Acta Palaeobot. 42(2): 177–184, 2002

When the Romans departed.... evidence of landscape change from Metchley Roman Fort, Edgbaston, Birmingham

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Received 6 June 2002; accepted for publication 24 October 2002

ABSTRACT. The ditch of a Roman fort provided a sequence of well-preserved pollen and some plant macrofossils. The results show that pioneer woodland and scrub with willow and hawthorn first spread over a previously occupied landscape. The woodland matured into ash and then into oak woodland replacing scrub, while the signs of human occupation became very faint. Then clearance of the oak woodland and the start of rye growing showed increased human activity, probably Saxon. There followed a change to holly wood, possibly as wood pasture, and cornflower appeared, probably in the medieval period. Finally, there was a general reduction of woodland, although beech became established, and an increase in open land, with hemp probably being grown. Such a find is highly unusual for a Roman ditch, and suggests that the ditch fill may represent quite a long period of deposition, revealing a sequence of local landscape changes in the Roman period and thereafter. This makes an interesting comparison to historical evidence, and to other evidence of regional landscape changes.

KEY WORDS: pollen, seeds, woodland regeneration, Roman, medieval

INTRODUCTION

Part of Birmingham university lies over the remains of the Roman Metchley Fort (see Fig. 1A). Excavations of this site were directed by Alex Jones of the Birmingham University Field Archaeology Unit in 1999 (Jones 1999), in advance of major redevelopment of the area. The results show that the fort was originally of 4 ha and built around A.D. 48 in the first phase of the Roman occupation, on a crossing of two main roads leading roughly north-south and east-west, and that there was a vicus, a civilian settlement occupied by traders and military camp followers. Later in the same century the fort was extended as shown by new boundary ditches (Fig. 1A), and may have changed to a store. After a further phase of military use, by the 2nd century, there was little military activity and the fort was abandoned by about A.D. 200 (Jones 1999).

During the excavations, suitable deposits for environmental archaeological evidence such as waterlogged and charred plant remains, insect remains and animal bones were searched for, but these were not very abundant except in one feature, a ditch with a fill of clay and sand together with some organic content.

A pollen monolith of 75 cm was collected by the writer from this ditch fill F308, going from the bottom of the ditch with clay and pebbles, up to a point where the fill was becoming rather dry with little apparent chance of useful preservation of plant remains. Two bulk samples were also collected by the archaeologists for analysis of the macrofossils, of layer 1722, (Fig. 1B), and from a different part of the ditch, layer 1741.

LABORATORY WORK, DATING

The pollen samples were processed using standard methods with fine filters to concentrate the size frac-

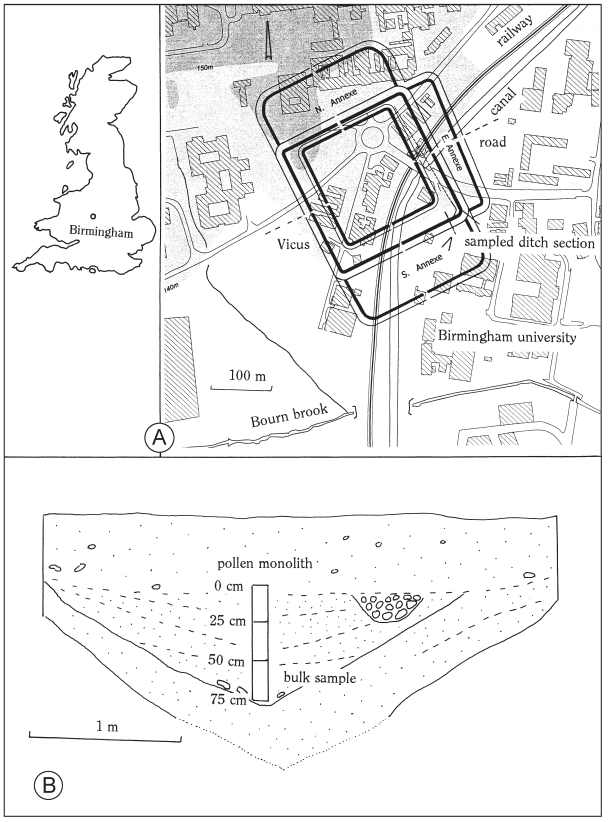

Fig. 1. Metchley Roman fort, Birmingham: **A** – map and plan of the various phases; **B** – sampled section of F308 ditch

tion of pollen. The finer organic part of the sample was concentrated by swirl separation on a shallow dish. Very fine material was removed by filtration on a 10µm mesh. The material was acetolysed to remove cellulose, stained with safranin and mounted on microscope slides in glycerol jelly. Counting was done with a Leitz Dialux microscope, and identifications were checked with the writer's pollen reference collection. Counts of between 225 and 430 grains were made in a pollen sum which excludes *Corylus* type, aquatic pollen and spores. The counts are considered sufficient for accuracy of the percentages, and one or two pollen slides were also scanned to accurately record the presence of rare taxa. This counting and scanning is considered to provide the maximum useful data for the amount of time spent. Standard reference works were used, notably Fægri and Iversen (1989) and Andrew (1984). The pollen diagram (Fig. 2) has been calculated and drawn using TILIA and TILIA.GRAPH (Grimm 1990). The pollen diagram has been arranged in ecological groups roughly in order of their appearance, and the pollen types are given in taxonomic order (Kent 1992) within the groups. A number of smaller and less ecologically informative pollen types, mainly of herbs, have been omitted for clarity.

The samples for plant macrofossils were prepared by being broken down in water, and the lighter, organic, fraction washed over to separate it from the inorganic material, and caught in a 300 µm sieve. The plant remains were identified using the writer's own reference collections. The results are listed in taxonomic order (Kent 1992) in Tab. 1.

The original phase of work which was funded by the developers of the site included the analysis of three pollen samples and one macrofossil sample. The other 19 pollen samples were analysed later, as the importance of the site became apparent.

The ditch fill was originally thought to represent the 2nd and 3rd centuries A.D. on the basis of the archaeological evidence (Jones, pers. comm.), but the pollen results were very different from those from other Roman ditches, and the presence of rye and cornflower pollen in the upper part suggested that a longer time span might be represented. It was therefore decided to obtain AMS radiocarbon dates from selected plant material from the monolith boxes, at the beginning and end of the sequence, and on the phase of renewed settlement in the middle. The organic content was so low that it was difficult to obtain enough suitable material from the pollen monoliths, but small pieces of charcoal were picked out, and also some *Sambucus nigra* seeds in the bottom sample at 73–75 cm. The results from the radiocarbon laboratory at the university of Waikato, New Zealand are given in Tab. 2.

RESULTS

The AMS radiocarbon date from the base of the sequence at 75–73 cm is 180 cal B.C. – cal A.D. 70, based on seeds of *Sambucus nigra*, is probably Roman in date (Tab. 2). This confirms the archaeological evidence.

The other two dates, from the middle and top of the sequence, were done with charcoal fragments. They are both older, and seem unlikely to represent the true age of the deposit. The most likely explanation is that coal, which was seen to be present in the uppermost sample, had contributed dead carbon to that collected for dating, such as in the form of carbon spheres which could be soot particles. It is possible that more radiocarbon dating samples can be extracted from the remaining monolith material in the future.

An indication of the dating of these Metchley deposits can be still be obtained from similar events recorded in radiocarbon dated pollen diagrams from Thetford, Cookley and Stafford, which cover the late prehistoric to the medieval period in detail (Greig in prep. a, b, c).

The pollen results, in the form of a pollen diagram (Fig. 2) and a table showing the interpreted stages of landscape change (Tab. 3) can be divided into five main pollen assemblage zones, called Metchley 1–5. A few additional results from seeds and beetles are also used.

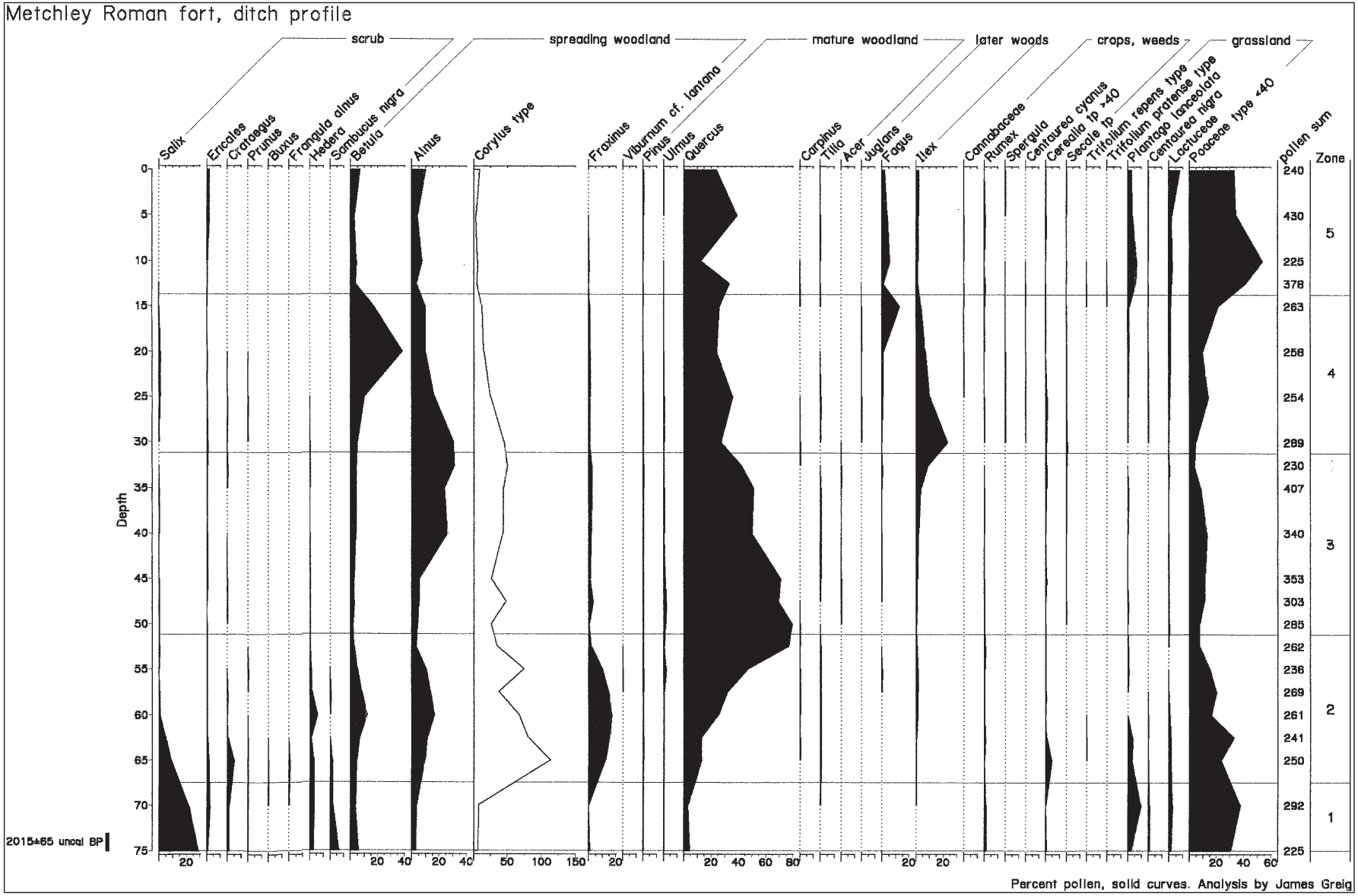

Fig 2. Pollen diagram. *Corylus*, Cyperaceae and aquatic taxa have been excluded from the pollen sum used for calculation of the percentages

Table 1. Plant macrofossil list, names and order according to Kent (1992)

Sample:	F308	F308	
Layer:	1722	1741	
Ranunculus sceleratus L.	–	3	celery-leaved buttercup
Urtica dioica L.	–	3	common nettle
Corylus avellana L.	1	–	hazel
Stellaria media (L.) Vill.	–	1	chickweed
Rubus idaeus L.	1		wild raspberry
R. sect. *glandulosus*	1	–	bramble
Rubus sp.	–	1	raspberry/bramble
Potentilla erecta (L.) Räusch	7	–	tormentil
Potentilla sp.	–	1	cinquefoil
Fragaria vesca L.	–	1	wild strawberry
? *Ilex aquifolium* L. (leaf spines)	+	–	holly
Conium maculatum L.	1	–	hemlock
Hyoscyamus niger L.	–	1	henbane
Stachys arvensis/sylvatica	2	1	? hedge woundwort
Sambucus nigra L.	89	4	elder
Lemna sp.	–	2	duckweed
Juncus sp.	–	1	rush
Carex subg. *Vignea*	–	1	sedge
Carex subg. *Carex*	–	1	sedge
Glyceria sp.	50	35	flote-grass
Poaceae	1	4	grasses
Triticum sp.	1*	–	wheat
Hordeum vulgare L.	1*	–	barley
other remains			
charcoal fragments	+	+	
tree bud scales	+	+	
insect remains	+	+	

Table 2. AMS radiocarbon dates from the university of Waikato dating laboratory, New Zealand

Depth	Material	Laboratory code	^{14}C age	Cal age 95.4% probability
0–2 cm	charcoal, carbon	Wk–10565	36,825 ± 482 B.P.	–
44–46 cm	charcoal, carbon	Wk–10566	2132 ± 56 B.P.	360–40 cal B.C.
73–75 cm	*Sambucus* seeds	Wk–10567	2015 ± 65 B.P.	180 cal B.C. – cal A.D. 130

Metchley –1 (75–70 cm)
Scrub spreading over abandoned land

The very base of the pollen sequence at 75 cm contains around 50% tree and shrub pollen, an unusually large amount for a Roman ditch. Some of the less obvious pollen records are probably some of the most important in terms of past vegetation represented. These are from taxa which are under-represented in the pollen record, mostly because they are insect pollinated such as *Crataegus* (hawthorn), *Prunus* (sloe) and *Sambucus nigra* (elder). All represent pioneer shrubs and trees which spread when they are not held back either by grazing or felling. Other taxa in this group with better pollen representation include *Salix* (willow) and *Hedera* (ivy). The thorny *Prunus* and *Crataegus* could have spread because they are resistant to grazing, thus providing evidence of some pasturing of stock. *Quercus* (oak), *Betula* (birch) and *Alnus* (alder) are present in small amounts as part of the normal background at this stage. Ericales pollen probably represents some heathland.

This interpretation has been tested, for the land to the southwest of the fort is at present overgrown with scrub mainly of birch, willow

Table 3. Stages of landscape change interpreted from the results from the Metchley fort ditch

	Depth	Landscape	Date
5	12.5–0 cm	increasing open grassland, possibly park; some rye, cereals and hemp grown, and walnut; remaining oak woodland with beech and holly	later medieval or postmedieval?
4	30–15 cm	holly, with birch, alder replacing some oak wood, some wood clearance, possible wood pasture; more open land and grassland; some rye and cereals with cornflower and other weeds, hemp and walnut grown	start of cornflower record at 30 cm suggests around A.D. 1200
3	50–32.5 cm	oak wood with hazel and alder, being partly replaced by alder; a little farming with rye grown	start of continuous rye record at 50 cm suggests around A.D. 600 (Saxon)
2	60–52.5 cm	ash and hazel wood developing into oak wood; less grassland; very little sign of farming; possible abandonment of much cultivated land	possible dark age compared with other pollen diagrams
1	75–70 cm	spreading willow, hawthorn, sloe and elder scrub; decreasing open land and farming, abandonment	the sequence starts in the Roman period, according to archaeological evidence, radiocarbon date

and hawthorn. Modern pollen from moss polsters collected in the hawthorn scrub where the vicus was (Fig. 1) shows that *Salix* pollen is well represented and *Crataegus* pollen is present under willow and hawthorn scrub, with a range of other trees such as *Quercus*, *Alnus* and *Corylus* represented. It has not yet been possible to check whether a thick hedge over a ditch could also produce such a pollen spectrum.

Macrofossils do not usually give as strong an impression of woodland as pollen results, but seeds of woodland or scrub plants were present, such as *Sambucus nigra* (elder), and possible leaf spines of *Ilex aquifolium* (holly) and bud scales, probably of trees. Other plants of woodland and scrub include *Rubus idaeus* (raspberry) and *R. glandulosus* (bramble) and *Stachys* cf. *sylvatica* (probable hedge woundwort) are presented on Tab. 1.

There is quite a large range of herbs present representing unwooded open land with grassland, with pollen of Poaceae (grasses), *Plantago lanceolata* (ribwort plantain) and *Centaurea nigra* (knapweed), and a seed of *Cynosurus cristatus* (crested dogstail). Modern pollen results show that *Plantago lanceolata* is very well represented, even in open scrub. Further evidence of grazed grassland is provided by beetles of grassland and dung (Smith, in Jones 1999).

Cereal pollen together with charred grains of *Hordeum* sp. (barley), *Triticum* sp. (wheat) and wood charcoal indicate some level of human activity around the time when the ditch started to fill up in the Roman period.

Wetland and aquatic vegetation is indicated by a small pollen record of Cyperaceae (sedges) together with numerous seeds of *Glyceria* sp. (sweetgrass) which grows in standing water or floats in it. Diatoms were present in most samples showing that the ditch probably remained filled with water. The rather few aquatic and wetland taxa and small amounts present shows that damp conditions were probably very local to the ditch. The local vegetation of the surrounding dry land should therefore be very well represented in the results.

Metchley –2 (65–52.5 cm)
Increasing oak and ash woodland

Very large amounts of *Corylus* (hazel) together with increased *Alnus* (alder), *Fraxinus* (ash) and *Betula* (birch) show the development from scrub to secondary or pioneer woodland, and increasing *Quercus* (oak) shows further development to mixed oak woodland. The shrub records found previously reduce, although *Frangula alnus* (alder buckthorn) and *Buxus* (box) were recorded at 65 cm. Box is much associated with Roman sites (Hall & Kenward 1990), but would not have been expected in natural vegetation, although it can easily be grown in gardens and might have persisted as a relic of cultivation.

Herb pollen starts to decline, and although there is a record of Cerealia type pollen (>40 mm), most of the grains were only just into this size range, and within that of *Glyceria*, so the records may not represent cereals.

A similar phase with very little sign of

human activity has been found in the pollen diagrams from Thetford, Cookley and Stafford. This seems to represent the so-called dark age between the end of the Roman period and the beginning of the Saxon period, corresponding to the migration period on the mainland of Europe.

Metchley –3 (50–32.5 cm)
Oak wood with clearings, rye growing

Tree and shrub pollen, mainly *Quercus* (oak), *Corylus* (hazel) and *Alnus* (alder), with some *Ulmus* (elm), amounting to a total of about 80% trees and shrub pollen, represents a fairly well-established woodland, the sort of level obtained from natural deposits just before the signs of prehistoric woodland clearance, but rarely found in much later deposits. *Quercus* is partly replaced by *Alnus* in this zone, with only a slight reduction in total tree pollen.

Although the amounts of herb pollen are low, there is a consistent small *Secale* (rye) record from this point. Other signs of human activity were carbon spheres of < 1 mm diameter, perhaps soot from fires, and a little wood charcoal at 44–46 cm, which was selected for dating, although the results seem show contamination with dead carbon, probably from coal.

Such faint signs of renewed farming may show that this took place at some distance from the site, so that only occasional indicative pollen grains such as rye reached the old fort ditch in the wood. The start of consistent rye pollen records has been dated to the Saxon period in other pollen diagrams (Greig in prep. a, b, c).

Metchley –4 (30–15 cm)
Holly wood

This phase is defined by another change in the woodland, to *Betula* (birch), *Alnus* (alder), *Quercus* (oak) and *Ilex* (holly). The latter is significant; this is a much greater record than the occasional *Ilex* pollen grains which are often present in pollen diagrams of this general period. Holly is insect pollinated, and its pollen is mostly deposited right under the tree, according to modern pollen studies (Wiltshire, personal communication). The pollen record could represent holly which was growing over the ditch, confirmed by possible *Ilex* leaf spine (Tab. 1). *Ilex* could also have formed a more extensive holly wood with other trees as more minor elements. The past existence of holly woods is indicated by historical wood names such as Hollyhurst and Hollyfast (Wager 1998). Holly is associated with wood pasture, the trees being coppiced and pollarded to promote fresh new growth which could provide forage for stock (Rackham 1980). The pollen peak seen here could be the result of the ending of this management, which would have allowed the holly trees to grow and flower freely.

Herb pollen still remains low, but *Cannabis* type (possible hemp) appears and *Centaurea cyanus* (cornflower), a cornfield weed which seems to have become very abundant in the medieval period by around A.D. 1200 (Greig 1991a).

Metchley –5 (12.5–0 cm)
Beech wood, more farming

The final phase has a general reduction in tree pollen to around 40% and a woodland with *Fagus* (beech) replacing *Ilex* (holly), which is a natural succession (Rackham 1980). Like the evidence of holly wood, it is unusual to find such a marked beech curve in a British pollen diagram. *Juglans* (walnut) was found in two samples, and was also present in the modern pollen rain which suggests that an isolated walnut tree in a garden is enough to give such a record.

There is a general increase in herb pollen records, suggesting that more open land was being farmed, and some records of Cannabaceae, probably from *Cannabis sativa* (hemp). Increased Poaceae and *Plantago lanceolata* show the spread of grassland. *Juncus* sp. (rush) seeds were very abundant in some of the upper samples, showing that the later ditch deposits may have become marshy rather than wet.

This phase could be medieval or post-medieval by comparison with the pollen results from Thetford, Cookley and Stafford (Greig in prep. a, b, c).

DISCUSSION

The results from Metchley can be usefully compared with other pollen results from a number of sites in the general region, and with

historical and archaeological information for the immediate area.

The results from Metchley –1 and –2 with a succession of vegetation from scrub to various kinds of woodland suggests that occupation of this immediate area, at least, seems to have virtually ceased.

Results obtained from other Roman ditch fills are usually very different, with a few scattered grains of trees and shrubs, mainly oak, alder and hazel amounting to around 5% of the total. The Roman landscapes interpreted from such sites is generally open farmland, with not much woodland, rather like that of today. At one site, however, at Alcester (26 km to the south) the pollen and macrofossil evidence from a ditch of trees and shrubs was interpreted as an Iron Age hedge growing alongside the ditch, which had preserved the evidence (Greig 1994). It has been suggested that the evidence from Metchley could be represent a hedge (Pat Wiltshire, pers. comm.). This may well have been the case to begin with, as existing hedges grew up and provided a nucleus for the spread of scrub and then woodland over the abandoned landscape, but the very small amount of herb pollen present in Metchley –2 and –4 suggests closed woodland by those stages.

The regrowth of woodland and scrub at about this time does not seem to have just been a local event, since some other pollen diagrams show similar results. Two fairly detailed and well-dated pollen diagrams from Cookley, 20 km to the west, and from Stafford, 40 km to the north (Greig in prep. b, c) show that woodland increased slightly after the Roman period (date cal A.D. 385–440 from Stafford), mainly in pioneer taxa such as *Betula*, *Alnus*, *Corylus*, *Salix* and *Fraxinus*. This regional reduction in land use is even evident in sufficiently detailed and well-dated pollen diagrams as far away as northern France (Cyprien & Visset 2001).

Some indication of the time likely to have been taken for the spread of woodland over abandoned land is given by the development of still fairly open scrub where the vicus was (Fig. 1) in perhaps 50–60 years, and the growth of large oaks on the banks of the canal, which was opened by 1807.

In Metchley –3 the beginning of records of rye together with reduction of tree pollen also has parallels in the Thetford, Cookley and Stafford results (Greig in prep. a, b, c). Although the radiocarbon calibration curve gives quite a wide range of possible dates, some date around A.D. 600 seems likely for this event, which is the Saxon period.

The evidence of the introduction of rye from charred cereal remains is not quite so clear; the finds may be biased by the different processing needs of the glumed wheats emmer and spelt such as parching, and the use of chaff as fuel in the Roman period, compared with free-threshing crops such as rye and bread wheat. The latter are occasionally found on Roman sites in the region about 30 km south of Metchley (Moffett & Ciaraldi 1999) which suggests that *Secale* may have only been a minor crop, if it was cultivated at all. The evidence from the few Saxon cereal remains here is rather inconclusive (Moffett & Ciaraldi 1999), although Secale seems to have been widely grown as an important crop in the Saxon period (Greig 1991b)

There is historical evidence from the 8th–11th C recording land boundaries, making it appear that the area round Metchley was then sparsely occupied and wooded land on the border between two Saxon kingdoms (Hooke 1982).

The strong evidence of holly wood in Metchley –4 is not seen in the other pollen diagrams, but two other sites, Brewood and Lawn Farm, both in Staffordshire to the north of this area have also produced evidence of surprisingly well wooded medieval environments with holly present.

The increased crop records and the arrival of *Centaurea cyanus* (cornflower) in Metchley –4 appears to be medieval in date, both from the radiocarbon dates from other pollen diagrams (Greig in preparation a and b) and because *Centaurea cyanus* appears in seed records from about A.D. 1200 (Greig 1991a).

Historical evidence from Warwickshire, the area immediately to the southwest of Metchley, adds to the evidence from the pollen that this whole area remained well wooded and was sparsely settled in the medieval period (Wager 1998). The area around Metchley, although now part of Britain's second largest city, has only two originally medieval churches, and therefore centres of settlement nearby, at Harborne 1.5 km to the west, and Northfield 4.5 km to the south. Woodland is indicated in many local place names in the surroundings with the – leah ending (Wager

1998) which means woodland, such as Shenley, Weoley, Selly Oak, and probably Metchley itself, which could explain the very faint signs of occupation at Metchley. In medieval times and later, some woods were carefully managed as coppice to maintain a renewable source of various kinds of timber. Other woods were allowed to be used as wood pasture to a greater or lesser extent and the consequent grazing discouraged regeneration of trees and gradually created an open grassland landscape with trees (Wager 1998), or heath. Many of these wood pastures were finally enclosed by landowners in the late medieval period as parks, as was Metchley (Jones, pers. comm.), finally becoming remaining open spaces as the city of Birmingham expanded over the area in the 19th century and later. The pollen evidence goes on until some time apparently in the medieval or post-medieval period, which will hopefully be established by a radiocarbon date.

ACKNOWLEDGEMENTS

I would like to gratefully acknowledge the help of Alex Jones, the archaeologist directing the Metchley project, who invited me to sample this profile, and the Estate Management Office of Birmingham University, the developers of the site. Thanks to Patricia Wiltshire, who commented very usefully upon an earlier version, and to the reviewer of the text. I would also like to thank Nigel Dodds for his site plan in Fig. 1. The support of English Heritage whilst doing this work is also gratefully acknowledged.

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