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GALLIBURY DOWN ISLE OF WIGHT - POLLEN ANALYSIS OF A BRONZE AGE DOWNLAND PALAEOSOL

INTRODUCTION

This report contains data from two Bronze Age archaeological sites of the Newbarn/ Gallibury Down complex, Isle of Wight. The first is that of the Apes Down ring ditch excavated in 1979 by D.J. Tomalin as a consequence of deep ploughing and therefore potential damage. The second is the major excavation of Gallibury (formerly Newbarn Down, Isle of Wight) also excavated under the auspices of the Isle of Wight Archaeological Committee with Department of Environment funding. Excavation reports of both sites are forthcoming, but reference has been made by Tomalin (1979). Both sites are important in elucidating the Bronze Age vegetation ecology of the chalklands. The pollen data from these are as follows:

1. THE APES DOWN RING DITCH

Samples for pollen analysis were taken from the buried soil profile underlying the mound, and from the lower silts of the ditch infill. For reasons which will become apparent, 'spot' samples and not contiguous samples were used in the analysis. Of these, only the samples taken from the upper disturbed rendzina type soil profile yielded sufficient pollen to enable counting and analysis.

Samples of approximately 15 grams were subjected to standard pollen analytical extraction techniques, for de-calcification, de-floculation, silica and cellulose removal. The remaining pollen grains were stained with safranin and mounted in glycerol jelly. Even in the one sample found to contain sufficient quantities, the absolute pollen frequencies were very small. Using ordinary light, and phase contrast microscopy, pollen totals of 150 grains and 112 spores were identified. A further 21 pollen grains were indeterminable due to excessive degradation. This information is given in Table 1, where each type is expressed as a percentage of the total pollen sum, as is usual in soil pollen analysis. Spores have been calculated as a percentage of total pollen (including indeterminable) plus total spores.

Before discussing the results obtained, a number of points relating to the pollen analysis of calcareous soils need to be elucidated. It has long been realised that pollen is poorly, if at all preserved in soils with high pH values. This has presented a problem in chalk downland areas which have had the greatest degree of prehistoric human activity. Dimbleby (1974) has shown that pollen can occur in calcareous soils in archaeological contexts, but in low absolute frequencies. From this 'key' discussion, it is evident that certain problems and points of interpretation exist in the analysis of such soils.

Without looking at these in detail, it is sufficient to say that pollen obtained from such soils appears to be coeval with the period of burial; that is, in the order of two to three seasons prior to burial, due to rapid oxidation of the pollen exine in this environment (Dimbleby 1974, Havinga 1971). Because of soil faunal mixing, (primarily earthworm), the pollen unlike that in acid soils or peats, shows no stratification within the profile. Pollen that is recovered from soils is representative of local and not regional vegetational characteristics (Dimbleby 1962).

These points are particularly relevant to Apes Down. Here, samples analysed from a rendzina soil type appeared to have been disturbed through prehistoric cultivation and were of sufficiently high pH value for faunal intermixing to have distributed pollen throughout the upper profile. Consequently, it is felt that pollen discussed here (with the possible exception of Taraxacum type) is representative of the vegetation present immediately prior to burial of this ground surface. Furthermore, the pollen is derived from locally growing plant communities and as such indicates the nature of the vegetation in the Apes Down valley.

The dominance of herbaceous pollen types over arboreal pollen is the primary feature of this pollen record. The lack of arboreal pollen indicates openness of vegetation in the vicinity of the site at the time of burial. Because of the small frequency of tree pollen present, it is difficult to ascertain whether or not those species recorded were growing locally in small quantity, or if the pollen was derived from more extensive areas of vegetation at a distance. Of these two possibilities, the latter seems most probable as detailed analyses of peat mires in the Island have shown that extensive woodland remained in the lowlands during the Bronze Age (Scaife 1980). Thus Alnus was probably derived from growth in lowland valleys. Similarly, the pollen of Pinus is most likely to have arrived from long distance sources due to its readily transported pollen grains. Quercus, Ulmus and Tilia occur in small frequencies indicating negligable growth of these trees in the Apes Down valley. Of the arboreal types, Betula and Corylus may have been growing as small patches of 'scrub' in abandoned cultural areas, much as they do today in the valley.

Of the herbaceous pollen recorded, Taraxacum type (Li guliflorae) forms 50% of total pollen. This pollen is readily preserved due to its robust exine and coarse morphology. This type is usually regarded as indicative of a pastoral environment, the pollen being produced by such genera of Compositae as Taraxacum and Leontodon. Its presence in chalk soils has been noted in quantity at other sites (e.g. Ranscombe, Sussex - Dimbleby, pers. comm.). The presence in high quantity of other pastoral and fallow types as Plantago lanceolata and Gramineae similarly indicate an overall pastoral nature to this area just prior to the burial of this ground surface.

Cereal cultivation is indicated by the presence of some pollen from weeds characteristic of arable cultivation. These include Cereal type, (taken as greater than 45μ with wide annuli to the pore), *Sinapis* type and *Artemisia*. No indication of the extent of arable activity can be made from such analyses. Indeed, it is likely that the buried soil itself was subjected to cultivation prior to its fallow/pastoral phase. This is evidenced by the disturbed soil profile and scouring marks in the chalk sub-strate. It is possible that at least some of the large percentage of *Taraxacum* type pollen may have originated from species of Liguliflorae known to be weeds of arable land (e.g. *Sonchus arvensis*). Its extremely robust exine would remain long after other pollen types were destroyed in this environment.

Pteridium aquilinum was present in high quantity. This is again a feature characteristic of some chalk soil pollen analyses. Dimbleby (Dimbleby & Evans 1974) has postulated that its occurrence may have been due to 'mucked out' litter being added to arable land as a fertilizer. Alternatively, bracken may have 'invaded' the area on agricultural abandonment, when soil conditions may have been more suitable than today. The resistance of spores to decay would account for the relatively high frequencies caused by either of these possibilities.

From the above analysis, a broad series of changes can be seen to have taken place:

i) During Neolithic times, the downland was not cleared, but consisted of a mosaic of vegetational community types caused by transient clearances of 'Landnam' type. This evidence is based upon detailed pollen analysis of peat mires (Scaife 1980, Tomalin and Scaife 1979).

ii) The Bronze Age heralded more extensive clearance of the downland forest for agriculture. In the region of the Apes Down valley, little or no arboreal vegetation existed.

iii) Areas of arable activity may have been abandoned due to soil deterioration or other reasons.

iv) These areas became fallow land and pasture. It was in an area such as this that the barrow was constructed. The pollen results in Table 1 present a record of the local vegetation immediately prior to mound construction.

2. NEWBARN/GALLIBURY DOWN (SZ 442855)

The Gallibury Down barrow group is situated on the high chalk downs of the Island 7 km south west of Newport. This barrow, excavated between 1977 and 1979, was sited on one of the isolated patches of residual 'clay with flints' capping the chalk. The site has been dated on pottery characteristics (Tomalin 1979) from a primary burial containing a beaker bowl to around 1700-1600 BC. As a consequence of its position on the clay capping, the markedly deleterious effects of chalk alkanity (as experienced in the Apes Down dry valley complex) were absent. The soils present were of circumneutral pH and were poorly preserved brown earth or agricultural soils. Furthermore there was better pollen preservation than experienced in the Apes Down valley. This enabled a full pollen diagram, albeit rather limited in species diversity, to be constructed from analysis of this site. Although a 'clay with flints' capping was present, the resulting data can be considered as relating to and reflecting the autochthonous vegetation of the high downland. This is important, as there exist no other published pollen diagrams from chalk downland soils underlying Bronze Age barrows. Those of Dimbleby and Evans (1974) are of Neolithic date comprising long barrows, henges and causewayed enclosures.

Pollen data from this site are presented in Tables 2 and 3. Figure 1 illustrates the stratigraphy of the site. Preliminary data from this site are given here and in Scaife (1980) and are based upon a single spot sample obtained from the excavation.

a) THE SPOT SAMPLE (Table 1) (Scaife 1980)

Moderately high absolute pollen frequencies (although not fully quantified) were found. Low arboreal pollen frequencies (10.6% TP) and high herb totals (89.4% TP) showed that a predominantly open environment existed. There were high values of Gramineae, Taraxacum type, Plantago lanceolata plus lower but significant quantities of chalk pastoral types - Lotus type, Polygala, Papilonaceae - which indicate a dominantly pastoral or abandoned arable environment. Lesser frequencies of arable indicators - Cerealia type (5% TP), Spergula type and Artemisia may be used to suggest that cereal cropping was being carried out at this time. Interesting occurrencies were those of Pinus (5.4% TP) and Calluna (4.4% TP). In the case of Pinus, the openness of the environment and its exposed position have probably resulted in the incorporation more readily of long distance transported pollen grains. It can be noted that Pinus charcoal has been found by other workers in southern England as, for example at Chicks Hill (Ashbee and Dimbleby 1958; Bell 1981). Pine may therefore have been locally present in the Hants/Dorset region and the question of its local proximity in the Isle of Wight arises. In view of the lower frequencies recorded in the ensuing pollen diagram, the possibility of contamination from recent Pinus plantation sources may be noted. Care was, however, taken in sampling of this test sample and the discrepancy is likely to be due to chance inherent variation in spatially disparate samples. Pollen of Calluna was present and illustrated the existance of heathland plant communities at this time and which are seen more clearly in the analysis of Bohemia Bog adjacent to Bleak Down SZ 513833) (Scaife 1980).

This preliminary analysis concluded that at a period prior to c.1700 BC, this stretch of downland was essentially a pastoral environment with some evidence of mixed economy.

b) THE FULL ANALYSIS

Under the auspices of the Department of the Environment a pollen stratigraphical column (Figure 1) was subjected to a fuller palynological investigation in 1982. The resulting pollen diagram (Figure 2) was drawn from the table recorded (Table 3).

The barrow site/ring ditch was excavated as a rescue archaeological site because of the closeness to the present ground surface and the effects of deep ploughing in recent years. Preservation of the old land surface was facilitated by the 'stiff' clay capping the buried Bronze Age ground surface thrown up during the barrow's construction. This effectively sealed an old land surface which was apparently a clay-rendzina type soil. The intact nature of this buried surface was visually readily apparent with no faunal mixing of the overburden and old land surface observable. This was also substantiated by the absolute pollen frequencies indicated in the pollen diagram, where pollen frequencies may be expected to increase steadily upwards through a soil profile and reach their highest values at the top of the old land surface (Dimbleby 1961). This is brought about by the progressive destruction of pollen by mechanical and biological agents. This phenomenon is noticeable in the pollen diagram (   ) where at the old land surface frequencies attain a maximum of 27,000 grains per gram. The apparent level, that is taken from the clay over-burden exhibits markedly low pollen frequencies (650 grains per gram). The presence of high APF in the uppermost levels may also be taken as evidence that truncation of the old land surface had not taken place immediately prior to construction of the barrow since these seem to represent the humic levels of a grassland sward community.

Absolute pollen frequencies were ascertained by the use of an exotic marker/indicator pollen (Garrya elliptica) which was added to a known weight of dried soil sample at the outset of the pollen concentration procedure. Standard extraction techniques were used including: KOH and HCL deflocculation; HF silica digestion, cellulose removal by Erdtman's acetolysis and staining and mounting in glycerol jelly. A total of grains was counted for each level, the results of which were calculated as a percentage of total pollen (TP) for each level. Results of this pollen analysis are given in Figure 2 in pollen diagram form and in Table 3 for the absolute numbers of grains/taxa recorded.

At a depth of 79 cm, the old land surface of Bronze Age date is clearly seen by the marked decline in absolute pollen frequencies. The sharp junction as noted is indicative of little faunal mixing across this boundary/interface. It appears that an old turf line existed between 80 and 85-6 cm and that these soils were therefore not truncated.

The pollen data from these humus A levels are dominated by herbaceous pollen of Gramineae, Plantago lanceolata and Compositae species. These taxa plus the lesser presences of others are indicative of a pastoral/grassland vegetation on this site. How closely this can be compared with contemporary species rich downland grassland is unclear because pollen preservation is not ideal in such soils and many Calcicolos taxa (therefore indicative of grassland ecotypes) are entomophilous and thus poorly represented in such pollen spectra. However, the thickness of the turf and the dominant taxa are strongly suggestive of at least pasture. Pollen of weeds and cereals are few although a small Cerealia component is noted. Cereal pollen especially early varieties are renowned for their poor pollen production/dispersal characteristics and consequently some underestimation of their importance in the pollen spectrum might be expected. Weeds often associated with arable activity (e.g. Cruciferae, Artemisia, Chenopodium) are poorly represented. These can often be better indicators of arable agriculture in the pollen record and their paucity here may be evidence to suggest that the environment was predominantly pastoral but with possibly small scale or isolated patches of arable cropping taking place locally, or more extensively at distance from the site. That the latter occurred has been illustrated for the lowland Greensand soils of the Island to the east of this site adjacent to Gatcombe Withy Bed and Bohemia Bog (Scaife 1980).

The arboreal vegetation is poorly represented with only small quantities of Quercus, Alnus and Corylus. For the presence of more extensive Corylus growth such as is seen around the local downland adjacent to the site today, higher percentages of its pollen might be expected. Again it seems likely from comparison with long pollen sequences from the lowlands that this input is likely to be of longer distance origin.

In the 'B' horizon soil levels below 80 cm, pollen frequencies are lower (less than 1000 grains per gram). As noted, this is usual for soil pollen distribution and has been discussed in detail by Dimbleby (1961). It is noted also that those taxa such as Pteridium and Polypodium became more predominant. This is likely to be the result of differential pollen preservation/destruction of the more/less resistant taxa. Dimbleby has shown in many pollen sequences an increase in Corylus pollen in the lowest levels of certain soils. This is also present here and might represent scrub colonization in the post deforestation of the site.

DISCUSSION AND NOTE ON THE STATUS OF DOWNLAND FLORA

The character and history of the chalkland flora and the creation of the present downland vegetation has for long remained a primary concern of ecologists studying contemporary vegetation succession and palaeobotanists'/palaeoecologists' analyses of the past. The problem of alkalinity of the chalk strata and of the low surface water/high drainage discharge from the chalk has been a primary factor in the scant knowledge of this region. Attempts at elucidating the changing palaeoecology of the downland have been made by Thorley (1971, 1981) for Sussex, Scaife (1980) in the Isle of Wight and in Dorset and Hampshire by Waton (1981). Earlier work in Kent includes that of Godwin (194) at Wingham and Froghat and the molluscan analyses of Kerney (1963) Kerney et al (1964) and Kerney et al (1981), Lambert (in Kerney et al 1964) has also recovered a small quantity of pollen of Allerød date at Brook, Kent.

The above vegetational data are however taken from pollen investigations of peat areas adjacent to the present downlands where topogenous valley mires occur. Their use for delimiting the history of the chalklands is somewhat restricted by the high pollen domination of the autochthonous and local vegetation representative of more acid substrates under - or adjacent to the mires analysed. Such data therefore become enigmatic for elucidating the problem as interpretation of the spectra necessarily requires consideration as to the extent and character of the pollen catchment under differing conditions of vegetation. For example the extreme dominance of autochthonous alder carr communities in valley bottoms as described at Lewes I and II (Thorley 1981) and at Gatcombe Withy Bed, I.W. and Borthwood Farm, I.W. (Scaife 1980) may have a substantial restricting effect on the pollen taxa from surrounding areas becoming incorporated into the peats underlying these communities. The overall result of these studies has been to confirm that the downlands were totally vegetated by coniferous (*Pinus*) and deciduous woodland during the early and middle Flandrian respectively. This contrast strongly with earlier beliefs that the downland grasslands were a natural plant community. Unlike the early ideas such as those of Wooldridge and Linton (1933) that the downlands were created by Neolithic man arriving in Britain and clearing the less dense downland vegetation, it has been shown that a general asynchroneity of vegetation deforestation occurred. Neolithic clearance may certainly have been more widespread in the central Wessex area, but on the chalk areas peripheral to this central activity, local shifting clearances have been illustrated (Tomalin and Scaife 1979, Scaife 1980). More extensive clearances have been shown to have taken place during the Bronze Age for both pollen data and from molluscan work in Kent; of Kerney (1963) Kerney et al 1964, Bell (1982) and Thomas (1982) in Sussex illustrating the environmental changes from dry valley colluvial fills and from archaeological contexts. These phases of clearance apparently occurred at differing times from the Neolithic onwards. Pollen data are similarly commensurate with this, showing middle Bronze Age clearance in Sussex (Thorley 1971, 1981) and later Bronze Age at Winchester (Waton 1982). In the Isle of Wight, on the basis of pollen analyses of peats (Scaife 1980, 1982) and those data given here from Apes Down and Gallibury Down, clearance had occurred by the early Bronze Age.

CONCLUSIONS

Data from these two sources in relative spatial proximity but in differing geomorphological and topographical aspects have been presented. Although pollen from Gallibury Down was preserved largely by the presence of a clay capping to the chalk, the environmental interpretation must be considered as representative of the downland flora at this time (i.e. early Bronze Age). Both sites seem to illustrate a markedly pastoral aspect, but some minor differences may be noted. The pollen spectra from the Apes Down valley are typical of those discussed by Dimbleby (Dimbleby and Evans 1974) in that high percentages of Pteridium aquilinum are present. As noted, Dimbleby (Dimbleby and Evans 1974) has postulated a pastoral cause for these. Such evidence is not , however, present for the high downland crest of Gallibury Down. At the limits of speculation it might be suggested that if such a pastoral cause was responsible then the dry valley might have proffered a differing pastoral environment to the high ridge. Alternatively, the absence is purely negative evidence upon which assumptions as to such activities are entirely hypothetical and which surely relate to stochastic or natural ecological factors affecting floral distribution. Any anthropogenic delimitations must therefore remain enigmatic without further analyses from other adjacent barrows.

In the Apes Down sequence, it has been noted that some arboreal pollen does occur albeit in diminutive quantities. It is, however, relevant that even small quantities of Tilia were recorded. Although the woodland appeared to be absent on the high downland it has been shown (Scaife 1980, 1982 and Scaife in Tomalin and Scaife 1979) that Tilia (along with Ilex) remained the most important arboreal taxa growing on the Lower Greensand derived soils of the Island,only being cleared later in the Bronze Age. This clearance has been C^{14} dated at Bohemia Bog at 2910 bp and at Borthwood Farm at 3280 ± 80 (Scaife 1980).Representation of Tilia might therefore be derived from these lowland sources. A single grain of Tilia was noted from the clay overburden of the barrow and could therefore be of any age or origin. The pollen spectra presented here therefore show a strongly pastoral aspect for this region of the chalk downs which existed during the early Bronze Age.

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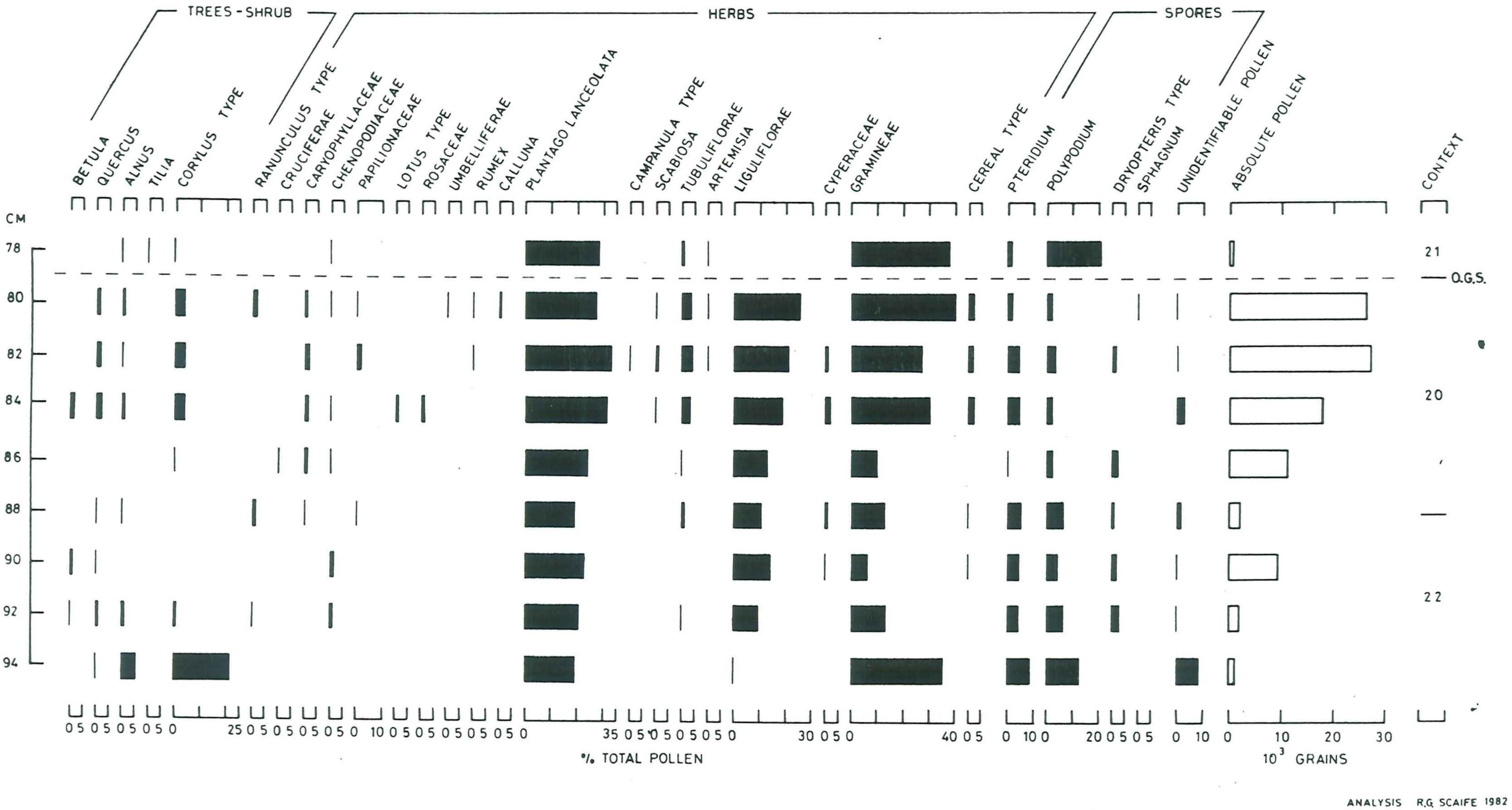
TREES - SHRUB
HERBS
SPORES
BETULA
QUERCUS
ALNUS
TILIA
CORYLUS TYPE
RANUNCULUS TYPE
CRUCIFERAE
CARYOPHYLLACEAE
CHENOPODIACEAE
PAPILIONACEAE
LOTUS TYPE
ROSACEAE
UMBELLIFERAE
RUMEX
CALLUNA
PLANTAGO LANCEOLATA
CAMPANULA TYPE
SCABIOSA
TUBULIFLORAE
ARTEMISIA
LIGULIFLORAE
CYPERACEAE
GRAMINEAE
CEREAL TYPE
PTERIDIUM
POLYPODIUM
DRYOPTERIS TYPE
SPHAGNUM
UNIDENTIFIABLE POLLEN
ABSOLUTE POLLEN
CONTEXT
CM
78
80
82
84
86
88
90
92
94
21
O.G.S.
20
22
% TOTAL POLLEN
10^3 GRAINS
ANALYSIS R.G. SCAIFE 1982

	Perc.		count
Betula.	2.7	% Total Pollen.	4
Pinus.	0.7		I
Ulmus.	0.7		I
Quercus.	2.0		3
Tilia.	0.7		I
Alnus.	I.3		2
Coryloid.	2.7		4
Calluna.	0.7		I
Cruciferae Undiff.	0.7		I
Sinapis Type.	2.0		3
Papilionaceae Undiff.	0.7		I
Convolvulus	0.7		I
Plantago lanceolata.	6.7		IO
Compositae Undiff.	9.3		I4
Taraxacum Type.	50.7		76
Anthemis Type.	0.7		I
Artemisia.	0.7		I
Cyperaceae.	0.7		I
Gramineae.	I5.4		23
Cereal Type.	0.7		I
Pteridium.	39.3	% Total pollen + Spores.	I03
Filicales Undiff.	3.4		9
Unidentified pollen.	I2.3	% Total pollen + Unident. pollen	
Derived spore?	0.7		
Total pollen.	I50 grains.		
Total spores.	II2 spores.		
Total unidentified.	2I grains.		

TABLE 1 Pollen analysis of Apes Down ring ditch.

GALLIBURY DOWN, ISLE OF WIGHT

Depth	78		80		82		84	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Betula	-	-	-	-	-	-	3	1.4
Pinus	-	-	2	0.6	1	0.5	1	0.5
Alnus	1	3.4	2	0.6	1	0.5	2	0.9
Quercus	-	-	3	0.9	3	1.4	4	1.9
Tilia	1	3.4	-	-	-	-	-	-
Corylus	1	3.4	12	3.6	8	3.7	8	3.7
Calluna	-	-	2	0.6	-	-	-	-
Gramineae	8	27.6	120	36.1	54	24.8	60	27.9
Cereal type	-	-	6	1.8	3	1.4	4	1.9
Cyperaceae	-	-	-	-	2	0.9	3	1.4
Anthemis T	1	3.4	7	2.1	4	1.8	6	2.8
Artemisia	1	3.4	1	0.3	1	0.5	-	-
Bidens T	1	3.4	4	1.2	4	1.8	-	-
Tubuliflorae	3	10.2	12	3.6	9	4.1	6	2.8
Liguliflorae	-	-	51	15.4	42	19.3	37	17.2
Caryophyllaceae undiff	-	-	2	0.6	3	1.4	2	0.9
Campanula T	-	-	-	-	1	0.5	-	-
Chenopodiaceae	1	3.4	1	0.3	-	-	1	0.5
Sinapis T	-	-	-	-	-	-	-	-
Leguminosae undiff	-	-	1	0.3	3	1.4	-	-
Lotus T	-	-	-	-	-	-	2	0.9
Plantago lanceolata	6	20.7	82	24.7	66	30.3	62	28.8
Rosaceae undiff	-	-	-	-	-	-	1	0.5
Ranunculus	-	-	5	1.5	-	-	-	-
Rumex T	-	-	1	0.3	1	0.5	-	-
Scabiosa	-	-	1	0.3	2	0.9	1	0.5
Umbelliferae	-	-	1	0.3	-	-	-	-
Unidentified/degraded			1		1		5	
Polypodium	6	20.7	6	1.8	7	3.2	8	3.7
Pteridium	2	6.9	22	6.6	9	4.1	10	4.7
Dryopteris T	-	-	-	-	3	1.4	-	-
Sphagnum undiff			1					
Total	29	100.0	332	100.0	218	100.0	215	100.0

TABLE 2 Pollen analysis of Newbarn/Gallibury Down.

SALLIBURY DOWN, ISLE OF WIGHT

Depth	86		88		90		92		94	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Betula	-	-	-	-	1	0.9	-	-	-	-
Pinus	-	-	1	0.9	2	1.8	1	0.9	-	-
Alnus	-	-	1	0.9	-	-	2	1.8	2	4.5
Quercus		-	1	0.9	1	0.9	2	1.8	1	2.3
Tilia	-	-	-	-	-	-	-	-	-	-
Corylus	1	0.9	-	-	2	1.8	2	1.8	8	18.2
Calluna	-	-	-	-	1	0.9	-	-	-	-
Gramineae	20	18.0	26	23.2	13	11.9	27	23.9	13	29.5
Cereal type	-	-	1	0.9	1	0.9	-	-	-	-
Cyperaceae	-	-	2	1.8	1	0.9	-	-	2	4.5
Anthemis T	1	0.9	2	1.8	-	-	1	0.9	-	-
Artemisia	-	-	-	-	-	-	-	-	-	-
Bidens T	-	-	-	-	-	-	-	-	-	-
Tubuliflorae	1	0.9	2	1.8	3	2.7	1	0.9		
Liguliflorae	26	23.4	21	18.8	28	25.7	19	16.8	1	2.3
Caryophyllaceae undiff	2	1.8	1	0.9	-	-	-	-	-	-
Campanula T	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae	1	0.9	-	-	2	1.8	2	1.8	-	-
Sinapis T	1	0.9	-	-	-	-	-	-	-	-
Leguminosae undiff	-	-	1	0.9	-	-	-	-	-	-
Lotus T	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	48	43.2	38	33.9	45	41.3	41	36.3	7	15.9
Rosaceae undiff	-	-	-	-	-	-	-	-	-	-
Ranunculus	-	-	2	1.8	-	-	1	0.9	-	-
Rumex T	-	-	-	-	-	-	-	-	-	-
Scabiosa	-	-	-	-	-	-	-	-	-	-
Umbelliferae	-	-	-	-	-	-	-	-	-	-
Unidentified/degraded	-		3		1		1		3	
Polypodium	5	4.5	7	6.3	5	4.6	7	6.2	6	13.6
Pteridium	1	0.9	6	5.4	5	4.6	5	4.4	4	9.1
Dryopteris T	5	4.5	2	1.8	2	1.8	3	2.7	-	-
Sphagnum undiff										
Total	111	100.0	112	100.0	109	100.0	113	100.0	44	100.0