England, including Neolithic deposits at Runnymede Bridge, Berks (Robinson 1991, 320), a late Bronze Age waterhole at Reading Business Park, Berks (Robinson 1992a), a middle Bronze Age well at Yarnton, Oxon (Robinson unpublished) and late Bronze Age sediment at Bidford-on-Avon, Warks (Osborne 1988). Reported early captures suggest that it was a very rare member of the British insect fauna in the early 19th century (Allen 1967, 205-6, 220-21; Jessop 1986, 26). *O. taurus* is now common in Southern and Central Europe but does still occur in Belgium, Northern France and the Channel Islands (Harde 1984, 232; Jessop 1986, 26; Paulian 1959, 88-9). Like *O. nutans*, it feeds on the dung of large herbivorous mammals on permanent pasture, particularly cattle dung, and stocks tunnels with dung at the edge of the droppings.

Aphodius varians Duft. Single right elytra of the pale spot form of *A. varians* were found in each of Sample 856 from Feature 178108 and Sample 857 from Feature 178122, two intercutting middle Bronze Age pits . This scarabaeoid dung beetle has not been captured in Britain for over 150 years (Allen 1967, 222-3) although it is still widely distributed in France (Paulian 1959, 171). It has been identified from several other British prehistoric sites including late Bronze Age sediments at Runnymede Bridge (Robinson 1991) and Wallingford Bypass (Robinson unpublished) and an Iron Age settlement at Mingies Ditch, Oxon (Allen and Robinson, 1993, 138).

Lytta vesicatoria (L.) Two heads, a pronotum and some fragments of elytron of *L. vesicatoria* were identified from Sample 857 from Feature 178122, a middle Bronze Age pit. It is mainly a Mediterranean insect that in Britain is a non-established, immigrant species but it occurs sporadically in Southern England, sometimes in large numbers (Fowler 1891, 101; Harde 1984, 35, 222). The adults chew the leaves of various trees and shrubs of the Oleaceae (Buck 1954, 26; Chinery 1986, 276; Harde 1984, 35). *L. vesicatoria* is the Spanish fly of medieval aphrodisiac potions. It has not previously been found from a prehistoric context although there are Roman (Robinson 1996) and post-medieval (Hakbijl 1986) archaeological records.

Apis mellifera L. (honey bee) Workers of *A. mellifera* were represented by a thorax and right middle tibia in Sample 856 from Feature 178108, a middle Bronze Age pit, a head and some fragments in Sample 857 from Feature 178122, another middle Bronze Age pit and 16 heads and other skeletal elements including hind tibia with their setae (pollen baskets) in Sample 828 from Context 174009, a Roman waterhole. It is uncertain whether honey bee was a natural colonist of the early Post-Glacial or whether there was a deliberate introduction of hive bees. Honey bee was certainly well established in Britain during the Roman period (Robinson unpublished). It is also known from a few Iron Age sites eg Mingies Ditch, Oxon (Allen and Robinson 1993, 139) and there is a single example of honey bee from a late Bronze Age context, at Runnymede Bridge, Berks (Robinson 2000, 147).

The Taphonomy of the Insect Remains

The deposits investigated all accumulated under water and the insect remains were preserved by the anaerobic conditions that resulted from the partial decay of organic remains as the sediments formed. All the waterholes / wells / pits supported populations of aquatic insects but, with the exception of Sample 277 from Feature 141024 and Sample 229 from Context 135071, both middle Bronze Age waterholes, the proportion of aquatic insects was very low. Sample 828 from Feature17049, a Roman waterhole, contained a major component of Coleoptera that occur in mouldy hay, straw etc (Fig. 1, Species Group 8) and Coleoptera of indoor habitats (Species Groups 9 and 10). It is plausible that many of the insects had been amongst organic refuse, from a building, that had been dumped in the waterhole. Some of these species were also present in Sample 856 from Feature 178108 and Sample 857 from Feature 178122, middle Bronze Age pits. Some of the insect remains in these two samples could also have been amongst refuse brought to the pits. Otherwise, the insects were derived from the landscape surrounding the deposits. The assumption has been followed that of the order of 50% of the terrestrial Coleoptera that reached the deposits by natural agencies had their origins within a circle of 50m radius centred upon the feature. The preservation of remains in Samples 802, 1293 and 1297 was poor and many of the insects would have been lost as a result of decay. Preservation of remains in the other samples, however, was good and there did not seem to have been any problems with differential decay.

The Middle to Late Bronze Age Environment and Site Activities

Introduction

The insects from the middle Bronze Age waterholes and pits (Sample 229 Feature 135071, Sample 802 Feature 103040, Sample 277 Feature 141024, Sample 856 Feature 178108, Sample 857 Feature 178122) comprised rich, diverse faunal assemblages. Terrestrial insects characteristic of well-drained warm open habitats predominated. There was much evidence from dung beetles that domestic animals were concentrated at the site. Disturbed ground, possibly cultivated soil, was also present. Woodland appears largely to have been absent, although there was certainly some mixed scrub, which could have been in the form of hedges. Not all the samples contained synanthropic beetles but species characteristic of indoor habitats and timber structures were found in one group of pits. These aspects of the site are considered in more detail below.

The waterholes and pits were possibly contemporaneous: five radiocarbon dates from Feature 135071 being centred on 1345cal BC, Feature 141024 giving a date of 1380-1040 cal BC (2 sigma) and Feature 178108 giving a date of 1450-1210 cal BC (2 sigma).

Woodland, Scrub and Hedges

The wood and tree-dependent Coleoptera of Species Group 4 ranged from 1.2 to 6.4% of the terrestrial Coleoptera in the four samples from the Bronze Age shown in Fig. 1. A slight presence of *Quercus* sp. (oak) was suggested by a single example of the bark beetle *Scolytus intricatus*. *Lytta vesicatoria* had perhaps been attracted to a tree of *Fraxinus excelsior* (ash). The majority of the wood and tree-dependent Coleoptera were species which tend to be associated with scrub and hedgerow bushes. They included *Acalles turbatus*, a weevil which bores into dead twigs and small bushes especially of *Crataegus* sp. (hawthorn) in hedges, *Magdalis ruficornis*, a bark-feeding weevil usually associated with *Prunus spinosa* (sloe) and *Scolytus rugulosus*, a bark beetle of Rosaceae (sloe, hawthorn etc). There were numerous examples of the pentatomid bug *Dolycorus baccarum*, which feeds on *Prunus spinosa* (sloe), in Sample 857. The occurrence of *Phyllodecta vulgatissima*, which feeds on leaves of the sallow group of willows such as *Salix caprea* and *S. cinerea*, and *Chalcoides sp.*, which feeds on the leaves of both *Salix* spp. (willows) and *Populus* spp. (poplars) showed that other shrubs were also present. Although there were some beetles of decaying wood, species characteristic of old woodland were entirely absent. *Phymatodes alni*, for example, although now rare is as much a species of dead wood in hedgerows as woodland.

The results suggested that there was little, if any, woodland in the vicinity of the site during the middle Bronze Age. In all but Sample 227 from Feature 141024, the abundance and range of species would be consistent with an otherwise open landscape, divided by thorn hedges in which grew a few sallows and oak trees. Sample 277 had a higher proportion of tree and wood-dependent Coleoptera, Species Group 4 comprising 6.4% of terrestrial individuals. It contained the same species as the other samples, with several examples of *Acalles turbatus*. Such a result could be explained either by the waterhole being immediately adjacent to a hedge or by Context 121044, from which Sample 277 was taken, having accumulated after the waterhole had been abandoned and that there had been local scrub regeneration around it.

Grassland, Arable and the Open Landscape

All the Bronze Age insect assemblages gave strong evidence for grassland. The chafer and elaterid beetles of Species Group 11, such as *Phyllopertha horticola* and *Athous haemorrhoidalis*, comprised around 5% of the terrestrial Coleoptera. Another member of this group, *Agrypnus murinus*, which is characteristic of well-drained soils, was well-represented in Sample 856 from Feature 178108 and Sample 857 from Feature 178122, the intercutting pits. Many of the Carabidae (ground beetles) commonly occur in grassland including *Pterostichus cupreus*, *Calathus fuscipes* and some species of *Amara*. A warm sunny aspect to the site, with sheltered areas of permanent grass which was relatively short, was suggested by the occurrence of *Brachinus crepitans* (bombardier beetle) in several of the samples. This curious beetle defends itself with an explosive discharge. Another beetle of warm dry habitat is the tenebrionid *Opatrum sabulosum*, which was represented by six individuals in Sample 857. It occurs in sandy areas where there are breaks in the vegetation cover and now has a distribution on Britain which is principally coastal, although it is known from parts of

Berkshire and Surrey (Brendell 1975, 10). The lygaeid bug *Aphanus rolandri*, also found in this sample, only occurs in sheltered sunny habitats. Further evidence of broken sandy grassland was given by *Calathus* cf. *ambiguus* but there was no other evidence of the heathland vegetation with which this beetle is often associated, although heathland subsequently developed in the region.

Grass-feeding insects included cicadellid bugs from the genus *Aphrodes*. The phytophagous beetles gave some indication of the grassland vegetation. They included *Ceuthorhynchidius troglodytes* which feeds on *Plantago lanceolata* (ribwort plantain), *Mecinus pyraster* which feeds on *P. media* (hoary plantain) as well as *P. lanceolata*, *Hydrothassa glabra* which feeds on *Ranunculus* spp. (buttercups) and *Galeruca tanaceti* which is mostly associated with *Achillea millefolium* (yarrow). A more general association with Compositae is shown by *Olibrus* sp. Weevils from the genera *Apion* and *Sitona* which feed on clovers and vetches (Species Group 3) ranged from 2.3 to 3.7% of the terrestrial Coleoptera. Such values are not high enough to suggest hay meadow but are characteristic of grassland that has not been so heavily grazed as to prevent the flowering of clovers. Two of the more host-specific members of this group that were identified, *Sitona hispidulus* and *S. lepidus* mostly feed on *Trifolium* spp. (clovers) although they can also occur on *Medicago* spp. (medicks) (Morris 1997, 51, 57).

Evidence that the grassland was grazed by domestic animals was given by the scarabaeoid dung beetles of Species Group 2. These beetles feed on the droppings of larger herbivores on pasture. They ranged from 9.3% of the terrestrial Coleoptera in Sample 229 from Feature 135071 to 19.2% of the terrestrial Coleoptera in Sample 856 from Feature 178108. The lower value is what might be expected from a largely pastoral landscape but the higher value suggested that domestic animals were concentrated in the vicinity of the middle Bronze Age pit. It is possible that the enclosure in which this pit was situated was used for management of stock which grazed over a much wider area.

The most numerous of the scarabaeoid dung beetles were species of *Aphodius*: *A.* cf. *sphacelatus* in Samples 229 and 277, *A. granarius* in Samples 856 and 857. However, species of *Onthophagus* were also well-represented in samples 229and 277), comprising 33.3% individuals in these two samples. Two species of *Onthophagus* in Samples 229 and 277, *O. nutans* and *O. taurus*, are now extinct in Britain. Individuals of *Aphodius* greatly outnumber *Onthophagus* in present-day dung faunas in Britain. The proportion of *Onthophagus*, however, rises further south in Europe. It is possible that mean summer temperatures were somewhat warmer when some of the middle Bronze Age deposits accumulated (see below).

The insects from the Bronze Age samples also included members of several other families of Coleoptera which commonly occur in the droppings of domestic animals. They included the hydrophilids *Sphaeridium bipustulatum* and *Megasternum obscurum*, the histerid *Hister quadrimaculatus* and the staphylinids *Anotylus sculpturatus* gp. and *Philonthus* spp. Some of these species are members of Species Group 7 and also occur in other categories of foul organic material including dung heaps and middens.

Coleoptera are very good at demonstrating the importance, species composition and use of grassland within the vicinity of a waterlogged deposit, but are less effective at indicating the presence of arable (Robinson 1983). This is because cereal crops in Britain do not commonly suffer from beetle pests. Sample 277 from Context 141024 did, however, contain a single example of *Aphthona* cf. *euphorbiae*, a beetle that as well as occurring on species of *Euphorbia* (spurges) also feeds on *Linum usitatissimum* (flax). Otherwise, possible evidence of arable was given by the carabid (ground) beetles of Species Groups 6a and 6b which are favoured by areas of bare or weedy disturbed ground. The two members of Species Group 6a, *Agonum dorsale* and *Harpalus rufipes*, beetles of general disturbed ground or arable, ranged from 0 to 3.5% of the terrestrial Coleoptera. The species of *Amara* such as *A. apricaria* and *A. bifrons* that belong to Species Group 6b, beetles of sandy or dry disturbed ground and arable, ranged from 0 to 0.7% of the terrestrial Coleoptera. Their abundance was certainly sufficient to show the occurrence of their habitat in the vicinity of the waterholes. However, it is much harder to establish whether they were from cultivated ground or disturbed, weedy and bare ground as occurs around settlements. In the case of Sample 229 from Feature 135071, there was no evidence from the insects for the proximity of settlement whereas Sample 856 from Feature 178108 and Sample 857 from Feature 178122 contained synanthropic beetles and it is very likely that there would have been areas of bare and weedy ground between buildings (see below).

The phytophagous beetles included some that are dependent on potential arable weeds. For example *Pseudostyphlus pillumus* feeds on *Tripleurospermum*, *Anthemis* and *Matricaria* spp. (mayweeds) and many of the Ceuthorhynchinae feed on Cruciferae that are arable weeds. However, many of the phytophagous beetles feed on herbaceous plants that occur in several habitats. *Chaetocnema concinna*, which feeds on Polygonaceae, was present in all the Bronze Age samples but it is uncertain whether it was feeding on *Rumex* spp. (dock) at the base of the hedges, in waste ground, in grassland or growing in cultivated ground. It could also have been feeding on other plants such as *Polygonum aviculare* (knotgrass) growing on disturbed ground.

Marsh and Aquatic Habitats

All the marsh and aquatic insects from the middle Bronze Age samples are likely to have lived in or around the waterholes / pits. A population of *Hydraena testacea* apparently lived in Waterhole Feature 135071 (Sample 229) while *Helophorus* sp. (*brevipalpis* size) thrived in Waterhole Feature 141024 (Sample 277). All the samples also contained a few other water beetles characteristic of stagnant conditions, such as *Agabus bipustulatus*, *Hydrobius fuscipes* and *Limnebius papposus*. Chironomid midge larvae were found in some of the samples. The occurrence of *Tanysphyrus lemnae* in Sample 229 suggested that its host plant *Lemna* sp. (duckweed) covered the surface of the water in Waterhole Feature 229. There was no other evidence of aquatic plants from the samples. Some staphylinid beetles including *Lesteva longoelytrata* and *Platystethus cornutus* gp. probably lived on mud or damp ground around the margins of the waterholes and pits. The carabid beetle *Agonum marginatum* was identified from Sample 229 but there were relatively few carabids that occur amongst marginal and damp ground vegetation.

Settlement-related Habitats

The insects from Sample 229 from Feature 135071 and Sample 277 from Feature 141024 and Sample 802 from Feature 103040, two of the waterholes, gave no indication of the proximity of human settlement or buildings. Woodworm beetles of Species Group 10 and the synanthropic beetles of Species Group 9 which are favoured by indoor habitats were absent. The beetles of foul organic material of Species Group 7 were no more abundant than might be expected, given the occurrence of pasture grazed by domestic animals and the numbers of Lathridiidae (Species Group 8) were high, but not unusually so in Sample 277.

The insects from Sample 856 from Feature 178108 and Sample 857 from Feature 178122, the intercutting pits, however, gave good evidence for the presence of timber buildings and other aspects of a settlement. Woodworm beetles of Species Group 10, mostly *Anobium punctatum* but also *Lyctus linearis*, ranged from 2.2 to 3.6% of the terrestrial Coleoptera in these samples. They are rare members of the British woodland insect fauna under natural conditions because their habitat of dry dead wood is uncommon but they thrive in timber structures. The cerambycid beetle *Phymatodes testaceus*, which was present in both Samples 856 and 857, could have attacked old oak timbers on the outside of a building or have emerged from firewood, rather than being from naturally occurring dead wood. The general synanthropic beetles of Species Group 9a, represented by *Ptinus fur*, ranged from 1.2 to 3.0% of the terrestrial Coleoptera. *P. fur* naturally feeds on debris in bird and rodent nests but flourishes in much larger numbers inside buildings amongst stable debris, in old hay, in thatch and amongst relatively dry waste in neglected corners from food preparation. The values for these two groups of beetles from the two samples strongly suggests that there was a building adjacent to the pits or that debris from a building was dumped into them. Feature 178122 cut Feature 178108 after it had silted up, so the results imply that there was some continuity to the presence of a building or buildings on this part of the site. Members of the Lathridiidae (Species Group 8) comprised around 5% of the terrestrial Coleoptera in the two samples. They tend to occur in old hay, thatch, sweet compost etc. The two most numerous, *Lathridius minutus* gp. and *Corticaria punctulata*, tend to flourish in settlements.

The insects from Samples 856 and 857 gave no other evidence for high concentrations of organic refuse associated with any settlement. They did, however, give some indication of nettle-covered disturbed ground as occurs around settlements. The beetles *Brachypterus urticae*, *Apion urticarium*, *Cidnorhinus quadrimaculatus* and *Ceutorhynchus pollinarius*, all of which feed on *Urtica dioica* (stinging nettle), comprised 3.1% of the terrestrial Coleoptera in these samples. They only made up 0.5% of the terrestrial Coleoptera in Samples 229 and 277, from the other two waterholes. Samples 856 and 857 were the only Bronze Age samples to contain the nettle-feeding bug *Heterogaster urticae*. Many of the beetles that occur in arable fields (see above) also occur on disturbed and weedy ground. For example, the ground beetle *Agonum dorsale* and the Polygonaceae-feeding leaf beetle *Chaetocnema concinna* already mentioned could as readily have been occurring on waste ground in a settlement as in cultivated fields. However, several of the samples contained beetles which feed on members of the Malvaceae, particularly *Malva sylvestris* (common mallow), such as *Podagrica fuscicornis* and *Apion aeneum*. The Malvaceae are very vulnerable to grazing and are most likely to have grown in areas from which stock were excluded, such as waste ground in settlements.

Other Environments
All the insects identified could have occurred in the habitats already described. There was no evidence that there had been any development of heathland, the Ericaceae (heather etc)-feeding beetles of Species Group 12 being absent. Although there was evidence for

settlement, the minor stored grain pests known to have been present in Britain during the Bronze Age were not found. Single individuals of *Apis mellifera* (honey bee) workers were discovered in each of Samples 856 and 857, the middle Bronze Age pits Features 178108 and 178122. While these do not provide strong enough evidence to prove that beekeeping was undertaken at the settlement, it does show that the resources of bee colonies, honey, wax and propolis (a resinous waterproof glue), would have been available. Sample 856 contained several beetles with curious habitats from the family Silphidae. *Thanatophilus sinuatus* is a carrion beetle likely to have been feeing on animal remains in the vicinity of the deposit. *Aclypea opaca* is a rare beetle most usually attacking the roots of turnip and beetroot but it probably feeds on other roots as well, so cannot be used to argue the Bronze Age cultivation of root vegetables. Finally, *Silpha atrata*, which feeds on snails and slugs, showed the presence of land snails. (Soil conditions on the site were unsuitable for the preservation of shells).

The Roman Environment and Site Activities

Introduction

There were insufficient insects from Samples 1293 and 1297 from Feature 174019, an early Roman waterhole of Phase RCP2, for detailed interpretation. However, useful assemblages were recovered from Sample 828 from Feature 174009, a Roman waterhole of Phase RCP3 and Sample 170 from Feature 135087, a late Roman pit. While both samples gave evidence of an open terrestrial landscape, there were contrasts between them. Sample 828 gave very strong evidence for the proximity of settlement-related habitats, including a timber building. Sample 170, however, had no strong evidence it was close to a settlement. Instead, it gave rather better information on more general landscape conditions. Dung beetles gave evidence for the grazing of domestic animals and disturbed ground was also present. There was very little indication of woodland or scrub.

Woodland, Scrub and Hedges

The wood and tree- dependent Coleoptera of Species Group 4 comprised 0.3%% of the terrestrial Coleoptera in Sample 828 from Waterhole Feature 174009 and 1.3% of the terrestrial Coleoptera in Sample 170 from pit Feature 135087. They included *Platystomos albinus*, which is associated with dead wood in old woodland or isolated old trees and *Magdalis armigera* which feeds on twigs and small branches of *Ulmus* spp. (elms). There were no beetles associated with scrub or hedge. The results suggested a very open landscape with perhaps no more than isolated trees.

Grassland, Arable and the Open Landscape

The chafers and elaterids of Species Group 11 only comprised 1.1% of the terrestrial Coleoptera from Sample 828 whereas they comprised 2.7% of the terrestrial Coleoptera from Sample 170. *Athous hirtus* was the only member of this group to be represented by more than a single individual. Various of the carabid (ground) beetles such as *Trechus obtusus* or *quadristriatus* and the staphylinid (rove) beetles such as *Xantholinus linearis* or *longiventris* can occur in grassland although no strong grassland faunal element could be distinguished amongst the members of these families in the Roman samples. The more host-specific phytophagous beetles of grassland plants included *Gymnetron labile* and *G. pascuorum*, both of which feed on *Plantago lanceolata* (ribwort plantain). Weevils from the genera *Apion* and *Sitona* which feed on clovers and vetches (Species Group 3) ranged from 0.9% of the terrestrial Coleoptera in Sample 828 to 2.7% of the terrestrial Coleoptera in Sample 170. This suggests either overgrazed pasture or only a slight presence of grassland around the waterhole of Sample 828 whereas Sample 170 gave stronger evidence for grassland.

Evidence for grazing by domestic animals was given by the scarabaeoid dung beetles of Species Group 2. They comprised 3.7% of the terrestrial Coleoptera Sample 828 from Feature 174009 and 10.7% of the terrestrial Coleoptera in Sample 170 from Feature 135087. The percentage for Sample 828 suggested no more than a slight or background presence of domestic animals, whereas the result from Sample 170 is appropriate to a pastoral landscape or domestic animal being kept in the field in which the pit Feature 135087 was situated. The scarabaeoid dung beetles in the Roman samples were almost all species of *Aphodius* such as *A. granarius* and *A.* cf. *sphacelatus* along with a few examples of *Geotrupes* sp. There was only a single individual of *Onthophagus*, *O. ovatus*, which is still common in Britain. Beetles from other families which occur in dung, such as *Cercyon haemorrhoidalis*, *Megasternum obscurum* and *Xantholinus glabratus* were also present.

Disturbed or sparsely weedy disturbed ground was suggested by the occurrence of the carabid (ground) beetles *Agonum dorsale* and *Harpalus rufipes* (Species Group 6a). They comprised 2.0% of the terrestrial Coleoptera in Sample 828 and 2.7% of the terrestrial Coleoptera in Sample 170. These values are certainly high enough to suggest the occurrence of their preferred habitat nearby. However, in the case of Sample 828, it is much more likely that these beetles were from disturbed ground associated with a settlement rather than any arable fields beyond. Likewise, the phytophagous insects of weeds in this sample were more likely to have been from settlement habitats. Unfortunately, the insect assemblage from Sample 170 was small and it is not possible to determine further details of the disturbed ground habitats.

Marsh and Aquatic Habitats

Small water beetles, particularly *Helophorus* sp. (*brevipalpis* size) and *Ochthebius* cf. *minimus* and the larvae of Chironomidae (midges) lived in the waters of the various Roman waterholes and pits. The damp margins of the water-hole Feature 174009 (Sample 828) appear to have favoured beetles such as *Lesteva longoelytrata* and *Platystethus cornutus* gp. However, there was no evidence of marsh or aquatic plants.

Settlement-related Habitats

The insects from Sample 828 from the Roman pit Feature 174009 included several faunal elements highly characteristic of settlements. Species Group 10, beetles which infest structural timber, comprised 4.3% of the terrestrial Coleoptera. They were all *Anobium punctatum* (woodworm). In the almost complete absence of other woodland insects, they provided very strong evidence for the presence of timber structures. The general synanthropic beetles of Species Group 9a were, at 9.2% of the terrestrial Coleoptera, particularly well represented. *Ptinus fur*, which occurs inside buildings amongst stable debris, old hay, in granary waste and amongst food scraps in neglected corners, predominated. However, there were also some examples of *Mycetaea hirta*, a fungal feeder which occurs in damp places inside buildings, sometimes feeding on the dry rot fungus and *Typhaea stercorea*, another fungal feeder which occurs in old haystack bottoms as well as in such indoor habitats as stable bedding. The Lathridiidae (Species Group 8) were also well represented, comprising 13.2% of the terrestrial Coleoptera. The most numerous of these fungal feeders was *Lathridius minutus* gp. which although readily occurring in outdoor habitats such as grass tussocks, is very much favoured by the various accumulations of damp plant material to be found on settlements such as old hay, animal bedding and thatch. *Xylodromus concinnus*, another beetle likely to have been occurring with some of the other synanthropic beetles amongst mouldy organic material inside a building, was common in Sample 828.

It is clear that the pit Feature 174009 was either next to a building or that organic refuse from inside a building had been dumped in it. It is possible that the building was domestic or agricultural. However, it is unlikely to have been used for the long-term storage of fully cleaned cereals because even the minor grain pests were absent.

There was probably a limited quantity of settlement-related foul organic refuse because *Anotylus inustus*, which tends to favour such material, had joined *A. rugosus* and *A. sculpturatus* gp., staphylinid beetles that are also common in animal droppings and natural accumulations of decaying material. However, the hydrophilid and staphylinid beetles of Species Group 7 which occur in a wide range of foul organic materials as well as dung were, at 5.7% of the terrestrial Coleoptera in Sample 828, no more abundant than in the other samples from the site.

Nettle-covered disturbed or waste ground as occurs in settlements was a major part of the environs of pit Feature 828. The beetles *Brachypterus urticae*, *Apion urticarium* and *Cidnorhinus quadrimaculatus*, all of which feed on *Urtica dioica* (stinging nettle), comprised 10.9% of the terrestrial Coleoptera from Sample 828, a very high value indeed for these species. Nettle-covered ground would have provided an ideal habitat for some of the carabid beetles that were well represented, such as *Nebria brevicollis*. Other plants likely to have been growing amongst the nettles that were suggested by the Coleoptera included members of the Malvaceae, most likely *Malva sylvestris* (common mallow), the food of *Podagrica fuscicornis*, *Apion rufirostre* and *A. radiolus* and *Rumex* spp. (docks) or *Polygonum* spp. (knotgrass), the host of the most numerous leaf beetle from the sample, *Chaetocnema concinna*.

The high concentration of *Apis mellifera* (honey bee) remains in Sample 828 suggested that the Roman settlement was involved with beekeeping. There were the remains of at least 16 workers in a 3-litre sample. Honey bees need a source of water to dilute their honey when they are feeding on it during the winter. Once a colony has found a source of water, its location is communicated amongst the workers and they will all tend to use it. Inevitably, some fall in and drown. The pit Feature 174009 appears to have been used as such a water source. It is unlikely that the occupants of the settlement would have tolerated a bee colony other than a managed hive.

Sample 170 from Waterhole Feature 135087 contained a single example of the synanthropic beetle *Ptinus fur* but woodworm beetles were absent. Some nettle and mallow-feeding beetles, such as *Apion urticarium* and *A. radiolus*, were present but not in such high proportions as in Sample 828. The insects thus suggested this waterhole was distant from any settlement.

Discussion

There had already been much human activity and modification to the environment at Perry Oaks before the first deposits in which insects were preserved accumulated. Insects have been analysed from two earlier sites in the area which help place the Perry Oaks middle and late Bronze Age insect assemblages in the regional sequence: Runnymede Bridge, Berks (Robinson 1991; Robinson 2000) and on a much smaller scale, Staines Road Farm, Shepperton, Surrey (Robinson unpublished).

The Runnymede sequence, from palaeochannel sediments of the Thames, began in the Mesolithic, the earliest large assemblage of insects dating to circa 5500 BC. It included a fauna of mixed woodland with an "old woodland" element of Coleoptera which are now associated with over-mature trees or woodland of great age. Some of these species are now very rare or extinct in Britain. Open-country species were absent and there was only a very slight presence of scarabaeoid dung beetles consistent with the presence of wild larger herbivores. A sample from the start of the Neolithic, dated to 4040 to 3785 cal BC (2□)still had a fauna of closed woodland but a rise in scarabaeoid dung beetles suggested domestic animals were being herded in the woodland. A sequence which extended from circa 3500 to shortly before 2000 cal BC showed a landscape of small clearances which still retained at least one third tree cover. *Alnus glutinosa* (alder) probably predominated at the site but this was because the channel was flanked by the floodplain. The insects suggested *Quercus* sp. (oak), *Tilia cordata* (small-leaved lime), *Ulmus* sp. (elm) and *Fraxinus excelsior* (ash) mixed woodland on drier ground. There was still a strong "old woodland" element to the fauna with species now rare or extinct in Britain. Open areas of grassland were also a significant aspect of the Neolithic landscape around Runnymede as suggested by the Scarabaeidae and Elateridae of Species Group 11 and other more host-specific phytophagous species. As in the Bronze Age samples from Perry Oaks, there was a group of beetles which tend to be associated with dry sun-warmed habitats on sandy and chalky soils, most of which now have somewhat coastal distributions. Scarabaeoid dung beetles gave strong evidence that the open areas were grazed by domestic animals. Although the sequence spanned a long period of time, the only changes within it were probably related to a local clearing going out of use.

Unfortunately, there was a gap in the Runnymede sequence for the early to middle Bronze Age (c. 2000 - 1200BC). An early Bronze Age pond somewhat similar to the Perry Oaks waterholes, on gravel at Staines Road Farm, Shepperton, was dated to 2300-1750 calBC (2□). Unfortunately, the insect remains from it were poorly preserved. However, they reflected a landscape which had experienced substantial clearance, with grassland being grazed by domestic animals. As at Perry Oaks, the weevil *Acalles turbatus* suggested the occurrence of thorn scrub but it was thought to represent scrub which had colonised the immediate area around the waterhole after it had been abandoned.

Sedimentation resumed at Runnymede in the late Bronze Age, with a radiocarbon date of 1265-935 calBC (2□) being obtained for one short sequence and a longer sequence spanning the period from circa 1000-850 calBC. Major changes had occurred since the Neolithic. Thorough clearance had taken place. The wood and tree-dependant beetles of Species Group

4 had declined to under 2% of the terrestrial Coleoptera. Woodland species had largely been replaced by species of rosaceous thorn scrub (hawthorn, sloe etc) and *Salix* sp. (willow). There was a strong and consistent presence of beetles of grazed grassland. There were fewer beetles that nowadays tend to occur in sandy coastal areas than from the Neolithic samples but this group was not entirely absent. Insects of cultivated ground were only found in a bird pellet which was interpreted as being from a bird which had been feeding on arable plots beyond the floodplain.

The results were in many ways very similar to those from middle Bronze Age Perry Oaks, allowing for the substrate of the site at Runnymede Bridge being damper because it was on the bank of the Thames. The landscape evidence from Perry Oaks of hedged enclosures of rich pasture for domestic animals and some cultivated fields can easily be seen as a continuation of the same late Bronze Age landscape at Runnymede Bridge onto drier ground. The occurrence of beetles which now tend to occur in warm sandy coastal habitats was perhaps a reflection of the development of permanent pasture on well-drained soil, a habitat which has now almost entirely disappeared from the region. These soils have now all been built over, cultivated, had their grassland improved or degenerated to heathland.

Despite the existence of a late Bronze Age settlement at Runnymede and even some midden debris in the river, the general sequences from Runnymede had fewer synanthropic insects than did middle Bronze Age pits Features 178108 and 178122 at Perry Oaks. The synanthropic beetles of Species Group 9a were almost absent and there were very few of the woodworm beetles of Species Group 10. This was perhaps because the river resulted in the sediments at Runnymede containing insects from a very large catchment, diluting remains of very local origin. There was, however, an example of honey bee from the short late Bronze Age sequence at Runnymede (Robinson 2000, 153), which was somewhat later in date than the honey bees from pits Features 178108 and 178122 at Perry Oaks. They are so far the only Bronze Age and the earliest records of honey bee from Britain. While not demonstrating bee-keeping, they show that wax would have been available for bronze casting as well as honey as a sweetening agent.

Looking to the river gravels of the upper Thames Valley, Oxon, insects have been investigated from a middle Bronze Age waterhole dated to 1680-1420 calBC (2□) and a late Bronze Age waterhole dated to 1020-800 calBC (2□) at Eight Acre Field, Radley (Robinson 1995), a middle Bronze Age waterhole at Bradford's Brook, near Wallingford (Robinson unpublished) and a late Bronze Age waterhole with combined dates of 1310-980 cal BC at Mount Farm, near Dorchester (Robinson and Wilson 1987, 40-1) as well as a late Bronze Age waterfront site at Wallingford Bypass similar to the one at Runnymede Bridge (Robinson unpublished). All had insect assemblages which suggested landscapes which had largely been cleared of woodland, some had species of scrub which could have been occurring in hedgerows, all gave evidence for relatively species-rich grassland with sufficient scarabaeoid dung beetles to suggest concentrations of domestic animals and the water-hole sites also had beetles of disturbed-ground habitat that readily occur in arable fields. The Bradford's Brook assemblage included some species which, as at Perry Oaks, were highly suggestive of a settlement on the site: *Anobium punctatum* (woodworm beetle), the indoor synanthropic beetle *Ptinus fur* and, not found at Perry Oaks, the minor grain pest *Stegobium paniceum*.

Looking further afield, insects from middle Bronze Age pits at Godmanchester, Cambs, dated to 1640-1420 cal BC (2□) gave evidence for very open conditions (Robinson unpublished). High percentages of scarabaeoid dung beetles from them indicated concentrations of domestic animals leaving dung around them while carabid beetles of sandy disturbed ground suggested there could have been cultivated areas. An open landscape of chalk pasture was also suggested by insects from the middle Bronze Age shaft at Wilsford, Wilts (Osborne 1989). It gave a combined radiocarbon date of 1520-1390 calBC (2□). Both the Wilsford Shaft and a middle Bronze Age well near Etton, Cambs dated to 1980-1620 calBC (2□) (Robinson 1992b) had well-developed synanthropic faunal elements with numerous examples of *Anobium punctum* and *Ptinus fur*.

Two middle Bronze Age insect assemblages from wells stand out from the others including Perry Oaks: the Wilsford Shaft (Osborne 1988) and a well at Yarnton (Robinson unpublished). Both had extremely high levels of scarabaeoid dung beetles, which comprised around 50% of the terrestrial Coleoptera. Many of these dung beetles are now extremely rare or extinct in Britain, the significance of which is discussed below.

The results from the middle Bronze Age waterholes and pits at Perry Oaks showed the changes which had occurred to the British insect fauna with the creation of an organised agricultural landscape. They very much agree with the results which have been recorded on other sites in the Thames valley and elsewhere. They also showed the development of a synanthropic fauna of beetles associated with timber buildings which has not been recorded prior to the middle Bronze Age.

The scrub was presumably cleared at Perry Oaks at some stage in the Iron Age, although unfortunately there are no other local sites with insect evidence. However, evidence is available for comparison for the Roman period from a nearby site on the gravel terrace at Thorpe Lea Nurseries, Surrey (Robinson unpublished). An insect assemblage very similar to that from Perry Oaks Roman pit Feature 174009 was analysed from a mid-Roman waterhole in a settlement. It likewise contained a beetle fauna of an open landscape, although the proportion of scarabaeoid dung beetles was low. Equally strong evidence for the proximity of a timber building or the dumping of refuse from such a building into the waterhole was given buy the woodworm beetles of Species Group 10, the indoor synanthropic beetles of Species Group 9a and the Lathridiidae of damp hay and straw of Species Group 8. The settlement similarly had a large area of weedy or waste ground, as suggested by beetles which feed on *Urtica dioica* (stinging nettle), Malvaceae (mallows) and *Rumex* spp. (docks) or *Polygonum* spp. (knotgrass etc).

Many Roman sites have been investigated for insect remains on the gravels of the upper Thames valley, Oxon (Robinson 1983; Robinson 1992c, 57-9). The results from them suggested that the floodplain and part of the first gravel terrace tended to be used for the raising of domestic stock, as indicated by the proportion of the scarabaeoid dung beetles of Species Group 2 while the settlements on the higher (and drier) terraces performed mixed farming, as indicated by a lower proportion of dung beetles and the presence of the carabid beetles of Species Groups 6a and 6b that are favoured by cultivated soil. The Coleoptera from the late Roman waterhole Feature 135087 at Perry Oaks perhaps show some evidence for the mixed farming of the drier gravel terraces.

An increase in beetles which flourish in various habitats associated with buildings, including all the species of such habitats that occurred at Perry Oaks, was also noted for the upper Thames valley. It was thought to represent an increased intensity of occupation of settlements on the river gravels in the Roman period, perhaps including the housing of some domestic animals inside for part of the year. The absence, as at Perry Oaks, of the very serious pests of stored grain that were introduced by the Romans, such as *Oryzaephilus surinamensis* and *Sitophilus granarius* was attributed to large-scale storage of de-husked grain perhaps only occurring on major villas, in towns and on military sites.

The results from the Roman pits and waterholes at Perry Oaks fall into the pattern shown by other sites in the Thames valley. The insect faunas reflected an open mixed agricultural landscape in which the settlement area was large enough to have its own distinctive fauna of weedy ground. There was also a substantial synanthropic element from a timber building that had perhaps held some animal bedding or hay.

Scarabaeid Dung Beetles and Climate

It has already been noted (p.) that three species of scarabaeid dung beetle which are now extinct in Britain were found in the middle Bronze Age samples: *Onthophagus nutans*, *O. taurus* and *Aphodius varians*. *O. taurus* was also found in the late Bronze Age sample. Palaeoentomological studies have found over 20 sites in Southern England and the Midlands with at least one of eight species of scarabaeid dung beetles, especially from the genus *Onthophagus*, that are now extinct or very rare in Britain (Robinson, in prep). The sites were mostly Neolithic to Iron Age in date. Examples from near Perry Oaks include from Neolithic Runnymede (Robinson 1991), early Bronze Age Staines Road Farm (Robinson unpublished) and middle Bronze Age Dorney (Eton Rowing Lake), Bucks (Robinson unpublished). Their present ranges in Europe are almost entirely in regions with warmer summer temperatures and a more continental climate than Britain. However, most of these beetles were by documented by collectors as very rare members of the British fauna into the 19th or in some cases early 20th century, when the British climate was slightly cooler than at present. In Neolithic to early Bronze Age deposits and late Bronze Age deposits, these beetles, although present, are never common. For them to be found at all in archaeological deposits they must have been more abundant than they were in the 19th century and it is possible that a slight decrease in mean summer temperature in comparison to those periods was the explantation for their decline. However, they are vulnerable to ploughing, larvae of *Onthophagus*, for example, overwintering in the dung-filled tunnels in which they developed. From the Iron Age onwards, the more fertile, better drained soils would have been in demand for arable rather than left as permanent pasture. Most modern grassland tends to be improved by ploughing and re-seeding. Thus, human activity could also have contributed to their decline and eventual extinction.

The coleopteran assemblages from the Wilsford Shaft, Wilts (Osborne 1989) and a well at Yarnton, Oxon (Robinson unpublished) stand out from all the other archaeological insect faunas so far analysed because they contain more of the extinct / very rare scarabaeids and because they have a much higher proportion of individuals of the genus *Onthophagus* in relation to individuals of the genus *Aphodius*. *Onthophagus* species and their close relatives are the main dung beetles of the Mediterranean basin, being replaced by Aphodiinae further north (Jessop 1986). Osborne (1989) pointed out that the ratio of *Onthophagus* to *Aphodius* from the Wilsford Shaft would now be more appropriate to mid-France than Southern England. These two assemblages were of very similar dates towards the end of the middle Bronze Age, Wilsford giving combined radiocarbon dates of 1520-1390 calBC (2□) and Yarnton giving combined dates of 1610-1430 calBC (2□).

These results are relevant to Perry Oaks because the middle Bronze Age waterhole samples contained several specimens of *O. nutans* and *O. taurus* and there was a high ratio of *Onthophagus* to *Aphodius* spp. Five radiocarbon dates from Feature 135071 centred on 1345 cal BC while a date of 1380-1040 cal BC (2□was given by Feature 141024. These two deposits were perhaps 100-200 years younger than the Wilsford and Yarnton deposits. A comparison between the proportion of *Onthophagus* as a percentage of *Onthophagus* and *Aphodius* individuals on various sites is given in Fig. 2. This shows that although not as high as Wilsford and Yarnton, the proportion of *Onthophagus* stands out at over 33% in the middle Bronze Age waterholes.. However, the proportion of *Onthophagus* in the intercutting middle Bronze Age pits, one of which gave a radiocarbon date of 1450-1210 cal BC (2□) was very much lower at 6% of the total of *Onthophagus* and *Aphodius*. Possibly the middle Bronze Age waterholes and pits belonged to the end of a warm phase, when numbers of *Onthophagus* were in decline. Populations of these beetles would be able to respond very rapidly to any climatic change, so the episode need not have been very long.

Conclusions

The insect analyses have given clear pictures of the middle Bronze Age, late Bronze Age and Roman environments at Perry Oaks. The middle Bronze Age environment of hedged enclosures of pasture grazed by domestic animals and perhaps some arable plots is just what would be expected in this period, when the ceremonial and perhaps more extensively wooded landscape of the Neolithic and earlier Bronze Age was reorganised for agricultural production. Insects also proved useful in showing the presence of a building adjacent to one of the Bronze Age waterholes. The Roman environment of the site represented a return to the general regional pattern. The well-drained gravel terrace of the site was used for mixed agriculture while the Roman settlement itself had its own distinctive environment. Synanthropic beetles flourished inside buildings. Insects also formed part of the agricultural economy, with evidence for bee-keeping.

The results are also of entomological interest. They included records of three species now extinct in Britain and several more of species that are now very rare in Britain. The middle Bronze Age specimens of honey bee are so far the earliest found in Britain. The occurrence of beetles of warm sunny dry habitats that now tend to have a coastal distribution in Britain indicated that the character of the Bronze Age grassland was very different from modern pasture in the region.

Finally, the abundance of scarabaeid dung beetle of the genus *Onthophagus* from Perry Oaks, including extinct species, gave limited support to evidence of Bronze Age climate change given by those beetles from the Wilsford Shaft and a well at Yarnton. There was possibly a brief episode towards the end of the middle Bronze Age when Southern England had significantly warmer summers than at present.

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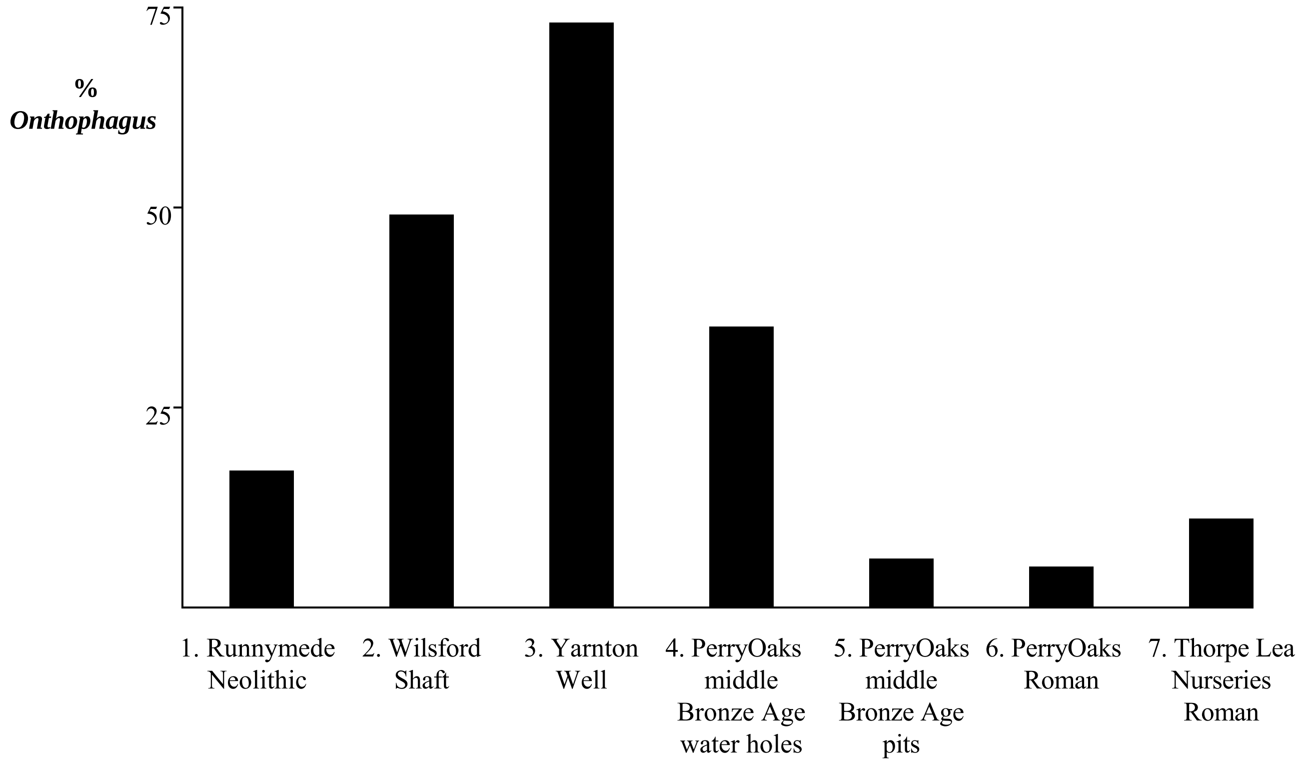
Fig. 2: Number of *Onthophagus* spp. individuals as a percentage of total *Onthophagus* and *Aphodius* spp. (including *Colobopterus* spp., excluding non dung-feeders)



1. Robinson 1991
2. Osborne 1989
3. Robinson unpublished
4. Feature 135071 Sample 229, Feature 141024 Sample 277
5. Feature 178108 Sample 856, Feature 178122 Sample 857
6. Feature 174009 Sample 828, Feature 135087 Sample 170
7. Robinson unpublished

Table 1 : Perry Oaks Coleoptera

	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman	
Feature	1350 71	1030 40	1410 24	1781 08	1781 22	156031	1740 19	1740 19	17400 9	135087	
Context	1550 28	1362 16	1210 44	1781 20	1781 21	156020	1740 32	1740 33	17403 9	135077	
Sample	229	802	277	856	857	227	1293	1297	828	170	species group
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10	
Carabus nemoralis Müll.	1	-	-	2	2	-	-	-	-	-	
Carabus sp.	-	-	-	-	-	-	1	-	-	-	
Leistus ferrugineus (L.)	-	-	-	-	1	-	-	-	-	-	
Nebria brevicollis (F.)	1	-	1	2	-	1	-	-	5	1	
Notiophilus aquaticus (L.)	-	-	-	-	1	-	-	-	-	-	
N. biguttatus (F.)	-	-	-	1	-	-	-	-	-	-	
Notiophilus sp.	-	-	-	-	-	1	-	-	1	-	
Loricera pilicornis (F.)	1	-	-	-	1	-	-	-	1	-	
Clivina collaris (Hbst.) or *fossor* (L.)	-	-	-	-	1	1	-	-	-	1	
Trechus obtusus Er. or *quadristriatus* (Schr.)	-	-	-	6	7	2	-	-	8	3	
Asaphidion flavipes (L.)	-	-	-	-	1	-	-	-	3	-	
Bembidion lampros (Hbst.)	3	-	-	-	2	-	-	-	-	1	
B. properans Step.	2	-	-	1	1	-	-	-	1	-	
B. lampros (Hbst.) or *properans* (Step.)	-	-	1	-	-	1	-	-	-	-	
B. genei Küst.	-	1	-	-	2	-	-	-	-	-	
B. obtusum Serv.	-	1	-	-	-	1	-	-	-	-	
B. biguttatum (F.)	-	-	1	-	-	1	-	-	1	1	
B. guttula (F.)	-	-	-	-	-	-	-	-	1	-	
B. lunulatum (Fouc.)	-	-	-	-	2	-	-	-	-	-	
Stomis pumicatus (Pz.)	-	-	-	-	1	1	-	-	-	-	
Pterostichus anthracinus (Pz.)	-	-	1	-	-	-	-	-	-	-	
P. cupreus (L.)	-	-	-	2	4	-	-	-	-	-	
P. lepidus (Leske)	-	-	-	-	-	1	-	-	-	-	
P. melanarius (Ill.)	1	-	-	-	2	-	-	1	1	-	
P. nigrita (Pk.)	-	-	-	1	-	-	-	-	-	-	
P. vernalis (Pz.)	3	-	-	1	-	-	-	-	-	-	
P. cupreus (L.) or *versicolor* (Sturm)	1	-	1	-	-	-	-	-	-	-	
Calathus cf. *ambiguus* (Pk.)	-	1	-	-	-	-	-	-	-	-	
C. fuscipes (Gz.)	1	-	1	4	4	1	-	-	1	-	
C. melanocephalus (L.)	-	-	-	1	3	-	-	-	-	-	
Synuchus nivalis (Pz.)	1	-	-	1	-	-	-	-	-	-	
Agonum dorsale (Pont.)	2	-	-	2	1	-	-	-	2	-	6a
A. marginatum (L.)	1	-	-	-	-	-	-	-	-	-	
A. muelleri (Hbst.)	-	-	-	-	1	-	-	-	1	-	
Amara cf. *aenea* (Deg.)	-	-	-	-	1	-	-	-	-	-	
A. apricaria (Pk.)	-	-	-	1	-	-	-	-	-	-	6b
A. aulica (Pz.)	-	-	-	-	1	-	-	-	-	-	
A. bifrons (Gyl.)	-	-	-	-	2	1	-	-	-	-	6b
A. tibialis (Pk.)	-	-	-	-	1	-	-	-	-	-	6b
Amara spp.	1	-	1	10	7	1	-	-	2	4	
Harpalus rufipes (Deg.)	1	-	-	2	3	1	1	-	1	2	6a
H. azureus (F.)	-	-	-	1	-	-	-	-	-	-	

	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman	
Feature	135071	103040	141024	178108	178122	156031	174019	174019	174009	135087	
Context	155028	136216	121044	178120	178121	156020	174032	174033	174039	135077	
Sample	229	802	277	856	857	227	1293	1297	828	170	species group
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10	
Harpalus S. *Ophonus* sp.	2	-	1	1	1	1	-	-	1	1	
H. affinis (Schr.)	-	-	-	3	2	-	-	-	-	-	
Acupalpus cf. *consputus* (Duft.)	-	-	-	-	1	-	-	-	-	-	
A. dorsalis (F.)	-	-	-	-	1	-	-	-	-	1	
Licinus depressus (Pk.)	-	-	-	-	-	1	-	-	-	-	
Badister bipustulatus (F.)	-	-	-	-	-	1	-	-	-	-	
Dromius linearis (Ol.)	-	-	1	1	1	1	-	-	-	-	
D. quadrimaculatus (L.)	-	-	-	1	-	-	-	-	-	-	
Microlestes maurus (Sturm)	-	-	-	-	-	2	-	-	-	-	
Metabletus foveatus (Fourc.)	-	-	-	2	-	-	-	-	-	1	
M. obscuroguttatus (Duft.)	-	-	-	-	-	-	-	-	1	-	
M. truncatellus (L.)	-	-	1	-	-	-	-	-	-	-	
Brachinus crepitans (L.)	1	-	-	3	4	1	-	-	-	-	
Hydroporus sp.	1	1	2	-	-	1	-	-	1	-	1
Agabus bipustulatus (L.)	1	1	1	1	2	1	-	-	1	-	1
Agabus sp. (not *bipustulatus*)	-	-	-	-	1	-	-	-	-	-	1
Colymbetes fuscus (L.)	-	-	1	-	-	-	-	1	-	-	1
Gyrinus sp.	-	-	-	-	1	-	-	-	-	-	1
Hydrochus sp.	2	-	1	-	2	-	-	-	-	-	1
Helophorus aquaticus (L.)	-	-	1	2	-	-	-	-	-	2	1
H. grandis Ill.	-	-	-	-	-	-	-	-	1	1	1
H. aquaticus (L.) or *grandis* Ill.	1	1	1	-	-	-	-	-	1	1	1
Helophorus spp. (*brevipalpis* size)	3	4	32	3	1	1	2	-	9	10	1
Coelostoma orbiculare (F.)	1	-	-	-	-	-	-	-	-	-	1
Sphaeridium bipustulatum F.	-	1	1	2	2	-	-	-	-	-	
S. lunatum F. or *scarabaeoides* (L.)	-	-	-	1	1	-	-	-	1	-	
Cercyon analis (Pk.)	-	-	-	-	-	-	-	-	2	-	7
C. haemorrhoidalis (F.)	-	-	-	4	2	-	-	-	2	2	7
C. lugubris (Ol.)	-	-	-	-	1	-	-	-	-	-	7
C. terminatus (Marsh.)	-	-	-	-	1	-	-	-	-	-	7
C. ustulatus (Pres.)	1	-	-	-	-	-	-	-	-	-	7
Cercyon spp.	-	-	-	1	1	1	-	-	2	-	7
Megasternum obscurum (Marsh.)	2	1	4	8	6	1	-	-	7	3	7
Cryptopleurum minutum (F.)	-	-	-	-	-	-	-	-	2	-	7
Hydrobius fuscipes (L.)	2	-	1	2	1	-	-	-	1	-	1
Anacaena globulus (Pk.)	1	-	-	-	-	-	-	-	-	-	1
A. bipustulata (Marsh.) or *limbata* (F.)	1	1	-	-	1	-	-	-	-	1	1
Laccobius sp.	1	-	-	-	-	-	-	-	-	-	1
Kissister minimus (Aubé)	-	-	-	-	-	-	-	-	1	-	
Paromalus sp.	-	-	-	-	-	1	-	-	-	-	
Onthophilus striatus (Forst.)	-	-	1	2	1	-	-	-	3	1	
Hister bissexstriatus F.	-	1	1	1	-	1	-	-	-	-	
H. quadrimaculatus L.	-	-	-	1	-	-	-	-	-	-	
Hister sp.	-	-	-	-	1	-	-	-	-	-	
Paralister purpurascens (Hbst.)	-	-	-	-	1	-	-	-	-	-	
Atholus duodecimstriatus (Schr.)	-	-	-	-	-	-	-	-	1	-	

	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman	
Feature	1350 71	1030 40	1410 24	1781 08	1781 22	156031	1740 19	1740 19	17400 9	135087	
Context	1550 28	1362 16	1210 44	1781 20	1781 21	156020	1740 32	1740 33	17403 9	135077	
Sample	229	802	277	856	857	227	1293	1297	828	170	species group
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10	
Ochthebius bicolon Germ.	-	-	-	-	-	-	-	-	1	1	1
O. cf. *bicolon* Germ.	-	1	3	2	11	-	-	-	2	-	1
O. minimus (F.)	1	-	2	-	-	-	-	-	1	-	1
O. cf. *minimus* (F.)	1	1	2	1	8	-	-	-	6	3	1
Hydraena cf. *riparia* Kug.	-	1	2	-	-	-	-	-	-	-	1
H. testacea Curt.	24	1	2	1	10	4	-	-	-	1	1
Limnebius papposus Muls.	1	-	2	1	2	-	-	-	1	1	1
L. truncatellus (Thun.)	-	-	1	-	-	-	-	-	-	-	1
Ptenidium sp.	2	-	-	1	-	-	-	-	-	-	
Choleva or *Catops* sp.	-	-	-	2	1	-	-	-	5	-	
Thanatophilus sinuatus (F.)	-	-	-	1	1	-	-	-	-	-	
Aclypea opaca (L.)	-	-	-	1	-	-	-	-	-	-	
A. undata (Müll.)	-	-	1	1	-	-	-	-	-	-	
Silpha atrata L.	-	-	-	1	-	1	-	-	-	-	
S. obscura L.	1	-	-	-	-	-	-	-	-	-	
Scydmaenidae gen. et sp. indet.	-	-	-	1	-	-	-	-	1	-	
Micropeplus fulvus Er.	-	-	-	2	1	-	-	-	1	-	
Acidota cruentata (Man.)	-	-	-	-	-	-	-	-	1	-	
Lesteva longoelytrata (Gz.)	-	1	-	6	6	1	-	-	16	1	
Omalium sp.	-	-	1	5	4	-	-	-	3	1	
Xylodromus concinnus (Marsh.)	-	-	-	-	-	1	-	-	7	-	
Carpelimus bilineatus Step.	-	-	1	-	-	-	-	-	1	-	
C. cf. *corticinus* (Grav.)	-	-	-	-	-	-	-	-	1	-	
Platystethus arenarius (Fouc.)	-	-	-	-	-	1	-	-	-	1	7
P. cornutus gp.	-	-	2	-	5	-	-	-	3	-	
P. nitens (Sahl.)	-	-	-	-	3	-	-	-	2	1	
Anotylus inustus (Grav.)	-	-	-	-	-	-	-	-	2	-	
A. nitidulus (Grav.)	1	-	-	3	2	-	-	-	4	1	
A. rugosus (F.)	1	-	-	2	1	1	-	-	2	1	7
A. sculpturatus gp.	1	-	2	5	6	1	-	-	3	-	7
Oxytelus fulvipes Er.	-	-	-	-	-	1	-	-	-	-	
Stenus spp.	6	1	1	3	9	2	-	-	4	3	
Lathrobium sp.	-	-	-	-	-	1	-	-	-	-	
Astenus sp.	-	-	-	-	-	-	-	-	1	-	
Rugilus orbiculatus (Pk.)	1	-	-	1	-	-	-	-	-	1	
Gyrohypnus angustatus Step.	-	-	-	-	-	-	-	-	1	1	
G. fracticornis gp.	-	-	-	1	2	-	-	-	-	-	
Xantholinus glabratus (Grav.)	-	-	-	-	3	-	-	-	1	1	
X. linearis (Ol.)	-	-	1	3	2	1	-	-	1	1	
X. longiventris Heer	-	-	1	-	2	-	-	-	-	2	
X. linearis (Ol.) or *longiventris* Heer	2	1	-	-	-	-	-	-	1	-	
Philonthus intermedius (B. & L.) or *laminatus* (Creutz.)	-	-	-	1	1	-	-	-	-	1	
Philonthus spp.	1	-	1	8	6	-	-	-	3	1	
Gabrius sp.	-	-	1	1	3	-	-	-	-	-	
Staphylinus aeneocephalus Deg. or	-	-	-	-	1	-	-	-	-	-	

	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman	
Feature	1350 71	1030 40	1410 24	1781 08	1781 22	156031	1740 19	1740 19	17400 9	135087	
Context	1550 28	1362 16	1210 44	1781 20	1781 21	156020	1740 32	1740 33	17403 9	135077	
Sample	229	802	277	856	857	227	1293	1297	828	170	species group
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10	
fortunatarum (Wol.)											
S. olens Müll.	-	1	1	3	4	1	-	1	-	1	
Staphylinus sp.	-	-	-	-	-	-	-	-	1	-	
Tachyporus spp.	-	-	-	3	3	-	-	-	1	-	
Tachinus spp.	2	-	2	1	5	-	-	-	2	1	
Aleocharinae gen. et sp. indet.	3	1	8	5	19	1	-	2	13	3	
Pselaphidae indet.	1	-	-	-	-	-	-	-	2	-	
Sinodendron cylindricum (L.)	-	-	-	-	-	1	-	-	-	-	4
Geotrupes sp.	1	1	1	5	2	1	1	-	2	-	2
Colobopterus erraticus (L.)	-	-	1	2	2	-	-	-	-	-	2
C. fossor (L.)	-	-	-	-	1	-	-	-	-	-	2
C. haemorrhoidalis (L.)	-	-	1	-	-	-	-	-	-	-	2
Aphodius ater (Deg.)	-	-	-	-	1	-	-	-	1	-	2
A. contaminatus (Hbst.)	-	-	-	-	-	-	-	-	1	-	2
A. distinctus (Müll.)	-	-	-	2	-	-	-	-	-	-	2
A. equestris (Pz.)	-	-	-	1	-	-	-	-	1	-	2
A. cf. *fimetarius* L.	-	-	-	-	-	-	-	-	-	1	2
A. foetidus (Hbst.)	-	-	-	10	12	1	-	-	-	-	2
A. granarius (L.)	-	-	2	22	14	-	-	1	2	2	2
A. luridus (F.)	-	-	-	1	-	-	-	-	-	-	2
A. cf *prodromus* (Brahm)	-	-	1	2	1	-	-	-	-	2	2
A. pusillus (Hbst.)	-	-	-	1	1	-	-	-	1	-	2
A. putridus (Fouc.)	-	-	1	-	-	-	-	-	-	-	2
A. rufipes (L.)	-	-	-	1	3	-	-	-	1	-	2
A. cf. *sphacelatus* (Pz.)	2	1	5	11	12	2	-	-	3	3	2
A. varians Duft.	-	-	-	1	1	-	-	-	-	-	2
Aphodius spp.	1	1	-	-	1	-	-	-	-	-	2
Oxyomus sylvestris (Scop.)	-	1	-	2	3	-	-	-	3	3	
Onthophagus nutans (F.)	1	-	1	-	-	-	-	-	-	-	2
O. ovatus (L.)	1	-	1	3	2	-	-	-	1	-	2
O. taurus (Schreb.)	1	-	2	-	-	1	-	-	-	-	2
O. vacca (L.)	1	-	-	1	-	-	-	-	-	-	2
Onthophagus sp. (not *nutans*, *ovatus* or *taurus*)	-	-	-	1	-	1	-	-	-	-	2
Phyllopertha horticola (L.)	2	1	2	4	2	1	-	-	-	-	11
Cetonia aurata (L.)	-	-	1	-	1	1	-	-	-	-	
Dascillus cervinus (L.)	-	-	-	1	-	-	-	-	-	-	
cf. *Cyphon* sp.	1	-	-	-	-	2	-	-	-	-	
Byrrhus sp.	-	-	-	-	1	-	1	-	-	-	
Syncalypta setigera (Ill.) or *striatopunctata* Steff.	-	-	1	1	-	-	-	-	-	-	
Dryops sp.	-	1	-	-	-	-	-	-	-	-	1
Agrilus angustulus (Ill.) or *laticornis* (Ill.)	-	-	1	-	-	-	-	-	-	-	4
Agrypnus murinus (L.)	-	-	-	3	6	1	-	-	1	-	11
Athous haemorrhoidalis (F.)	-	-	-	2	7	1	-	-	2	-	11
A. hirtus (Hbst.)	-	-	-	2	3	-	-	-	-	-	11

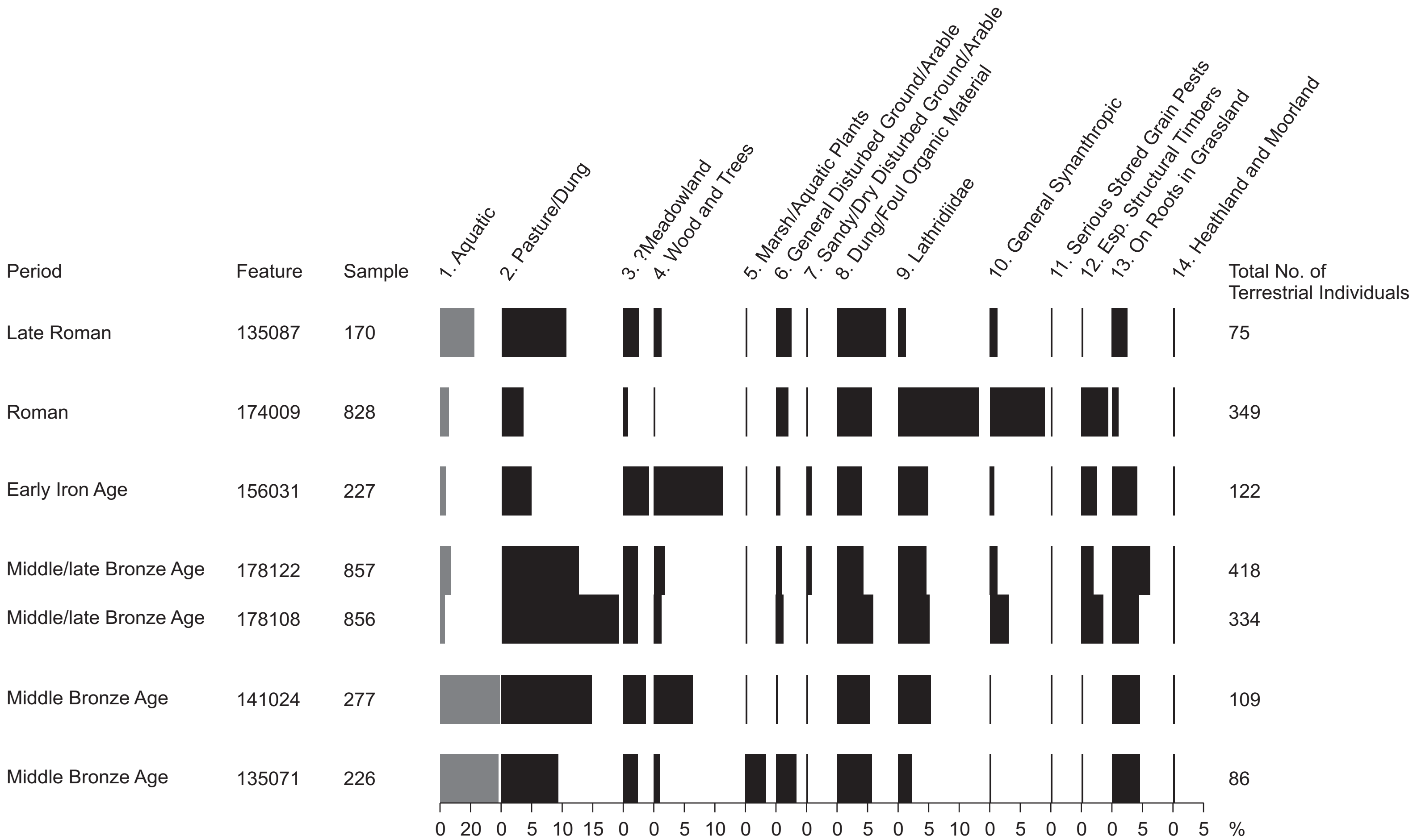
	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman	
Feature	135071	103040	141024	178108	178122	156031	174019	174019	174009	135087	
Context	155028	136216	121044	178120	178121	156020	174032	174033	174039	135077	
Sample	229	802	277	856	857	227	1293	1297	828	170	species group
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10	
Athous sp.	-	-	-	-	-	-	-	-	-	1	11
Actenicerus sjaelandicus (Müll.)	-	-	-	1	-	-	-	-	-	-	
Agriotes acuminatus (Step.)	-	-	-	-	1	-	-	-	-	1	11
A. lineatus (L.)	-	-	1	2	4	1	-	-	-	-	11
A. obscurus (L.)	1	-	1	-	2	-	-	-	-	-	11
A. sputator (L.)	-	-	1	1	1	-	-	-	-	-	11
Agriotes spp.	1	-	-	1	-	1	-	-	1	-	11
Melasis buprestoides (L.)	-	-	1	-	-	-	-	-	-	-	4
Cantharis nigra (Deg.)	-	-	-	1	-	-	-	-	-	-	
C. cf. *pellucida* Fal.	-	-	-	-	7	-	-	-	-	-	
C. rustica Fal.	-	-	-	7	4	1	-	-	-	-	
Cantharis sp.	-	-	-	-	-	-	1	1	1	1	
Dermestes sp.	-	-	-	1	2	-	-	-	-	-	
Grynobius planus (F.)	-	1	-	-	-	-	-	-	-	-	4
Anobium punctatum (Deg.)	-	-	-	11	8	3	-	1	15	-	10
Ptinus fur (L.)	-	-	-	10	5	1	-	-	26	1	9a
Lyctus linearis (Gz.)	-	-	-	1	1	-	-	-	-	-	10
Malachius aeneus (L.)	-	-	-	1	1	-	-	-	-	-	
M. bipustulatus (L.)	-	-	-	-	1	-	-	-	-	-	
Malachius sp. (not *aeneus*)	-	-	-	1	1	-	-	-	-	-	
Brachypterus urticae (F.)	1	-	-	6	8	1	-	-	31	-	
Pria dulcamarae (Scop.)	-	-	-	-	-	1	-	-	-	-	
Meligethes sp.	-	-	-	-	-	-	-	-	2	-	
Epuraea sp.	-	-	-	-	-	1	-	-	-	-	
Omosita colon (L.)	-	-	-	-	1	-	-	-	-	1	
Monotoma sp.	-	-	-	1	1	-	-	-	-	-	
Cryptophagidae gen. et sp. indet. (not Atomariinae)	-	-	-	1	3	1	1	-	5	-	
Atomaria spp.	1	-	4	5	7	3	-	-	17	-	
Olibrus sp.	-	-	1	1	2	2	-	-	-	-	
Orthoperus sp.	-	-	-	1	9	-	-	-	6	3	
Coccidula rufa (Hbst.)	-	-	-	1	1	-	-	-	-	1	
Stethorus punctillum Weise	-	-	-	1	2	-	-	-	-	-	
Coccinella septempunctata L.	1	-	-	3	2	-	-	-	-	-	
Platynaspis luteorubra (Gz.)	-	-	-	-	1	-	-	-	-	-	
Propylea quattuordecimpunctata (L.)	-	-	-	1	1	-	-	-	-	-	
Mycetaea hirta (Marsh.)	-	-	-	-	-	-	-	-	4	-	9a
Stephostethus angusticollis (Gyl.)	-	-	-	-	2	-	-	-	-	-	8
Lathridius minutus gp.	-	-	-	3	4	1	-	-	19	-	8
Enicmus transversus (Ol.)	-	-	3	2	5	3	-	-	8	1	8
Corticaria punctulata Marsh.	-	-	-	6	5	-	-	-	1	-	8
Corticariinae gen. et sp. indet.	2	-	3	6	4	2	-	-	18	-	8
Cis. sp.	-	-	-	-	-	2	-	-	-	-	4
Typhaea stercorea (L.)	-	-	-	-	-	-	-	-	2	-	9a
Anaspis sp.	-	-	-	1	1	-	-	-	-	-	
Oedemera nobilis (Scop.)	-	-	-	-	1	-	-	-	-	-	

	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman	
Feature	135071	103040	141024	178108	178122	156031	174019	174019	174009	135087	
Context	155028	136216	121044	178120	178121	156020	174032	174033	174039	135077	
Sample	229	802	277	856	857	227	1293	1297	828	170	species group
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10	
Opatrum sabulosum (L.)	-	-	-	-	6	-	-	-	-	-	
Lytta vesicatoria (L.)	-	-	-	-	2	-	-	-	-	-	4
Anthicus antherinus (L.)	-	-	2	1	2	-	-	-	-	-	
Grammoptera ruficornis (F.)	-	-	-	1	-	-	-	-	-	-	4
Phymatodes alni (L.)	-	-	-	1	1	-	-	-	-	-	4
P. testaceus (Ol.)	-	-	-	1	2	-	-	-	-	-	4
Bruchus (not *rufimanus*) or *Bruchidius* sp.	-	1	1	-	-	-	-	-	-	-	
Cryptocephalus sp.	-	-	1	-	-	-	-	-	-	-	
Chrysolina fastuosa (Scop.)	-	-	-	1	5	-	-	-	-	-	
C. hyperici (Forst.)	-	-	1	-	-	-	-	-	-	-	
C. polita (L.)	-	-	-	-	1	-	-	-	-	-	
Gastrophysa polygoni (L.)	-	-	-	1	2	-	-	-	-	-	
Hydrothassa glabra (Hbst.)	-	-	-	1	2	1	-	-	-	-	
Phyllodecta vulgatissima (L.)	-	-	1	-	-	-	-	-	-	-	4
Galeruca tanaceti (L.)	-	-	-	-	3	-	-	-	-	-	
Phyllotreta atra (F.)	1	-	-	-	-	-	-	-	-	-	
P. nigripes (F.)	-	-	-	1	-	1	-	-	2	-	
P. vittula Redt.	1	-	2	2	3	1	-	-	2	-	
Aphthona cf. *euphorbiae* (Schr.)	-	-	1	-	-	-	-	-	-	-	
Longitarsus spp.	3	-	2	4	5	18	-	-	-	1	
Altica sp.	1	-	-	-	-	-	-	-	-	-	
Chalcoides sp.	-	-	-	-	1	1	-	-	-	-	4
Epitrix pubescens (Koch)	-	-	1	-	1	1	-	-	-	-	
Podagrica fuscicornis (L.)	1	-	-	-	-	-	-	-	1	-	
Chaetocnema concinna (Marsh.)	2	1	3	6	5	1	-	-	6	1	
Chaetocnema sp. (not *concinna*)	-	-	2	-	-	-	-	-	2	1	
Psylliodes sp.	-	-	1	-	2	1	-	-	1	-	
Cassida sp.	-	-	-	-	1	-	-	-	-	-	
Platystomos albinus (L.)	-	-	-	-	-	-	-	-	-	1	4
Rhynchites caeruleus Deg.	-	1	-	1	-	-	-	-	-	-	4
Apion rufirostre (F.)	-	-	-	1	-	-	-	-	1	-	
A. aeneum (F.)	-	-	-	-	1	-	-	-	-	-	
A. radiolus (Marsh.)	1	-	-	-	-	-	-	-	1	1	
A. urticarium (Hbst.)	-	-	-	-	2	-	-	-	4	1	
A. cf. *virens* Hbst.	-	-	-	1	-	1	-	-	-	-	3
Apion spp. (not above)	1	1	1	4	3	3	-	-	3	2	3
Phyllobius roboretanus Gred. or *virdiaeris* (Laich.)	-	-	-	-	-	1	-	-	-	-	
Barypeithes araneiformis (Schr.)	-	-	1	1	2	1	-	-	-	-	
Strophosomus cf. *faber* (Hbst.)	-	-	-	-	1	-	-	-	-	-	
Barynotus sp.	-	1	-	-	-	-	-	-	-	-	
Sitona hispidulus (F.)	1	-	2	1	2	-	-	-	-	-	3
S. lepidus Gyll.	-	-	1	-	2	-	-	-	-	-	3
S. cf. *lineatus* (L.)	-	-	-	1	1	-	-	-	-	-	3
Sitona sp.	-	-	-	1	2	1	-	-	-	-	3
Cleonus piger (Scop.)	-	-	-	1	-	-	-	-	-	-	

	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman	
Feature	135071	103040	141024	178108	178122	156031	174019	174019	174009	135087	
Context	155028	136216	121044	178120	178121	156020	174032	174033	174039	135077	
Sample	229	802	277	856	857	227	1293	1297	828	170	species group
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10	
Hypera punctata (F.)	-	-	1	-	1	1	-	-	-	-	
Hypera sp. (not *punctata*)	-	-	-	1	-	-	-	-	-	-	
Alophus triguttatus (F.)	1	-	1	-	-	1	-	-	1	-	
Liparus coronatus (Gz.)	-	-	-	1	-	-	-	-	-	-	
Magdalis armigera (Fouc.)	-	-	-	-	-	-	-	-	1	-	4
M. ruficornis (L.)	-	-	-	1	1	-	-	-	-	-	4
Tanysphyrus lemnae (Pk.)	3	-	-	-	-	-	-	-	-	-	5
Rhyncolus lignarius (Marsh.)	-	-	-	-	-	3	-	-	-	-	4
Acalles turbatus Boh.	-	-	3	-	1	5	-	-	-	-	4
Pseudostyphlus pillumus (Gyl.)	-	-	-	3	-	-	-	-	-	-	
Cidnorhinus quadrimaculatus (L.)	-	-	-	1	2	-	-	-	3	1	
Ceuthorhynchidius troglodytes (F.)	-	1	-	-	-	-	-	-	-	-	
Ceutorhynchus erysimi (F.)	-	-	1	-	-	-	-	-	2	-	
C. cf. *floralis* (Pk.)	-	-	-	-	-	-	-	-	1	-	
C. pollinarius (Forst.)	-	-	-	1	3	-	-	-	-	-	
Ceuthorhynchinae gen. et sp. indet.	2	1	1	6	6	-	-	-	4	1	
Baris lepidii Germ.	1	-	-	-	-	-	-	-	-	-	
Anthonomus cf. *rubi* (Hbst.)	-	-	-	-	-	-	-	-	1	-	
Tychius sp.	-	-	1	1	-	-	-	-	1	-	
Mecinus pyraster (Hbst.)	-	-	1	1	-	2	-	-	-	-	
Gymnetron labile (Hbst.)	-	-	-	-	-	-	-	-	1	-	
G. pascuorum (Gyll.)	-	-	-	-	-	-	-	-	1	-	
Rhynchaenus cf. *avellanae* (Don.)	-	-	-	-	-	1	-	-	-	-	4
Rhynchaenus sp. (not *pratensis*)	-	1	-	-	-	-	-	-	-	-	4
Scolytus intricatus (Ratz.)	-	-	1	-	-	-	-	-	-	-	4
S. rugulosus (Müll.)	1	-	-	-	-	1	-	-	-	-	4
Kissophagus hederae (Schmitt)	-	-	-	-	-	1	-	-	-	-	4
Xyleborus cf. *dryophagus* (Ratz.)	-	-	-	-	1	-	-	-	-	-	4
Totals	127	38	163	347	458	129	8	8	374	96	

Table 2 : Perry Oaks Other Insects

	Middle Bronze Age					Late Bronze Age	Early Roman		Roman	Late Roman
Feature	1350 71	1030 40	1410 24	1781 08	1781 22	156031	1740 19	1740 19	17400 9	135087
Context	1550 28	1362 16	1210 44	1781 20	1781 21	156020	1740 32	1740 33	17403 9	135077
Sample	229	802	277	856	857	227	1293	1297	828	170
Sample vol (litres)	10	10	3	5	5	5	10	10	3	10
Forficula auricularia L.	-	-	-	5	7	3	-	-	5	1
Sehirus sp.	-	-	-	1	-	-	-	-	-	-
Thyreocoris scarabaeoides (L.)	-	-	-	-	1	-	-	-	-	-
Dolycoris baccarum (L.)	-	-	-	-	11	-	-	-	-	-
Pentatoma rufipes (L.)	1	-	-	1	-	-	-	-	-	-
Heterogaster urticae (F.)	-	-	-	4	4	-	-	-	3	1
Peritrechus sylvestris (F.)	-	-	-	-	4	-	-	-	-	-
Graptopeltus lynceus (F.)	-	-	-	-	1	-	-	-	-	-
Raglius alboacuminatus (Gz.)	-	-	-	-	6	-	-	-	-	-
Megalonotus chiragra (F.)	-	-	-	-	3	-	-	-	-	-
Aphanus rolandri (L.)	-	-	-	-	2	-	-	-	-	-
Stygnocoris fuligineus (Geof.)	-	-	-	-	2	-	-	-	-	-
Drymus sp.	-	-	-	1	-	-	-	-	-	-
Scolopostethus sp.	-	-	-	1	1	-	-	-	-	1
Philaenus or *Neophilaenus* sp.	-	-	-	1	2	-	-	-	1	-
Aphrodes cf. *albifrons* (L.)	-	-	1	-	1	-	-	-	-	-
A. bicinctus (Schr.)	-	-	1	2	2	1	-	-	-	1
Aphrodes sp.	1	-	3	2	4	2	1	-	1	2
Aphidoidea gen. et sp. indet.	-	-	-	-	15	-	-	1	2	-
Homoptera gen. et sp. indet.	10	-	-	1	-	-	-	-	-	1
Trichoptera gen. et sp. indet. - larva	-	1	3	-	-	-	-	-	-	-
Chrysis sp.	-	-	-	1	-	-	-	-	-	-
Myrmica rubra (L.) or *ruginodis* Nyl. - worker	-	-	2	-	1	-	-	-	-	-
Tetramorium caespitum (L.) - worker	-	-	-	-	1	1	-	-	-	-
Stenamma westwoodi gp. - worker	-	-	-	1	-	1	-	-	-	-
Formica cf. *fusca* L.- worker	-	-	-	-	1	-	-	-	1	-
Lasius fuliginosus (Lat.) - worker	-	-	-	-	-	4	-	-	2	-
L. niger gp. - worker	2	-	1	4	8	2	-	-	2	4
Lasius sp. (not *fuliginosus*) - female	-	-	-	3	1	-	-	-	-	-
Lasius sp. (not *fuliginosus*) - male	-	-	-	-	1	-	-	-	1	1
Apis mellifera L. - worker	-	-	-	1	1	-	-	-	16	-
Hymenoptera gen. et sp. indet.	2	1	16	4	39	8	-	-	12	2
Chironomidae gen. et sp. indet.	-	+	+	-	+	-	+	-	-	-
Dilophus febrilis (L.) or *femoratus* (Meig.)	-	-	-	1	-	1	-	-	3	1
Diptera gen. et sp. indet. - puparium	-	-	-	2	1	-	-	-	1	-
Diptera gen. et sp. indet. - adult	-	-	-	5	12	2	-	-	8	3



Species groups expressed as a percentage of the total terrestrial Coleoptera (i.e. aquatic excluded).
Not all the terrestrial Coleoptera have been classified into groups.