AN ASSESSMENT OF THE INSECT REMAINS FROM THE CROPMARK DITCHES IN PHASE 1A OF THE QUARRY NEAR BLACO HILL, MATTERSEY, NOTTINGHAMSHIRE.

PREPARED FOR TARMAC QUARRY PRODUCTS (EASTERN) LTD

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INTRODUCTION

The insect remains discussed here are recovered from sample sequences taken from the cropmark ditches recorded during excavations prior to quarrying (Morris and Garton 1996). These samples were collected under the supervision of Tony Morris, Daryl Garton, and Andy Howard of T&PAT during the course of excavation of trenches 35, 36 and 37 in the summer of 1996 (Fig. 1).

It was hoped that an assessment of these insect remains would suggest:

1) if there were insects present? and if so, are the faunas of interpretative value?
2) if a study of the insect remains would be informative as to the hydrology and water conditions within this complex drainage ditch system?
3) if the insect remains would provide information as to the nature of the surrounding environment and land use?
4) if there is a settlement near by?

Methods

The insect fragments examined here were recovered from the 15-20 litre samples taken at various pionts within the ditches as general biological samples. The weights, volumes and context details of these samples are listed in Table 1. In all cases a 2 litre sub-sample has been retained to be processed for the plant macro analysis. The remainder of the samples were then processed using the standard method of paraffin flotation as outlined in Kenward *et al.* (1980). This paraffin flot was then sorted under a binocular microscope and where applicable the insect fragments were identified by comparison to the Gorham Collection of British Coleoptera.

Whilst identifying the faunas present the system for "scanning" faunas as outlined by Kenward *et al.* (1985) was followed. On average the time taken to scan each sample was around 20 minutes. All the taxa present have been identified as far as was possible.

When discussing these faunas recovered two considerations should be taken into account.

1) The identifications of the insects present are provisional. Equally, many of the taxa present could be identified down to species during a full analysis, producing more detailed information. Therefore, these faunas should be regarded as incomplete and possibly biased.

2) The various proportions of insects suggested are very notional and subjective.

RESULTS

The insect taxa recovered are listed in Table 2. The numbers of individuals present is estimated in the following way * = 1-2 individuals ** = 2-5 individuals *** = 5-10 individuals **** = 10+ individuals. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987).

Discussion

Are insects present, and are the faunas interpretable?

Several of the samples produced no insect remains. These are listed in the top half of Table 1. These included the red clay deposits provisionally interpreted as being late glacial in origin (ES 04) and the two deposits examined in Trench 35. In terms of insect analysis no further work needs to be done on these deposits.

The remaining 14 samples all produced faunas of insects. These all came from the two cuts of the ditch in Trench 37. These two cuts were 20 metres apart. In both cases the samples were taken as a consecutive column sample through the depth of the trench.

These samples contained the remains of mainly Coleoptera (beetles) and Tricoptera (caddis flies). In the majority of cases these faunas were moderately large. It is clear that, even from this limited assessment, these faunas can be informative and aid the interpretation of this site.

Water conditions in the ditches

Both of the cuts of this ditch appear to have been filled with slow flowing waters. This is the habitat favoured by the majority of the Dytiscidae and Hydraenidae water beetles recovered such as *Hygrotus inaequalis, H. quinquelineatus, Graptodytes pictus* and *Hydroporus palustris* which occur throughout the depth of the deposits.

In both cuts the basal and the lower fills of the silty peat layers contain numbers of the larger diving beetles, such as *Agabus, Acilius* and *Colymbetes fuscus,* and the Whirligig beetle, *Gyrinus*. These suggest that at these levels there was a depth of permanent and open water. The upper levels of silt and the wood-peat in cut 3, and the upper silt in cut 5, show a drop in these species and the rise in the occurrence of *Hydrochus*. This species is often associated with stagnant and vegetation filled waters. This may suggest that there is a progressive move away from clear and open waters in these ditches towards rather still and stagnant waters over time. Estimating the extent and nature of this change may be aided by an examination of the caddis fly remains recovered from these deposits.

Several species of beetle suggest that these ditches also contained a range of aquatic plants. Amongst these are *Glyceria* (water grasses) and *Lemnea* (duckweeds); these are the host plants of *Notaris acridulus* and *Tanysphyrus lemnae* respectively. Other species of beetle present such as the *Plateumaris, Donacia* and *Prasocuris phellandri* suggest that in some places there were stands of reeds and sedges and various waterside Umbeliferae. A full analysis of these samples will allow these taxa to be identified down to species. This should

result in a much more detailed interpretation of the nature of the waterside vegetation.

Again there appears to be some degree of variation in the occurrence of species between samples. It would seem that in the case of both cuts these species are more dominant in the upper levels, suggesting that the ditches are progressively in-filling with emergent vegetation.

Land-use

The basal silts and the silty and humic peat fills from both cuts 3 and 5 contained a number of species which are indicative of the nature and use of the landscape associated with these field ditches.

The presence of farm land, either pasture or arable is clearly suggested by many of the Carabidiae (ground beetles) present. The majority of these are associated with damp ground in agricultural land and pasture. There are considerable numbers of species which are associated with herbivore dung lying in open ground. Mainly these species are various members of the Scarabaeidae. In particular, the various species of *Aphodius*, *Onthophagus* and *Geotrupes* present. This would suggest that stock animals, such as cattle, were in the area.

Also present are a range of species of beetle which feed in grass turf, or on species of plants which are common in pasture or meadow-lands. Amongst the former are the Scarabaeidae *Phyllopertha horticola* which, in its larval forms, feed on the roots of grasses in mature grasslands (Jessop 1986) as do the majority of the elaterids or "click beetles". In addition, there are also present a range of species of weevil which feed on plants commonly found in grassland. It is suspected that these species may have a narrower range of dissemination across the landscape than those discussed above. They therefore may indicate the presence of pasture directly adjacent to the ditch. Amongst these plants are the various species of *Rumex* (dock) (usually the host plants of *Apion*), *Trifolium* (clovers) (the host plants of the various species of *Sitona* and *Hypera*) and *Plantago* (the host plant of *Alophus triguttatus*, and the *Gymneton* species). The beetle *A. triguttatus* is also thought to be typical of wet meadow or pasturelands (Koch 1992).

A further identification of many of these taxa to species level should allow a more detailed reconstruction of the plant life and use of these pastures to be atempted.

It is noticeable that the numbers of these species decreases in the upper levels of cut 3 once the woody peats is encountered.

Trees and hedgerows

There are no indications of the presence of old or mature woodland in the area during these phases of occupation. This is not a surprise in terms of the lower silt and humic peat since it is thought that this area of Britain had been extensively cleared by the Iron Age. The presence of a cleared landscape from the Late Bronze Age on has been seen at a range of other archaeological sites such as the Iron Age and Roman settlements at Farmoor, Oxon. (Robinson 1979), the Iron Age settlement ditches at Minges Ditches, Oxon (Robinson 1993)

and the Roman "ladder" ditches at Little Paxon, Cambridgeshire (Smith in prep.) and the Iron Age and Roman ditches at Rectory Farm, West Deeping, Cambridgeshire (Smith in prep).

What is noticeable is the absence of indicators for woodland in the upper fills of cut 3 which was filled with a wood peat. This is not all that surprising. Both regenerating woodland and alder carr have a limited fauna of insects associated with them and so this type of woodland can fail to appear in the palaeoentomological record.

Evidence for settlement

Work on a number of both rural and urban sites in the last twenty years has clearly demonstrated that there is a fauna of insects which are associated with human occupation in the archaeological record (e.g. Hall *et al.* 1983, Kenward and Hall 1990, Kenward and Allision 1994). However, none of this fauna was recovered from these ditches. This suggests that settlements may not have been located in the immediate area.

RECOMMENDATIONS FOR FURTHER WORK

From the above assessment it should be clear that the insect remains so far recovered from Blaco Hill have the potential to be very informative about a number of aspects of the environment and the archaeology of the area. A more detailed study of these insect faunas would allow many of the conclusions put forward here to be confirmed and more detailed reconstruction of the environments associated with these ditches to be achieved.

In particular the careful excavation of this ditch system by T&PAT has suggested that it constituted a well maintained and complex system of drainage. However, the data derived from the insect remains examined here suggests that there is a history of these ditches progressively and eventually falling out of use. The collapse of this drainage system, suggested by the insect remains, has wider implications for the settlement of this area during this time.

It is therefore recommended that a full analysis of the 14 insect faunas examined here takes place. This should include an identification of all taxa down to species level if possible and a full count of individuals.

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Table 1. The Context Details for the Samples Assessed

Sample No.	*Weight Kg*	*Litres*	*Sediment*	*Cropmark Ditch*	*Context*
Trench 35					
ES 23	5.9	9	peat	I	0056
ES 24	6.2	7.5	brown earth	I	0056
ES 29	10.8	12	brown earth	VI	0260a
ES 30	6.1	16	peat	VI	0260e

Sample No.	*Weight Kg*	*Litres*	*Sediment*	*Context*
Trench 36				
ES 04 1 of 4, 2/3 of block 1	2.4	1.5	clay	Late-glacial lake mud?
ES 04 1 of 4, 2/3 of block 2	2.2	1	clay	Late-glacial lake mud?
ES 04 2 of 4, 2/3 of block 1	2.1	1.5	clay	Late-glacial lake mud?
ES 04 2 of 4, 2/3 of block 2	1.9	1.5	clay	Late-glacial lake mud?

There were only small faunas present in the above samples.

Sample No.	*Weight Kg*	*Litres*	*Sediment*	*Cropmark Ditch*	*Context*
Trench 37					
ES 34	2.9	4.5	peat & modern roots	I	0046a
ES 36	5.4	6	brown earth	I	0046a/b boundary
ES 37	5.1	7.5	peat	I	Top of 0046b
ES 39	5.1	7	peat	I	Middle of 0046b
ES 41	4.6	6	peat	I	Base of 0046b
ES 43	5.2	8	peat	I	Boundary of 0046b/0046k
ES 44	7.9	8.2	clay/sand	I	Base of ditch 0046k
ES 49	4.5	6	peat	I	0046b
ES 50	5.1	7	peat	I	0046b/x
ES 52	5	4.5	peat	I	0046x
ES 53	7.4	9	sandy clay	I	0046x/z
ES 57	5.9	6.8	peat	I	0047x
ES 59	3.8	5.5	peat/clay	I	0047y

2 Litres were retained from each sample for Plant Macro Analysis.

Table 2: The Insects Faunas

ES	34	36	37	39	41	43	44	49	50	52	53	55	57	59
COLEOPTERA														
Carabus sp.	-	-	-	-	-	*	-	-	-	-	-	*	-	*
Nebria spp.	-	-	-	-	-	*	*	-	-	-	-	-	-	-
Blethisa multipunctata (L.)	-	-	*	-	-	-	-	-	*	-	-	-	-	-
Elaphrus cupreus Duft.	-	-	-	-	-	-	-	*	-	*	-	-	-	-
Loricera pilicornis (F.)	-	-	**	*	-	-	-	-	**	*	-	-	-	-
Clivina fossor (L.)	-	-	*	-	-	-	-	-	-	-	-	-	-	-
Dyschirius spp.	-	-	*	-	*	-	*	*	-	-	*	**	-	*
Trechus spp.	-	-	-	*	-	-	-	-	-	-	-	-	*	-
Bembidion spp.	*	*	-	*	*	*	-	*	*	*	-	-	-	-
Patrobus spp.	-	-	-	-	-	-	-	*	-	-	-	-	-	-
Amara sp.	-	-	-	*	-	-	-	-	-	-	-	-	-	-
Harpalus. spp.	-	-	-	-	-	-	-	-	-	-	-	-	*	-
Stomis pumicatus (Panz.)	-	-	-	-	-	-	-	-	-	-	-	-	*	-
Pterotichus strenuus (Panz.)	-	-	-	-	-	-	-	-	*	*	-	**	-	-
P.vernalis (Panz.)	-	-	*	-	-	*	-	*	-	-	*	-	-	*
P. minor (Gyll.)	-	-	-	*	*	-	-	-	-	-	-	-	-	*
P. spp.	-	-	-	-	-	-	*	*	*	*	*	**	-	-
Agonum obscurum (Hbst.)	-	-	-	-	-	-	-	-	-	-	-	-	-	*
A. nigrum Dej.	-	-	-	-	*	-	*	**	-	-	-	**	-	*
A. fuliginosum (Panz.)	-	-	-	-	*	*	-	-	*	-	-	-	-	*
Agonum sp.	-	-	-	-	-	-	-	-	-	-	*	*	*	-
Chlaenius spp.	-	-	-	-	-	-	*	-	-	-	*	-	-	-
Dromius spp.	-	-	-	-	*	-	*	-	-	-	-	-	-	-
Haliplidae														
Haliplus spp.	-	-	-	-	-	-	*	-	-	-	*	-	-	-
Dytiscidae														
Hygrotus inaequalis (F.)	-	-	-	-	-	*	*	-	-	*	**	-	-	*
H. quinquelineatus (Zett.)	-	-	-	-	-	*	*	-	-	-	*	*	-	-
Graptodytes pictus (F.)	-	-	*	-	*	*	-	-	-	*	**	-	-	*
Hydroporus palustris (L.)	-	-	-	*	-	*	-	-	-	-	*	**	-	
H. spp.	-	-	-	-	-	*	-	-	**	*	***	-	-	**
Noterus clavicornis (Geer)	-	-	-	-	-	-	-	-	-	-	-	-	-	*
Agabus spp.	-	-	-	*	*	-	*	*	*	**	**	*	-	*
Colymbetes fuscus (L.)	-	-	-	-	*	-	-	-	-	*	*	*	-	-
Acilius sp.	-	-	*	-	*	*	*	-	*	-	*	*	-	*
Dytiscus spp.	-	-	-	-	-	*	-	-	-	-	*	-	-	*
Gyrinidae														
Gyrinus spp.	-	-	-	-	-	*	*	-	-	*	*	*	-	*
Hydraenidae														
Hydraena testacea Curt.	-	-	-	-	-	-	-	-	*	-	-	-	-	**
H. spp.	-	-	-	*	-	-	*	-	**	-	-	-	-	-
Ochthebius minimus (F.)	-	-	**	***	***	***	****	-	*	**	**	-	-	***
O. spp.	*	**	***	****	****	****	-	**	***	****	****	-	*	***
Limnebius spp.	-	-	-	***	**	***	*	**	**	**	***	**	**	***
Hydrochus spp.	-	-	*	*	**	-	-	*	-	*	-	*	-	*
Heloporus spp.	-	-	*	*	***	*	**	-	***	**	****	*	*	**
Hydrophilidae														
Coelostoma orbiculare (F.)	-	-	-	-	-	-	-	*	*	-	-	-	-	*
Sphaeridium spp.	-	-	-	-	-	-	-	-	-	-	*	-	-	-
Cercyon spp.	-	-	*	**	-	-	*	*	*	*	*	**	*	-
Anacaena spp.	-	-	*	-	-	*	-	-	-	*	-	-	-	-
Hydrobius fusipes (L.)	-	-	*	-	*	*	**	*	*	*	*	*	-	*
Laccobius spp.	-	-	-	*	*	-	-	-	-	*	*	-	-	***
Enochrus spp.	-	-	-	**	*	**	-	*	*	*	***	-	*	-
Cymbiodyta marginella (F.)	-	-	-	-	-	*	-	-	-	*	-	-	-	-
Histeridae														
Histeridae Gen. & spp indet.	-	-	-	*	-	-	-	-	-	*	-	-	-	-
Silphidae														
Silphidae Genus & spp. Indet.	-	-	-	-	-	-	-	*	-	-	-	*	-	-
Orthoperidae														
Orthoperus spp.	-	-	-	-	-	-	-	-	-	-	-	-	*	*

ES	34	36	37	39	41	43	44	49	50	52	53	55	57	59
Staphylinidae														
Olophrum spp.	-	-	-	-	-	-	-	*	-	-	-	-	*	-
Lesteva longelytrata (Goeze)	-	-	-	-	-	-	-	-	-	-	-	-	*	-
L. sp.	-	-	*	*	*	-	-	-	-	*	-	-	*	*
Oxytelus sculptus Grav.	-	-	*	-	-	-	-	-	-	*	-	-	-	-
Platystethus arenarius (Fourc.)	-		*	-	-	-	*	-	-	-	-	-	-	-
Bledius spp.	-	-	-	-	-	-	*	-	-	-	-	-	-	-
Stenus spp.	*	-	*	-	-	-	-	-	-	-	-	-	*	-
Paederus spp.	-	-	-	-	-	-	-	-	*	-	-	-	-	*
Stilicus orbiculatus (Payk.)	-	-	-	-	*	-	-	-	-	-	-	-	-	-
Lathrobium spp.	*	-	*	-	*	*	-	*	-	*	-	-	-	*
Gyrohypnus punctulatus (Payk.)	-	-	-	**	-	*	-	-	-	-	-	-	-	-
Xantholinus spp.	-	*	**	**	*	*	*	-	*	-	*	*	-	-
Philonthus spp.	-	-	-	*	-	-	-	-	-	-	-	*	-	-
Philonthus/ Quedius spp.	-	-	***	-	-	*	-	-	-	*	-	-	-	-
Tachinus spp.	-	-	-	-	-	-	-	-	*	-	-	-	-	-
Cantharidae														
Cantharid spp.	-	-	-	-	-	-	-	-	-	-	-	*	-	-
Elateridae														
Agroites spp.	-	-	*	*	-	*	-	*	-	-	-	*	*	-
Helodidae														
Helodidae Gen. & spp. Indet.	-	-	-	-	-	-	-	-	*	-	-	-	-	-
Dryopidae														
Dryops spp.	-	*	**	-	-	-	***	**	**	**	-	*	*	*
Anthicidae														
Anthicus spp.	-	-	-	-	-	-	-	-	-	-	*	-	-	-
Scarabaeidae														
Geotrupes spp.	-	-	-	-	-	-	*	-	-	-	-	*	-	-
Othophagus spp.	-	-	-	-	*	*	-	-	-	-	-	-	-	-
Aphodius spp.	-	*	-	*	**	**	***	**	**	***	**	****	-	*
Pyllopertha horticola (L.)	-	-	*	**	*	-	-	*	-	*	-	-	-	*
Chyrsomelidae														
Donacia spp.	**	*	**	*	***	***	-	***	****	*	-	*	*	***
Plateumaris spp.	-	-	*	-	*	-	-	*	-	*	-	-	-	***
Chrysomela spp.	-	-	-	-	-	-	-	-	-	-	-	*	-	-
Phyllodecta vulgatissima (L.)	-	-	-	*	-	-	*	*	-	***	*	-	-	*
Prasocuris phellandri (L.)	-	-	-	-	-	*	-	-	*	*	-	-	-	*
Phyllotreta spp.	-	-	*	-	-	-	-	-	-	-	-	-	-	*
Scolytidae														
Scolytus spp.	-	-	-	-	-	-	*	-	-	-	-	-	-	-
Cuculionidae														
Apion spp.	-	-	-	*	-	*	**	*	-	-	**	-	*	*
Sitona spp.	-	-	*	-	-	-	**	**	*	-	*	*	-	*
Bagous spp.	*	*	*	-	-	-	-	-	-	-	-	-	-	-
Tanysphyrus lemnae (Payk.)	-	-	-	-	-	-	*	-	-	-	-	-	-	*
Dorytomus spp.	-	-	-	-	-	*	-	-	-	-	-	-	-	-
Notaris acridulus (L.)	*	-	-	-	-	*	**	-	-	-	-	***	-	-
N. sp.	-	-	*	-	-	-	-	-	-	-	*	-	-	-
Thyrogenes spp.	*	-	-	-	-	-	-	*	-	-	-	-	-	-
Alophus triguttatus (F.)	-	-	-	-	-	-	-	-	-	-	-	*	-	-
Hypera sp.	-	-	-	-	-	**	-	*	-	-	*	-	-	-
Limnobaris spp.	-	-	-	-	-	-	-	*	-	-	-	*	-	*
Ceutorhynchus spp.	-	-	*	*	-	*	-	-	-	-	-	-	-	-
Gymnetron labile (Hbst.)	-	-	-	*	-	-	-	*	-	-	-	-	*	-
G. spp.	-	-	-	-	-	-	-	-	-	-	*	-	-	*

Fig. 1. Location of excavation trenches 33-41 and the cropmarks. Scale 1:10,000.