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PALYNOLOGICAL ANALYSES OF WEST HEATH BARROWS V, VIII, AND IX, SUSSEX.

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Samples for pollen analysis were taken from barrows V, VIII and IX spanning the sub-barrow soil, the old land surface (O.L.S.) and into the turf stacks forming the barrows construction. The unconsolidated white sands of the Ea horizons (See Macphail page) were samples contiguously at 2 cm intervals. The more organic in situ Ah horizons were sampled at closer 1 cm intervals to provide greater resolution of changes. Standard techniques were used for concentrating the sub-fossil pollen and spores (Faegri and Iversen 1974, Moore and Webb 1978). Movement of the absolute pollen frequencies (A.P.F.) was carried out using the addition of known numbers of an exotic pollen type(*Garrya elliptica*) to a known sample weight at the start of the preparation. A pollen sum of 500 grains at each level (excluding spores) was counted for barrow VIII and 400 grains each for barrows V and IX. These are average totals, for depending on the absolute pollen frequencies and the extreme dominance of some pollen taxa, the sum ranged from 200 to 1100 grains. These counts have been expressed as a percentage of total pollen (TP) and are represented graphically in pollen diagrams. Findings of these analyses are discussed individually.

Barrow V

In the palynological analysis of this barrow, certain problems have become apparent, making interpretations less straightforward than with the ensuing two barrows described. Samples were taken throughout the soil profile from the top of the Bhs into the second turf of the barrows construction. For ease of description of the apparent changes, six zones from I at the base (40 cm) upwards to 7 in the turf stack at 0 cm have been recognised. These are characterised as follows:

Zone 1: Absolute pollen frequencies are relatively high in the upper part of the Bhs reaching 250,000 grains per gram. Because this is the upper part of the Bhs zone and the constituent pollen types are similar to those in the [illegible] Ea profile, the [illegible] between zones 1 and 2 at 36 cm is not thought [illegible] of Calluna (ling), Erica (heather), Gramineae (grasses) and pteridium (bracken). The dominant vegetation at this site during this period was Corylus (hazel) with deciduous woodland at farther distance composed of Quercus (oak), Tilia (lime), Ulmus (elm) and Betula (birch). The latter is more frequent in this pollen profile than in barrows VIII and IX.

Zone 2, 3, 4: these are the unconsolidated sands of the podzolic Ea horizons Within this section of the soil profile, a number of anomalies occur. At 28 - 30 cm (Zone III) there are high absolute pollen frequencies of up to 415,000 grains per gram. This feature may be viewed as either a standstill horizon or buried soil which has subsequently been obscured by podzolisation. Alternatively it may be due to the presence of organic matter laminations containing higher numbers of pollen (see Macphail). The latter is seemingly likely because no apparent major pollen discontinuities or changes occur across this zone. At 22 cm there is evidence for soil truncation. Below this level absolute pollen frequencies are higher (207,000 grains per gram) with the vegetation dominated by Corylus (hazel) with other woodland elements present including Betula , Quercus, Tilia, Fraxinus (ash) and Alnus (alder). The latter is likely to have derived from alder Carr woodland in adjacent wetter valley bottoms. In addition to Corylus, Calluna percentages are higher and in response Hedera (ivy), Betula and Quercus are reduced. Should this truncation be a 'real feature' the levels below 22 cm may be of Mesolthic date.

Zone 5 : here the character of the pollen spectrum changes markedly for one level at 14 - 16 cm. Quercus (26% TP) and Allium (ramsons - 32% TP) are dominant with Calluna remaining important. This is therefore indicative of mature oak woodland with a ground flora dominated by Allium such as is found in southern England today. Two hypotheses may be suggested to explain this anomaly. Firstly, there is the possibility of contamination by the movement of pollen down the soil profile in root hollows. Secondly, it can be seen that the level immediately underlying this pollen spectrum has low absolute pollen frequencies. It is possible that a phase of truncation caused the removal of humic Ah horizons with consequent destruction of pollen near the surface. The soils of zone V may have been derived from elsewhere through natural or anthropogenic processes. This second hypothesis is substantiated by the presence of a peak of Allium pollen at 10 - 12 cm in the turf stack and this is reflected in the anomalously high iron content of the soil at this level (see Macphail). Contemporaneous soil material of this character was therefore used in the construction of the barrow.

Zone 6 : this is on Ah horizon of compact, highly humic character with absolute pollen frequencies of up to 350,000 grains per gram. In view of the above discussion, it is likely that the truncation of the in-situ soil is overlain by an inverted turf such that A.P.F. values, being inverted, decline upwards from 14 cm. Although not in situ the pollen is therefore representative of vegetation prior to the barrows contruction. The vegetation as in the other Ah horizons is one of Calluna heath associated with dominant Corylus scrub. Other pollen taxa associated with a heathland ecology include Ulex (gorse), Potentilla (cinquefoil), Rubus (bramble), Gramineae (grasses) and spores of Pteridium. The inverted Ea of this turf is of similar character to the in situ profile discussed above, with the presence of Allium and Hedera.

Barrow VIII

Figure represents the results of the analysis of smaples taken from the base of the Ea horizon though the in situ Ah and into turf 4 of the barrows structure. For purposes of discussion the principal changes in the soil pollen diagram have been zoned from the base (Zone I) at 40 cm upwards into the turf stack from 24-40 cm.

Zone 1: below this zone absolute pollen frequencies were too low to enable adequate counts of pollen to be made. It is likely that the pollen below this section of the profile has been lost because, as Macphail has suggested (page) there is a 'flush zone' above the iron pan. Although pollen frequencies were low, there is a marked difference between this and the subsequent zone. Percentages of Corylus pollen are high, attaining 60% TP with Quercus, Tilia with some Betula and Ulmus also present. Pollen of Calluna, Gramineae and Pteridium spores may be indicative of the initial clearance of the natural forest and early soil degradation causing some soil acidification and therefore pollen preservation. Few herbaceous taxa are represented and it seems likely that this early phase was one of limited spatial extent, with Corylus becoming dominant as colonizing scrub.

Zone 2: the significant changes in taxa at 37 cm (Zone 1/2) is evidence for the truncation of soils represented by Zone I. The most evident changes are the sharply rising values of Tilia (54%) and Hedera (75%), whilst those of Corylus and other arboreal elements decline.

Zone 3: A hiatus at 29 cm between zones 2 and 3 is indicated by stepped curves of Alnus, Corylus, Hedera, and Calluna and by slightly higher pollen frequencies in the upper level of Zone 2. This zone spans the immediate pre-barrow in situ soil consisting of the Ea and Ah horizons. Characteristically, absolute pollen frequencies rise sharply into the Ah horizon at the old land surface (27 cm). Vegetation remained dominated by Corylus scrub is more likely. background of other deciduous elements, with evidence of Calluna heath on site. Calluna frequencies are lower than might be expected for pure Callunetum and its presence as a ground flora to open Corylus scrub is more likely.

Zone 4 : the turves lying above the in situ Ah at 24 cm are presumed to be coeval with the soils underlying the barrow, but which were taken from areas surrounding the barrows site. These turves therefore provide further evidence for the local vegetation of the West Heath area. Four turves are represented in the analysis, all of which appear to be inverted and separated by the white sands of the Ea horizon. The Ah horizons have high absolute pollen frequencies due to their greater organic content and compaction. The character of the vegetation as indicated from these turves is essentially similar to that seen in the in situ profile. Minor differences that can be noted are slightly more dominant Calluna in turves 3 and 4 and the sporadic occurrences of Carpinus (hornbeam) and Ilex (holly) within these turves.

Barrow IX

Figure shows a sequence of pollen samples extending from the top of the in situ Ea, and mor humus (Ah) horizons into turf 1 which was placed inverted directly upon the old land surface. As in the barrows already described the pollen diagram may be considered as two separate and contemporaneous sequences of vegetation development. Absolute pollen frequencies rise shaply in the Ah horizons of the old land surface reaching frequencies of up to 520,000 grains per gram. This diagram is therefore described in two sections.

a) the in situ profile: the podzolic nature of the soil and the presence of Calluna (20%) and Erica (5%) pollen show the presence of heathland. As in previous barrows, Corylus frequencies are high (55%) being indicative of extensive Corylus scrub on the site. Hedera as in barrows V and VIII is important (up to 50% TP). Whether this is natural growth or due directly to man is discussed subsequently. However, unlike the previous analyses Hedera percentages are at their maximum at the old land surface and are therefore of early to middle Bronze Age date. In consequence, the high pollen percentages of Corylus in the Ea horizon are depressed although its actual abundance possibly remained the same.

b) the inverted turf: the principal characteristic of the above descriptions are present in the inverted sequence. Minor but significant differences between the two can be seen. Pollen of herbaceous taxa are more clearly represented with plantago lanceolata (ribwort plantain), Ranunculus (buttercups), Rumex (dock), Rosaceae spp., Spergula type (spurrey), Gramineae and cereal type pollen.

As shown for barrows V and VIII the environment in which this barrow was constructed was apparently within an area of Corylus scrub surrounded by woodland. This barrow has higher numbers of Calluna than at barrows V and VIII. Whilst Corylus scrub must have been of importance, the slightly higher Calluna percentages may indicate a locally more dominate patch of heathland. The overlying turf was evidently taken from an area which was closer or adjacent to an area where agriculture may have been practised. Assuming that the turf was not transported for any great distance and considering the low percentages of those agricultural taxa, it is likely that such activity was of only limited extent.

DISCUSSION

The three pollen profiles presented here are taken from barrows contained within a cemetery comprising eleven barrows. Pollen analyses of barrows I-IV and from below a mediaeval bank were published by Baigent in Drewett 1976. Certain problems have become apparent relating to the pollen profile from barrow I and discussion of these can be found in archival records and by consultation with the present author. Comparative pollen analyses from other Bronze Age barrows within the region include those of Moor Green, Hampshire (Ashby and Dimbleby, 1976), Minstead near Iping, Sussex (Dimbleby in Drewett 1973), Trotton Common (Keatinge unpublished) and Ascot Berkshire (Bradley and Keith-Lucus 1975). Dimbleby (1962) has also contributed much to the understanding of the development of heathland through the application of pollen analysis to soils.

From the interpretation of the pollen diagrams above (Figures) and from the earlier analyses of Baigent a view of the changing ecological character of West Heath may be outlined. Initially and not represented in the soil profile or pollen spectra, the 'natural' vegetation cover is likely to have been Brown earth underlying deciduous forest during the Atlantic period. These soils occurring under mixed oak woodland (Quercetum mixtum) or possibly under stands of Tilia would certainly have been subject to faunal (especially earth worm) mixing and have a ph and nature not conducive to pollen preservation. Early anthropogenic activity, possibly corresponding with the Mesolithic artifactual material found at West Heath (Drewett 1976) resulted in the opening up of the forest and subsequent soil acidification and growth of acidophilous ericaceous heathland. Corylus woodland or scrub became an important coloniser in the area. Soil acidifcation allowed the preservation and to some extent stratification of pollen in the Zones I of barrows V and VIII in the top of the Bh and base of the Ea horizons. In the Ea horizons of barrows V and VIII there is evidence for possible truncation of the soils, on a number of occasions during the late

Mesolithic or Neolithic. The vegetation of this early anthropogenic phase was forest consisting of Quercus, Tilia, Ulmus and Fraxinus. Clearings were present which contained abundant Corylus and possibly Betula scrub with patches of pure heathland or Erica and Calluna as a ground flora to the woodland of open aspect.

It is evident from the analysis of the pollen diagrams and from Dr. Macphail's pedological work that a number of periods/phases of soil truncation have taken place. It is suggested here that a mjaor hiatus may be present with early to middle Bronze Age soil formation being superimposed on the earliest, periods of soil acidification and vegetation described. The soil formation and its contained pollen represented in Zones in situ at the OLS and in the humic turves is presumed to be coeval with, or just pre-date the construction of the barrows. It is clear from the pollen evidence that the vegetation just prior to construction is again one of open woodland with clearings in which ericaceous shrub communities were the dominant ground flora. The matrix of arboreal vegetation surrounding the site comprised Quercus, Tilia, Corylus with some Fraxinus, Ulmus and Betula. Alnus is present throughout the pollen sequences and may be representative of carr woodland in the wetter valley bottoms adjacent to the site.

Tilia and Hedera have poor pollen dispersion characteristics due to their anemophily and are therefore usually poorly represented in pollen spectra. The presence of these taxa, often in relatively high frequencies (Tilia in barrow VIII for example) indicates that these species must have been dominant elements in the local vegetation. In the three pollen diagrams presented here and in those of Baigent (in Drewett 1976) percentages of Hedera pollen are high. This is especially so in the lower sections of the soil profiles of barrows V and VIII which may correspond to the Mesolithic period. These high pollen frequencies reaching 720,000 grains per gram soil, are exceptional and not generally encountered in normal circumstances of pollen deposition. An anthropogenic cause has been invoked by Dimbleby (1976) and Dimbleby and Simmons (1974) and Simmons et al 1981. It has been suggested that Hedera might have been collected in the Autumn and placed in forest clearings as fodder to attract red deer. As this taxon flowers in Autumn its pollen would be liberated in higher quantities and deposited on the ground surface. Similarly, high numbers have been noted at the Mesolithic sites of Addington, Kent (Dimbleby 1963) Iping Common, Sussex (Keef Wymer and Dimbleby 1965), Winfrith Heath, Dorset (Dimbleby 1976) and in the Mesolithic levels of the Bronze Age barrows of West Heath (Baigent 1976) and Minstead, Sussex (Dimbleby in Drewett 1973). These sites were similarly in open scrubby woodland. Natural causation might also be suggested in view of the frequency of this phenomenon. In such open woodland with abundant light, Hedera could be expected to flower profusely having a substantial number of dead and growing trees on which to establish This would result in a more consistent presence of Hedera for longer time periods, a fact which is supported by the presence of its pollen in all zones shown and including those of the Bronze Age (especially barrow IX). Dimbleby (pers. comm.) has, however, carried out pollen sampling under modern stands of flowering Hedera and found that even under its canopy, pollen percentages of this taxon are low.

Some variation occurs between the in situ profiles and the turves used in construction. These dissimilarities could be viewed as temporal variations resulting from barrow construction at different time intervals. Alternatively they may be minor spatial variations with turves being gathered from the local area and therefore representing minor differences in vegetation. The second of these hypotheses seems more plausible as the construction of barrow IX shows the greatest difference between the in situ soil profile and the turf stack although both sequences are assumed to be coeval. Any differentiation between the periods of construction of these and earlier barrows excavated is not felt to be possible. Variation between the vegetation of the different profiles is likely to be a function of spatial variability of that vegetation.

BIBLIOGRAPHY

Ashbee, P. and Dimbleby, G.W. (1976) The Moor Green Barrow, West End, Hampshire: Excavations 1961. Proc. Hants. Field. Club. Archaeol. Soc. 31, 5-18.

Baigent, J. (1976). See Drewett, P.L. 1976.

Bradley, R. and Keith-Lucus, M. (1975) Excavation and pollen analysis on a bell barrow at Ascot, Barkshire. Journ. Archaeol. Science 2, 95-108.

Dimbleby, G.W. (1962) The Development of British Heathlands and their Soils. Oxford Forestry Memoirs No. 23. Clarendon Press, Oxford.

Dimbleby, G.W. (1963) Pollen analysis of Mesolithic Site at Addington, Kent. Grana Palynologica 4, 140-148.

Dimbleby, G.W. in Drewett, P.L. (1973) The excavation of a turf barrow at Minstead, West Sussex, 1973. Sussex Archaeol. Colls. 113, 54-65.

Dimbleby, G.W. (1976) The history and archaeology of heaths. In The Southern Heathlands Eds. Sankey, J.H.P. and Mackworth-Praed, Surrey Naturalists Trust pp. 38-52.

Dimbleby, G.W. and Simmons, I.G. (1974) The possible role of ivy (Hedera helix) in the Mesolithic economy of Western Europe. Journ. Archaeol. Science. 1, 291-296.

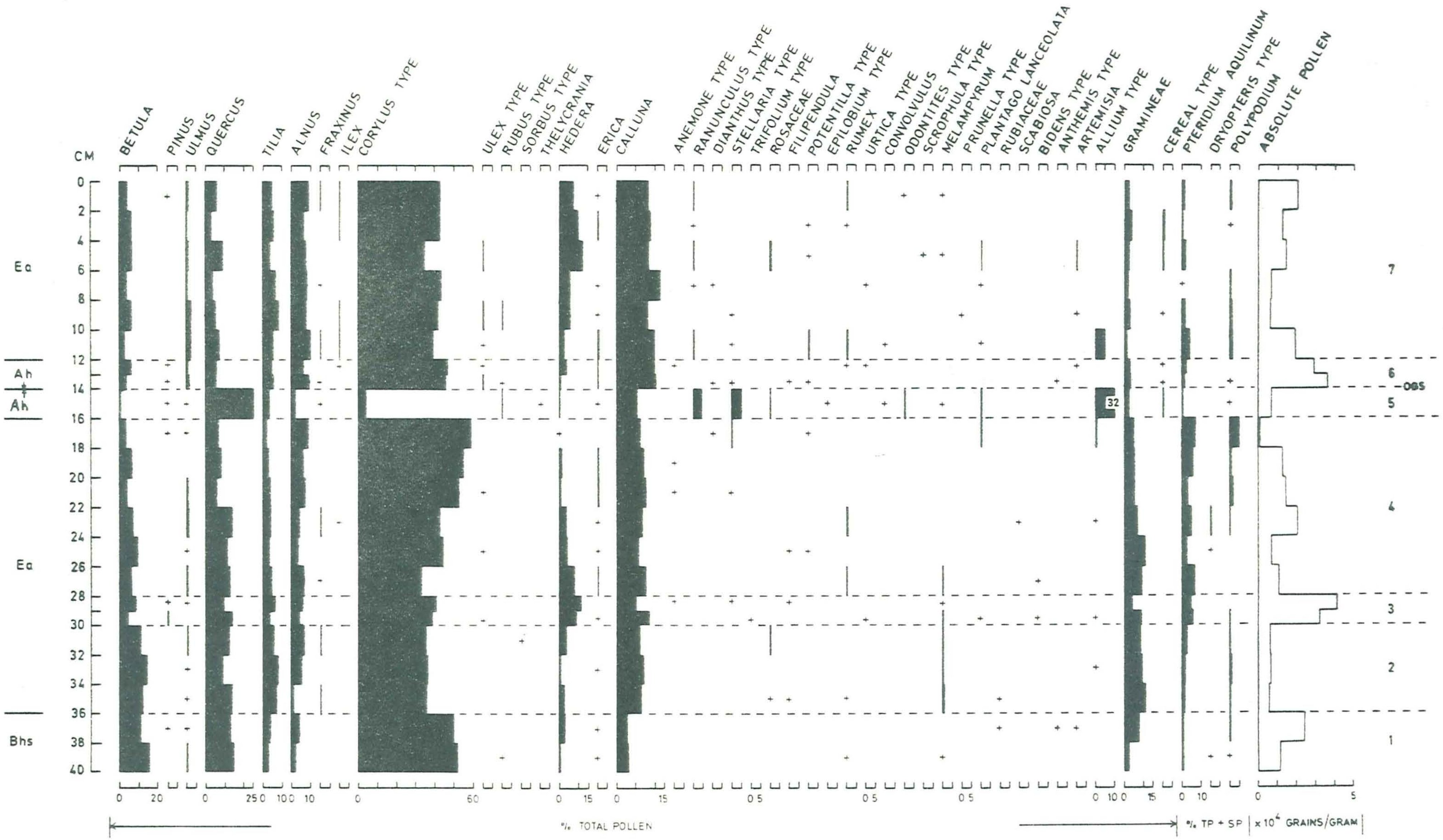
Drewett, P.L. (1976) The excavation of four round barrows of the second millenium B.C. at West Heath, Harting. 1973-1975. Sussex Archaeol. Colls. 114, 126-150.

Keef, P.A.M., Wymer, J.J., and Dimbleby, G.W. (1965) A Mesolithic site on Iping Common, Sussex, England. Proc. Prehist. Soc. 31, 85-92

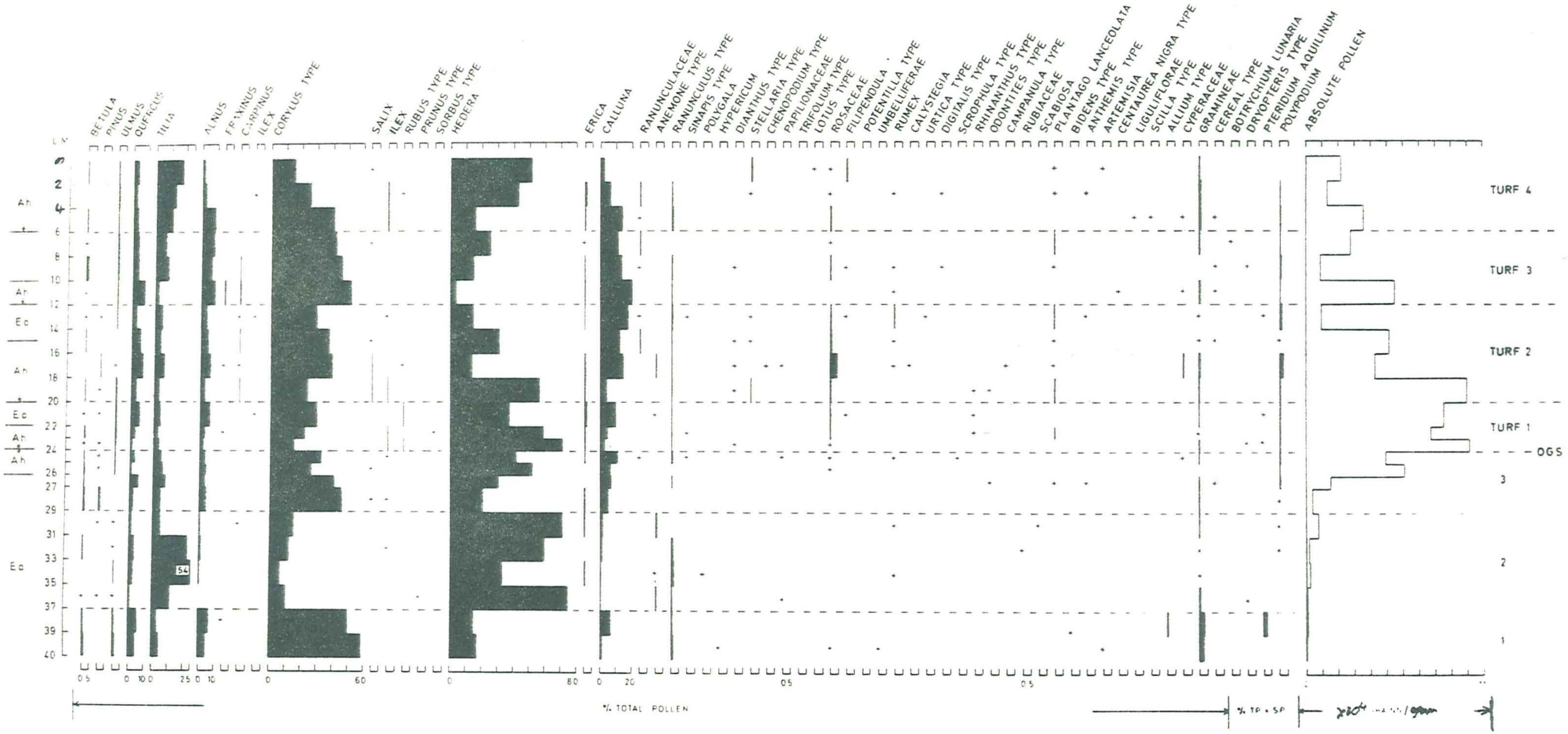
Faegri, K., and Iversen, J. (1974) Textbook of Pollen Analysis. 2nd. Edit. Blackwell Oxford.

Moore, P.D. and Webb, J.A. (1978) An Illustrated Guide to Pollen Analysis Hodder and Stoughton, London.

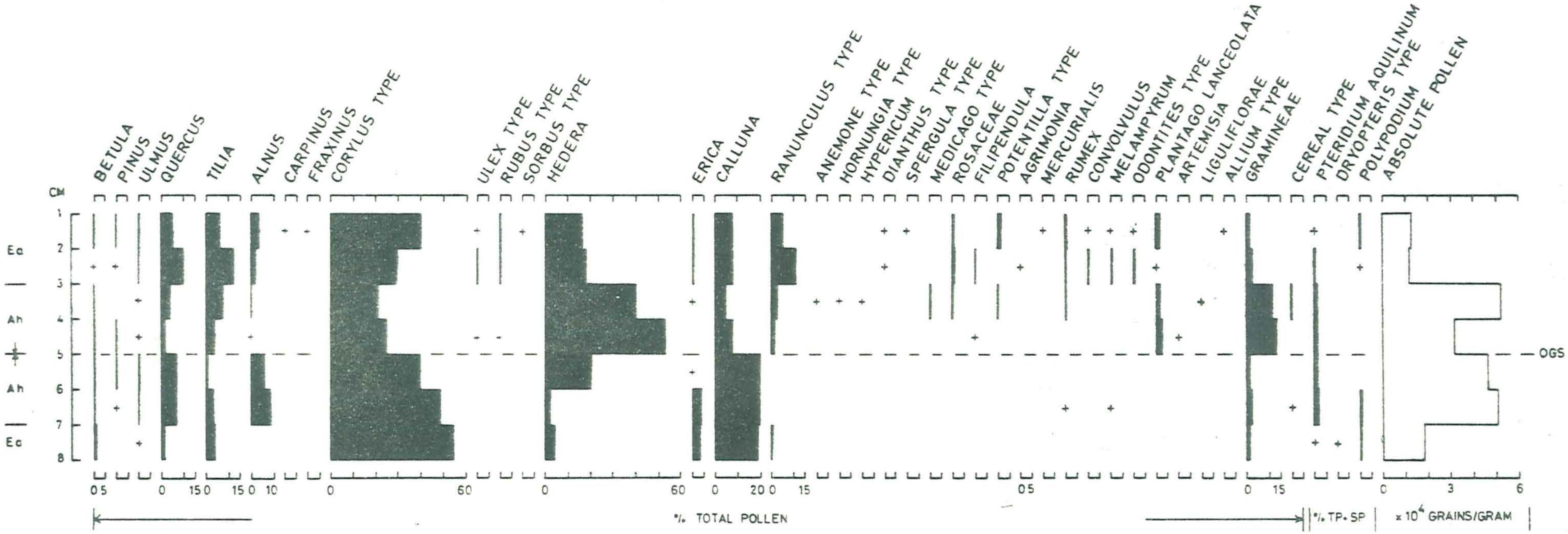
Simmons, I.G., Dimbleby, G.W. and Grigson, C. (1981) The Mesolithic In The Environment in British Prehistory Ed. Simmons, I. and Tooley, M. Duckworth, London. pp. 82-124.



POLLEN DIAGRAM BARROW V



POLLEN DIAGRAM BARROW VIII



POLLEN DIAGRAM BARROW IX

POLLEN RAW DATA: BARROW V.

DEPTH CM'S	Betula	Pinus	Ulmus	Quercus	Tilia	Alnus	Fraxinus	Ilex	Corylus type	Ulex type	Rubus type	Sorbus type	Thelycrania	Hedera	Erica	Calluna	Anemone type	Ranunculus type	Dianthus type	Stellaria type	Trifolium type	ROSACEAE	Filipendula	Potentilla type
0-2	16	1	5	25	21	38	2	2	176					30	1	70		2						
2-4	27		2	13	23	26		2	170					40	2	71		1						1
4-6	28	2	5	39	16	33			146	2				53		71		2				2		1
6-8	17		4	16	27	35	1		178					22	1	94		1	1					
8-10	25		10	22	33	31		2	167	3	2			23	1	65				1				
10-12	12		10	30	24	43	2	2	166	1				11	4	82		4		1				2
12-13	25	1	3	24	19	25		1	188	1				15	2	80	1							
13-14	16	1	6	22	24	39	1		189	2	1			4	2	84			1	1			1	1
14-16	3	1	1	154	20	12	1		54		2		1	2	1	62		26		31		4		
16-18	12	1	1	24	7	32			208					1		43			1	2				1
18-20	25			31	11	25			220					6	2	57		1						
20-22	14		4	24	17	29			212	1				4	2	60		1		1				
22-24	30		5	59	19	18	4	1	180					16	1	57								
24-26	37		1	45	14	13			179	1				17	1	46							1	1
26-28	27		3	52	18	27	1		133					33	2	62								
28-29	37	1	1	40	26	25			172					49		43		1		1			1	
29-30	17	2		55	15	18			155	1				35	1	67					1			
30-32	48		2	51	25	27	2		148			1		16		51						3		
32-34	57		1	37	31	21			146					4	1	57								
34-36	49		1	57	28	5	2		142					10		52						1	1	
36-38	45	1	1	54	15	17			200					13	1	21								
38-40	62		2	59	12	10			211		1			2	1	25								

DEPTH CM'S	Epilobium type	Rumex	Urtica	Convolvulus	Odontites type	Scrophula type	Melampyrum	Prunella type	Plantago lanceolata	Galium type	Scabiosa type	Bidens type	Anthemis type	Artemisia	Allium	GRAMINEAE	Cereal type		Pteridium	Dryopteris	Polypodium		Absolute Pollen per gramm
0-2		2			1		1									11			5		3		207,445
2-4		1														16	4		2		1		122,723
6-6						1	1		2					2		10	3		8				147,717
6-8			1						1							9			1		3		67,459
8-10								1						1		12	1		6		5		61,361
10-12		2		1					1						20	6			19		7		194,902
12-13		1	1											1		11	1		9				288,400
13-14													1			14	1		7		1		358,192
14-16	1			1	2		1		2						188	16	2		2		1		70,789
16-18									2						2	18			28		23		6,117
18-20																22			26		4		128,147
20-22																21			14		7		144,200
22-24		2									1	1			1	30			22	2	3		207,286
24-26																43			13	1	2		72,553
26-28		2					2									37			29				109,430
28-29							1									20			22				414,902
29-30			1				2		1						1	31			25		4		320,444
30-32							4									37			13		2		67,024
32-34							2								1	38			8		5		60,083
34-36		1					4			1						46			6		2		64,918
36-38										1			1	1		28			5		2		248,142
38-40		1					1									10			4	1	1		116,655

POLLEN RAW DATA: BARROW VIII.

DEPTH CM'S	Betula	Pinus	Ulmus	Quercus	Tilia	Alnus	Fraxinus	Carpinus	Ilex	Corylus type	Salix	Ulex type	Rubus type	Prunus type	Sorbus type	Hedera	Erica	Calluna	RANUNCULACEAE	Ranunculus type	Anemone type	Sinapis type	Polygala	Hypericum	Dianthus type
0-2	2		2	15	88	9				74	1	22			2	258		12							
2-4			4	11	65	15			1	34		3	1			215	5	33	2	3					
4-6	2		2	16	56	47				64		4				80	4	67	1	8					
6-8	1		4	18	34	41				110	1					127	1	55	2						
8-10	7		5	20	44	37		2		217						77	2	72	1	4					1
10-12	1		2	40	13	42	2	5		123						19	5	89		4					
12-14	1	1	3	14	24	20		1	1	135		1				74	3	87	1	5		1			
14-16	2			28	22	25		3		167	1					158		61	2	2					1
16-18		3	1	38	33	36	1	1		170	4		1			70	5	74		3	3				1
18-20	2	1	2	30	31	28		2		159	2	6				513	7	37		5					2
20-22	1	1	6	29	22	36			1	159			2			200	10	52		2	1				
22-23	4		4	20	19	22	1			220		2			1	413	7	35		2		1			
23-24	1	2	2	11	38	26				198		2	2			778	8	39		2					1
24-25	2	1	2	15	28	20				189		1				188	4	60	1	5		1			
25-26	4	1	4	5	32	19				151	1					266		33							
26-27	2			16	21	12				260						91		21		3					
27-29	5	2		11	24	22				240	1	1				148	4	27							
29-31		1	1	10	40	7		1		210						503	2	15			10				
31-33	3		1	18	112	8				203		1				276		8		7					
33-35			2	11	268	2				129						166	2	4		7	1		1		
35-37	1	1	1	6	82					78				1		531		4		2	2				
37-39	2		2	11	7	14	1			106						30		14		2				1	
39-40	3		3	9	10	10				118						36		3		2					

DEPTH CM'S	Stellaria type	Chenopodium type	PAPILIONACEAE	Trifolium type	Lotus type	ROSACEAE	Filipendula	Potentilla type	UMBELLIFERAE	Rumex	Calystegia	Urtica type	Digitalis type	Rhinanthus type	Odontites type	Campanula type	Rubiaceae	Scabiosa	Plantago lanceolata	Bidens type	Artemisia type	Artemisia	Centaurea nigra type	Taraxacum type
0-2	2				1	1	2												1			1		
2-4	1					1				1			1						1		1			
4-6						2																		1
6-8						1													2					
8-10						2	1			1			1						1					
10-12										1													1	
12-14	1					2	1			2		1							3		1			
14-16	1					3				1									1					
16-18		1	1			21		2		1	1					1			1					
18-20	2					4								1	1				3					
20-22						2	1							1										
22-23						2								1					2					
23-24				1		1		1																
24-25			1			1				1														
25-26						1		1																
26-27															1				1		1			
27-29																								
29-31										1								1						
31-33																	1							
33-35										1														
35-37			1																					
37-39								1												1				
39-40						1			1													1		

DEPTH CM'S	Endymion type	Allium type	CYPERACEAE	GRAMINEAE	Cereal type	Unidentified	Botrychium	Dryopteris	Pteridium	Polypodium	Absolute pollen grains per gram
0-2				3							219,817
2-4				6		1				2	130,615
4-6	1		1	5	1					3	354,138
6-8				4			1			2	272,619
8-10				1	1			2		4	92,458
10-12			1	4	1					3	546,212
12-14				1					1	7	96,000
14-16				1	1					1	515,000
16-18				3					1	11	425,425.
18-20			2	5						3	997,291
20-22				3					1	3	850,780
22-23				1						2	772,024
23-24				2		1		1	1	2	102,190
24-25			1	3						3	493,419
25-26										2	60,729
26-27				2		1				2	149,257
27-29				3						1	37,331
29-31				2						1	79,120
31-33				1						1	19,861
33-35				1							26,122
35-37				2		1		1			9,029
37-39		2		7					4		
39-40				6							

<u>POLLEN RAW DATA: BARROW IX.</u>

DEPTH CM'S	Betula	Pinus	Ulmus	Quercus	Tilia	Alnus	Carpinus	Fraxinus		Corylus type	Ulex type	Rubus type	Sorbus type	Hedera	Erica	Calluna	Ranunculus type	RANUNCULACEAE	Anemone type	Hornungia type	Hypericum	Dianthus type	Spergula type	PAPILIONACEAE
1-2	2	2	3	22	27	16	2	2		163	1	2	1	68	3	32	17	3				1	1	
2-3	1	1	2	41	49	11				117	2	3		70	2	28	47					1		
3-4	2		1	16	32	4				88				163	1	17	11		2	1	1			1
4-5	2	3	1	7	15	1				100	1	1		211		31	5							
5-6	2	2	3	32	5	27				162				84	1	82								
6-7	2	1	3	30	15	38				205				11	14	81								
7-8	5		1	7	17					222				18	14	77	2							

DEPTH CM'S	Medicago type	ROSACEAE	Filipendula	Potentilla type	Agrimonia	Mercurialis	Rumex	Convolvulus	Melampyrum	Odontites type	Plantago lanceolata	Artemisia	Taraxacum type	GRAMINEAE	Cereal type	Pteridium	Dryopteris	Polypodium	POLLEN ABSOL. per. E/gmm.
1-2		3		6		1	3	1	1	1	7			6		1		3	126,769
2-3		4	2		1		2	2	2	2	1			10		2		1	120,795
3-4	1	3		3			3				6		1	46	3	6			521,683
4-5			1								9	1		54		5			324,656
5-6									1					7		5			467,208
6-7							1							11	1	8		4	510,529
7-8											1			5		1	1	2	193228