Notes and News

THE LANDSCAPE CONTEXT OF MEDIEVAL SETTLEMENT ON THE SOUTH-WESTERN MOORS OF ENGLAND. RECENT PALAEOENVIRONMENTAL EVIDENCE FROM BODMIN MOOR AND DARTMOOR (Figs. 1–5)

The medieval settlements of the south-western moors of England have been the subject of archaeological interest for many years. Survey, excavations and interpretative work on both Bodmin Moor[1] and Dartmoor[2] have resulted in a significant expansion in our knowledge of the nature and extent of settlement and agriculture in the medieval period. Unfortunately, this has not been paralleled by palaeoenvironmental studies of the post-prehistoric upland environment, with most recent efforts on Dartmoor concentrating on the early Holocene.[3] The situation is even worse for Bodmin Moor with no published pollen diagrams since those produced by Walker[4] in connection with the excavation of medieval features in the St Neot parish.[5] The following issues therefore remain inadequately addressed for these moorland areas. What is the general nature of the late prehistoric and early historic land-use and how far has this moulded the subsequent medieval landscapes? What is the timing of medieval activity in these upland regions given the pollen analytical and radiocarbon data, and how far is this in accord with general archaeological theories and evidence? Recent work on both Bodmin Moor and Dartmoor goes some way towards tackling these questions, providing evidence of both the environmental context of settlement in 11th- to 14th-centuries A.D. and the timing and effect of this settlement on the upland environment. This paper reports on some aspects of the environmental context of late medieval settlement. It illustrates the potential for further studies and highlights some of the problems linked to palaeoenvironmental study of the later Holocene and its application to archaeological questions.

SAMPLING SITES AND THE LOCAL ARCHAEOLOGICAL CONTEXT

A problem of palaeoenvironmental study on both moors is the long history of anthropogenic exploitation of peat resources.[6] Most of the significant areas of deeper peat on Dartmoor have been tin streamed, cut for peat, or both. The situation is even worse on Bodmin Moor, due to the lack of blanket bog that characterizes the central area of Dartmoor. Palaeoenvironmental study is therefore restricted to those areas where suitable deposits can be located. The sites discussed in this paper were selected on the basis of the local archaeological contexts as part of projects to assess the impact of human communities during the Holocene on Bodmin Moor[7] and Dartmoor.[8] The sites where a medieval phase of activity can be demonstrated with radiometric age estimates are included here. Figure 1 shows the location of the moorland areas and the study sites.

BODMIN MOOR

Rough Tor

The Rough Tor area is characterized by extensive field and long house settlements. Excavations have taken place at Garrow (2 km to the S.) and the landscape context of medieval settlement at Brown Willy (1 km to the E.) has been investigated by Herring.[9]

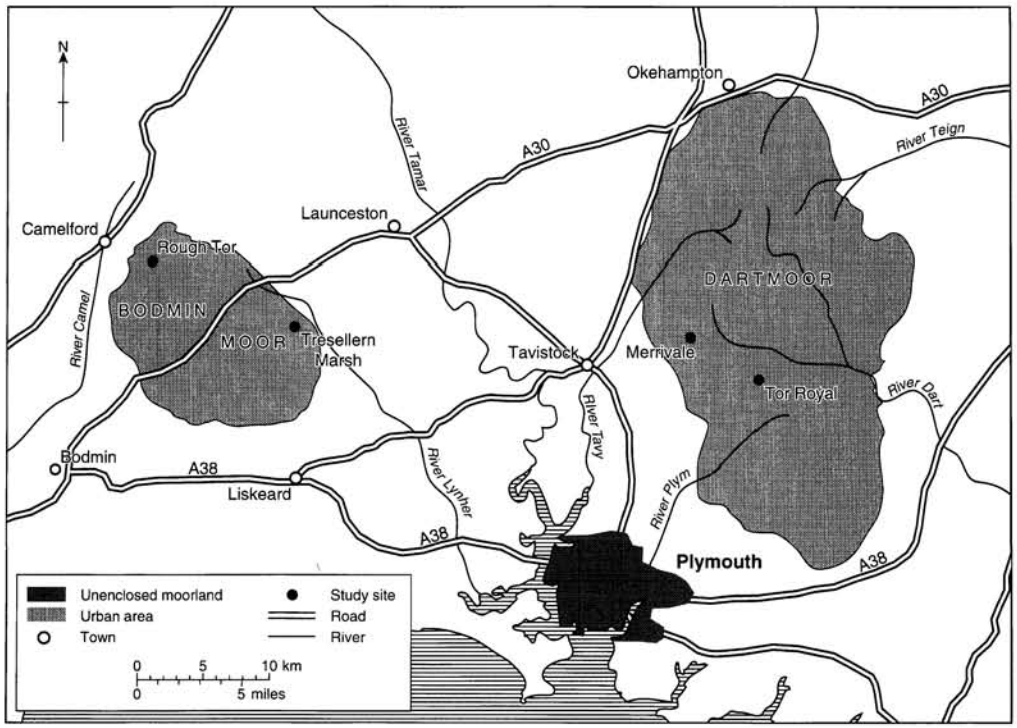

FIG. 1
Location of main upland areas in SW. England and location of study areas on Bodmin Moor and Dartmoor

Peat formation is patchy aside from Rough Tor Marsh itself, which has been extensively disturbed by tin streaming and peat cutting,[10] but several small deposits have formed in association with spring lines on the lower slopes of Rough Tor. A sampling site was selected from one of these, just below postulated post-prehistoric transhumance huts and adjacent to a medieval droveway.[11]

Tresellern Marsh

There is much evidence of medieval settlement in the Withey Brook valley, including the village at Trewortha and the settlement at Withem Brook adjacent to the mire. Although there is abundant evidence of peat cutting in the valley, apparently intact deposits remain in some locations and there is no evidence of tin streaming at the western end of the mire. A core was taken from one of these areas near to the northern edge of the mire to improve the chances of identifying agricultural activity in the nearby fields.

DARTMOOR

Merrivale

The Merrivale site is a small flush-fed mire in the upper reaches of the Walkham catchment, western Dartmoor. As with Rough Tor north, the small size of the deposit and the surrounding catchment topography suggests that the site has a relatively small pollen catchment area[12] and should therefore be sensitive to local vegetation changes. An archaeological hiatus of over 1000 years is present in the high moorland areas with no

settlement features which convincingly date to the period between the postulated Iron Age enclosure at nearby White Tor[13] and the early medieval period. The first evidence for settlement in the upper Merrivale area is most probably at Shillapark Farm, which displays a classic curvilinear cornditch and has buildings orientated downslope — a characteristic of virtually all of the medieval longhouses in the vicinity.[14] The most prominent features in this section of the R. Walkham are the well preserved remains of structures related to tin processing activities, which date from perhaps the mid-12th century A.D. The most northerly of these tin processing sites has been the subject of archaeological excavation which has dated the complex as operational during the 16th–17th centuries.[15]

Tor Royal

Tor Royal is an extensive ombrotrophic (i.e. rain-fed) mire and is presently a designated Site of Special Scientific Interest for its botanical and peatland value. The nature and size of the sedimentary system means that an essentially regional pollen signal is recorded in the sequence.[16] Documentary evidence in the form of stannery rolls suggests tin working at the nearby Whiteworks mine 1 km SW. from 1180. This activity was associated with field systems of a likely late medieval date on the eastern edge of Foxtor Mires. A tin smelting house was in operation somewhat later at Batchelors Hall from 1798–1804,[17] N. of the sampling site.

METHODS

The deposits were sampled using monolith tins for exposed faces (Rough Tor) and Russian corers for the deeper mire sites (Tresellern, Merrivale, Tor Royal). The sequences from Rough Tor, Tresellern Marsh and Merrivale consisted of well humified peat with no recognizable plant remains except for rootlets and some sedge and *Calluna* fragments. The Tor Royal core consisted of *Sphagnum* peat with lenses of sedge peat, trending into well humified peat towards the base. Samples were stored in plastic tubes, sealed with plastic film and stored at 4°C prior to analysis. Pollen samples were extracted at 50 mm or 100 mm intervals and prepared using standard chemical procedures including H.F. treatment for samples containing significant amounts of inorganic matter.[18] A count of at least 300 total land pollen grains was made, although at some sampled levels poor pollen concentrations meant lower counts were obtained. The diagrams were zoned on the basis of pollen stratigraphical changes. Samples for radiocarbon dating were taken on the basis of these changes and submitted to Beta Analytic, Glasgow University Research and Reactor Centre via English Heritage or the Natural Environment Research Council Radiocarbon Laboratory. Table 1 gives the results of the radiocarbon dating. Calibrated ranges were calculated using the maximum intercept method of Stuiver and Reimer[19] with end points rounded out to ten years in the form recommended by Mook.[20]

Pollen diagrams showing selected taxa are presented with calibrated radiocarbon dates. All the profiles covered the prehistoric period to a greater or lesser extent, and these periods will be discussed briefly to establish the context of later events. Fuller discussion of the earlier environmental evidence and its relationship to the archaeological sequences is published elsewhere.[21]

RESULTS

Rough Tor

The Rough Tor monolith diagram (Fig. 2) opens in the 5th millennium B.C. The lowest zone records the presence of *Corylus avellana* (hazel) — *Alnus glutinosa* (alder) scrub, with *Salix* (willow) and *Quercus* (oak) also present. The first evidence of significant human activity occurs at the opening of zone RTN2, dated to 780–385 cal. B.C. This transition records an expansion in grassland at the expense of the local tree and shrub cover, a

TABLE 1

RADIOCARBON DATES FROM ROUGH TOR, TRESELLERN MARSH, TOR ROYAL AND MERRIVALE REFERRED TO IN THIS PAPER

Sampling site depth-cm (lab code)	*Radiocarbon date Yrs BP (±1σ)*	*Calibrated age BC/AD (±2σ)*
Rough Tor		
10–15 (GU-5609)	modern	n/a
27.5–32.5 (GU-5610)	770±50	A.D. 1170–1290
47.5–52.5 (Beta-78541)	1840±40	A.D. 45–380
57.5–62.5 (Beta-78542)	2430±60	780–385 B.C.
70–77 (GU-5612)	5600±80	4670–4340 B.C.
Tresellern Marsh		
10–20 (Beta-84823)	990±80	A.D. 890–1225
25–35 (Beta-84824)	1830±70	A.D. 100–265 & A.D. 290–320
40–50 (Beta-84825)	2880±60	1130–940 B.C.
Merrivale		
95–96 (Beta-97050)	1040±60	A.D. 820–1035
100–104 (Beta-93819)	2230±60	395–140 B.C.
Tor Royal		
80–100 (SRR-5715)	840±95	A.D. 1030–1285
150–170 (SRR-5716)	1460±45	A.D. 540–660
230–250 (SRR-5717)	2240±45	395–180 B.C.
366–380 (Beta-93822)	3700±90	2390–1780 B.C.

process which continues into RTN3 with the appearance and expansion of a more diverse range of open ground indicators including Lactuceae (a group containing many grassland plants), *Plantago* spp. (plantains), *Potentilla*-type (probably referable to tormentil in this context), and *Centaurea nigra* (black knapweed). These changes begin after cal. A.D. 45–380. There were probably some areas of *Alnus* and *Corylus* still present during this zone, but *Quercus* has disappeared. This meadow-like flora is maintained until cal. A.D. 1170–1290, when falls in *Corylus* and *Alnus* and an expansion in Poaceae (grasses) indicate increased pressure on the local land resource. The record of cereal pollen at this point demonstrates that arable agriculture was being practised nearby. The final zone records a decline in species diversity and the spread of grassland with few herb types aside from *Potentilla*-type present in the local vegetation.

Tresellern Marsh

This diagram (Fig. 3) records the presence of dense alder carr on the surface of the mire, clearance of which begins some time prior to 1130–940 cal. B.C. Intensification of anthropogenic activity in TMA3, during the Romano-British period, resulted in the almost complete demise of tree and shrub cover, when grassland appears to have reached its maximum extent. This is followed by an apparent reduction in activity marked by slight increases in *Quercus* and *Betula* (birch) woodland and a fall in *Plantago lanceolata*. *Alnus* also seems to have recovered which, alongside a fall in Poaceae and the disappearance of *Succisa* (devil's bit scabious) and *Potentilla*-type, suggests some regeneration of alder and a reduction in open areas on the mire surface. This is followed by a re-expansion in *Plantago lanceolata* at cal. A.D. 890–1225, with other herb types also recorded — *Rumex acetosa* (common sorrel), *Galium*-type (bedstraw family), Chenopodiaceae (goosefoot family) and Cereal-type — albeit in small quantities. These pollen types indicate the presence of both pastoral habitats and arable land in the vicinity of the sampling site. This period also saw the demise of the remaining stands of oak woodland, although the expansion in ruderal and grassland

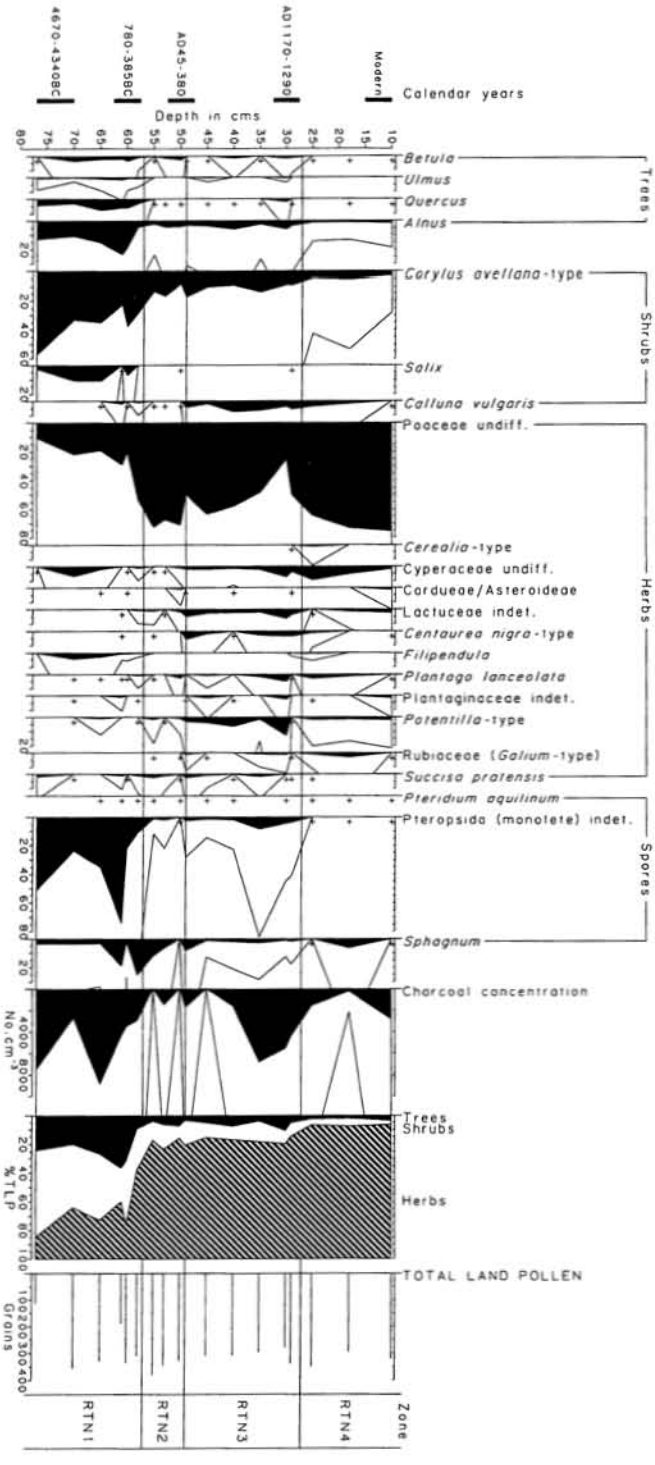

FIG. 2

Percentage pollen diagram for selected taxa from Rough Tor, Bodmin Moor. All percentages calculated as % total land pollen. '+' indicates the value is less than 1%

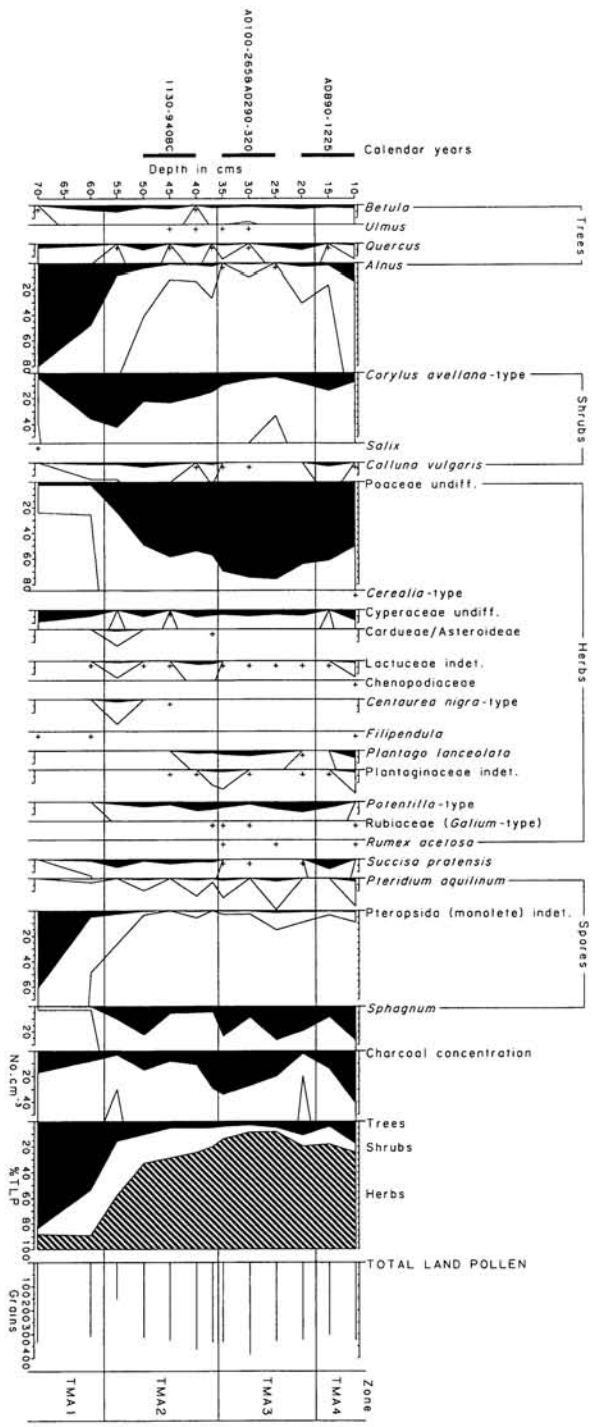

FIG. 3

Percentage pollen diagram for selected taxa from Tresellern Marsh, Bodmin Moor. All percentages calculated as % total land pollen. '+' indicates the value is less than 1%

habitats was probably as much a result of the renewed exploitation of previously cleared land as of the opening up of undisturbed, woodland habitats. The full context of this episode is missing as the sequence is unfortunately curtailed above this point, probably through peat cutting. In addition the resolution of the radiocarbon dates is poor so age estimates for particular events should be regarded cautiously.

Merrivale

The Merrivale pollen diagram (Fig. 4) opens sometime prior to 5000 B.C. given the significant expansion of *Alnus* at 1.25 m, a well dated chronozone apparent in many pollen diagrams from NW. Europe.[22] At this time there is evidence for increased disturbance to the woodland canopy, with the appearance of grass species and associated herbs including *Plantago lanceolata*, *Potentilla*-type and *Rumex* species. However, the compressed nature of the sediments in the lower zones means that the later Neolithic/Bronze Age periods are poorly resolved in the diagram.

Anthropogenic activity is recorded from the opening of MVLP3, where a fall in *Alnus* and *Corylus* is paralleled by a rise in Poaceae and the beginning of a sustained *Plantago lanceolata* curve. The opening of this zone at 1.10 m is undated, but the date of 400–110 cal. B.C. from 1.00 m suggests a late second or early first millennium B.C. period of activity. Some *Salix* and *Alnus* probably remained near to the sampling site, perhaps forming a carr community. The maintenance of a *Plantago lanceolata* curve suggests that the quality of the local sward remained good. In addition, *Calluna vulgaris* (heather/ling) values remain only low, although this may be a function of the poor pollen dispersal capabilities of ericaceous plants more remote from the sampling site.[23]

During MVL4Pa, dated to cal. A.D. 820–1030, the landscape was characterized by sparse *Corylus* scrub with a ground flora characterized by *Calluna*, *Filipendula* (meadow sweet), *Potentilla*-type, *Lotus* (bird's foot trefoil), Rubiaceae and *Succisa*, suggesting an acidic grassland community. There is little change in the nature of this community during the early medieval phase but the most significant facet of the landscape at this time is the sudden and sustained reduction of *Alnus* coincident with a peak in the representation of microscopic charcoal.

There is some woodland re-colonization recorded in MVLP5, but the surrounding area seems to have consisted mainly of low species diversity grassland. The upper zones are undated but working on an age-depth correlation, the appearance of cereal pollen at 0.35 m almost certainly relates to arable agriculture in the 17th century, possibly at the nearby Shillapark farm. Final destruction of local *Alnus* woodlnd occurs in MVLP6, and a primarily pastoral landscape is recorded with increases for *Rumex acetosa* (common sorrel).

Tor Royal

Most of the Tor Royal pollen diagram (Fig. 5) covers the early Holocene period and is described in detail elsewhere.[24] Only sediments post-dating 2000 B.C. are considered here. The Bronze Age is characterized by a mixture of environments including heathland, woodland and some grassland. Increases in *Plantago lanceolata* and other herbs in TR4 suggest expansion of pastoral habitats in this period.

The continued presence of disturbed acid grassland communities also characterizes the moorland environment across the Iron Age and Romano-British periods into the Dark Ages, with an intensification of land use from TR5 (395–180 cal. B.C.). There may be some reduction in land use pressure in the Dark Ages with a decrease in *Plantago lanceoloata* and Poaceae, but hazel scrub is decreasing and grassland increasing by the start of the medieval period.

The medieval landscape around Tor Royal is characterized by acid grassland consisting of *Rumex* species, *Potentilla*-type, *Plantago lanceolata* and various members of the Asteraceae (daisy) family. After cal. A.D. 1050–1285, the rise in the cereal pollen curve illustrates the cultivation of arable fields and thus the spread of local settlement in the

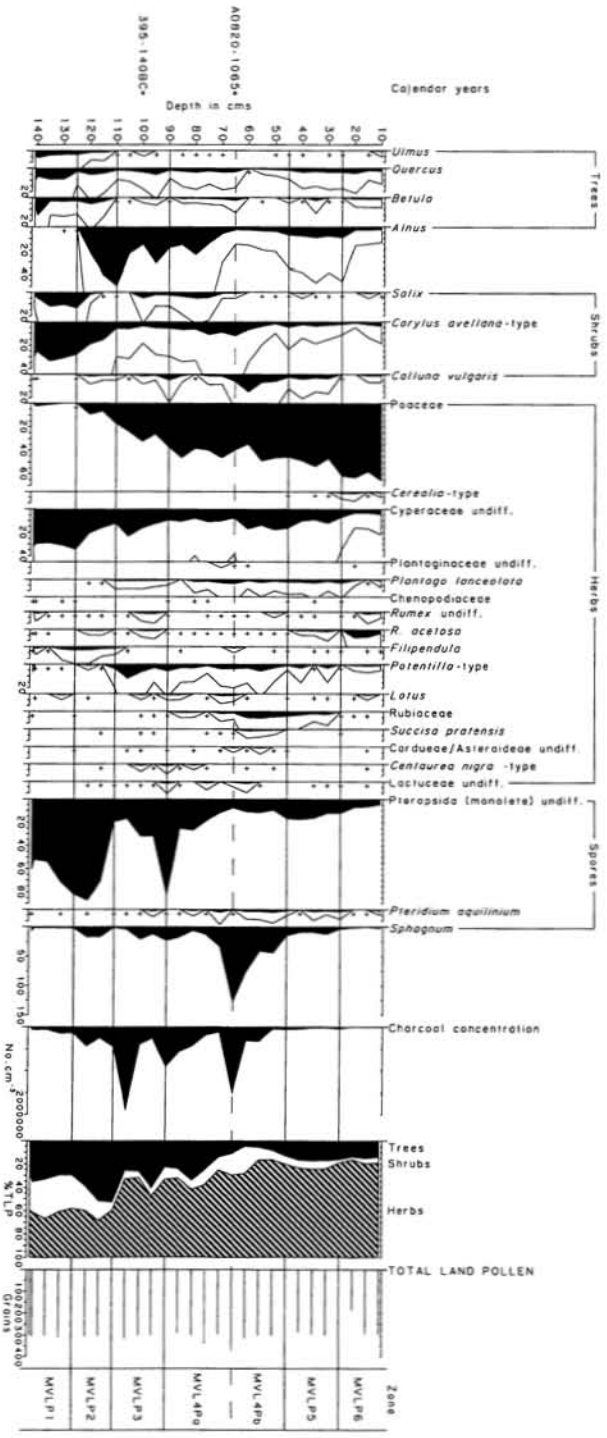

FIG. 4

Percentage pollen diagram for selected taxa from Merrivale, Dartmoor. All percentages calculated as % total land pollen. '+' indicates the value is less than 1%

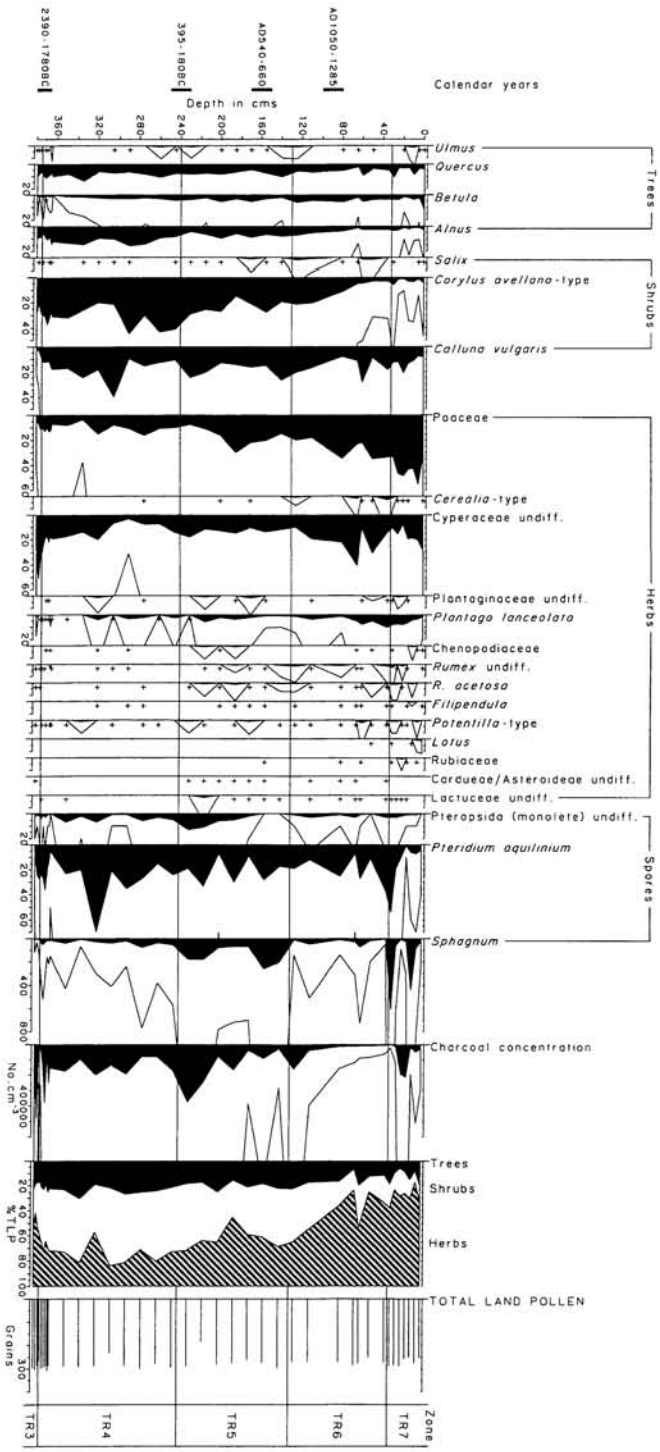

FIG. 5

Percentage pollen diagram for selected taxa from Tor Royal, Dartmoor. All percentages calculated as % total land pollen. '+' indicates the value is less than 1%

immediate locality. The most recent samples display pollen spectra characteristic of the present moorland community with little, if any, woodland cover.

DISCUSSION

The palaeological sequences provide a corpus of information on the development of upland landscapes in the later Holocene. These data can be used to address issues arising from the interpretation of the archaeological database, although this must be approached with caution where archaeological sequences are largely undated. The following discussion is split into two main sections. The first considers the environmental context of late prehistoric through to early medieval anthropogenic activity, and the second is concerned with the effect of late medieval settlement on this environment.

Early medieval environments

There has been a certain amount of debate over the possibility of pre-1200 A.D. settlement on Dartmoor,[25] with a recent paper stating that previous identification of long sequences of occupation on Dartmoor were based on archaeological evidence that was largely 'illusory'.[26] There has been less discussion of this question for Bodmin Moor, although place name evidence has been interpreted as showing that pastoral land-use of the moor began before the seventh century A.D.[27] Herring has also argued persuasively that both the rough huts in the Rough Tor area of the moor and the place name evidence suggest that a transhumance system may have been in place as early as 1000 B.C. and continued through until A.D. 1000,[28] but points out that there is presently no toponymical, documentary or archaeological evidence to support this.

The pollen data shed some light on the question of pre-13th-century activity on both uplands; all the diagrams record anthropogenic activity in the vicinity of the sampling sites prior to the late medieval phase of settlement. On Dartmoor, at Tor Royal, the beginning of a *Plantago lanceolata* curve and decreases in tree and shrub pollen are recorded as continuing through the first millennium B.C., with a possible hiatus in 5th–7th centuries A.D. prior to a resumption in activity and continued expansion in Poaceae and maintenance of the *Calluna vulgaris* curve. This suggests the increasing presence of grass-dominated heathland, with *Potentilla*-type, *Rumex* species and *Plantago* also significant as part of a disturbed acidic grassland flora.[29] A similar picture is evident at Merrivale with increases in *P. lanceolata* and falls in arboreal pollen percentages continuing from the first millennium B.C. until the marked intensification of activity in the 9th century A.D.

A clear picture of the nature of the upland vegetation in the pre-12th- to 14th-century context is provided by the Rough Tor sequence. Anthropogenic activity in the Romano-British period led to the development of a species rich grassland at Rough Tor. This grassland, represented in zone RTN3, seems to have been floristically very similar to 'old meadow' communities such as the *Cynosurus cristatus-Centaurea nigra* grassland[30] maintained by a low input, traditional management regime that would have involved light grazing and perhaps the removal of a hay crop. In the context of the suggested field evidence for transhumance, the pollen record from this site points to the existence of a grassland that is typical of a vegetation community that would be expected to develop and be maintained by such a low-input system of land use. This began sometime between the 1st–4th centuries A.D., was maintained for about 1000 years, and remained in place until late medieval settlement of the uplands made this system redundant. Documentary evidence records the significance of moorland grazing areas later in this period. The Domesday book records that the manors on the granite of Bodmin Moor — Hamathethy, Halvana and Draynes — had extensive areas of pasture attached to them,[31] areas which were most probably on the moor. The extent of pasture land recorded for Hamathethy, which included the Rough Tor Moors, is five leagues by two. The length of the Domesday league is unclear but may have been 1.3–1.5 km,[32] suggesting an extensive area of moorland was used by this manor alone. The palaeoecological record clearly shows that pastoral use of the moorland at this

time was a development of land use that had its genesis in the later prehistoric period. The Tresellern data are less clear due to lower resolution and dating imprecision but more intensive grazing that at Rough Tor is indicated by the abundance of Poaceae, *Plantago lanceolata* and *Potentilla*-type throughout the Romano-British and early medieval periods.

The character of the early medieval activity that is evident in the Dartmoor diagrams can be explained in a similar way to that proposed for Rough Tor, as a result of a seasonal system of land-use that began in later prehistoric times and was maintained until widespread settlement spread onto the uplands in the 12th to 14th centuries. Recent re-consideration of the archaeological evidence by Quinell[33] supports the model presented here, with the upland regions utilized as a grazing resource from the later prehistoric period until the early medieval peirod, with pastoral activity preventing the large scale regeneration of woodland.[34]

The palynological signal of permanent settlement as opposed to seasonal or sporadic land-use cannot be readily discerned, but the evidence for continuing management of the upland landscape does not preclude the possibility that some settlements were occupied on the uplands in this period. Whether these were temporary herdsmen's shelters or more permanent structures can only be clarified by further excavation. Aside from sporadic occurrences of cereal pollen at Tor Royal there is no reason to believe that there was cultivation on the moors on any significant scale prior to the 13th century. There was certainly some form of a human presence on both uplands as the continuation of a *Plantago lanceolata* curve demonstrates, with the evidence for the maintenance of grass-dominated areas and inhibition of significant tree and shrub regeneration over a number of centuries indicating this was not only occasional activity, and may have been almost as intensive as late medieval land use in certain localities.

This persistence of limited areas of woodland from the first millennium B.C. through until the 12th to 14th centuries A.D. with no detectable large-scale increase or decrease in area, suggests that there was a delicate equilibrium between exploitation of the land-resource and the 'natural' environment, with woodland possibly being carefully husbanded on the uplands. The records of cereal pollen in pre-12th-century contexts represent either long range transport from the lowlands or short lived and small scale experiments in the cultivation of the upland.[35] Potential evidence for early tinning around Merrivale[36]suggests that industrial activity may also be seen as a component of the exploitation of the uplands in the early medieval context.

Late medieval landscape contexts: settlement and cultivation on the uplands

The environmental impact of the 'high tide' of late medieval settlement phases are clearly recorded in all four diagrams (RTN3–4; TMA4; TR6–7; MVL4–6) in the form of reductions in tree and shrub pollen and increases in grass and ruderal herbs. Arboreal pollen percentages fall to their lowest levels for the diagrams during the late medieval period, reflecting the final demise of 'natural' woodland communities on both of the uplands. The most unequivocal evidence of the permanent settlements is indicated by the appearance of cereal pollen. Cereal pollen does not disperse well as, with the exception of *Secale* (rye), cereals are self-pollinating.[37] The identification of cereal pollen is thus critical in defining the advent of the longhouse settlements and the cultivation of arable fields. This event horizon is dated to between cal. A.D. 1050–1280 at Tor Royal, cal. A.D. 1170–1290 at Rough Tor north and around cal. A.D. 890–1225 in the Withey Brook valley. Although the equivalent horizon is not so well dated at Merrivale, on the basis of extrapolation of radiocarbon chronology cereals may not have been cultivated here until the 17th century.

Recent assessments of the field evidence for Dartmoor[38] and Bodmin Moor[39] have concluded that it is unlikely that the majority of the upland settlements were established before 1200–1250, and thus well within the above calibrated ranges for the pollen evidence that reflects this event-horizon. This has also been recorded in the other pollen diagrams from Dartmoor that cover this period, although few of these diagrams have dates for this

event itself. Austin *et al.*[40] recorded cereal pollen and a flora characteristic of arable environments at Okehampton Park from cal. A.D. 1250–1280. Austin and Walker's[41] diagram from Hound Tor dated late medieval arable activity from cal. A.D. 1220 with cereal pollen including *Avena* (oats) and *Secale*, with the decline in this episode of cultivation estimated to have occurred around 1300–1310. Maguire *et al.*[42] recorded substantial quantities of cereal pollen in their diagram from Holne Moor. They estimated that the cultivation phase occurred between 1100–1350 although this was not dated directly.

The reductions in *Alnus* alongside high concentrations of charcoal apparent in the Merrivale diagram in MVL4Pb probably mark the beginning of local tinworking activities in the Walkham catchment, which may have begun as early as the 9th century.[43] The timber from *Alnus* is noted as being one of the finest for the production of charcoal[44] and reduced levels of this species in pollen diagrams have been tentatively linked to smelting activity in other parts of the south-western peninsula.[45] There is no evidence of cultivation at this time. The appearance of cereal pollen at Tor Royal in TR6 probably reflects the activities of tinners at Whiteworks to the S., since there is documentary evidence that this site was in operation since the late 11th century.[46] The demise of *Corylus* at this time indicates the clearance of remaining areas of scrub for fuel and building purposes and also the suppression of re-growth by increased grazing intensities. The Rough Tor moors were intensively utilized in the late medieval period, with settlement at Brown Willy and ridge and furrow cultivation at Rough Tor and on the SE. slopes of Louden Hill. Considering the restricted dispersal capacity of cereal pollen, the record of cereal pollen in RTN3 probably reflects cultivation at the latter site. The single record of cereal pollen at Tresellern Marsh and increases in herbs at the top of the final zone must relate to the establishment of fields in the Withey Brook valley, but the sequence is truncated just at the point where this begins. There are no other dates available for this event horizon on Bodmin Moor. Walker[47] found that the colonization of the St Neot area was reflected in a surge in arable and pastoral indicators in the late 12th to early 13th century, but this date was derived from extrapolation from radiocarbon dates above and below the event itself in the pollen diagram.

Other pollen data on land use alteration in the late medieval period cannot be so easily related to settlement *per se* but it is probable that the changes in pastoral management were associated with this; they all suggest an intensification of grazing, resulting in changes such as the loss of meadow vegetation at Rough Tor. The location of the sampling site at Rough Tor next to a droveway would also have made the local vegetation particularly susceptible to the effects of trampling by stock. The palaeoecological evidence for grazing on Rough Tor at this time is complemented by documentary evidence. Maclean[48] recounted that in 1288:

> Henry Cauvel took out a writ of disseizin against Hugh Peverell and David Wof of common pasture in Hamathethy, which he claimed as pertaining to his free tenement in Lauden (Louden). Henry did not appear and judgement was given for Hugh and David.

The *Plantago lanceolata* curve at Rough Tor begins to rise just below the dated horizon at the top of RTN3 and the appearance of cereal pollen, which alongside accompanying decreases in the *Corylus* curve points to steadily increasing anthropogenic activity in the decades immediately prior to the actual advent of local cultivation and the main settlement phase. This phenomenon is less clear in the Dartmoor diagrams. There is a suggestion of such a phase at Tor Royal, with declines in *Corylus* apparently beginning before the appearance of cereal pollen, although the response from *Plantago lanceolata* is not as clear as at Rough Tor. Upland settlement on both moors may have taken place in the context of an environment that had been more intensively utilized by human communities for some time prior to the actual colonization of the uplands in the 12th to 13th century. Further study is needed to elucidate whether this pattern holds for the rest of the moorland.

Although the pollen spectra corresponding to the late medieval period illustrate the cultivation of uplands, the importance of pastoral habitats at this time is clearly

demonstrated through the predominance of herbs typical of such environments. *Potentilla*-type and *Galium*-type, both of which are common in all the diagrams, are often associated with pastoral land. The former pollen type is probably refereable to *Potentilla erecta* (tormentil), a common species in damp, disturbed grassland habitats, where its flowering is greatly enhanced by grazing.[49] Members of the Lactuceae tribe are also well represented, a large group which includes many species typical of grassy and waste places. *Rumex acetosa* is present in both Dartmoor diagrams, but is not common in the Bodmin diagrams. *Rumex acetosa* is often seen as a pastoral indicator, and may represent deteriorating grazing conditions[50] or the development of acid pastures.[51] If these ecological interpretations are accepted, then a decline in the quality of the Dartmoor sward began around the same time around both sampling sites: *R. acetosa* is consistently recorded from 390–130 cal. B.C. at Tor Royal and 400–110 cal. B.C. at Merrivale. This process appears to culminate with the increased landscape pressure that accompanied local settlement and the cultivation of the uplands in the late medieval period.

Plantago lanceolata is the most frequently encountered herb in the medieval levels on both moors. This species has long been regarded as a pastoral indicator,[52] although it occurs in a range of habitats including rocky outcrops, wasteland, waysides and spoil heaps, as well as pasture and meadow.[53] There are inferential difficulties connected to interpreting fluctuations in herbs such as *Plantago lanceolata* as direct indicators of land-use intensities, particularly in the absence of a wide suite of ruderal herb types, which is a particular problem with the pollen record from Bodmin Moor.[54] The possible over-representation of certain pollen types both in terms of proximity to the sampling site and relative pollen productivities further complicates the interpretation of the palaeoecological record. Notwithstanding these considerations, the palaeoenvironmental records provide an illustration of the nature of the pastoral activity during the late medieval period. In comparison with the pollen data from post- and pre-medieval contexts, it is clear that the late medieval period was probably the most intensive in terms of land-use: the magnitude of the *P. lanceolata* peak in the Tor Royal diagram and also the Tresellern Marsh diagram are greater than those recorded in the prehistoric levels in these diagrams. This may be seen to be in broad agreement with Beckett's[55] hypothesis that, in contrast to the prehistoric period, pastoral activity was more intense than in the Bronze Age and that the late medieval period saw the most intensive use of the uplands than at any time before or since. This must be viewed alongside the comparatively subdued representation of *P. lanceolata* at Rough Tor and Merrivale, which may represent the effects of differing grazing regimes: intensive and extensive grazing may have different effects on the composition of the ground flora.[56]

PALAEOENVIRONMENTAL RESEARCH ON THE SOUTH-WESTERN UPLANDS AND ITS APPLICATION TO ISSUES OF MEDIEVAL ARCHAEOLOGY

This paper has sought to demonstrate some of the problems and potential connected with utilizing paleoenvironmental evidence in the absence of archaeological excavation, in order to address some of the issues regarding medieval settlement on the south-western uplands. As the Tresellern Marsh sequence illustrates, many of the valley deposits have been cut for peat, even where there is no field evidence for this. This does not always affect earlier sediments, leading to the somewhat ironic situation that the prehistoric period is better represented than the medieval in the palaeoenvironmental record, whereas the reverse is true for the archaeological remains.

Smaller peatland areas at the edge of valleys or associated with spring lines are less likely to have been cut or streamed, but these deposits can have their own problems in terms of slow sediment accumulation rates hampering the temporal resolution of the pollen record. However, where they do exist and are not affected by such factors, this type of deposit can provide the best information in relation to the local archaeological sequences. For raised bog and larger valley mire sequences such as Tor Royal and Tresellern Marsh,

the nature of the sampling sites means that the palaeoecological picture of the landscape is far more 'generalised' and it is often not possible to expand much on terms such as 'predominantly pastoral landscape' in the interpretation of the pollen record. Smaller deposits such as those from Merrivale and Rough Tor demonstrate that the more specific components of this generally open grassland environment would have included a range of landscape contexts including acid grassland, heathland and meadow, as well as localized patches of woodland. These vegetation communities were formed and maintained by the exploitation of the uplands over a timescale that began as early as the Neolithic in some areas, yet were disrupted within a relatively short space of time by the impact of late medieval settlements and farming. Certainly the time from the 1st millennium B.C. through to the early medieval should be seen as an extended period of pastoral land use of the uplands in some locations, developing into an organized systems of controlled grazing and hay meadow management. Although there is some evidence for slackening of pressure in the Dark Ages, pastoral land use remained universal and quite intensive in some areas. Land use pressure was apparently already increasing in the earlier medieval period prior to the main phase of settlement and arable cultivation.

It is not possible to use radiocarbon dates to identify the precise timing of environmental change and there is always the danger of 'suck in and smear' effects[57] when independent dating evidence is available, such as in the form of pottery. In the absence of excavation it becomes even more difficult to focus specifically on problems of the timing of upland settlement. In future investigations, a problem oriented approach might be the best tactic, with consideration given to precisely what information a given deposit may provide in relation to the archaeological context under investigation, with close sampling intervals and a comprehensive radiocarbon dating program using accelerator mass spectrometry (AMS) to overcome some of the problems of temporal resolution and sample depth. The debate between Austin and Walker[58] and Beresford[59] over the nature of settlement at Hound Tor on Dartmoor highlights that even where both excavated contexts and pollen data are available, interpretation of the respective data sets does not necessarily become any more straightforward.

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A BRONZE SOCKETED MOUNT AND BLADE FROM SHAPWICK HOUSE, SOMERSET (Fig. 6, Pls. X, XI)

Work over a number of years has documented a complex sequence of post-Dissolution and post-medieval transformations of the gardens and parkland landscape around Shapwick House on the northern flank of the Polden Hills in Somerset.[1] Excavations and fieldwork show how a medieval moated manor house site of the abbots of Glastonbury Abbey and its surroundings were modified according to the tastes of its post-Dissolution owners to create the open parkland seen today.[2]

From the 8th century until the Dissolution, Shapwick was part of the estates of Glastonbury Abbey.[3] A survey of 1327 describes the demesne manor house as a 'Court with barton . . . the garden contains 5 acres'[4] and excavations in 1994 partially uncovered medieval structures and confirmed the alignment of the moat and the location of the great medieval barn. Standing-building recording has identified a surviving first-floor hall whose roof was erected soon after 1489, with a chamber over the E. wing and a detached kitchen to the W. which was roofed *c.*1430.[5] This evidence can be correlated with the description in Abbot Beere's terrier of 1515 which mentions a 'hall, chamber, storeroom, kitchen, stable, garden and barton inside the moat'.[6] The overall impression is of an administrative and agricultural centre dedicated to garnering the resources on which the power and wealth of a major abbey like Glastonbury depended. These links were reinforced through ecclesiastical ties at the two successive church sites.

The immediate post-Dissolution ownership of the manor is complex.[7] The house was substantially re-organized in the early 17th century, probably by Sir (later Lord Chief Justice) Henry Rolle (1589?–1656) who also seems to have cleared away the buildings obstructing the view to the N. of the house and deposited the demolition rubble in the moat.[8] Finds of Merida-type red micaceous ware, 'Malling' jug, Cistercian ware and German stonewares confirm the date for the moat infilling as 1620–40 and hint at a family of fashionable taste, wealth and good contacts. Appropriately, Rolle's new terraced garden