Insect remains from Charterhouse Square, London

(MoLA Site Codes XSF10, XTE12)

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Introduction

Twenty-four bulk samples were taken during two phases of excavation carried out by Museum of London Archaeology (MoLA) at Charterhouse Square. Preliminary assessment indicated that insect remains preserved by anoxic waterlogging were present in ten samples. Six samples from deposits associated with a large ditch containing pottery dating to the late 15th to 17th century were subsequently selected by MoLA for detailed insect examination.

Methods

The insect samples had volumes of 2 litres and were initially sieved to 0.25mm by MoLA staff. Once received they were boiled briefly with washing soda (sodium carbonate) to break down small lumps of sediment that remained and paraffin flotation was carried out to extract insect remains (Kenward *et al*. 1980).

For analysis beetle (Coleoptera) sclerites were removed from the paraffin flots onto moist filter paper for identification using a low-power stereoscopic zoom microscope (x10 – x45). Identification was by comparison with modern insect material and reference to standard published works. Numbers of individuals and taxa of beetles (Coleoptera) and bugs (Hemiptera) were recorded, and taxa were divided into broad ecological groups for interpretation following Kenward *et al*. (1986) and Kenward (1997). The proportions representing each ecological group was calculated for the two largest assemblages. The relative abundance of terrestrial groups was calculated after subtracting aquatics from the total. Nomenclature follows Duff (2012) and Aukema and Rieger (1995-2006) for Coleoptera and Hemiptera:Heteroptera respectively. The abundance of other groups of invertebrates in all the flots was recorded semi-quantitatively on a four-point scale (+ occasional, ++ several (in the order of 4-10 identifiable items), +++ frequent, ++++ abundant). The extracted insect material has been retained in vials of industrial methylated spirit.

The insect assemblages

Beetle and bug assemblages consisting of 30 – 120 individuals were recovered from the samples together with other invertebrate remains. The material generally showed low levels of erosion but fragmentation varied between samples. The exception was sample {39} (context 283) where erosion of sclerites/fragments was significantly more advanced with loss of colour and surface texture.

The remains recovered are discussed below by area. The main statistics of the two largest assemblages are shown in Table 1, the host plants of plant-feeding insects in Table 2, and lists of insects and other invertebrates recorded from each sample in Table 3.

Open Area 5

Four samples from contexts (32), (278), (283) and (298) were examined. The earliest of these was from context (278) (sample {38}) where the plant assemblage was dominated by material indicative of stable waste (Karen Stewart, plant report). A number of elements in the small insect assemblage are consistent with this interpretation. Several groups of beetles identified as characteristic of stable waste were represented (Kenward and Hall 1997), namely taxa associated with relatively dry mouldering plant litter in buildings (*Ephistemus globulus*, *Latridius minutus* group, Latridiidae sp.), hydrophilid beetles associated with foul organic material especially dung (*Cryptopleurum minutum*, *Cercyon haemorrhoidalis*, *Cercyon nigriceps*), and the grain pests *Sitophilus granarius* and *Oryzaephilus surinamensis*. Plant-feeding insects included *Chaetocnema concinna* agg. found on knotweeds and other Polygonaceae, and *Phyllotreta* spp. found on wild and cultivated brassicas. These may represent disturbed or cultivated ground close to the ditch but equally such plants might have colonized material accumulated in a midden before eventual disposal. Single individuals of two aquatic beetles were recorded: *Tanysphyrus lemnae*, a tiny weevil that lives on duckweed (*Lemna*), and *Helophorus*. Occasional water flea ephippia (*Daphnia*: resting eggs) and ostracod carapaces were also noted.

A similarly small assemblage from a later deposit (context (283), sample {39}) also included a distinctive group of beetles indicative of the introduction of material from within buildings. Eight of the 28 terrestrial taxa could be assigned to this group and they including *Tipnus unicolor* (a spider beetle), *Blaps* (churchyard or cellar beetle) and *Trox scaber* (a hide beetle). Beetles associated with foul to very foul nutrient-rich material organic material (*Cercyon terminatus*, *C. nigriceps*, *Cryptopleurum minutum*, *Platystethus arenarius*) were also well-represented, together with a small-eyed flour beetle (*Palorus ratzeburgi*) which is particularly typical of very spoiled grain. Together these groups might indicate that stable waste had also contributed to the deposit but since there do not appear to have been indications for stable waste among the plant remains, the 'building fauna' may have come from other types of buildings, with the foul group perhaps arriving with (or being attracted to) dumped cess for which there was evidence (Karen Stewart, plant report). *Tipnus unicolor* and *Blaps* are particularly strongly synanthropic species. *Blaps* lives in dark damp places such as stables, cellars, barns and sheds and underneath floorboards. *T. unicolor* is uncommon in natural habitats although it has sometimes been recorded from birds' nests (e.g. Hinton 1941; Linsley 1944, Palm 1959). In reviewing its archaeological occurrence, Kenward (2009, 308-310) concluded that that it is generally a good indicator of long-lived high status buildings and it is often well-represented in post-medieval domestic assemblages.

Aquatic insects were much commoner in the larger assemblage from context (32) (sample {7}) making up almost a quarter of the beetles and bugs, and water flea (Cladocera spp.) ephippia and ostracod carapaces were abundant. Most of the water beetles were either eurytopic or were not identified closely enough to provide much detail on water conditions but *Haliplus lineatocollis* is generally found in slow-running water (Friday 1988, 149) while *Coelostoma orbiculare* is typical of moss in floating rafts of vegetation or at the margins of

still or slowly flowing water (Foster *et al*. 2014, 72). A number of plant-associated insects suggested the types of vegetation growing within or close to the ditch. *Tanysphyrus lemnae* found on duckweed (*Lemna*) was well-represented, and *Prasocuris junci* and *Gymnetron beccabungae* or *veronicae* are mainly associated with brooklime (*Veronica beccabunga*) and probably other waterside *Veronica* spp.. Stands of nettles (*Urtica*) were indicated by nettle ground bug (*Heterogaster urticae*), a nymph of the jumping plant louse *Trioza urticae*, and the weevils *Nedyus quadrimaculatus* and *Parethelcus pollinarius*. Another weevil, *Graptus triguttatus,* is found in grassy open places where it generally feeds on ribwort plantain (*Plantago lancelolata*) while the bark beetle *Scolytus rugulosus* generally attacks the woody Rosaceae suggesting that some trees or shrubs were growing close to the ditch. The presence of cereal bran and fig seeds among the plant remains suggested the dumping of cess (Karen Stewart plant report) and a record of a large seed beetle (*Bruchus*) ties in with this. Identification of archaeological *Bruchus* specimens is problematic but the size and general characteristics of the remains were indicative of *B. rufimanus* or *B. pisorum* whose larvae develop within medium and large legume seeds, the former especially in field beans and the latter especially in peas (Hoffman 1945, 43; Hubble 2012, 29-31). Both species were frequently consumed within infested pulses, the beetles surviving passage through the gut well, and in archaeological contexts the presence of their remains is generally characteristic of faeces (e.g. Smith 2013). In some cases they can provide the main evidence for the consumption of pulses since pulses themselves preserve poorly unless mineralised or charred (e.g. Allison and Hall 2001; Carruthers and Allison 2015). A small group of decomposer beetles that are typical members of a 'building fauna' may have been introduced incidentally with the cess. Members of the building fauna are frequently recovered from cess deposits probably largely representing the use of discarded organic litter to dampen smells.

The small assemblage from context (298) (sample {45}) was comparable with that seen in context ([32) (sample <7>) in that the proportion of aquatic beetles was similarly high, and a growth of brooklime or possibly other *Veronica* spp. in the ditch was suggested by *Gymnetron beccabungae* or *veronicae*. This is in contrast to the limited evidence for aquatic plant taxa (Karen Stewart, plant report). There were also indications of the introduction of waste into the ditch, including litter from within buildings.

Open Area 6
Group 76 (sequence of deposits in the ditch)

Two samples from contexts (276) and (274) were examined. The larger of the two insect assemblages came from the earlier of the two deposits (context (276), sample {37}). Almost a quarter of the beetles and bugs were aquatics including *Ochthebius minimus*, *Cymbiodyta marginellus* and *Coelostoma orbiculare*, and an elytral fragment was tentatively identified as ?*Hydrochara caraboides*. Beetles from damp ground and waterside habitats were also common (17% of the terrestrial taxa). The general implications of the taxa represented were for shallow water with moss either among rafts of vegetation or at the water's edge, duckweed on the water surface, and wet waterside mud. Emergent or semi-aquatic plants

were indicated by *Notaris acridulus*, usually associated with reed sweet-grass (*Glyceria maxima*) and perhaps other semi-aquatic grasses, *Prasocuris phellandrii* which feeds primarily on waterside Ranunculaceae, and donaciine leaf beetles. Nettles were indicated by *Brachypterus* and several other plant-feeding insects provided hints of a disturbed or grassy area outside the ditch: *Sitona* species feed on members of the pea family (Fabaceae) while *Oxystoma* specifically feeds on vetches (*Lathyrus* and *Vicia*), and *Meligethes* and *Ceutorhynchus contractus* are associated with various wild and cultivated Brassicaceae. Trees growing by the ditch were suggested by *Hylesinus varius*, a bark beetle that usually tunnels under the bark of ash (*Fraxinus*). Some of the eurytopic decomposers recorded may have exploited wet decomposing litter on the water margins but a number of taxa that are regarded as typical synanthropes suggest a limited input of occupation waste. No specific types of waste were indicated however.

The small assemblage from context 274 (sample {35}) also included a substantial aquatic component (29% of the whole assemblage) with similar general implications. Water beetles included *Hygrotus inaequalis* found in permanent, albeit often very shallow, waters (Foster and Friday 2011, 103), *Coelostoma orbiculare* and *Tanysphyrus lemnae* indicating moss and duckweed, and *Notaris acridulus* which is typically associated with reed sweet-grass (*Glyceria maxima*). Nettles were again suggested by *Brachypterus*. The plant report suggests that abundant grass seeds might indicate the dumping of hay (Karen Stewart, plant report) but there was no convincing evidence in the form of barn beetles that would colonize mouldering hay or a building fauna (which overlaps with the barn beetle category) to support this.

Discussion

The deposits at the base of ditch [247] = [303] had probably formed during a period when maintenance was neglected. Most of the samples provided insect evidence for the dumping of occupation waste and litter from within buildings into the ditch, some of which had the characteristics of stable waste with a combination of a building fauna, grain pests, and decomposers exploiting open-textured foul matter (Kenward and Hall 1997). Combined evidence from plant and insect remains provides the most convincing evidence for the presence of stable waste and this was forthcoming from context 278 (sample {38}). The disposal of material that could potentially have been used for manuring indicates its general abundance within the area and also suggests that equines and possibly other domestic animals were housed nearby. In some deposits members of a building fauna may have arrived with cess probably largely representing the use of discarded organic litter to dampen smells.

There was good evidence for aquatic conditions in the ditch from several samples. The water was either still or slowly flowing and probably permanent, although it may have been rather shallow and subject to seasonal fluctuations. Most samples provided evidence for a growth of duckweed on the water surface and a number of plant-feeding insects provided indications for a variety of aquatic and waterside plants and nettles. In Open Area 5 lower numbers of aquatics in the samples from contexts 278 and 283 (samples {38} and {39}) may reflect a

large input of occupation waste at these points rather than being a genuine reflection of less aquatic conditions.

There were hints that land outside the ditch was rather open but records of two species of bark beetles (Scolytini) found on ash trees and woody members of the Rosaceae suggested that some trees or shrubs were present.

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