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The Fossil Insect Assemblage from the Meare Iron Age Lake Village

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Man is the dominant influence upon the insect fauna extracted from the Iron Age Village at Meare: for the first time from a Somerset Levels site, beetle species and abundance have been significantly affected by human activity rather than ecological processes alone. Not only is the Meare Village fauna more varied than that from any previous site, the numbers of insects recovered per sample is also very high, reflecting the provision by man of large numbers of suitable habitats.

One unexpected aspect of the fauna is the survival into the Iron Age of Anthicus gracilis, a species now extinct in this country. Its disappearance has been attributed to a period of climatic cooling and this record would suggest a post-Iron Age causal deterioration. As the species is one which would be favoured by human activity, however, caution must be exercised in assessing its significance and the climatic inferences, discussed later, are based upon the total fauna rather than single species.

Samples

Condiditions of preservation varied across this island edge site and beetles survived well only in the most organic sediments. In the areas of drier and more mineral deposits the few insect remains were badly fragmented and largely unidentifiable. Of the samples collected in conjunction with material for botanical investigation, workable faunas were recovered from MVW W 9, MVW X 14, MVW Y 12 and MVW Z 4. The beetle faunas from these four samples show a large degree of overlap although minor differences are referable to their archaeological contexts and are discussed later. The species list for the site is given as Appendix 1.

Species of Interest

Cristatella mucedo. Numerous statoblasts of the freshwater polyzoan were recovered from the productive samples. One example with a detail of the

dispersal hooks is shown in Plates 1 and 2. C. mucedo lives in still or slowly flowing water and its fossil record in Britain extends back to the Hoxnian (Great) Interglacial (Shotton and Osborne 1965).

Onthophagus austriacus or nuchicornis. At least four individuals of Onthophagus were recovered of which one large head was proved to be identical with females of both austriacus and nuchicornis. In the absence of any male heads, on which the species are easily separable, the identification must remain questionable. A record of O. austriacus, a species which does not live in Britain, would be significant in view of the occurrence of Anthicus gracilis.

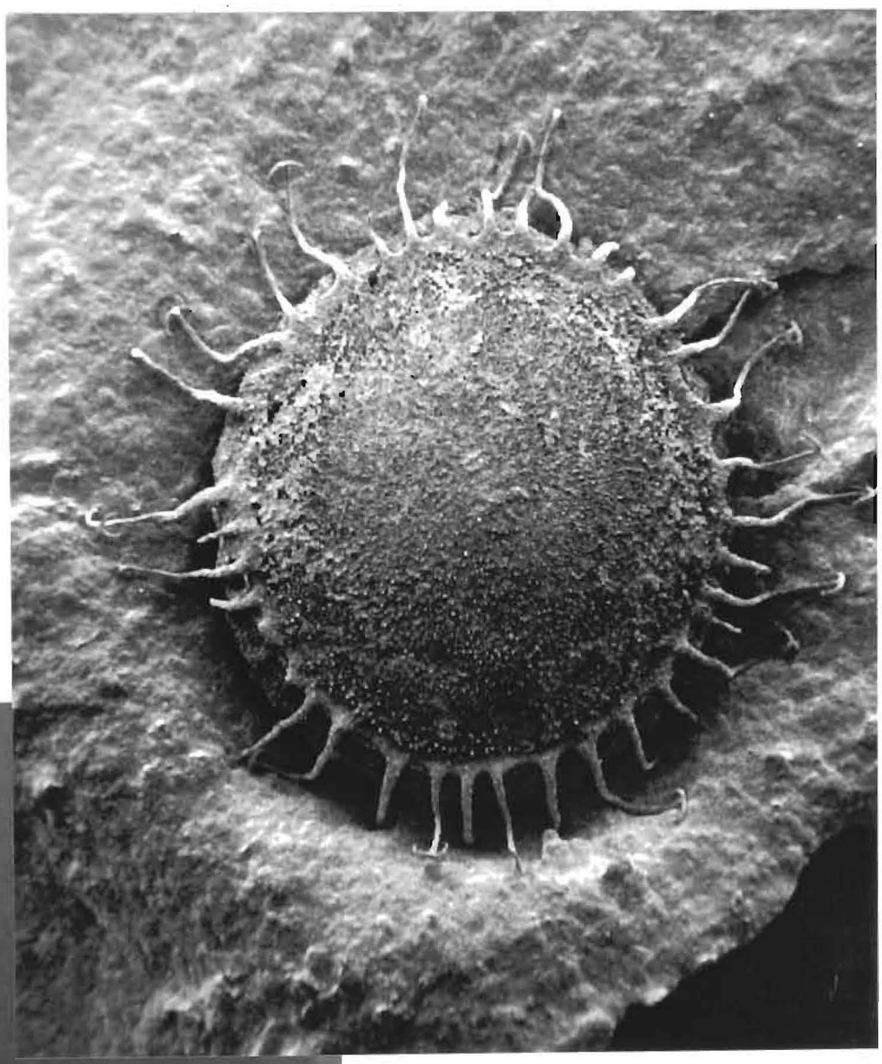
Eremotes ater. This weevil which lives in rotten coniferous and deciduous wood is today known only from north Scotland and Sherwood Forest. There are, however, three other post-glacial records for the species, from Shropshire (Osborne 1972) Yorkshire (Buckland and Kenward 1973) and London (Girling and Greig 1977) indicating that it was formerly more widespread. The specialised habitat of the species is one which would be affected by tree clearance; initially the cutting down of trees might provide an increase in available dead wood and tree stumps but once the woodland had been cleared, all potential habitats would have been removed. E. ater is the only species from the site requiring dead wood, perhaps suggesting that this biotype was not common.

Palaeoenvironment of Meare Lake Village

The reconstruction of the site environment, has been divided into two sections made up of the 'natural' and 'man-made' elements. These divisions are not exclusive as many of the human activities serve only to exaggerate naturally occurring processes and increase the availability of existing habitats.

i. Natural setting of Meare Lake Village

The large ground beetle fauna indicates that a variety of different substrates and ground moisture conditions existed from the water edge to the higher part



Plates 1 and 2

1) Cristatella mucedo (S.E.M. X 80) 2) Detail of hooks (S.E.M. X 300)

of the island. The common Pterostichus species. P. nigrita, diligens, minor and vernalis argue for damp organic soils and reinforcing these, Bembidion fumigatum and Odacantha melanura are typical fen species found at the edges of ponds amongst thick reed and rush vegetation. Agonum fuliginosum and A. gracile are both found in wet leaves, moss and other vegetation in lake and pond edges. Other species , however, prefer more open habitats. Pterostichus melanura, Calathus fuscipes, C. melanocephalus and Bembidion properans, all species new to the list of beetles recovered from the Levels sites, tend to be found on drier, lightly vegetated soils or in meadows. All can be considered indicative of ground disturbance, preferring cultivated areas, and as such are often common in post-Neolithic sites. Another Carabid found in dry vegetated soils is Dromius linearis, (Plate 3) further promoting the evidence for drier, cleared areas contributing insects to the predominantly lake edge fauna.

The stenotopic aquatic species are uniform in requiring calcareous rich water, as would be expected at a fen edge site. Many of the water beetles have previously been recorded from trackway sites, notable examples including Noterus clavicornis, Hydroratus clypealis and Hyphydrus ovatus. Aquatic habitats required by the water beetles range from stretches of fairly open water suitable for Gyrinus and Dytiscus species and Colymbetes fuscus, to vegetated and muddy pools. One aquatic species, Esolus parallelepipedus requires flowing stream or lakeside habitats. Adjacent to the water edge, damp mud and vegetation afford widespread habitats for the large, Hydrophilidae and Scirtidae faunas, and decaying plant accumulations, particularly reeds, would have provided habitats for Corylophus cassidoides and Orthoporus brunnipes.

The Phytophages shown in table 1 are predominantly associated with waterside vegetation, rushes, reeds and sedges being the most commonly cited host-plants.

BEETLE	FOOD PLANT
Donacia vulgaris	Carex, Typha and Sparganium
Platuemaris braccata	Phragmites communis
P.sericea	Iris pseudocoris and Carex
Chrysolina banksi	Ballota nigra
Phyllotreta undulata	Cruciferae
Chaetocnema concinna	Polygonum
Bruchus loti	Leguminaceae
Sitona lepidus	Leguminaceae
S.ononidis	Ononis arvense
Tanysphyrus lemnae	Lemna
Eremotes ater	Decaying deciduous and coniferous wood
Notaris acridulus	Carex, Glyceria and Polygonum
N.scirpi	Carex, Typha and Scirpus
Thryogenes festucae	Carex
T.scirrhosis	Sparganium
Micrelus ericae	Calluna and Erica
Limnobaris pilistriata	Cyperaceae
Mecinus pyraster	Plantago
Rhynchaenus quercus	Quercus

Table 1

Host plants for the phytophagous beetles

(based mainly upon Reitter 1911 and 1916, Hoffmann 1945-58)

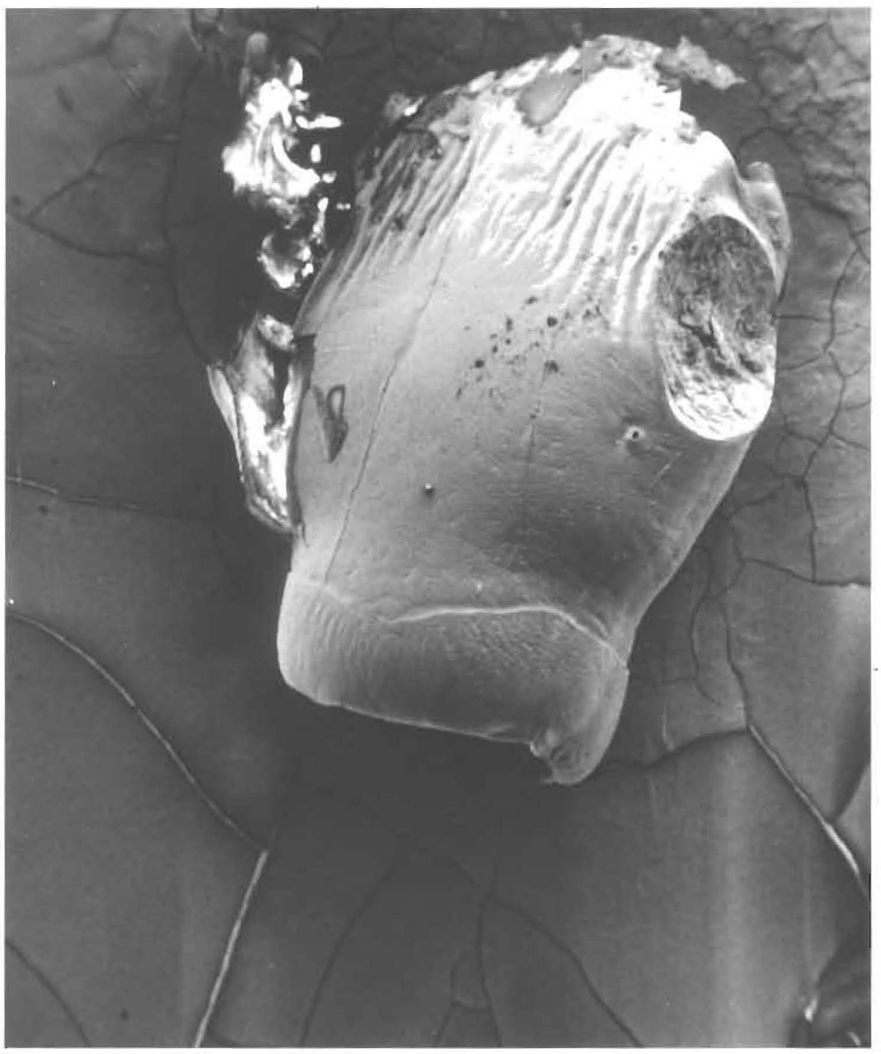


Plate 3

Dromius linearis head (S.E.M. X 75)

A number of species, however, require food plants usually found in cultivated or waste ground. Mecinus pyraster feeds on plantain, Chrysolina banksi on horehound, Sitona ononidis on restharrow and S. lepidus on various legumes. Two other vegetation types are indicated; Rhynchaenus quercus lives on oak leaves and Micrelus ericae is a heather or ling feeder. All of these species suggest that away from the thick fringe of reeds and rushes bordering the water, there existed cleared and possibly cultivated areas. The heather feeder, M. ericae, deserves special attention as it is the commonest phytophage at the site, 33 individuals having been recorded. Its host-plants occur widely in the raised bog peats of the Somerset Levels and there are frequent records of the weevil from these deposits. It is questionable whether or not suitable host-plants grew on the clacaneous soils of the island or whether the heather and/or peat was being deliberately brought to the site for fuel, thatching or bedding etc. M.ericae and Silis ruficollis, another species present in the Lake Village fauna have both been recovered from urban deposits at Carlisle where their presence was attributed to the importation of their host-plants (Girling in preparation).

ii. Man's influence at the Village Site

Certain aspects of the site already discussed, for instance, the tree clearance, are a result of human activity but man's impact is seen more emphatically from a consideration of the synanthropic beetles in the samples. These species show varying degrees of association with man; the ground beetles which live in cultivated soils are clearly favoured by man and are fairly synanthropic, other species are today found almost exclusively in man-made habitats and these are strongly synanthropic. A further division can be made between native and imported synanthropes, the latter group owing their presence in this country to trade. So far archaeological records of imported synanthropes date to Roman times and there are no earlier records of this exotic faunal element (Buckland 1977). At Meare Lake Village the main

synanthropes are species which were present in natural habitats, surviving in low numbers, until the advent of dwellings or groups of dwellings providing a plethora of specialized biotypes which permitted large scale population increases.

The commonest named species from the site, Anobium punctatum, (Plates 4 and 5) is here considered to be strongly synanthropic. There are two earlier records for the species; one from the Sweet Track (see page) and a single individual from the woody peats at Stileway (unpublished). The latter record indicates that even in the dense forest conditions inferred for that area, the habitat for the species was comparatively rare. A. punctatum lives in dead wood and its preference for dry wood makes it a serious pest of structural timbers (Hickin 1963). At the Village Site, its abundance is undoubtedly due to use of timber in buildings. Accompanying A. punctatum is another Anobiid, Grynobius planus; also a pest in worked timber such as fence posts. The profusion of wood borers at this Village site contrasts with the earlier trackwa Although probable Anobiid borings have been detected in the Sweet Track timbers (and whether these are contemporaneous with its use is uncertain), no individuals have been recovered from the samples, and it is unlikely that the beetles would ever have been serious pests in the waterlogged wood of the trackways.

Ptinus fur (Plate 6) a related species lives in dry vegetable material including wood and food. Similar habitats are suitable for Enicmus minutus and Pseudominutus (Plates 7 and 8). These synanthropes which have not been recorded from earlier Levels sites were probably living in and around buildings.

Man, in storing various plant materials, using them in flooring and bedding and eventually discarding this litter together with other refuse, inadvertently provided widespread habitats for the large rubbish/compost element of the fauna. Typical members include species of Staphylinidae and Cryptophagidae.

Plates 4 and 5. Anobium punctatum

4) Head 5) Pronotum (S.E.M. X 75)

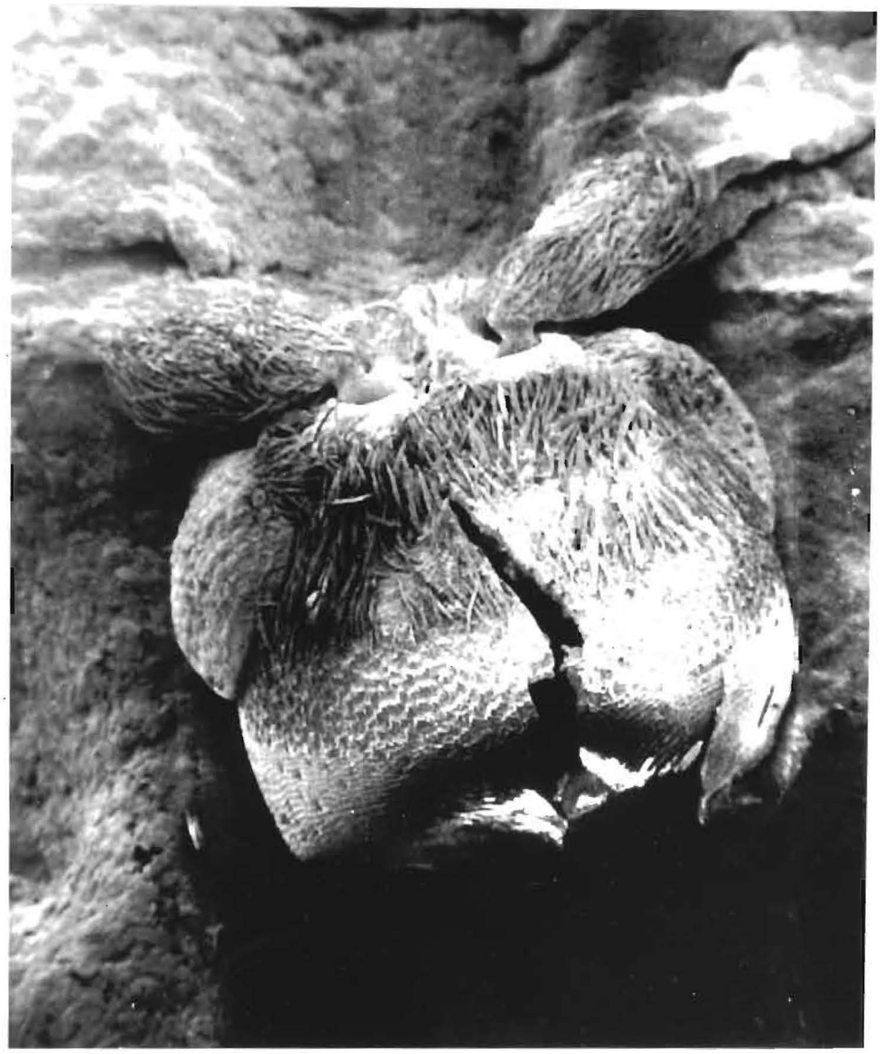
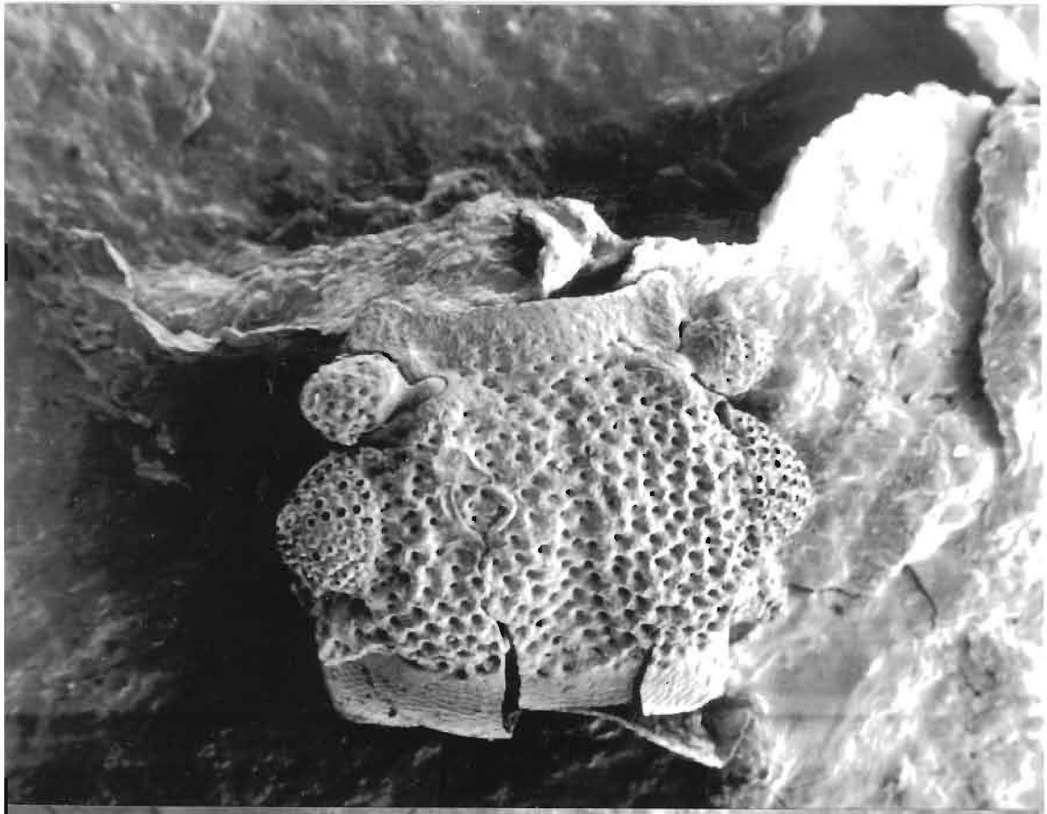
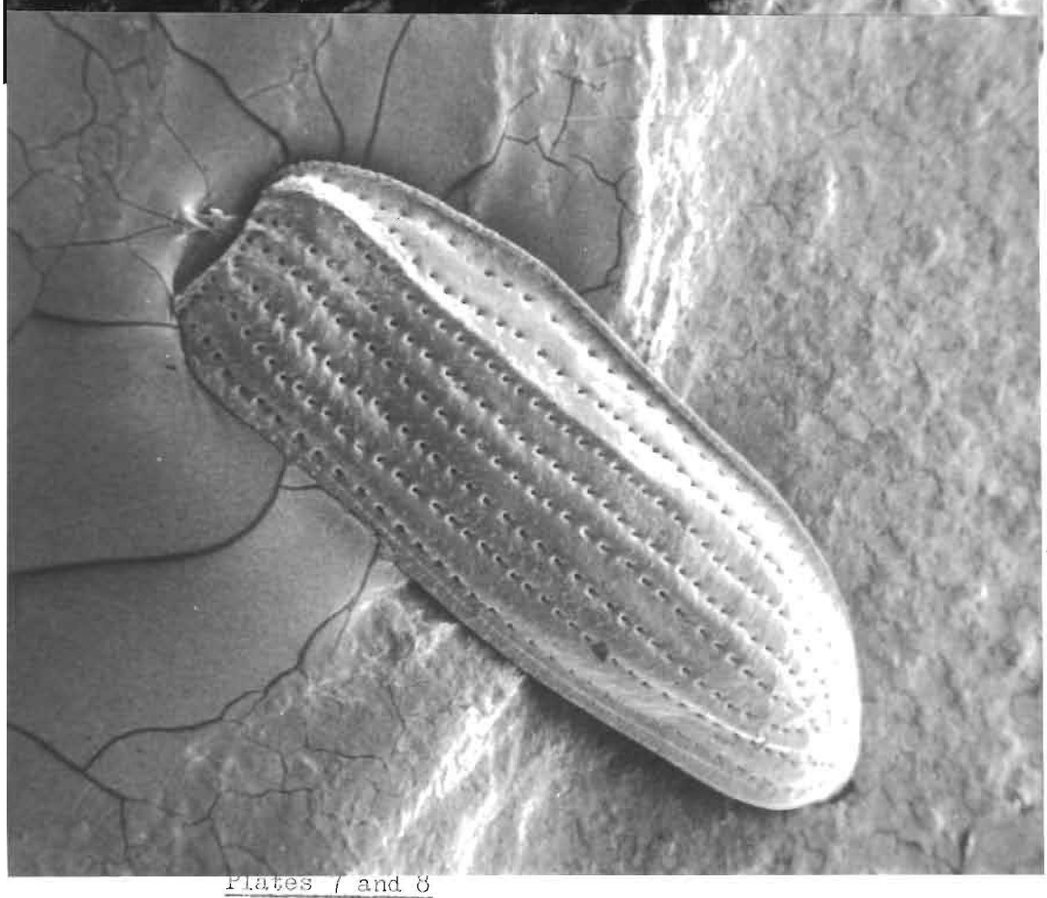


Plate 6

Ptinus fur head (S.E.M. X 75)





Plates 7 and 8

Enicmus minutus or pseudominutus (S.E.M. X 90)

7) Head 8) Elytron

Naturally occurring reed refuse is a common habitat in the Levels and most sites already investigated have an important reed-litter component in the fauna. At the Village site, the numbers are high enough to question whether reeds were being deliberately cut, either for use in thatching, etc., or to clear and drain areas of reed swamp.

The final indicator of probable human activity is the suggestion from the dung beetle fauna of animal husbandry, backed up by evidence from the ground-beetles and the grass-land miner Phyllopertha horticola of probable meadows surrounding the village.

The overall environment of Meare Village, suggested by the beetle fauna is of a group of wooden dwellings set at a lake side area with the adjacent islands grazed and cultivated. Samples X14 and Y 12 contain a higher percentage of aquatic arthropods, suggesting that these were laid down in a wetter environment, whereas W 9 and Z 4 are dominated by species strongly associated with man. The richness of the Z 4 list might reflect the age of the sample; it is stratigraphically later than the other three and must represent a late phase of the village when the variety of habitats had been available for some time. W 9 was collected from below timber, a relevant feature in explaining the high level of wood borers recovered from this sample.

Climatic implications of the Meare Village fauna

The climatic inferences based upon the Somerset Levels beetle remains from Neolithic and Bronze Age sites can now be extended to include the Iron Age although in the case of Meare Village, the evidence must be regarded as negative. The fauna recovered from the site is typically southern British, and there are no species whose climatic requirements would not be met today in this area. The survival into the Iron Age of Anthicus gracilis, one of the species from the Levels deposits now extinct in this country, is unexpected. This species, however, is

less significant climatically than Micropeplus caelatus and especially Oodes gracilis, as it is unlikely that the latter could survive in England today and its presence suggests a phase of warmer climate during the early Neolithic. The disappearance of these species has been attributed to a phase of climatic cooling and if correct, A.gracilis at least was not eliminated from Britain until a post Iron Age deterioration. The well documented climatic worsening of the early Iron Age, an episode which may well have accounted for the loss of climatically sensitive species, does not appear to have brought about its extinction as it is present in the latest sample from the site. From archaeological deposits in Britain, two other late extinctions have been recorded; Airaphilus elongatus (Gyll.) (Osborne 1973) and Cyrinus strigulosus Reg. (Girling in press) and in each case, the Little Ice Age has been postulated as the most likely cause of their disappearance. A.gracilis could well be another casualty of this short lived period of colder climate centred around 1750 A.D.

Relevant to any determination of climatic parameters is a consideration of the site microclimate and in particular the high temperatures within heaps of vegetation produced by bacterial decay. One feature of the site is the high numbers of species found in such habitats, suggesting that decaying vegetation was a common feature. The abundance of 'compost' species is often very typical of human habitation sites. As A.gracilis lives in decaying reeds and the raised temperature of such a habitat would protect the species against outside temperature changes, care must be taken in assessing its importance. Its survival may in part have been favoured by human activity.

The early Iron Age climatic deterioration finds some support from beetle remains at other sites (see Osborne 1976) but at Meare Village, no conclusions can be drawn from the fauna so far recovered from the site.

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Appendix 1

The Mearn Leath Lake Village insect fauna.

The nomenclature follows Pope's 1977 revision of Kloet and Hincks and the numbers are based upon minimum totals of any common [illegible].

	W9	X14	Y12	Z4	Total
POLYZOA					
Cristatella mucedo Cuvier		60	28	10	98
CRUSTACEA					
Daphnia sp.				6	6
INSECTA					
DERMAPTERA					
Forficula auricularia (L.)	1			1	2
HEMIPTERA	5	4	17	23	49
TRICHOPTERA	1		1		2
COLEOPTERA					
Carabidae					
Cicindella sp.				1	1
Carabus sp.				1	1
Nebria brevicollis (F.)	2		1		3
Elaphrus uliginosus F.				1	1
Loricera pilicornis (F.)	1			1	2
Dyschirius globosus (Herbst)			1	2	3
Trechus obtusus Er. or quadristriatus (Schrank)	2		2	3	7
Bembidion properans Steph.				1	1
B. gilvipes Sturm.		1			1
B. assimile Gyll.			1	3	4
B. fumigatum (Dufts.)	1	1	2		4
Bembidion spp.			4	3	7
Pterostichus diligens (Sturm)		1	5	8	14
P. melanarius (Ill.)			1		1
P. minor (Gyll.)			3	4	7
P. nigrita (Payk.)			4	2	6
P. strenuus (Panz.)				1	1

	W9	X14	Y12	Z4	Total
P. vernalis (Panz.)				1	1
P. (Poecilus s.sp) sp.			2		2
Pterostichus sp.				1	1
Calathus fuscipes (Goeze)			1		1
C. melanocephalus (L.)			1		1
Agonum albipes (F.)			1	1	2
A. fuliginosum (Panz.)			2	3	5
A. gracile sturm				1	1
A. livens (Gyll.)				1	1
A. marginatum (L.)				1	1
A. obscurum (Herbst)				1	1
Agonum spp.			1	4	5
Harpalus sp.				1	1
Chlaenius tristis (Schall.)			1		1
Odacantha melanura (L.)			2	1	3
Dromius linearis (Ol.)			1		1
Haliplidae					
Haliplus obliquus (F.)				1	1
Haliplus sp.			1		1
Noteridae					
Noterus clavicornis (Deg.)			3	1	4
Dytiscidae					
Hydrovatus clypealis Sharp			1		1
Hyphydrus ovatus (L.)			1		1
Hygrotus decoratus (Gyll.)			4		4
H. inaequalis (F.)		1	2		3
Hydroporus scalesianus Steph.			6	6	12

	W9	X14	Y12	Z4	Total
Hydroporus spp.			10	12	22
Graptodytes bilineatus (Sturm)				4	4
Agabus bipustulatus	1		1		2
A. congener			1		1
Agabus sp.			1	1	2
Ilybius sp.			1		1
Colymbetes fuscus (L.)	1			1	2
Dytiscus sp.			1		1
Gyrinidae					
Gyrinus suffriani Scriba			1		1
Gyrinus spp.			3		3
Sphaeriidae					
Sphaerius acaroides Waltl.			1		1
Hydrophilidae					
Hydrochus carinatus Germ.			1	2	3
Helophorus aquaticus (L.)	1		1		2
H. brevipalpis Bed.	5		1	6	12
Helophorus spp.			1	2	3
Coelostoma orbiculare (F.)	9	1	8	17	35
Sphaeridium bipustulatum F.				1	1
Cercyon spp.	11	5	10	24	50
Hydrobius fuscipes (L.)	1		2	3	6
Limnoxenus niger (Zschach)	1				1
Anacaena globulus (Payk.)			1	3	4
Helochares spp.	2	1		1	4
Enochrus spp.	4	4	15	6	29
Cymbiodyta marginella (F.)	2				2
Chaetarthria seminulum (Herbst)	4	3	5	13	25

	W9	X14	Y12	Z4	Total
Histeridae					
Acritus nigricornis (Hoff.)				1	1
Hydraenidae					
Ochthebius minimus (F.)		1		13	14
Ochthebius spp.	40	9	4	48	103
Hydraena palustris Er.			9		9
H. testacea Curt.			1		1
Hydraena sp.				1	1
Limnebius aluta (Bed.)			7		7
Ptiliidae					
Gen. et spp. indet.				3	3
Leiodidae					
Agathidium sp.	1		1		2
Silphidae					
Silpha atrata L.			1	1	2
Scydmaenidae					
Gen. et spp. indet.				1	1
Staphylinidae					
Micropeplus fulvus Er.			1		1
Micropeplus sp.			1		1
Olophrum sp.				1	1
Acidota crenata (F.)			1		1
Lesteva heeri Fauv.			3	6	9
L. longoelytrata (Goeze)				1	1
Carpelimus or Thinobius spp.	2	1	1		4
Platystethus cornutus (Gn.) or degener Muls. and Rey			1	4	5
Anotylus rugosus (F.)			1	4	5

	W9	X14	Y12	Z4	Total
Anotylus spp.	4			5	9
Stenus spp.	17	5	27	37	86
Paederus sp.	2		1		3
Lathrobium brunnipes (F.)	1			1	2
L. terminatum Grav.	2	1	4	4	11
Lathrobium spp.			3	6	9
Ochthephilum fracticorne (Payk.)				1	1
Lithocharis sp.		1			1
Rugilus spp.	1			3	4
Leptacinus sp.	1				1
Xantholinus linearis (Ol. or longiventris Heer	4	2	3	8	17
Erichsonius cinerascens (Grav.)	3		2	5	10
Philonthus spp.	4		6	20	30
Staphylinus stecorarius (Ol.)				1	1
Quedius spp.	4		1	10	15
Tachyporus sp.				1	1
Gymnusa brevicollis (Payk.)			1	1	2
Drusilla canaliculata (F.)	1			1	2
Aleocharinae indet.	4	2	4	8	18
Pselaphidae					
Bryaxis spp.		1	2	2	5
Brachygluta spp.		1	3		4
Geotrupidae					
Geotrupes sp.	1		1	1	3
Scarabaeidae					
Aphodius spp.			18	10	28
Onthophagus austriacus Panz. or nuchicornis (L.)	1		1		2

	W9	X14	Y12	Z4	Total
Onthophagus sp.			1	1	2
Phyllopertha horticola (L.)			1		1
Clambidae					
Clambus sp.				1	1
Scirtidae					
Gen. et spp. indet	7	25	70	64	166
Byrrhidae					
Cytilus sericeus (Forst.)			1		1
Byrrhus sp.			1		1
Dryopidae					
Dryops spp.			2	2	4
Elmidae					
Esolus parallelepipedus (Müll.)		2		3	5
Elateridae					
Agrypnus murinus (L.)	1				1
Ampedus sp.					
? Actenicerus sjaelandicus (Müll)			1		1
Denticollis linearis (L.)				2	2
Cantharidae					
Silis ruficollis (F.)			1		1
Anobiidae					
Gryonobius planus (F.)				1	1
Anobium punctatum (Deg.)	86	3	1	69	159
Ptinidae					
Ptinus fur (L.)	16		1	9	26
Mitidulidae					
Epuraea ?unicolor (Ol.)				1	1
Gen. et spp. indet.	1		1	1	3

	W9	X14	Y12	Z4	Total
Silvanidae					
Psammoecus bipunctatus (F.)				2	2
Cryptophagidae					
Telmatophilus brevicollis Aubé or schoenherri (Gyll.)				1	1
Atomaria spp.	1			11	12
Gen. et spp. indet	42	1	4	90	137
Phalacridae					
Phalacrus corruscus (Panz.)	3			1	4
Stilbus testaceus (Panz.)	5		2	4	11
Corylophidae					
Corylophus cassidoides (Marsh.)	1	4	8	7	20
Orthoperus brunnipes (Gyll.)	2			58	60
Coccinellidae					
Coccidula rufa (Herbst)	1			1	2
Chilocorus bipustulatus (L.)				1	1
C. rennipustulatus (Scriba)				1	1
Coccinella sp.				1	1
Lathridiidae					
Lathridius minutus (L.) and pseudominutus (Strand)	38	2	3	76	119
Corticaria punctulata (Marsh.)	10			13	23
Corticaria sp.	5			6	11
Corticorina spp.	9		1	14	24
Cisidae					
Cis sp.				1	1
Anthicidae					
*Anthicus gracilis Panz.			1	1	2

	W9	X14	Y12	Z4	Total
Bruchidae					
Bruchus loti Payk.			1	1	2
Chrysomelidae					
Donacia vulgaris Zschach			3		4
Donacia spp.	1		1		2
Plateumaris braccata (Scop.)		2	2	1	5
P. sericea (L.)			1	1	2
Chrysolina banksi (F.)			1		1
Lochmaea sp.				2	2
Phyllotreta undulata				1	1
Phyllotreta sp.	2			1	3
Longitarsus sp.			2	2	4
Altica sp.			1	2	3
Chaetocnema concinna (Marsh.)	4			4	8
Apionidae					
Apion spp.	1		1	3	5
Curculionidae					
Otiorhynchus sp.			1		1
Sitona lepidus Gyll.			1	1	2
S. ononidis Sharp			7		7
Tanysphyrus lemnae (Payk.)	1	1	3	2	7
Eremotes ater (L.)				1	1
Bagous spp.			1	2	3
Notaris acridulus (L.)	1				1
N. scirpi (F.)			2	1	3
Thryogenes festucae (Herbst)	1		1	1	3
T. scirrhosis (Gyll.)	1		2	2	5
Microlus ericae (Gyll.)	1	6	9	17	33

	W9	X14	Y12	Z4	Total
Ceutorhynchus sp.				1	1
Limnobaris pilistriata (Steph.)	2				2
Mecinus pyraster (Herbst)				1	1
Rhynchaenus quercus (L.)				1	1
Rhynchaenus sp.				2	2
Hymenoptera					
Parasitica	19	5	15	18	57
Formicidae	2	4	3	21	30
Diptera					
Tipulidae	20		2	7	29
Indet.	26		35	25	86
ARANAEA	4		2	12	18