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THE EFFECT OF THE MEARE HEATH FLOODING EPISODES ON THE COLEOPTERAN SUCCESSION

Maureen A. Girling

Episodes of flooding in the Somerset Levels must greatly have effected prehistoric man whose communications between the rock islands and the surrounding hills were dependent, to some extent, on a network of wooden trackways. Stratigraphic and palaeobotanical investigations of the peat deposits have revealed recurrence surfaces, or regeneration complexes, where Cladium and other fen plants have colonised a former raised bog surface following the inwashing of calcareous water. A major recurrence surface has been established for the Somerset Levels and related to a number of trackways (Clapham and Godwin 1948). One of these trackways, Meare Heath, has been the subject of more recent archaeological investigation which has concluded that it was constructed from longitudinal planks laid across sleepers, and it was dated at 2980±70 B.P. (Coles and Orme 1976, 1978). Palaeobotanical investigations at the site of the excavation (Beckett 1976, 1978) have indicated that the track timbers are positioned in the raised bog peats slightly below the Cladium horizon, supporting the conclusion of Clapham and Godwin, but further showing a second flooding episode higher in the sequence and demonstrating the relationship of both to known clearance phases. Investigation of the fossil insect faunas from the site have shown that a major faunal change occurred at the flooding horizon, and a preliminary account of this work was given by Girling (1976) Results of the complete faunal analysis show that the raised bog/fen transition, demonstrable by an enormous population increase, is reflected in the almost total replacement of raised bog insects by fen inhabitants. Above this first major horizon, a further flooding event can be resolved, corresponding with the renewal of Cladium in the plant succession, and fen conditions are also suggested for the highest peats. The overall changes in the beetle faunas provide evidence that the first flooding episode resulted in the complete inundation of the peat surface, and that although there was a return to raised bog conditions, these were not as pronounced as the earlier bog development, probably because calcareous water extended closer to the site and continued to exert an influence between phases of flooding. Meare Heath has produced the richest aquatic fauna of any trackway site but amongst the other beetles is a carabid no longer found in this country whose disappearance is undoubtedly linked to climatic factors.

Sample monolith and analysis

Material for insect investigation was collected from Meare Heath site 1, in the profile where botanical samples had previously been taken by Beckett (1976). 34 samples of approximately 4 kg were cut vertically at 5 cm intervals

from a freshly cleaned peat surface. The topmost 4 samples extended into friable, cracked peat, and as modern insects were noted during their processing, results from this level are not included. The series of insect samples spans the upper part of the botanical profile whose stratigraphy is summarised below.

Insect sample number	Depth and peat type (after Beckett)
1	
2	(Disturbed)
3	
4	0 cm
5	
6	
7	Fresh *Sphagnum*
8	
9	
10	
11	
12	40 cm
13	
14	Dark, humified peat with *Cladium*
15	54 cm
16	
17	Fresh *Sphagnum*
18	70 cm
19	
20	*Cladium* with monocot. remains
21	
22	90 cm
23	
24	100cm TRACK
25	
26	
27	*Sphagnum-Calluna-Eriophorum*
28	
29	
30	
31	
32	
33	
34	
	(1.75 - 1.85 woody peat 1.85 -2.65 *Phragmites* below 2.65 clay)

The insect assemblagesfor samples 5 - 34 fall naturally into 6 faunal groups based upon species habitat requirements and substantiated by variations in faunal diversity. These groups are A (samples 5 - 10); B (11 -14); C (15 - 16) D (17 - 18); E (19 - 23) and F (24 -34). The list of insect species is arranged according to these divisions and nomenclature follows Kloet and Hincks (1977).

Meare Heath Faunal List

	A	B	C	D	E	F	TOTAL
INSECTA							
HEMIPTERA							
Corixidae	-	-	-	-	1	-	1
HETEROPTERA indet.	5	3	1	6	15	7	37
Ulopa reticulata (F.)	-	-	-	-	-	4	4
HOMOPTERA indet.	21	1	8	17	22	13	82
TRICHOPTERA	1	-	1	-	14	4	20
COLEOPTERA							
Carabidae							
Cicindela sp.	1	-	-	-	1	-	2
Blethisa multipunctata (L.)	-	2	-	-	1	-	3
Bembidion humerale Sturm or quadrimaculatum (L.)	-	-	-	-	1	-	1
Tachys walkerianus Sharp	-	-	-	-	1	-	1
Pterostichus atterimus (Herbst)	1	-	1	1	3	-	6
P.diligens (Sturm)	4	-	-	-	3	5	12
P.minor (Gyll.)	-	-	-	-	3	1	4
P.nigrita (Payk.)	1	-	-	-	1	2	4
P.strenuus (Panz.)	2	-	-	-	-	-	2
P.vernalis (Panz.)	-	-	-	1	-	-	1
Agonum ericeti (Panz.)	-	-	-	-	-	1	1
A.viduum (Panz.)	-	-	-	-	1	-	1
Agonum sp.	-	-	-	1	-	-	1
Bradycellus ruficollis (Steph.)	-	-	-	-	-	4	4
Bradycellus sp.	-	-	-	-	1	-	1
Stenolophus mixtus (Herbst)	-	-	-	-	1	-	1
Acupalpus dorsalis (F.)	-	-	-	-	4	-	4
Chlaenius sulcicollis Payk.	-	-	-	-	1	-	1
Odacantha melanura (L.)	1	-	-	-	-	-	1
Demetrias attricapillus (L.)	1	-	-	-	-	-	1
Dromius longiceps Dej.	3	-	-	-	-	-	3
Noteridae							
Noterus clavicornis (Deg.)	4	-	1	-	7	-	12
Dytiscidae							
Laccophilus variegatus (Germ.)	-	-	-	-	3	-	3
Hydrovatus clypealis Sharp	-	-	-	-	3	-	3
Bidessus unistriatus (Schrank.)	-	-	-	7	6	-	13

	A	B	C	D	E	F	TOTAL
Hygrotus inaequalis (F.)	-	-	-	-	9	-	9
H.versicolor (Schall.)	-	-	-	-	2	-	2
Hydroporus gyllenhali Schiodte	-	-	-	-	-	1	1
H.melanarius Sturm	-	-	-	-	-	9	9
H.obscurus Sturm	-	-	-	-	-	1	1
H.scalesianus Steph.	4	-	2	3	12	6	27
H.tristis Payk.	-	-	-	-	-	2	2
Hydroporus spp.	6	-	3	-	3	4	16
Graptodytes granularis (L.)	-	-	-	1	10	-	11
Porhydrus lineatus (F.)	-	-	-	-	6	-	6
Copelatus haemorrhoidalis (F.)	-	-	-	-	1	-	1
Agabus bipustulatus (L.)	-	-	-	-	-	2	2
A.labiatus (Brahm)	-	-	-	-	1	-	1
Rhantus frontalis (Marsh.)	-	-	-	-	1	-	1
Colymbetes fuscus (L.)	-	-	1	-	1	-	2
Gyrinidae							
Gyrinus caspius Mén.	-	-	1	-	1	-	2
Sphaeriidae							
Sphaerius acaroides Waltl	1	-	-	-	3	-	4
Hydrophilidae							
Georissus crenulatus (Rossi)	-	-	-	-	5	-	5
Helophorus brevipalpis Bed.	2	-	2	-	5	-	9
Coelostoma orbiculare (F.)	8	-	2	2	5	1	18
Hydrobius fuscipes (L.)	-	-	-	-	2	-	2
Anacaena globulus (Payk.)	-	-	-	-	3	-	3
Helochares lividus (Forst.) or obscurus (Müll.)	9	13	12	-	17	8	59
Enochrus spp.	35	16	30	16	46	2	145
Chaetarthria seminulum (Herbst)	18	5	2	-	5	-	30
Hydrophilus piceus (L.)	(1)	-	-	-	-	-	1
Hydraenidae							
Ochthebius bicolon (Germ.)	2	-	-	-	1	-	3
O.marinus Payk.	3	-	1	-	9	-	13
O.minimus (F.)	5	-	3	-	9	-	17
Hydraena palustris Er.	-	-	1	1	13	-	15
Limnebius aluta (Bed.)	4	-	1	3	55	-	63
Limnebius sp.	3	-	-	-	1	-	4

	A	B	C	D	E	F	TOTAL
Ptiliidae							
Gen. et sp. indet.	4	-	-	-	-	-	4
Scydmaenidae							
Gen. et sp. indet.	3	-	1	-	-	-	4
Staphylinidae							
Lesteva heeri Fauv.	4	-	-	-	-	-	4
Carpelimus or Thinobius spp.	2	-	1	1	-	-	4
Platystethus cornutus (Grav.)	-	-	-	-	1	-	1
Anotylus rugosus (F.)	-	-	-	-	2	-	2
Stenus spp.	15	1	4	12	17	6	55
Lathrobium brunnipes (F.)	-	-	1	-	-	-	1
L. terminatum (Grav.)	-	-	-	-	2	-	2
Lathrobium sp.	1	-	1	-	2	-	4
Ochthephilum fracticorne (Payk.)	-	-	-	-	-	5	5
Xantholinus longiventris Heer	-	1	1	-	3	3	8
Erichsonius cinerascens (Grav.)	-	-	-	-	3	-	3
Philonthus spp.	1	-	-	-	2	-	3
Gymnusa brevicollis (Payk.)	1	-	-	-	-	-	1
Drusilla canaliculata (F.)	-	-	-	-	-	1	1
Aleocharinae indet.	7	4	1	1	10	9	32
Pselaphidae							
Bryaxis sp	1	-	-	-	5	5	11
Brachygluta sp.	-	-	-	-	1	1	2
Pselaphus heisei (Herbst)	-	-	-	-	1	-	1
Scarabaeidae							
Aphodius spp.	-	-	-	-	1	1	2
Phyllopertha horticola (L.)	-	-	-	-	1	-	1
Scirtidae							
Gen. et spp. indet.	14	8	2	4	33	44	105
Byrrhidae							
Cytilus sericeus (Forst.)	-	-	-	-	5	-	5
Heteroceridae							
Heterocerus fusculus Kies.	-	-	-	-	3	-	3
Dryopidae							
Dryops spp.	3	-	2	4	17	-	26

	A	B	C	D	E	F	TOTAL
Elmidae							
Riolus cupreus (Müll.)	-	-	-	-	1	-	1
Elateridae							
Actenicerus sjaelandicus (Müll.)	-	1	-	-	3	1	5
" " (larvae)	-	-	-	-	12	5	17
Sericus brunneus (L.)	-	-	-	-	-	1	1
Cryptophagidae							
Gen. et. spp. indet.	-	-	-	-	4	-	-
Coccinellidae							
Platynaspis luteorubra (Goeze)	-	-	-	-	1	-	1
Chilocorus bipustulatus (L.)	-	-	-	-	1	2	3
Adalia bipunctata (L.)	-	-	-	-	1	-	1
Chrysomelidae							
Donacia sp.	-	-	-	-	4	-	4
Plateumaris discolor (Panz.)	5	1	-	-	-	7	13
P.sericea (L.)	18	-	3	-	1	-	22
Lochmaea suturalis (Thom.)	-	-	-	-	-	8	8
Altica sp. (?spp.)	2	-	2	-	2	4	10
Chaetocnema concinna (Marsh.)	-	-	-	-	-	1	1
Apionidae							
Apion spp.	1	-	1	-	1	1	3
Curculionidae							
Micrelus ericae (Gyll.)	1	1	-	-	12	12	26
Limnobaris pilistriata (Steph.)	1	-	2	1	12	4	20
HYMENOPTERA							
Formicidae	107	28	5	9	11	143	303
Parasitica	3	-	1	-	1	9	14
DIPTERA							
Tipulidae	67	41	3	4	20	27	162
Indet. (adult)	3	-	-	2	5	-	10
Indet. (puparia)	4	-	-	1	6	9	20
ARANAEA	2	-	3	1	3	4	13

which would not readily occur in wet fen. Georissus crenulatus is found in muddy pond edges, usually buried in the mud and the same habitat is suitable for Heterocerus fusculus. Cicindela sp. require a mineral substratum for larval development, although the adults fly, as do the ladybirds Adalia bipunctata and Platynaspis luteorubra Although each beetle might have arrived at the site by a number of mechanisms, their incorporation in flood water may not be out of the question. The small group of Aphodius sp., Anotylus rugosus and Platysthus rugosus are of interest as all commonly occur in dung, and the association of the flooding horizons with clearance phases have been detailed by Beckett and Hibbert (1979). These species, and the grass root-miner Phyllopertha horticola, also present in Group E, are common components of insect faunas where there is evidence of grazing.

Group D (samples 18 - 17)

The two samples at this level are marked by a loss of the majority of the calcareous-rich aquatic beetles which, combined with reduced species richness and diversity, argues for a reduction in nutrient-status of the ecosystem. This process does not, however, lead to the oligotrophic conditions of the lower raised bog peats, as low numbers of fen species persist, including P.atterimus, Graptodytes granularis and Bidessus unistriatus. Despite these remnants of the Group E fauna, suggesting some availability of fen or base rich - neutral water in the vicinity, there is little resemblance to the previous level.

Group C (samples 16 - 15)

The trend of nutrient loss in the last two samples is checked by the reappearance of numbers of fen-pool and pond edge species which imply a further episode of flooding. Two of these beetles, Gyrinus caspius and Colymbetes fuscus prefer some open water, and the former, like Ochthebius marinus, also occur in brackish water. The presence of Plateumaris sericae indicates that the renewed flooding lasted sufficiently long to permit the establishment of its fen plant hosts such as Carex spp. or Iris pseudacorus. This single example of a caddis from this part of the sample monolith was a caddis case built from sand grains.

Group B (samples 14 - 11)

Accompanying the low species diversity which signifies the end of renewed flooding, there are very low totals amongst the pond beetles. As nutrients are reduced, P.sericea is replaced by P.discolor, the Eriophorum feeder. The persistence in Group D of fen species after the previous flooding episode is not parelleled in this part of the monolith, probably because the second flooding episode was less severe.

Group A (samples 10 - 5)

Evidence from the highest samples is less clear cut than in the earlier faunal groups, but there are indications of a return of fen conditions. Three carabids which live at pond edges in accumulations of Typha, Odacantha melanura, Demetrias atricapillus and Dromius linearis are restricted to this phase of the succession, and Noterus clavicornis together with all three Ochthebius species also suggest fen pools, perhaps resulting from further flooding. An example of Hydrophilus piceus recovered from nearby peats which stratigraphically belong to this latest phase also implies fen pools.

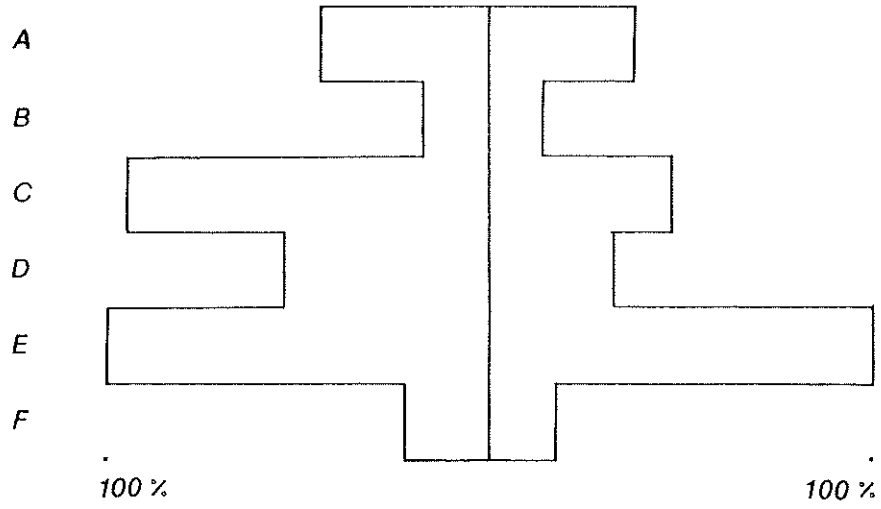
Faunal diversity and indicator species related to the flooding mechanism

The variation in the successive beetle assemblages can be illustrated by changes in numbers of taxa and individuals. In Figure 1 values for the faunal groups are shown as a percentage of total variation. There is a distinct change from the Group F raised bog fauna to the highest values for both numbers and taxa which encompass the first flooding phase at the site. The richness of Group E falls off rapidly, and is not repeated in later flooding episodes although both are marked by an increase of diversity.

In addition to overall faunal changes, it is possible to select individual taxa as indicators of flooding. Whilst isolated occurrences of species cannot validly be used in this way, the combination of a number of such records can usefully signify the onset of flooding. The occurrence of 10 such beetles within the faunal groups is plotted below.

Name		A	B	C	D	E	F
Cicindela sp.	(dry ground)	X				X	
G.crenulatus	(muddy pond edges)					X	
Sphaerius acaroides	" "	X				X	
R.cupreus	(running water)					X	
N.clavicornis	(fen pools)	X		X		X	
G.caspius	(open water)			X		X	
C.fuscus	(")			X		X	
O.bicolon	(fen pool edge)	X				X	
O.marinus	(")	X		X		X	
O.minimus	(")	X		X		X	
	TOTAL	6	0	5	0	10	0

Changes in diversity combined with species records accord with the plant record. There is some support, also, for Beckett's conclusion that wetter surface conditions preceded the flooding episode and were probably the factor that motivated trackway construction. The beetle faunas from samples 23 and 22 contain numbers of species which suggest a higher number of pools or swampy


A
B
C
D
E
F
100 %
100 %
taxa
Individuals

places, and the indicators of small acid pools which characterised the raised bog faunas are no longer present. The major influx of calcareous water species occurs in samples 21 and 20, combined with records of other beetles which might be individuals washed into the area. The abundant representation in these samples of species numbers is reinforced by their totals, for instance 32 individuals of Limnebius aluta at level 20. Extensive areas of surface water apparently replaced the former complex of pools and swamps. Contrasting with this evidence for standing water, at least in the first flooding episode, the intervening peat development is marked by low aquatic totals which suggest a relatively drier surface eventually emerging at 18 and 11. Although there is little support from the Meare Heath fauna where phytophages are uniformly scarce the renewed growth of plants at the regeneration complex, resulting in the deposition of fresher, unhumified peat evident in the stratigraphy might have acted to raise the surface level above the reach of the receding flood water.

The disappearance from Britain of Chlaenius sulcicollis.

The rich fauna of sample 20 contained part of a large carabid pronotum with no suitable match amongst the present British species. Exact correspondence was found with the mainland European carabid Chlaenius sulcicollis in which the smooth, finely microreticulated pronotal surface gives way to dense sculptue at the back angles. C.sulcicollis is rare in Europe, and displays a marked avoidance of northern areas, occurring in southern Sweden and Finland, Denmark, dominantly middle and south Germany, France although very rarely in the north, Italy and Eastern Europe into Siberia (Horion 1941). Summer temperatures throughout its range are as high as those of southern Britain today which suggests a lower limit for former climatic variation. It is likely, however that warmer summer temperatures than those of southern Britain would be more suited to maintaining populations of this species in the country. The continuation of the present range of. C.sulcicollis eastwards in Europe and Siberia demonstrates that the beetle tolerates a degree of continentality which might favour a reconstruction of a warmer, but more continental regime for Britain in the Bronze Age. Previous records of beetles now extinct from this country have been made from Neolithic peats and the suggestion of temperatures as warm, or warmer, than those of the present, are supported by this further species. Ocdes gracilis Villa is pronouncedly a middle and southern European species and it occurs with Micropeplus caelatus Er.and Anthicus gracilis Panz. The warm conditions inferred for these species apparently continued throughout the Bronze Age, and the persistence in Somerset of A.gracilis into the Iron Age indicates that no intervening phase of climatic deterioration had occurred by then to account for its extinction. The elucidation of the changes which occurred in the climate at or after the Iron Age remains a problem to be solved but there is continuing evidence from beetles in the Somerset peats of favourable conditions during the Neolithic and Bronze Age.

Group F (samples 34 - 24)

The fauna of the basal 11 samples is composed of a raised bog assemblage, typical for its poverty in species diversity and insect numbers. The major components of the peat type, Sphagnum, Calluna and Eriophorum are the dominant host plants of the phytophagous beetles from these layers, and there are indications for heather, sedges and possibly birch which may be eaten by Lochmaea suturalis although this species is more commonly recorded on Calluna. Heaths or acid bogs are the usual habitat of Agonum ericeti and Bradycellus ruficollis has been recorded under Calluna on peat. The aquatic beetles require small, acid pools or swampy Sphagnum, and an area of pools separated by tussocks of mosses and fringed by sedges and cottongrass may be invisaged at this part of the sequence. A telling proportion of the beetles confined to Group F are raised bog or acid heath dwellers, and these include A.ericeti, Hydroporus melanarius, H.obscurus, H.tristis and L.suturalis. Another species confined to Group Ochthephilum fracticorne, has previously been recorded in raised bog faunas from a number of sites in the Levels. Amongst the other insects, remains of the bug Ulopa reticulata occur only in these lower samples. This species is typical of heathery places (Le Quesne 1965).

Group E (samples 23 - 19)

At the level of sample 23, there is a noticable faunal enrichment which is continued in sample 22 and reaches a maximum in the two higher samples. The most significant proportion of these arrivals are aquatic species which uniformly demand calcareous water. Amongst these water beetles are Noterus clavicornis, Laccophilus variegatus, Porhydrus lineatus, Hydrovatus clypealis, Hygrotus inaequalis and Copelatus haemorrhoidalis. The habitats for these species are lakes or pools with detritus bottoms, fen dykes or ditches and similar calcareous, nutrient rich bodies of water, often with thick pond weed and water-side vegetation (Balfour-Browne 1948, 1950). Coupled with the occurrence of these Noteridae and Dytiscidae which are restricted to this part of the monolith, there is a disappearance of the acid pool representatives of the latter genus which typified the lower peats. Corresponding increases in the Hydrophilidae and Hydraenidae, species of which usually inhabitat weedy pond edges, are also apparent at this level, with values of 55 examples of Limnebius aluta illustrating the richness of samples. Present in this group is the single representative at the site of an elmid, Riolus cupreus. As this family is usually found in running water, some significance may be attached to its occurrence. Although aquatic beetles dominate faunal group E, there are records of fen and/or waterside ground beetles such as Chlaenius sulcicollis, Agonum viduum and Acupalpus dorsalis, all found frequently at the margins of rivers or pools, and Pteristichus atterimus known from peat substrates or pond edges. A further element in Group E is the small number of species

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CHANGES IN THE MEARE LAKE COLEOPTERA FAUNA IN RESPONSE TO FLOODING

In the Somerset Levels, the flooding of raised acid bogs by calcareous water and the resulting changes in the flora have been widely demonstrated from the studies of botanical remains within the peat deposits, (eg. Dewar and Godwin, 1963). Now a study of a marked variation in insect remains from a Meare Lake peat monolith is providing further evidence of changing ecological conditions due to the inwashing of base rich water on to an acid bog.

The insect remains, which are currently being investigated, have been extracted from a series of samples collected from a peat cutting in which was exposed a section of the Meare Lake trackway. Samples were taken at 5cm. intervals to a depth of 1.70cms. below the peat surface. Analysis of the successive insect faunas has revealed a distinct change occurring at sample 24 (112cms. below the top). At this point, the acid bog beetle fauna is largely replaced by an increasingly rich assemblage dominated by species with habitat requirements indicative of eutrophic conditions. Evidence for this different environment is present, to a varying extent, to the monolith top, indicating that fen conditions prevailed during the construction and usage of the trackway.

The beetle fauna from the lower ten samples is characterised by low numbers of both individuals and taxa. The basal sample, number 34, is richer than succeeding samples but even so it contains a minimum total of only 32 individuals from 11 beetle taxa, together with a slightly larger number of ants. Most of the species identified from these lower samples are confined to this part of the monolith. These include the ground beetles Agonum ericeti (Panz.) and Bradycellus ruficollis (Steph.) which are found only in acid conditions such as heathland. The record of the water beetle Hydroporus tristis (Payk.) is interesting as the species is rarely found in Southern England today. Together with other aquatic species from the lower monolith samples, H. tristis is typical of stagnant acid pools. The phytophagous or plant feeding species include Micrelus ericae (Gyll.), which lives on heather and, present in the two bottom samples, Lochmaea suturalis (Thom.) which feeds on birch or ling.

Sample 24 marks the first appearance of species of the eutrophic faunal element which totally dominates the fauna higher up the monolith. Amongst these incoming species is Noterus clavicornis (Deg.) (=sparsus), common throughout samples 24 - 1, which occurs in reed-swamp or fen conditions. Other water beetles include Bidessus unistriatus (Schrank), now found only in South and East England, where it lives in fen drains, and Hygrotus inaequalis (F.), Hydrovatus clypeatus Sharp. and Porhydrus lineatus F., detritus pond species which provide a clear contrast to acid ponds indicated in the lower monolith. Several of the recorded Hydrophilidae are found in Somerset today. For instance, Limnebius aluta (Bed,), one of the commonest species in the monolith, has been taken in numbers in a mossy pool on Shapwick Heath by Balfour-Browne (1958). Much rarer, but also known today from Somerset, is Hydrophilus piceus (L.), a near complete individual of which was found in the uppermost 40cms. of peat at the sampling site, (Plate). Indicators of eutrophic conditions are not confined to the water beetle fauna. The ground beetle Pterostichus aterrimus (Hbst.), a comparitively rare species in England today, has been recorded in fenland particularly in the eastern counties. Other fenland carabids are Odacantha melanura (L.) which lives in stem of Typha, Phragmites and other reeds and Risophilus monostigma which is frequently taken amongst reeds near water.

Apart from the different habitat requirements of the beetle assemblages from below and above sample 24, there is a clear change in the size of beetle populations. The impoverished fauna of sample 34 has already been noted. In clear contrast, over half of the one hundred beetle taxa so far recorded from Meare Lake are present in a single sample, number 20, where individuals total several hundred. Sample 22 and 21, also contain large numbers of species and individuals, demonstrating the major change in faunal composition occurring with ten cms. of the boundary.

At the level of the trackway, 75cms. below the surface, there is a temporary change in the fauna. The eutrophic indicators, present to this level, disappear, and sample 14, which is immediately above the timbers, contains low numbers of beetles mostly associated with decaying vegetation habitats. There are no true

water beetles from this sample. This assemblage reflects the immediate trackway environment, with the structure initially raised above water level, then covered by vegetations as peat growth continued.

Comparisons may be drawn between the Coleoptera from Meare Lake and Abbot's Way (Girling, 1976) where sampling was extended from the Neolithic trackway down to the clay which underlies the peat deposits of the Levels. At this site, the beetles reflect the change from eutrophic to oligotrophic conditions as the level rises above the influence of base rich ground water. The upper part of the Abbot's Way monolith, contains an acid bog fauna strongly resembling that from Meare Lake. At Abbot's Way, however, the trackway lies within this peat type, indicating that it was constructed across an acid peat bog.

There are strong similarities between the eutrophic peat samples from the lower part of Abbot's Way and the upper part of Meare Lake, with a number of species common to both. At Abbot's Way, changing water levels permitted flat, esturine silts to be colonised by Cladium, Phragmites and other reeds, forming a eutrophic reed swamp. Ground water continued to supply bases to the growing peat even when its depth exceeded 100cms. Beetles from this part of the monolith are almost exclusively fen and reed swamp species and present a uniform picture, the gradual reduction in nutrients evident only in a decrease of indicator species. The enrichment of the peat at Meare Lake, however, is a more dynamic process than the supply of bases by ground water. The beetle fauna is dominated by reed swamp and fen species, but not to the exclusion of other insects, as was the case at Abbot's Way. Several peat bog species persist through the flooding horizon, others may have been washed into the area. These minor faunal differences are therefore important when considering the peat genesis.

References

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