ABSTRACT

Pollen sample populations from an archaeological site beside Tatton Mere were collected for the purpose of identifying paleoenvironmental conditions occurring before, during and subsequent to its Early Mesolithic occupation. Recovery of pollen spectra typical of the Atlantic Period in deposits which contained the Mesolithic archaeological record, as well as other information, prompted reassessment of the site’s depositional history. It became evident that the Mesolithic artifacts had been deflated from their original position and now rested upon and below the surface of the elluviated B Zone of a paleosol. The pollen the samples contain has most probably been downwashed to its present position from the soil surface established some time in the past 1500 years.

The landuse history of the township that includes this site has been reconstructed on the basis of historical sources (Higham 1986b). Some time ago, I proposed a method for reconstructing landuse histories on the basis of pollen records recovered from archaeological sites (Schoenwetter 1990). Application of that method to the palynological record from the site at Tatton Mere yields an independent interpretation of landuse changes that closely parallels the reconstruction based on documentary sources. This outcome suggests the method may also be applied to non-site terrestrial locales, and should be a useful way to elaborate and extend landuse
INTRODUCTION

Palynological evidence of the role of cultural behavior in shaping the development of vegetative environments is traditionally recognized through interpretation of "anthropogenic indicator" pollen types (Behere 1981,1986). And, normally, the spectra incorporating these types are components of stratified pollen sequences recovered from cores collected at lacustrine or bog sites, or from sediment columns collected from exposed profiles at terrestrial sites. Though this approach is highly successful -- especially when coordinated with archaeobotanical and geological information -- it has three drawbacks.

First, because each pollen sample recovered from a core or column must represent a unique point in time, it is impossible to assess synchronic variability in the pollen rains represented by the spectra. As a result, the assumption that the pollen spectrum of a sediment sample is indeed representative of the pollen rain of the time cannot be tested. Second, precise dating of such samples is difficult. Chronological control is usually achieved through sample associations with radiocarbon dates and estimates of uniform deposition rates. When the research question is the character of human impacts which occurred in more recent periods of prehistory, or in historic times, the accuracy and precision of dates of this sort will often accommodate equifinal interpretations. Third, the cores and sample columns are usually recovered from locales devoid of independent evidence of human behavior. Though archaeological
sites are defined by the existence of evidence of cultural activity, and it is reasonable to expect that the range of forms of evidence of human behavior would be greater and more strongly expressed at archaeological sites than elsewhere, palynological analysis of archaeological site-context deposits are more rarely undertaken.

Pollen records from archaeological site-context deposits are often considered poor sources of information on vegetation change because they typically contain pollen that is more poorly preserved, and their spectra can be dramatically affected by cultural behavior. Behaviors that influence spectrum characteristics may mask the natural "background" pollen frequencies that reflect vegetation patterns or may mimic background pollen frequencies that did not in fact occur. But pollen records that are directly associated with the archaeological record are thereby directly associated with whatever evidence of vegetation patterns and cultural impacts on that vegetation that may be identifiable through analyses of the architecture, artifacts, faunal remains and other aspects of the archaeological record. Such associations can provide valuable clues to proper interpretation of the pollen spectra it seems unwise to ignore.

Some time ago, I proposed a method of pollen analysis that would address these problems (Schoenwetter 1990). Application of this method requires recovery of populations of samples from the deposits occurring at archaeological sites. The direct association of such samples with geoarchaeological and cultural evidence allows them to be dated with the same degree of accuracy and precision as the archaeological record, and analysis of populations of samples of equivalent age allows recognition of such synchronic variability as may exist. The temporal control offered by their archaeological associations, and information on the relative stratigraphic position of the
samples, allows identification of sequential change in very precisely dated populations of pollen spectra. The method assumes that since the source of the pollen samples is an archaeological site, populations of ostensibly contemporary spectra probably reflect both the “background” pollen rain produced by local vegetation and the impact of cultural activities on that rain. This assumption supports assessment of variation in the relative and absolute frequency values for pollen types amongst such populations.

Both practical experience and theoretical understanding of the processes by which pollen is produced, dispersed and preserved suggest that the pollen frequency values representing the “background” pollen rain lie within statistical parameters at any given time. Thus the frequency values of the “background” pollen types in a population of contemporary samples can be expected to evidence a low degree of variability. Alternatively, the pollen frequency values of anthropogenic pollen types, or the frequency values of “background” pollen types affected by cultural activity, can be expected to evidence a high degree of variability in a population of contemporary samples. For example, the frequency of Cerealia pollen would expectably differ significantly in samples recovered from the basal fill of a storage pit, a midden deposit, the earthen floor of a dwelling, and the excrement of a privy even if all were the same antiquity. Analyses of populations of ostensibly contemporary samples from a site, then, should allow recognition of the pollen types with low degrees of intra-population variability as components of the “background” pollen rain and identification of the pollen types with statistically significant intra-population variability as components of the “cultural” pollen rain.

Most archaeological sites offer opportunity for recovery of suites of non-
contemporary samples as well as suites of ostensibly contemporary samples. Though
the archaeological record may provide evidence of only a single occupation, deposits
formed both prior to and subsequent to that occupation may be sampled. And if the
archaeological record provides evidence of successive multiple occupations, deposits
attributable to each one, and the deposits formed during intervals between occupations,
will each yield populations of ostensibly contemporary samples. Any archaeological
site, then, can be sampled in a way which allows identification of sequent pollen spectra
populations, called “pollen groups” (Schoenwetter 1990), and allows recognition of the
ways that the frequencies of pollen types representing the background and the cultural
components of local pollen rains have changed over the course of time. Interpretations
are based on sequential changes in the averaged relative pollen frequency values
(Schoenwetter and Limon 1982, Schoenwetter 1990) and the averaged absolute pollen
frequency values (Schoenwetter 1996, Schoenwetter and Hohmann 1997) of the pollen
groups. The method provides evidence that can be interpreted in terms of either
ecosystem changes or landuse histories, depending on other available information.

This method evolved as a product of studies of pollen records from 19th and
20th century archaeological sites. Two questions such data could not address were (A)
whether or not the method could be applied to reveal ecosystem histories and landuse
histories at non-site locales, and (B) whether or not the method could document human
impact events significantly earlier than the 19th century. Opportunity arose to evaluate
a palynological study of a Cheshire locality in those terms. Though the sampling
strategy had been designed to explore very different concerns, the resulting data
suggests that application of this method of pollen analysis may yield credible landuse
THE SAMPLED LOCALE (FIG.1)

Tatton Park, Cheshire, is a public recreational facility under the custody of the National Trust and Cheshire County Council. During the course of studies of the archaeological record of Old Tatton Village (Higham 1982, 1983, 1986b, n.d.; Higham
and Cane, in press) archaeologists were directed to a locale adjacent to a bathing
beach at Tatton Mere where erosion of the sandy bank had exposed an *in situ*
concentration of Mesolithic flints. The artifacts lay upon and just beneath the
uncomformable surface of a silvery-gray sand superimposed by roughly a meter of red
sand overburden.

Sediment samples collected in 1982 from a column at Square 155 (Fig. 2) proved
sufficiently poliniferous to justify further research. During the 1983 season, the
excavators recovered populations of samples from positions above, at and below the
surface on which the artifacts lay, and collected a population of samples from a
pitfeature at the same stratigraphic level as the Mesolithic occupation. The object of
this sampling strategy was recovery of populations of pollen records large enough to
allow assessment of the paleoenvironmental context of the associated artifacts, as well
as paleoenvironmental conditions predating and postdating the episode of Mesolithic
occupation.

Analysis of roughly half of these samples identified pollen spectra typical of the
Atlantic Period. Some samples incorporated cereal pollen and other anthropogenic
indicator pollen types. This suggested the pollen records were younger than the
associated early Mesolithic artifacts, and prompted re-evaluation of the stratigraphy and
site formation processes at the locale, aided by a single radiocarbon date for the red
sand superimposed on the Mesolithic assemblage. The artifact assemblage seems to
have been deflated, intact, from its original position at the surface of a forest soil profile
to its present position on the surface of the eluviated (B) zone of that soil. When the
deflation occurred cannot be precisely reconstructed, but the local archaeological
record, a local Holocene mire pollen sequence (Chambers and Whilshaw 1991), and pollen sequences from other meres in northern Cheshire (Schoenwetter 1982a,b, Twigger 1983, Oldfield et al.1985 ) suggest regional soil erosion was a product of late prehistoric, Romano-British or post-Roman agricultural practices. In any case, a thick bed of aeolian red sand blanketed the Mesolithic assemblage and infilled an adjacent pitfeature sometime after 1500 B.P. The surface of the red sand unit was ultimately stabilized by vegetation and the processes normal to soil formation were reestablished. Physical evidence of those processes was destroyed, however, when subsequent use of the locale for crop production mixed the A and B soil horizons in a zone of plough-disturbed soil in the upper 30 cm of the profile.

Clearly, the sampled deposits are younger than the associated artifacts, and pollen study cannot prove informative about Mesolithic Period paleoenvironments. The samples are poliniferous, however, and very little of the pollen they contain is so damaged that identification is affected. Also, statistically significant differences in pollen spectrum characteristics occur in stratigraphically superimposed samples (Fig.2), which suggests the existence of a pollen sequence.

According to Dimbleby (1986), such a sequence could be the consequence of vegetational changes occurring at the site since pollen began to be downwashed from the surface of the soil established at the time the red sand unit was stabilized by vegetation. Normally, investigation of such a pollen sequence would be considered unprofitable because of poor chronological control. After all, the date the surface of the red sand became stabilized is not securely known, and the site-context deposit samples were not collected in a fashion which allows their relative stratigraphic positions to be
expressed precisely. Thus even if a pollen sequence was identifiable on acceptable 
grounds, the sequence could as easily represent a short as a long interval of time. 
Interpretation of the sequence in terms of successive vegetation change would therefor 
be unjustified or, at best, remain a hypothesis which might or might not prove testable. 

However, investigation is defensible in this case. Higham (1986a) has presented 
a well-documented reconstruction of landuse changes at what is now Tatton Park since 
Norman times on the basis of historical records. Since this work provides a detailed 
reconstruction of the characteristics and sequence of vegetation changes occurring at 
the Tatton Mere archaeological locality, the degree to which an independent 
palynologically-based reconstruction of landuse changes at Tatton Mere matches 
that based on historical evidence constitutes a test of the method I have proposed 
(Schoenwetter 1990). It also tests the appropriateness of applying the method to 
terrestrial deposits that are not datable through association with radiocarbon dates or 
datable archaeological records.

THE PALYNOLOGICAL RECORD

Since logistical constraints placed limits on the number of samples that could be 
analyzed, pollen extracts were prepared for only 26 of the 43 samples collected from 
the artifact-rich area of the site. Members of the archaeological team collected samples 
as excavation proceeded, with concern that they should be representative of the site's 
depositional units and artifactual contexts. Site excavation was horizontally controlled 
by one meter square units and vertical position was recorded in terms of both arbitrary 
intervals ("spits" or "levels") and depositional contexts. These controls were also used 
for the pollen samples, thus assuring that whatever the archaeological record of any
specific excavation unit might be, there was an associated sediment sample representing the same horizontal and vertical location. The units were stripped in 10cm vertical increments, subdivided by deposit type if that was necessary. The relative stratigraphic positions and depositional environments of the samples were thus determinable from the square and spit data that accompanied them.
Figures 2 and 3 illustrate, respectively, the pollen spectra of the vertical column samples collected at square 155 and the spectra of the samples collected in excavation units. Two of the spectra of Figure 3 were collected from the same spit in the same square (Samples 9 and 11) and two others (Samples 40 and 41) were recovered from the deposits infilling stakeholes of the same pit feature. Each member of these pairs contains a pollen spectrum likely to be the exact contemporary of the other. As illustrated by the upper section of Figure 4, there is no statistically significant difference between the members of these pairs. However, statistically significant differences consistently occur between the spectra of pairs of samples collected from stratigraphically superimposed spits in the same square (Samples 31 and 29, 5 and 36 and 16 and 22) or from different depositional contexts that occur at the same depth.
(Samples 26 and 42), as illustrated on the lower section of Figure 4. The simplest explanation for these patterns is that the spectra represent pollen rains trapped at different times.

If similar spectra identify a type of pollen rain trapped at the same time, and differences between spectra identify pollen rains trapped at different times, the pollen record characteristics that distinguish groups of samples can be used to recognize changes in the pollen rains trapped at different times. Since the relative stratigraphic position of each spectrum is known, the relative temporal order of such pollen spectra groups may be easily identified.¹

**DISCUSSION**

¹ Since the successive order of the pollen groups can be identified by their positions in the pollen sequence, and their distinctive characteristics interpreted as reflections of successive pollen rain changes, there is a tendency to consider the pollen groups as homologues of the zones or subzones of a traditional pollen sequence. It is normally advisable to resist this thought, however, for a number of reasons. First, each sample was deliberately collected to represent the pollen record of the specific excavation unit from which it was collected, normally a volume of 0.10 cubic meters. If the strategy was successful, as suggested by the statistical equivalence of pollen records from the same excavation unit, the spectrum of any given sample is the homogenized expression of a number of sequential pollen rains, rather than the reflection of a single pollen rain. The individual spectra of a pollen group of such samples, then, are not logical equivalents of the sort of sequential, but temporally unique, pollen spectra of a traditional pollen sequence. Second, the characteristics that distinguish a pollen group from previous or subsequent groups are identified by the mathematically averaged values of the pollen frequencies of the members of the group (Schoenwetter 1990:288-9). The characteristics that distinguish the members of a zone or subzone in a traditional pollen sequence are usually time-dependent patterns in the waxing and waning of frequency values for a series of pollen taxa, and the relationship of their curves to those of other pollen taxa whose frequency values wax and wane on other stratigraphic horizons. Average pollen frequencies have very little importance in a traditional pollen analysis. Third, temporal gaps are more likely to exist in a pollen sequence which is identified as a succession of pollen groups, and palynological expression of the periods of time that separate the groups is obscured by emphasis on the average similarities and differences of the spectra that make up a group. This is not much of a problem when the analysis is directed towards reconstruction of the character of land use changes effected over the course of a few decades or centuries. But such gaps are definite disadvantages when the analysis is directed towards reconstruction of the character of vegetation changes which took place over
periods of time measurable in millennia.
<table>
<thead>
<tr>
<th>Pollen Group</th>
<th>TLP</th>
<th>AP : Corylus : NAP</th>
<th>Quercus</th>
<th>Ulmus</th>
<th>Tilia</th>
<th>Fagus</th>
<th>Alnus</th>
<th>Salix</th>
<th>Cyperaceae</th>
<th>Poaceae</th>
<th>Cactaceae</th>
<th>Cerealia</th>
<th>Disturbed Ground</th>
<th>Indiges (Chenopodiaceae &amp; Plantago Major)</th>
<th>Liguliflorae</th>
<th>Other NAP</th>
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<td>1</td>
<td>847</td>
<td>16.5 : 3.3 : 80.2</td>
<td>12.7</td>
<td>1.4</td>
<td>0.1</td>
<td>1.2</td>
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<td>43.0</td>
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<td>30.6 : 11.1 : 58.3</td>
<td>21.4</td>
<td>1.3</td>
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<td></td>
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<td>3.4</td>
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<td>33.9 : 18.8 : 47.3</td>
<td>22.2</td>
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<td>5</td>
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<td>15.2</td>
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<tr>
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<td>1.4</td>
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Table 1: Average pollen frequency values for the pollen groups.
Tatton Mere pollen spectra can be organized into the nine pollen groups whose average pollen frequency values are expressed on Table 1. Some spectra of the Square 155 series are sufficiently similar to some from the other series for inclusion in the same pollen groups. Biostratigraphic correlation of the two series is thus effected.

The most ancient pollen group, Group 9, is represented in samples 29, 37 and 36. All were collected at the base of the illuviated portion of the B zone in the glacio-fluvial sand, within mottled sand or root casts. This assemblage is best characterized by the ways in which it contrasts strongly with Group 8, represented by the spectra of two samples collected just above the boundary between the eluviated (silver-gray) and the illuviated (glacio-fluvial sand) deposits of an ancient (presumably Mesolithic Period) paleosol. Samples 32 and 33 contain significantly more *Tilia* and *Calluna* pollen and significantly less *Quercus* pollen.

The succeeding pollen assemblage (Group 7), represented in samples 31 and 26 from the eluviated sand and sample 22, from pitfeature fill, is characterized by very low NAP values, by reduced values for *Tilia*, and an increase in the *Quercus* frequency.

The next youngest assemblage (Group 6) is represented by the 90cm depth sample from square 155, pitfeature fill sample 42, and pitfeature stakehole samples 40 and 41. Increased NAP, the consistent occurrence of small quantities of *Tilia* and *Ulmus* pollen, a significant quantity of Cerealia pollen, and significant increases in Liguliflorae and various herbaceous pollen types characterize this pollen assemblage.

The next youngest pollen assemblage (Group 5) is identified from the records of samples 16, 9, 11, 7 and 5 from the redeposited red sand deposit. It is distinguished by a major increase in the average *Ulmus* and *Calluna* pollen frequencies. Pollen records
of the 70 and 80cm depth samples from locus 155 identify the subsequent assemblage (Group 4). It is differentiated from the pollen group which immediately precedes it by lower frequencies of *Ulmus* pollen, loss of *Salix* pollen from the record, and higher frequencies of *Alnus* pollen. It is distinguished from the succeeding assemblage (Group 3) by lower frequencies for *Quercus* pollen and higher values for *Corylus* and *Calluna* pollen.

Pollen group 3 is identified from the spectra of the 60, 50 and 40cm levels at locus 155. A significant rise in the average *Quercus* pollen frequency accounts for most of the change in the AP: *Corylus* ratio, and *Tilia* pollen makes its last appearance in the sequence. The following pollen assemblage (Group 2) was recognized from the samples collected at 30 and 20 cm depths at locus 155. It is characterized by further reduction in the *Corylus* pollen frequency and a surge in the frequency value for Liguliflorae pollen. The final pollen assemblage of the sequence (Group 1) is represented in the 10cm sample from locus 155. Severe reductions in both AP and *Corylus* values characterize this assemblage along with a major increase in Poaceae pollen, reduced Liguliflorae pollen values and local overrepresentation of Labitae pollen.

The spectra and the pollen groups have a decidedly Atlantic period character, and cannot be correlated with any of the phases of the Holocene pollen sequence recognized by Chambers and Wilshaw. The youngest phase of their sequence, dated subsequent to the 16th century on the basis of recovery of hemp pollen at 64cm depth (Chambers and Wilshaw 1991:27), however, provides palynological evidence for the presence of an open landscape exploited by grazing and crop production. A similar interpretation can be offered for the time period represented by pollen groups 5 through
1, since NAP values increase from about 40% to about 80% in both sequences. In the mereside site sequence, though, almost all of this increase is accounted for by grass pollen, while grass pollen only increases by 10% in the parallel pollen sequence from the mire.

Given the free-draining character of both the red sand deposit and the eluviated gray-silver sand deposit, and the probability that the aeolian formation of the former allowed little opportunity for entrapment of pollen as deposition proceeded, it seems very unlikely that any of the pollen observed in these samples has great antiquity. Pollen falling on the surface of the red sand deposit most likely contributed to the soil formation processes which ultimately allowed that surface to be stabilized by vegetation. From that date (apparently not earlier than Roman or Romano-British times), further soil development and pollen downwash invested subsequent pollen rains to ever deeper levels in the red sand and gray sand units and contributed to the degradation and destruction of any pollen retained in the gray sand and glacio-fluvial sand units since the erosion interval. In all probability, the reason that the deposits are poliniferous despite a depositional environment that normally discourages pollen preservation is that the oldest pollen they contain is less than one to one and one half millennia old.

LANDUSE HISTORY OF THE TATTON MERE LOCALITY

Higham's studies of Tatton township, and especially his analysis of the archaeological evidence of Mesolithic, Neolithic, Bronze Age, Iron Age, Roman, and Saxon occupations (Higham 1983, n.d.), provide a sound basis for identification of landuse changes at the site at Tatton mere. To place his reconstructions in perspective, some discussion of the geography of Tatton township is in order.
The western two-thirds of Tatton township occupies a portion of a northwest-to-southeast trending low sand and gravel ridge south of the River Bollin, but the eastern third, flanking Moberley Stream, is lower in elevation and supports clayey soils. Tatton Mere, and the River Liley which drains it, effectively bisects the township along a north-south axis. Tatton Mere is one of a series of meres in lowland Cheshire that occupy basins in the glacial till underlain by salsiferous rocks which are undergoing solution weathering. Tatton Mere was probably formed when collapse of an underground solution cavern provided a sink within the drainageway. The mere is known to have been naturally enlarged in medieval times and further enlarged artificially in the 19th century. Since its management as a recreational park was begun, a minor watercourse has been dammed to enlarge the mere further to provide a bathing area for children. Erosion of the eastern shore is ongoing.

Because the former are more easily farmed (Higham 1986b), the distribution of sandy and clayey soils in the township effectively defined the distribution of arable land and wooded land, respectively, prior to and during the medieval period. The soil along the eastern margin of the mere today is sandy, but the soils on both shores of the mere probably had a high clay content before enlargement and erosion. When the red sand was deposited and stabilized by vegetation, then, the Mesolithic site probably lay on a ridge, quite near the clayey soil bordering the mere.

A radiocarbon date on charcoal fragments associated with the Mesolithic flints (HAR 9206, 3270 + 90 B.P.) need not establish a terminus ante quem for the erosion of overlying soil and deflation of the archaeological record to eluviated subsoil, since the charcoal could have been incorporated in the upper levels of the soil lost to erosion and
deflated to that position -- especially if the locus was cleared and farmed significantly prior to Romano-British times. Higham (n.d.: V-3) argues that its place name suggests that settlement in Tatton township was maintained on land cleared for agriculture during Iron Age and Romano-British times. He further suggests that settlement was "arguably at a low level before the late [Norman] conquest period" because of the frequency of pockets of clayey terrain and "the frontier status of the Mersey region lying between the Kingdoms of Mercia and Northumbria from the 7th until the 10th centuries (Higham 1986b:2)".

Though no written sources document land ownership or landuse patterns prior to the Doomsday Book, place names, local topography and the character of the situation in 1066 suggest that parishes such as Rostherne (incorporating Tatton township and eleven other townships, or vills) had been "founded as small so-called minster churches under the patronage of Mercian kings, bishops or members of the local aristocracy, during the mid-to-late Saxon period (Higham n.d.: V-3)."

In 1086, Tatton township incorporated two manors which probably respected boundaries which existed in 1066 and for some period previous. Tatton was the larger, western, estate; Norshaw, in the northeastern quadrant of the township, was the smaller. In 1086 Tatton manor was sub-let to a radman of the free man Echebrant, a sub-tenant of William, Baron of Halton (Higham n.d: V-9). From it he drew the rents and services of his manorial tenants, including military service (Higham n.d.: V-10).

Higham suggests that population growth occurred at Tatton in the 12th and 13th centuries, during a period when the ill-documented processes of patronage allowed and
probably encouraged the emergence of sub-baronial vassals who were able to establish themselves as a significant local aristocracy who were eventually to become the forbears of Cheshire’s numerous gentry families (Higham n.d.:V-10).

In the last quarter of the 13th century, Richard, son of Sir William of Massey, inherited and purchased land in Tatton. Among the holdings he acquired in the northeastern quadrant of the township in 1286 was land previously granted to Mobberly Priory that included the right to enclose woodland east of Tatton Mere. This property had been open to pannage since the early part of the 13th century (Higham n.d.:V-15). In 1290, Richard sought permission of Edward I to move the principle road in Tatton Township ("Portstrete") so it might avoid property he wished to enclose to create a deer park (Higham n.d.:V-13). We also know that about 1300 an agreement between Sir Richard and William de Tabley, lord of Knutsford, confirmed the rights of both parties and their tenants to pannage in the woods of both manors, excepting Richard's new park (Higham 1986b:6). Apparently, the mereside locality sampled for pollen analysis lay in a part of the township which was not well populated or farmed in Norman times, within woodland used for pannage until 1300, when it was enclosed.

Sir Richard's deer park was maintained until at least the 15th century (Higham n.d.). Place names on a 1733 map of the Tatton estate, field boundary evidence from land transfer records, and plough marks "which betray the reverse 'S' shape characteristic of medieval ploughing (Higham n.d. V-18)" suggest the area of the Mesolithic site was a field used for mixed pasturage and farming when it was subsequently cleared. But by 1733 it lay on the boundary between fields named Marliff Meadow and Mare Coppy, which was almost certainly marked by a hedgerow at some
earlier time. Mare Coppy was adjacent to a large group of fields with coppy names, which together suggest a substantial area of coppiced woodland where the core of the old deer park once existed (Higham pers. comm. 1996). Between 1400 and 1730, then, after inclusion in the deer park the site seems to have been located in or near coppiced woodland, then buried beneath a hedgerow between agricultural fields.

The site area itself was put to the plough sometime before 1750, judging by surface indications of narrow ridges and furrows. Ploughing is also physically manifest at the site by the disturbed deposit which lies between 10cm and 30cm depth. The land was emparked in the mid-to-late eighteenth century, however, so utilized as pasture for two centuries by the Egerton family. Since inclusion in Tatton Park in 1950, the site area has been continuously grazed by both domestic cattle and wildlife.

Documentary evidence, the physical evidence of ploughing and a radiocarbon date and the site’s stratigraphy, then, suggest the following sequence of landuse changes at the mereside site locale:

Since the 1950’s the site at Tatton Mere has lain within the bounds of a recreational park under the joint control of the National Trust and Cheshire County Council. In addition to human pedestrian traffic, the park’s management accommodates grazing and occupation by both domestic livestock and red and fallow deer. Immediately prior to the modern park’s development the site lay within the pastureland created by emparkment in the mid- to late 18th century; prior to that date it was at least occasionally cultivated; and sometime prior to 1730 it lay beneath a hedgerow dividing two open fields.

As it is situated on the more easily tilled soil of the sandy ridge, one might
imagine that (possibly intermittent) cultivation of the locale extended back throughout the historic record and even well into its prehistory. But cultivation of this particular plot could only have been initiated in the 15th century. For two previous centuries it lay within the bounds of an enclosed deer park, and for some time prior to the late 12th century it probably lay within a wood exploited for forest resources.

Occupation of Tatton Park during the first quarter of the first millennium A.D. is evidenced by both the archaeological record revealed during excavations near Tatton Hall (Higham 1983, 1986b, n.d.) and radiocarbon dated pollen records analyzed by Chambers and Wilshaw (1991). It is not unlikely that the mereside locale was farmed at that time, and even during earlier Iron Age, Bronze Age and Neolithic times, but it is unlikely that evidence of such land-use would be preserved at this location. Any deposits or paleosols that developed at the locale after the glacio-fluvial sand was laid down seem to have been lost through erosion during the Roman or Romano-British periods of prehistory. The date of subsequent deposition of the red sand unit is not clear. Whenever it occurred, it infilled and buried such evidence of land-use as the pitfeature may suggest, but only the evidence for occupation of the district by farmers suggests that land-use at this site involved farming.

LANDUSE INTERPRETATIONS OF THE POLLEN SEQUENCE

The only pollen records with the potential to reflect environmental conditions occurring prior to the burial of the gray sand by redeposited red sand are those of Pollen Group 9, since they were collected from the base of the B zone of the soil that developed subsequent to Mesolithic occupation. Two pieces of information suggest that this is indeed the case: first, pollen preservation was significantly poorer in these
samples, as evidenced by both the frequency of damaged pollen grains and lower pollen concentration values. Second, though the mean \textit{AP:Corylus:NAP} ratio of Pollen Group 9 is statistically identical to that of Pollen Group 8, significant differences in \textit{Tilia} and Poaceae pollen frequencies suggest that the two groups reflect pollen rains likely to have been trapped at quite different times.

Average frequency values for Poaceae, Chenopodiaceae and Liguliflorae pollen in Pollen Group 9 are sufficient to support reconstruction of use of the site for pasture, while the arboreal and \textit{Corylus} pollen values suggest a lightly wooded local landscape with a significant shrub understory. It is reasonable to suggest that this pollen record reflects landuse at the site sometime subsequent to its Neolithic or Bronze Age clearance but prior to the erosion episode or deposition of the red sand unit. The situation represented by the average pollen frequencies of Pollen Group 8 is different. The features of this pollen group suggest a range of landuses: pasturage, fallowing, cereal production and woodlot grazing and cutting. Though \textit{Cerealia} pollen occurs, it is not accompanied by \textit{Chenopodium} or \textit{Plantago} pollen as indicators of local cultivation. Local farming is also counter indicated by the relatively high value for heath pollen, which suggests soil development on the site itself was probably not sufficiently advanced to allow normal yields. Fallow land near grazed woodland seems a likely interpretation.

Pollen Group 7 identifies an episode in the landuse sequence when the site was located in mature oak woodland, with an open hazel shrub understory and a mix of other deciduous trees nearer the mere. The site seems to have been significantly distant from either pasture or cultivated land, or even from a road or other source of
disturbed ground weeds. Such a woodland would not normally be recognized as a form of deliberate landuse, but historic records document the likely occurrence of a manorial game park at this locale from the late 13th to at least the 15th century A.D.

Significant increases in the proportions of NAP (mostly grass pollen) and Liguliflorae suggest that the frequency values of Pollen Group 6 represent use of the site for hay meadow and cereal production. Most of the reduction in arboreal pollen, however, is accounted for by a sharp decrease in the oak pollen frequency; no statistically significant change occurs in the average elm, lime, ash or alder frequency values between the deposition of the pollen rains represented by Pollen Groups 7 and 6. The Group 6 pollen record group thus suggests selective removal of mature oak trees from a wood quite near the site.

Loss of both basswood and ash pollen in the record for Pollen Group 5, and a significant decrease in the hazel pollen frequency, is essentially compensated by increases in the elm pollen value and the values of Plantago and Chenopodiaceae pollen. While farming activities that had the same affects on the pollen record as those indicated for Pollen Group 6 were continued at the site itself, uncleared woodland (probably on the heavier soil on the shore of the mere) and a hedgerow or some other source of coppiced elm also seem to have made contributions to the Group 5 pollen record.

Significant increases in the values for grass and Liguliflorae pollen suggest use of the site for hay meadow rather than cereal production at the time of deposition of Pollen Group 4. In addition to a further reduction in the oak pollen frequency, loss of willow pollen from the record and a marginal increase in the value of alder pollen may suggest
alteration of the nearby wood. The record is consistent with a change in the position of
the shore of Tatton Mere relative to that of the site, and continued harvesting of oak.

The principle distinctions between the records of Pollen Groups 4 and 3 are the
increased Quercus value and the decreased Corylus values in the latter. These
changes are consistent with conversion of site’s use from farming to continuously
grazed pasture. This pasture would have allowed livestock access to the mere and the
narrow wood that occupied its western shore, and grazing within the oak-alder woodlot
early in the growing season would have the observed effect on hazel pollen production.
Lack of change in the grass pollen value and minimal change in the values for
Liguliflorae and Tubuliflorae pollen suggest grazing continued through the growing
season. The increased oak pollen value may be only a response to lessened hazel
values, but the occurrence of very low frequencies of basswood and ash pollen suggest
the woodlot was recovering from prior human exploitation. The very significant increase
in Liguliflorae pollen that distinguishes Pollen Group 2 from Pollen Group 3 could be
interpreted as indicating the site was used for fertilized hay meadow production or as
wet pasturage. Here, it seems more likely that it reflects modification of the
management strategy applied to the land, with use of the pasture encompassing the site
limited to winter months and the earliest part of the growing season, rather than
throughout the year. Manure left on the pasture from May through August would create
the same rich habitat for weed development as fertilized hay meadow.

The sorts of palynological changes which distinguish Pollen Groups 2 and 1 are
consistent with a significant reduction in grazing pressure and further loss of mereside
woodland near the site. The marked increase in Labitae pollen, however, supports
argument that such grazing as occurred at the locality was continuous, since more palatable summer fodder (especially dandelion) was removed.

CONCLUSIONS

If the palynological interpretation Pollen Group 7 is accepted as corresponding to the late 13th - 15th century horizon of site use for Sir Richard's deer park, the landuse sequence suggested by Higham's analysis of available documents and that suggested by the changes in characteristic features of the pollen groups are too similar to be coincidental. The pollen record, in fact, amplifies the historic record in some ways. Higham's suggestion that population was low and landuse was not intensive at the time of the Norman Conquest is wholly consistent with the landuse interpretation for Pollen Group 8, and the palynological record for Pollen Group 6 seems independently to suggest the landuse indicated by 15th-16th century documentary evidence. As urban populations expanded in the 16th-17th centuries, increases in the market value of mature oak lumber could explain the sort of selective logging suggested by the Group 6 pollen record.

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**TABLES**

Table 1: Average pollen frequency values for the pollen groups

**FIGURES**

Figure 1: Locations of the excavations, mire cores and mesolithic site at Tatton Park
Figure 2: Pollen spectra of samples collected from the vertical profile at Square 155

Figure 3: Pollen spectra of samples collected at the mesolithic site.

Figure 4: Pollen spectra comparisons

TABLE CAPTION

Table I: Average pollen frequency values for the pollen groups.