

# Copper Mining in the Bronze Age at Mynydd Parys, Anglesey, Wales

By DAVID A. JENKINS

With contributions by SIMON TIMBERLAKE, ANDREW DAVIDSON, KALLA MAL, PETER MARSHALL,  
TIM MIGHALL, CHARLOTTE O'BRIEN and DAVID N. SMITH

## APPENDIX S.1. SOME CHARACTERISTICS OF EARLY BRONZE AGE MAULS FROM MYNYDD PARYS (D. Jenkins)

<i>(a) Properties</i>		<i>Intact cobbles</i>	<i>Fractured cobbles</i>	<i>Flakes</i>	<i>Fragments</i>
Number		66	17	35	12
Weight (g)	Max-min	7800–460	4080–210	1630–60	1560–190
	Average	2050	1740	750	750
	Mode	1880	1500	660	620
Dimensions (mm)	Maximum	270–40	205–105	190–70	175–80
	Mode	140	150	120	
	Minimum	140–40	105–20	80–10	80–25
	Mode	70	70	35	50
<i>(b) Petrology</i>					
	Silicified siltstone	2	–	1	1
	Sandstones	10	2	5	1
	Orthoquartzite (pale buff)	13	4	2	2
	Orthoquartzite (Carb.)	2	2	–	–
	Metaquartzite (Gwna?)	8	–	–	1
	Quartz breccia	–	1	–	–
	Rhyolite/tuff	4	1	9	3
	Porphyry	5	1	3	1
	Microgranite	3	3	6	1
	Microgranodiorite	2	2	4	1
	Microdiorite	2	–	1	–
	Andesite	3	–	–	–
	Basalt	1	–	–	1
	Granite	1	–	1	–
	Granite gneiss	1	–	–	–
	Granodiorite	2	–	–	–
	Dolerite	2	1	2	–
	Meta-tuff	1	–	–	–
<i>(c) Modifications</i>			<i>Intact &amp; fractured cobbles</i>	<i>Flakes</i>	<i>(Average)</i>
Numbers			83	35	
By use	Flaked		24	12	
	Battered one end		39	15	
	Battered both ends		20 (71%)	1 (46%)	64%
	Battered edge		15	1	
	Battered face (mortar?)		4	–	
Re-use	Battered one end		18	5	
	Battered both ends		14 (35%)	1 (16%)	30%
Adaptation	Pecking/rill/notch		10 (12%)	3 (9%)	11%

APPENDIX S.2. SITE S1.1, CONTEXT 104 STRATIGRAPHY  
(T. Mighall)

<i>Stratigraphic layers</i>	<i>Depth (cm)</i>	<i>Characteristics</i>
12	0–3.2	Brown/green clay with charcoal
11	3.2–5	Sand yellow coloured clay
10	5–7	Light brown clay with small pieces of quartz and charcoal
9	7–10	Light brown/cream clay with quartz
8	10–15	Grey clay, possibly with some organics characterised by lighter brown bands. Lenses of charcoal are visible
7	1515.5	Dark brown irregular band. Possibly peat
6	15.5–17.5	Dark brown organic substance with clay, charcoal, and quartz
5	17.5–22	Light grey clay with thin organic? Lens at 20.0–20.5 cm
4	2226	Dark grey clay
3	26–27	Very dark grey clay with possible charcoal or decayed wood. Charcoal at 26.5 cm
2	2729	Light brown/cream clay with quartz
1	29–33	Light brown, grey, irregularly laminated clay

APPENDIX S.3. SITE S3 STRATIGRAPHY  
(S. Timberlake & T. Mighall)

<i>Stratigraphic layers</i>	<i>Depth (cm)</i>	<i>Characteristics</i>
15	0–8	Mid-dark grey silt with small charcoal fleck inclusions and small flecks white-yellow spots of clay/shale flakes (sub 2 mm diameter)
14	8–18	Mid-dark grey slightly clayey silt, with charcoal inclusions
11	18–26	Mid-dark grey clayey silt with small charcoal fleck inclusions, rotted shale and light clay pieces and larger shale pieces (5–10 mm diameter)
9B	26–30	Light grey-brown silt with light grey/white clay laminae
9A	30–37	Dark grey to mid grey silt with micro laminae (dark)
7	37–38	Light grey clay-rich silt speckled with black charcoal with small shale inclusions
5	38–43	Light brown clay with yellowish jarosite inclusion
3	43–44	Dark grey laminated, slightly organic silt
3	44–46	Dark grey laminated, slightly organic silt
2	46–47	Dark grey organic silt with small twigs and organic matter
1	47–50	Grey clay-rich silt

APPENDIX S.4. THE INSECTS RECOVERED FROM THE MATERIAL FROM MYNYDD PARYS  
(D. Smith & K. Mal)

Taxa	RDB* status	Ecological code	Site S1				Site S3				Phytophage host plants
			0–30	50–46 SU 1–2	46–38 SU 5–3	38–30 SU 9A–6	30–26 SU 9B	26–18 SU 11	18–8 SU 14	8–0 SU 15	
CARABIDAE											
<i>Carabus violaceus</i> L.	–	–	–	–	–	–	–	–	–	1	1
<i>Carabus problematicus</i> Hbst.	–	–	–	–	–	–	–	–	–	1	–
<i>Notiophilus hypocrita</i> Curt.	–	–	–	–	–	1	–	–	–	–	–
<i>Notiophilus</i> spp.	–	–	–	–	–	–	–	–	–	3	1
<i>Trechus quadristriatus</i> (Schrk.)	–	–	–	–	1	–	–	–	–	–	1
<i>Trechus quadristriatus</i> (Schrk.)	–	ws	3	–	–	–	–	–	–	–	–
<i>/T. obtusus</i> Er.											
<i>Trechus</i> spp.	–	–	7	–	–	3	–	1	3	–	–
<i>Bembidion</i> spp.	–	–	–	–	–	–	–	5	–	–	11
<i>Trichocellus placidus</i> (Gyll.)	–	ws	–	–	–	–	–	–	–	–	8
<i>Acupalpus flavicollis</i> (Sturm.)	Nb	ws	–	–	–	–	–	–	–	6	–
<i>Acupalpus</i> spp.	–	–	–	–	–	–	1	2	8	–	–
<i>Pterostichus. diligens</i> (Sturm.)	–	ws	–	–	–	–	–	–	–	–	4
<i>Pterostichus niger</i> (Schall.)	–	–	–	–	–	–	–	1	–	–	–
<i>Pterostichus madidus</i> (F.)	–	–	2	–	–	–	–	–	–	–	–
<i>Pterostichus</i> spp.	–	–	3	–	–	–	–	4	9	–	–
<i>Calathus melanocephalus</i> (L.)	–	–	–	–	–	–	–	–	–	–	4
<i>Calathus</i> spp.	–	–	5	–	–	2	–	4	–	–	7
<i>Agonum</i> spp.	–	–	1	–	–	–	–	–	7	–	4
<i>Amara tibialis</i> (Payk.)	–	–	–	–	–	–	–	–	8	–	–
<i>Amara bifrons</i> (Gyll.)	–	–	–	–	–	1	–	–	–	–	–
<i>Amara equestris</i> (Duft.)	Nb	–	1	–	–	–	–	–	6	–	–
<i>Amara</i> spp.	–	–	3	–	–	–	1	2	4	–	–
DYTISCIDAE											
<i>Hydroporus</i> spp.	–	a	4	–	–	–	–	1	–	–	6
<i>Agabus bipustulatus</i> (L.)	–	a	–	–	–	–	–	–	1	–	–
HYDRAENIDAE											
<i>Limnebius</i> spp.	–	a	–	–	–	1	–	1	8	–	–

Taxa	RDB* status	Ecological code	Site S1				Site S3				Phytophage host plants
			0-30	50-46 SU 1-2	46-38 SU 5-3	38-30 SU 9A-6	30-26 SU 9B	26-18 SU 11	18-8 SU 14	8-0 SU 15	
HYDROPHILIDAE											
<i>Cercyon analis</i> (Payk.)	-	df	-	-	-	-	-	-	-	2	
<i>Cercyon</i> spp.	-	df	-	-	-	-	-	2	-	1	
<i>Megasternum boletophagum</i> (Marsh.)	-	df	2	-	-	-	-	-	-	-	
<i>Megasternum</i> sp.	-	-	-	-	-	-	-	-	-	1	
<i>Hydrobius fuscipes</i> (L.)	-	a	-	-	-	-	-	-	1	-	
<i>Laccobius</i> spp.	-	a	-	-	-	-	-	-	2	-	
<i>Chaetarthria seminulum</i> (Hbst.)	-	a	-	-	-	-	-	-	3	-	
			-	-	-	-	-	-	-	-	
SILPHIDAE											
<i>Silpha tyrolensis</i> Laich.	-	g	1	-	-	-	-	-	-	-	
<i>Silpha</i> sp.	-	-	-	-	-	-	-	-	1	-	
CATOPIDAE											
<i>Choleva</i> spp.	-	-	7	-	-	-	-	4	3	2	
LIODIDAE											
<i>Agathidium atrum</i> (Payk.)	-	t	-	-	-	-	1	4	2	-	
<i>Agathidium sphaerulum</i> Rtt.	-	t	5	-	-	-	-	-	5	-	
<i>Agathidium</i> spp.	-	-	-	-	-	1	-	3	-	2	
SCYMINIDAE Genus and species Indeterminate		-	1	-	-	-	-	1	4	4	
STAPHYLINIDAE											
<i>Micropeplus staphylinoides</i> (Marsh.)	-	df	-	-	-	-	-	1	6	2	
<i>Metopsia gallica</i> (Koch.)	-	-	-	-	-	2	1	-	-	-	
<i>Omalium</i> sp.	-	-	1	-	-	-	-	-	-	-	
<i>Lathrimaeum unicolor</i> (Marsh.)	-	ws	-	-	-	1	7	9	-	7	
<i>Olophrum piceum</i> (Gyll.)	-	ws	-	-	1	1	-	2	5	-	
<i>Olophrum fuscus</i> (Grav.)	-	ws	-	-	-	-	-	-	-	7	
<i>Olophrum</i> spp.	-	ws	6	-	-	-	-	-	-	2	

Taxa	RDB* status	Ecological code	Site S1				Site S3				Phytophage host plants
			0-30	50-46 SU 1-2	46-38 SU 5-3	38-30 SU 9A-6	30-26 SU 9B	26-18 SU 11	18-8 SU 14	8-0 SU 15	
<i>Acidota crenata</i> (F.)	Mb	df	-	-	-	-	-	1	-	2	
<i>Lesteva longelytrata</i> (Goeze)	-	ws	-	-	-	-	-	-	2	-	
<i>Lesteva</i> sp.	-	ws	-	-	-	-	-	1	-	-	
<i>Stenus</i> spp.	-	-	-	-	-	-	-	2	4	5	
<i>Lathrobium</i> spp.	-	-	-	-	-	-	-	-	1	3	
<i>Xantholinus linearis</i> (OL.)	-	-	-	-	-	-	-	-	13	-	
<i>Xantholinus</i> spp.	-	-	-	-	1	2	-	4	-	4	
<i>Philonthus</i> spp.	-	-	-	-	-	-	-	-	11	-	
<i>Staphylinus</i> spp.	-	-	-	-	-	-	-	-	3	4	
<i>Quedius</i> sp.	-	-	-	-	-	-	-	1	-	-	
<i>Tachyporus</i> spp.	-	-	-	-	-	-	-	-	14	7	
PSELAPHIDAE											
<i>Bryaxis bulbifer</i> (Riechb.)	-	-	-	-	-	1	-	-	5	-	
ELATERIDAE											
<i>Agriotes</i> sp.	-	p	-	-	-	-	-	-	-	-	1
HELODIDAE											
<i>Cyphon</i> spp.	-	ws	1	-	-	4	-	1	2	-	
NITIDULIDAE											
<i>Meligethes</i> sp.	-	p	-	-	-	-	-	-	-	-	1
LATHRIDIIDAE											
<i>Enicmus minutus</i> (Group)	-	-	-	-	-	-	-	-	1	-	
<i>Corticaria</i> or <i>Corticarina</i> spp.	-	-	-	-	-	-	-	-	2	-	
TENEBRIONIDAE											
<i>Cylindronotus laevioctostriatus</i> (Goeze.)		t	2	-	-	-	-	2	2	3	- Calluna spp. (heather), under bark & in dead- wood of range of trees
SCARABAEIDAE											
<i>Geotrypes</i> spp.	-	df	5	-	-	-	-	-	-	-	
<i>Aphodius</i> spp.		df	-	-	-	-	-	-	2	-	

Taxa	RDB* status	Ecological code	Site S1				Site S3				Phytophage host plants
			0–30	50–46 SU 1–2	46–38 SU 5–3	38–30 SU 9A–6	30–26 SU 9B	26–18 SU 11	18–8 SU 14	8–0 SU 15	
CHRYSOMELIDAE											
<i>Phyllotreta</i> spp.	–	p	1	1	–	–	–	–	–	–	
<i>Haltica</i> spp.	–	t	1	–	–	–	–	1	–	–	
<i>Chaetocnema concinna</i> (Marsh.)	–	p	–	–	–	1	–	–	–	–	
SCOLYTIDAE											
<i>Dryocoetes villosus</i> (F.)	–	t	–	–	–	2	–	–	–	–	Under bark of range of deciduous trees
CURCULIONIDAE											
<i>Apion frumentarium</i> (Payk.)	Nb	p	–	1	–	–	–	6	3	1	On <i>Rumex</i> spp. (dock)
<i>Apion</i> spp.	–	p	6	–	–	–	1	1	–	5	
<i>Polydrusus</i> sp.	–	p	–	–	–	–	–	–	–	1	
<i>Phyllobius</i> spp.	–	t	–	–	1	–	–	–	5	–	
<i>Trachyphloeus alternans</i> Gyll.	Nb	p	–	–	–	–	1	1	3	7	Often associate with <i>Helianthemum nummularinum</i> (L.) Mill. (rock-rose) or <i>Plantago</i> spp. (plantains)
<i>Trachyphloeus</i> spp.	–	–	–	–	–	1	–	1	–	–	
<i>Barypeithes</i> spp.	–	–	4	–	–	–	–	3	4	7	
<i>Strophosoma capitatum</i> (Geer.)	–	t	–	–	–	–	–	–	–	1	
<i>Sitona regensteinensis</i> (Hbst.)	–	p	–	–	–	1	–	–	–	–	<i>Cytisus scoparius</i> (L.) Link (broom) or <i>Ulex europaeus</i> L. (gorse)
<i>Sitona hispidulus</i> (F.)	–	p	1	–	–	1	–	2	8	1	<i>Trifolium</i> L. (clover), FABACEAE (pea family)
<i>Sitona cylindricollis</i> (Fahrs.)	–	p	3	–	–	–	–	–	–	3	<i>Melilotus</i> spp. (melilot)
<i>Sitona</i> spp.	–	–	5	–	–	–	–	3	6	5	
<i>Alophus triguttatus</i> (F.)	Nb	p	–	–	–	–	–	1	–	–	<i>Plantago lanceolata</i> L. (ribwort plantain)
<i>Hypera</i> spp.	–	–	–	–	–	–	–	2	1	3	
<i>Ceutorhynchus</i> spp.	–	–	–	–	–	–	–	2	–	–	

Taxa	RDB* status	Ecological code	Site S1				Site S3				Phytophage host plants
			0-30	50-46 SU 1-2	46-38 SU 5-3	38-30 SU 9A-6	30-26 SU 9B	26-18 SU 11	18-8 SU 14	8-0 SU 15	
<i>Micrelus ericae</i> (Gyll.)	-	m	-	-	1	-	-	-	-	2	<i>Calluna vulgaris</i> (L.) Hull (heather), <i>Erica tetralix</i> L. (crossed leaved heather)
<i>Gymnetron</i> spp.	-	p	1	-	-	-	1	3	-	2	<i>Plantago lanceolata</i> L. (ribwort plantain), <i>Plantago</i> spp. (plantains)

*Key to ecological groupings used*

a= aquatic water beetles  
ws = waterside taxa often associated with emergent vegetation  
df = taxa often associated with dung  
g = taxa often associated with grassland/pasture  
p= taxa associated with grassland and open areas  
t = taxa associated with dead wood, fallen timber and tree leaf  
m= taxa associated with moorland

\*Red Data Book status (Hyman & Parsons 1992; 1994)

RDB1 = Endangered  
RDB2 = Vulnerable  
RDB3 = Rare  
RDBK = Status not sufficiently known  
RDBX = presumed extinct in the British Isles  
NA and NB = notable species

APPENDIX S.5. THE PROPORTIONS OF THE ECOLOGICAL GROUPS OF COLEOPTERA  
(D. Smith & K. Mal)

<i>Depth (cm) and Sub-unit (SU)</i>	<i>Site S1</i>			<i>Site S3</i>				
	<i>0–30</i>	<i>50–46</i>	<i>46–38</i>	<i>38–30</i>	<i>30–26</i>	<i>26–18</i>	<i>18–8</i>	<i>8–0</i>
		<i>SU 1–2</i>	<i>SU 3–5</i>	<i>SU 6–9A</i>	<i>SU 9B</i>	<i>SU 11</i>	<i>SU 14</i>	<i>SU 15</i>
Minimum Number of Individuals	82	2	5	26	14	85	189	145
Minimum Number of Taxa	26	2	5	16	8	34	41	41
% Aquatic (a)	4.9%	0.0%	0.0%	3.8%	0.0%	2.4%	7.9%	4.1%
% Waterside (ws)	18.3%	0.0%	20.0%	23.1%	57.1%	20.0%	11.6%	19.3%
% Dung/ foul matter (df)	11.1%	0.0%	0.0%	0.0%	0.0%	6.1%	5.3%	6.3%
% Grassland (p)	20.6%	100.0%	0.0%	15.8%	50.0%	21.2%	9.2%	19.8%
% Trees/woodland (t )	12.7%	0.0%	25.0%	10.5%	16.7%	10.6%	9.2%	3.6%
% Moorland (m)	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	1.8%

*Appendices S.4 and S.5*

The nomenclature for Coleoptera (beetles) follows that of Lucht (1987). The right-hand column in Appendix S.4 lists the host plants for the phytophage species of beetle that were recovered and are predominantly derived from Koch (1989; 1992). The plant taxonomy follows that of Stace (2010). The affiliation of each beetle species to a particular ecological grouping is indicated in the third column of Appendix S.4. The meaning of each ecological code is explained in the key at the base of the table. The occurrence of each of the ecological groupings is expressed as a percentage in Appendix S.5 and is illustrated in Figure 15. The pasture/grassland, dung, and woodland ecological groupings are calculated as percentages of the number of terrestrial species only, as opposed to the whole fauna. An individual taxon can occur in more than one ecological grouping and, therefore, the proportions presented in Appendix S.5 and Figure 16 can exceed 100%. The second column also includes the Red Data Book (RDB = rarity) status of the insects recovered. This information, and the codes used are derived from Hyman and Parsons (1992; 1994). The RDB classifications are outlined at the base of the table.



APPENDIX S.6. PLANT MACROFOSSILS – SITE S1.1  
(C. O'Brien)

Context	Section 1.1										
	101	104									105
	Top	12 + 11	10+9	8	6+7	5	4	3	2	1	
Unit	100	100	100	100	100	100	100	100	100	100	100
Volume processed (ml)	100	100	100	100	100	100	100	100	100	100	100
Bud scales	-	(+)	+	-	+	+	(+)	(+)	-	+	(+)
Charcoal	+	-	-	+++	-	-	-	+++	++	+++	+
Insect / beetle	-	(+)	+	(+)	+	+	+	+	(+)	+	-
<i>Waterlogged remains (total count)</i>											
(g) <i>Leontodon</i> sp. (hawkbit)	achene	-	-	-	-	-	-	1	-	-	-
(q) <i>Chara</i> sp. (stoneworts)	oosporangium	-	-	-	-	-	-	1	-	-	-
(r) <i>Cerastium</i> sp. (mouse-ears)	seed	-	-	1	-	3	1	-	1	-	1
(r) <i>Persicaria lapathifolia</i> (pale persicaria)	nutlet	-	-	-	-	-	1	-	-	-	-
(r) <i>Plantago major</i> (greater plantain)	seed	-	-	-	-	-	1	-	-	-	-
(r) <i>Urtica dioica</i> (common nettle)	achene	-	-	1	3	2	2	2	-	-	1
(t) <i>Betula</i> sp. (birches)	fruit	-	-	-	1	1	-	-	-	-	-
(t) <i>Rubus</i> sp. (brambles)	fruitstone	-	-	-	-	1	-	-	-	-	3
(t) <i>Rubus fruticosus</i> agg. (bramble)	fruitstone	-	-	-	-	1	-	-	-	-	1
(t) <i>Rubus idaeus</i> (wild raspberry)	fruitstone	-	-	-	-	1	-	-	-	-	-
(w) <i>Carex</i> sp. (sedges)	trigonous nutlet	-	-	-	-	4	1	-	-	-	2
(w) <i>Juncus</i> sp. (rushes)	seed	9	36	20	9	9	9	2	3	5	17
(w) <i>Juncus articulatus</i> -type (jointed rush-type)	seed	-	-	-	-	1	1	-	-	2	4
(w) <i>Juncus effusus</i> type (soft rush-type)	seed	-	3	15	43	72	26	12	16	18	15
(w) <i>Rorippa</i> sp. (yellow-cresses)	seed	-	-	1	2	3	2	-	3	-	10
(w) <i>Schoenoplectus lacustris</i> (common club-rush)	nutlet	-	1	-	-	-	-	-	-	-	-
(w) <i>Sphagnum</i> sp. (sphagnum moss)	leaf	-	-	1	3	13	7	1	-	-	3
(w) <i>Sphagnum</i> sect. <i>Acutifolia</i> (sphagnum moss)	leaf	-	66	-	-	1	-	-	-	-	-
(w) <i>Typha</i> sp. (bulrush)	seed	-	-	-	-	1	-	-	-	-	-
(x) Brassicaceae undiff. (cabbage family)	seed	-	-	-	-	2	-	-	-	-	-
(x) Caryophyllaceae undiff. (pink family)	seed	-	1	-	4	4	2	3	3	2	3

Context	Section 1.1											
	101	104									105	
Unit	Top	12 + 11	10+9	8	6+7	5	4	3	2	1		
Volume processed (ml)	100	100	100	100	100	100	100	100	100	100	100	
(x) <i>Cenococcum geophilum</i> (soil fungus)	sclerotia	10	55	23	30	35	13	8	12	4	12	7
(x) <i>Chenopodium</i> sp. (goosefoots)	seed	–	–	1	–	–	–	–	1	–	–	–
(x) <i>Hypericum</i> sp. (St John's-worts)	seed	–	–	1	–	1	1	1	1	–	–	–
(x) Musci sp. (mosses excluding <i>Sphagnum</i> )	branch	–	12	3	52	>200	51	8	12	19	32	–
(x) <i>Potentilla</i> sp. (cinquefoils)	achene	–	–	–	1	–	–	–	–	–	–	–
(x) Poaceae undiff. (grass family)	caryopsis	1	11	3	21	16	11	8	17	6	35	–
(x) <i>Prunella vulgaris</i> (selfheal)	nutlet	–	–	–	–	–	1	–	1	–	–	–
(x) <i>Pteridium aquilinum</i> (bracken)	frond fragment	–	–	11	25	>200	4	3	11	2	5	–
(x) <i>Pteridium aquilinum</i> (bracken)	sporangium (with spores)	–	97	–	248	408	–	–	166	31	–	–
(x) Pteridophyta undiff. (ferns)	sporangium	–	–	60	–	–	114	90	–	–	63	30
(x) <i>Ranunculus</i> subgenus <i>Ranunculus</i> (buttercup)	achene	–	–	–	–	–	1	–	–	–	–	–

g = grassland; q = aquatic; r = ruderal; t = tree/woodland; w = wet/damp ground; x = wide niche

(+): trace; +: rare; ++: occasional; +++: common; ++++: abundant

APPENDIX S.7. PLANT MACROFOSSILS – SECTIONS S1.2 AND S1.3  
(C. O'Brien)

Section	1.2				1.3	
	207	204	204	204	307	308
Context	A	B	C	D	A	B
Unit	100	100	100	100	100	100
Volume processed (ml)						
Bud scales	–	(+)	–	–	–	–
Charcoal	+	+++	++	+++	(+)	+++
Insect / beetle	–	–	–	(+)	–	+
<i>Waterlogged remains (total count)</i>						
(r) <i>Cerastium</i> sp. (mouse-ears)	seed	–	–	–	–	1
(r) <i>Plantago major</i> (greater plantain)	seed	–	–	–	–	1
(r) <i>Urtica dioica</i> (common nettle)	achene	1	–	–	–	3
(t) <i>Rubus</i> sp. (brambles)	fruitstone	–	–	1	–	1
(w) <i>Carex</i> sp. (sedges)	trigonus nutlet	–	–	1	–	–
(w) <i>Juncus</i> sp. (rushes)	seed	11	5	8	7	10
(w) <i>Juncus articulatus</i> type (jointed rush-type)	seed	–	–	1	–	–
(w) <i>Juncus effusus</i> type (soft rush-type)	seed	8	–	–	–	59
(w) <i>Rorippa</i> sp. (yellow-cresses)	seed	–	–	2	–	3
(w) <i>Sphagnum</i> sp. (sphagnum moss)	leaf	4	1	–	9	2
(w) <i>Typha</i> sp. (bulrush)	seed	–	2	–	1	1
(x) Brassicaceae undiff. (cabbage family)	seed	–	–	–	–	1
(x) <i>Cenococcum geophilum</i> (sSoil fungus)	sclerotia	16	12	3	8	3
(x) <i>Chenopodium</i> sp. (goosefoots)	seed	–	–	–	–	1
(x) Musci sp. (mosses excluding <i>Sphagnum</i> )	branch	–	4	–	22	–
(x) <i>Potentilla</i> sp. (cinquefoils)	achene	–	1	–	–	1
(x) Poaceae undiff. (grass family)	caryopsis	1	1	2	2	–
(x) <i>Pteridium aquilinum</i> (bracken)	frond fragment	–	3	1	3	–
(x) <i>Pteridium aquilinum</i> (bracken)	sporangium (with spores)	7	–	–	168	–
(x) Pteridophyta undiff. (ferns)	sporangium	–	20	–	–	–

r = ruderal; t = tree/woodland; w = wet/damp ground; x = wide niche

(+): trace; +: rare; ++: occasional; +++: common; ++++: abundant

APPENDIX S.8: PLANT MACROFOSSILS – SECTION S3  
(C. O'Brien)

		Section 3	
Depth (cm) from the top		0–30	30–52
Volume processed (ml)		200	200
Ericaceae undiff. (heathers)	leaves	+++	+++
Insect/beetle		+++	(+)
<i>Waterlogged remains (total count)</i>			
(g) <i>Leontodon</i> sp. (hawkbit)	achene	3	–
(q) <i>Callitriche</i> sp. (water-starwort)	fruit	2591	36
(q) <i>Lemna</i> sp. (duckweeds)	fruit	–	1
(r) <i>Aphanes</i> sp. (parsley-pierts)	seed	1	–
(t) <i>Betula</i> sp. (birches)	fruit	–	3
(t) <i>Rubus</i> sp. (brambles)	fruitstone	2	–
(t) <i>Rubus idaeus</i> (wild raspberry)	fruitstone	1	–
(w) Cyperaceae undiff. (sedge family)	trigonus nutlet	1	–
(w) <i>Juncus</i> sp. (rushes)	seed	>2000	804
(w) <i>Juncus articulatus</i> type (jointed rush type)	seed	15	5
(w) <i>Juncus effusus</i> type (soft rush type)	seed	>2000	548
(w) <i>Rorippa</i> sp. (yellow-cresses)	seed	259	43
(w) <i>Sphagnum papillosum</i> (sphagnum moss)	branch	1	–
(x) Brassicaceae undiff. (cabbage family)	seed	–	1
(x) <i>Cenococcum geophilum</i> (soil fungus)	sclerotia	51	82
(x) <i>Hypericum</i> sp. (St John's-worts)	seed	1	–
(x) Lamiaceae undiff. (dead nettle family)	nutlet	–	1
(x) Musci sp. (mosses excluding <i>Sphagnum</i> )	branch	20	–
(x) <i>Potentilla</i> sp. (cinquefoils)	achene	11	–
(x) Poaceae undiff. (grass family)	caryopsis	1	–
(x) Pteridophyta undiff. (ferns)	sporangium	10	9
(x) <i>Rumex</i> sp. (docks)	nutlet	1	–
(x) <i>Saxifraga</i> sp. (saxifrages)	seed	2	–
(x) <i>Viola</i> sp. (violets)	seed	2	–

g = grassland; q = aquatic; r = ruderal; t = tree/woodland; w = wet/damp ground; x = wide niche.  
(+): trace; +: rare; ++: occasional; +++: common; ++++: abundant]

## BIBLIOGRAPHY

- Koch, K. 1989. *Die Käfer Mitteleuropas*. Ökologie. Band 2. Krefeld: Goecke and Evers
- Koch, K. 1992. *Die Käfer Mitteleuropas*. Ökologie. Band 3. Krefeld: Goecke and Evers
- Hyman, P. & Parsons, M.S. 1992. *A Review of the Scarce and Threatened Coleoptera of Great Britain*. Peterborough: UK Joint Nature Conservation Committee UK Nature Conservation 3
- Hyman, P. & Parsons, M.S. 1994. *A Review of the Scarce and Threatened Coleoptera of Great Britain*. Peterborough: UK Joint Nature Conservation Committee UK Nature Conservation Part 2
- Lucht, W.H. 1987. *Die Käfer Mitteleuropas (Katalog)*. Krefeld: Goecke and Evers
- Stace, C. 2010. *New Flora of the British Isles*. Cambridge: Cambridge University Press