THE INSECTS ASSOCIATED WITH LINDOW MAN

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In order to investigate the insects associated with the Iron Age body discovered in Lindow Moss, Cheshire, samples of peat from around parts of the body, and the water used for cleaning the hair and skin, were reserved for insect analysis. Ten samples were investigated and in the following list, the letter assigned to each identifies the sample in the insect table.

A. Hair area: - water
B. Hair and beard area: - water
C. Hair - back: - water
D. Right ear-hole: - peat
E. Impression of skull: - peat
F. Abdomen area: - peat
G. Abdomen area: - water
H. Back, general: - peat
I. Spinal chord cavity: - ?
J. Final cleaning, top side: - water

The samples were processed and sorted by Mr A. Moss at the Department of Geography, Birmingham University, and the insects were sent to the author at the Ancient Monuments Laboratory for identification and analysis. The list of insects and arachids from the samples is given in Table One and the numbers for each represent a minimum based on any common part. The nomenclature for Coleoptera follows Pope (1977).

TABLE ONE

INSECT NAME	A	B	C	D	E	F	G	H	I	J	TOTAL
INSECTA											
HEMIPTERA											
HOMOPTERA											
Gen. et spp. indet.	-	-	-	-	-	-	-	2	-	-	2
HETEROPTERA											
Gen. et spp. indet.	1	1	-	-	1	1	-	6	-	-	10
TRICHOPTERA											
LIMNEPHELIDAE											
Limnephilus griseus or ignavus	-	-	-	-	-	-	-	-	1	-	1
Limnephilus sp.	-	-	-	-	-	1	-	5	-	-	6
Limnephilidae indet.	-	-	-	-	-	1	-	1	1	-	3
Trichoptera -"species a"	1	1	-	-	1	-	-	-	2	-	5

COLEOPTERA											
CARABIDAE											
Pterostichus diligens (Sturm)	-	1	-	-	-	-	-	1	-	-	2
DYTISCIDAE											
Hydroporus obscurus Sturm	-	-	-	-	-	-	-	1	-	1	2
Hydroporus sp.	-	1	-	-	-	-	1	-	-	-	2
Graptodytes granularis (L.)	-	1	-	-	-	-	-	1	-	1	3
Agabus ?bipustulatus (L.)	-	-	-	-	1	-	-	-	-	-	1
HYDROPHILIDAE											
Helophorus brevipalpis Bed.	-	-	-	-	-	1	-	-	-	-	1
Enochrus spp.	2	1	-	-	-	-	-	4	-	-	7
HISTERIDAE											
Paralister sp.	-	-	-	-	-	-	-	1	-	-	1
STAPHYLINIDAE											
Lesteva heeri Fauv.	-	-	-	-	-	1	-	-	-	-	1
Philonthus sp.	-	-	-	-	-	-	-	1	-	-	1
Aleocharinae indet.	1	1	-	1	-	1	-	2	-	-	6
SCARABAEIDAE											
Phyllopertha horticola (L.)	-	-	-	-	-	-	-	-	-	1	1
SCIRTIDAE											
Gen. et spp. indet.	-	1	-	-	2	1	-	2	-	-	6
CHRYSOMELIDAE											
Plateumaris discolor (Panz.)	-	-	-	-	-	-	-	1	-	-	1
P. discolor or sericea (L.)	-	1	-	1	1	1	1	1	-	1	7
Altica britteni Sharp or ericeti (Allard)	-	-	-	-	2	-	-	1	-	-	3
Chaetocnema sahlbergi (Gyll.)	-	-	-	-	-	1	-	-	-	-	1
CURCULIONIDAE											
Rhyncolus lignarius (Marsh.)	-	-	-	-	1	-	-	-	-	-	1
Ceutorhynchus sp.	-	-	-	-	1	-	-	-	-	-	1
Limnobaris pilistriata (Steph.)	-	-	-	-	-	1	-	1	-	-	2
Rhynchaenus ?quercus (L.)	-	-	-	-	-	1	-	-	-	-	1
Curculionidae indet.	-	-	-	-	1	-	-	-	-	-	1
Coleoptera larvae	1	1	-	-	1	-	-	2	-	-	5
HYMENOPTERA											
PARASITICA	-	1	-	-	1	-	-	1	1	-	4
FORMICIDAE											
"Myrmica type"	-	-	-	-	1	-	-	1	-	-	2
"Lasius type"	1	1	-	-	1	-	-	3	-	-	3

DIPTERA											
TIPULIDAE											
Gen. et spp. indet.	2	2	1	-	5	4	1	30	1	2	48
ARACHNIDA											
ACARI	10	17	-	2	10	4	1	11	3	8	66
ARANAEA	1	-	-	-	1	-	-	-	-	-	2

As the peat samples were small (less than -), and collected with the water was any residual peat washed off the body surface, the assemblages of insects were impoverished. Furthermore, the retrieved insects were rarely represented by the full complement of exoskeletal parts (i.e. heads, thoraces, beetle wingcases etc.) and those which were recovered were often fragmented. The incompleteness of the insect remains rendered identification difficult. Members of five insect families were recorded in addition to numbers of mites and two spiders. The larval Trichoptera (caddis) were identified and commented on by Miss Bridget Wilkinson, but the remains were generally too sparse to allow specific identifications. Fragments of both adult and pupal Diptera (true flies) were sent to Dr Peter Skidmore who is reporting on them separately. In the same order, larval Tipulidae (leather-jackets), which burrow below ground, were recorded in all but one sample.

Inferences about the immediate environment of the bog body are largely based on the twenty or so taxa of Coleoptera (beetles) present in the samples. In particular, the more stenotopic species, which display particular habitat requirements, provide most data. The fauna largely reflects the conditions at the site into which the body was introduced; few beetles appear to be related to the presence of the corpse. The implication from the beetles and other insects are for a neutral to acid bog with peaty pools fringed with wetland plants and other bog vegetation growing in the vicinity. Whilst the paucity of insect species is consequent on the sample size, the nutrient-status of the bog is also a contributory factor as the insect numbers are inversely proportional to the nutrient supply. Neutral to oligotrophic bogs are characterised by faunas which are relatively low in diversity and numbers.

Two species of predaceous water beetles were recorded from the site. Graptodytes granularis is a small species with a variable colour pattern on the elytra. The identification was confirmed by features on the ventral coxal plate, examples of which were recovered. Balfour-Browne (1940) regards G. granularis as a stagnant water species frequenting detritus ponds and drains and it occurs locally in England and Wales. Hydroporus obscurus, a reddish-coloured species, is generally paler than others in the genus. Its identification was also confirmed on coxal plate features. Records of the species from the north of Britain are mainly from acid water bodies such as Sphagnum pools and peat mosses according to Balfour-Browne (ibid), although he notes that in Norfolk it occurs in fresh water drains. In north France, the species is found in stagnant peaty pools around Pas-de-Calais and the Somme, although it is rare elsewhere (Guignot 1931-33). A further species of Hydroporus present in the samples was too incomplete to be identifiable. A scrap of striated cuticle also of a water beetle may be referable to Agabus bipustulatus, a very widely occurring species, but this suggestion must remain tentative.

The hydophilids Enochrus and Helophorus brevipalpis inhabit the weedy margins of pools although the latter flies readily and is frequently found away from water. The evidence for pools is reinforced by numbers of Scirtidae, a family adapted for aquatic conditions although hibernation is on land (Crowson 1981). Caddis-fly larvae, which unlike the adults are aquatic, are represented by Limnephilidae, inhabitants of small pools often in peaty areas, and by parts of another type, termed "species a", which occurs widely from the tundra to temperate areas but has yet to be recognised (pers. comm. B. Wilkinson). The staphylinid beetle Lesteva heeri is usually found in wet vegetation adjacent to water.

The phytophagous, or plant-feeding, beetles mainly indicate vegetation found around ponds or other damp situations. The most frequent records in this category were eight examples of Plateumaris, a leaf beetle. Unfortunately, most of the remains were fragments of undersides, appendages and elytra, although the latter were referable to two of the four species in the genus; discolor or sericea. The single, complete elytron, in peat from the back of the body, belonged to discolor, a feeder on Eriophorum (cotton-grass) and species of Carex (sedge). The base of another elytron appeared closer to sericea, but this identification was not confirmed as the overlapping sutural margin near the apex was missing. It is possible both species were present; sericea also feeds on Carex as well as Iris pseudacoris. Sedges provide one of the food plants of Chaetocnema sahlbergi. In addition, Fowler (1890) notes occasional records of this beetle on Vaccinium (cranberry) and Joy (1932) gives as another host Glaux maritima (seawort), a plant of coasts and inland salt areas. According to Hoffmann (1950) Limnobaris pilistriata feeds on various Cyperaceae including Scirpus sylvaticus, the leaves of which are eaten by the adults, and Juncus (rushes). Reitter (1916) also includes Cladium mariscus as a host.

Two of the weevils suggest the presence of some trees; Rhynchaenus is a deciduous leaf-miner and Rhyncolus lignarius is found in decaying, mainly deciduous trees. Hence, there is a slight suggestion of carr woodland in the vicinity although the beetles could relate to trees on drier ground. One of the species in the fauna more likely to have originated from such a location is Phyllopertha horticola. The larvae are root-miners on grasses, cereals and clover, often occurring in meadows where they can be destructive. The adults, which fly readily, often damage young trees, but they are also recorded on bracken (Fowler 1890, Britton 1956, Horion 1958).

One beetle whose occurrence at the site is most likely due to the corpse is Paralister. The peat from the back yielded a single elytron which most closely matched P. obscurus (Kug.) and P. puparescens (Herbst), but without the important pronotal character of the single or double striae near the lateral margins, a specific identification is not possible. Many

Histeridae are associated with carrion, although dung or rotten vegetation serve as alternative habitats. The state of preservation of the body would suggest very little decomposition had taken place. As the humic acids of the bog water served to "tan" and thus preserve the corpse, it is likely that it was submerged; any floating part projecting above the surface of the water would have been subject to normal, aerobic decompostion. Such a state would almost certainly have attracted numbers of insects, especially flies, drawn to the decomposing flesh, as is attested by well-documented post-mortem studies (e.g. Easton and Smith 1970, Smith 1979) and now, several archaeological examples of insect assemblages associated with human burials. A preliminary account of the most detailed study of an archaeological burial is given in Buckland (1979). In this case, the corpse was sealed in a lead coffin after it had attracted Phorid flies and the beetle Rhizophagus parallelocollis Gyll. The latter is a possible predator on the flies although moulds on the corpse provide a possible nutrient source and account for its association with church-yards. In the closed, anaerobic environment of the coffin, enormous numbers of fly and beetle remains were preserved. The same beetle has been recorded from the chasuble preserved with a 15th. century burial (Girling 1981) and additionally from a Roman coffin and a Medieval cathedral burial (Girling in preparation). Not uncommonly associated with archaeological burials are insects, especially fly puparia, replaced by metal salts from corroded metal grave goods; brooches from an Anglo-Saxon cemetery in Sussex were covered by up to about a hundred replaced puparia (Girling 1985). These examples illustrate typical insect assemblages associated with normal decomposition and are clearly unlike the Lindow Moss fauna. It is possible, however, that the presence of the corpse resulted in the pool water becoming foul or maloderous, and this could have attracted the histerid beetle. Dr P.C. Buckland has drawn my attention to a photograph of Lindow Moss site showing the corpse of a sheep which had strayed into the peat area and drowned in one of the pools. This indicates the treachery of the peat surface and natural instances of animals becoming trapped may have provided a not infrequent food supply for insects which feed on carrion.

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