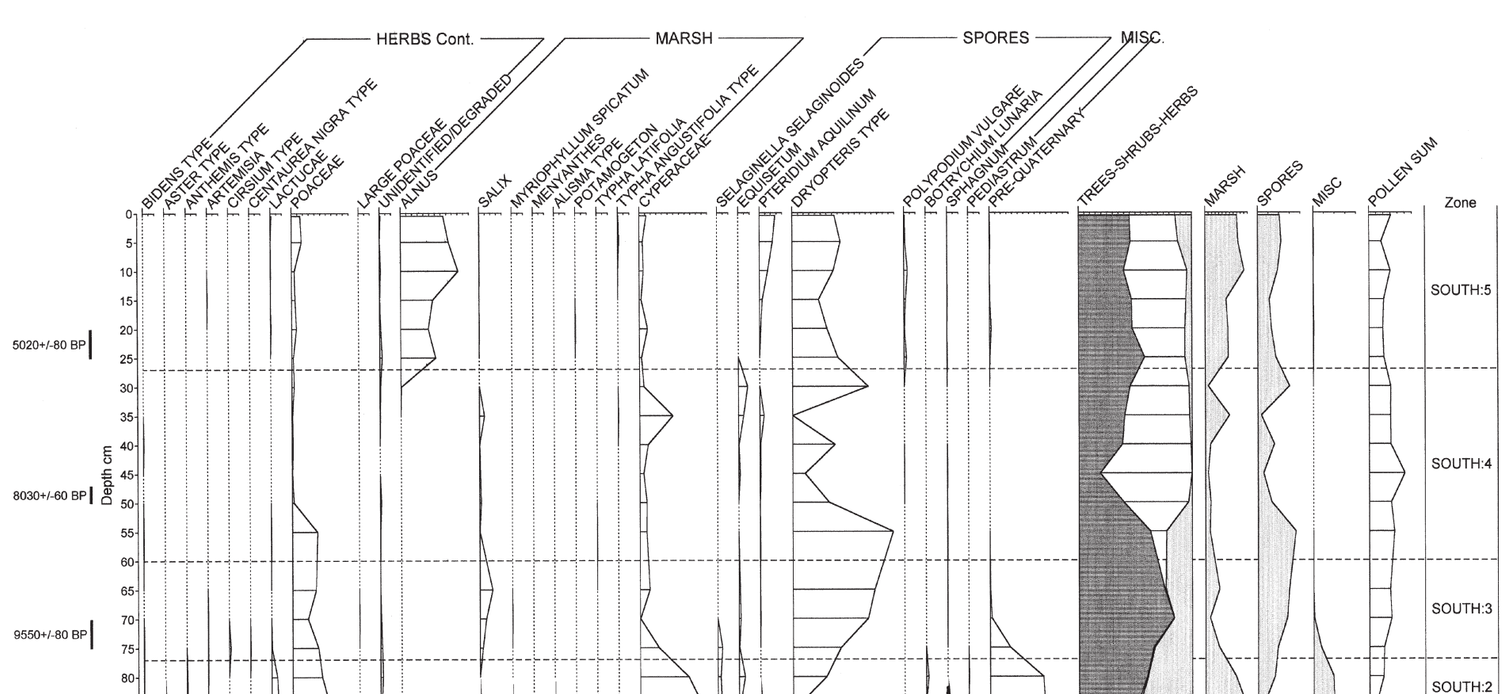

Figure 8 (part 1) Pollen diagram of the valley peat sequence at Southorpe Quarry

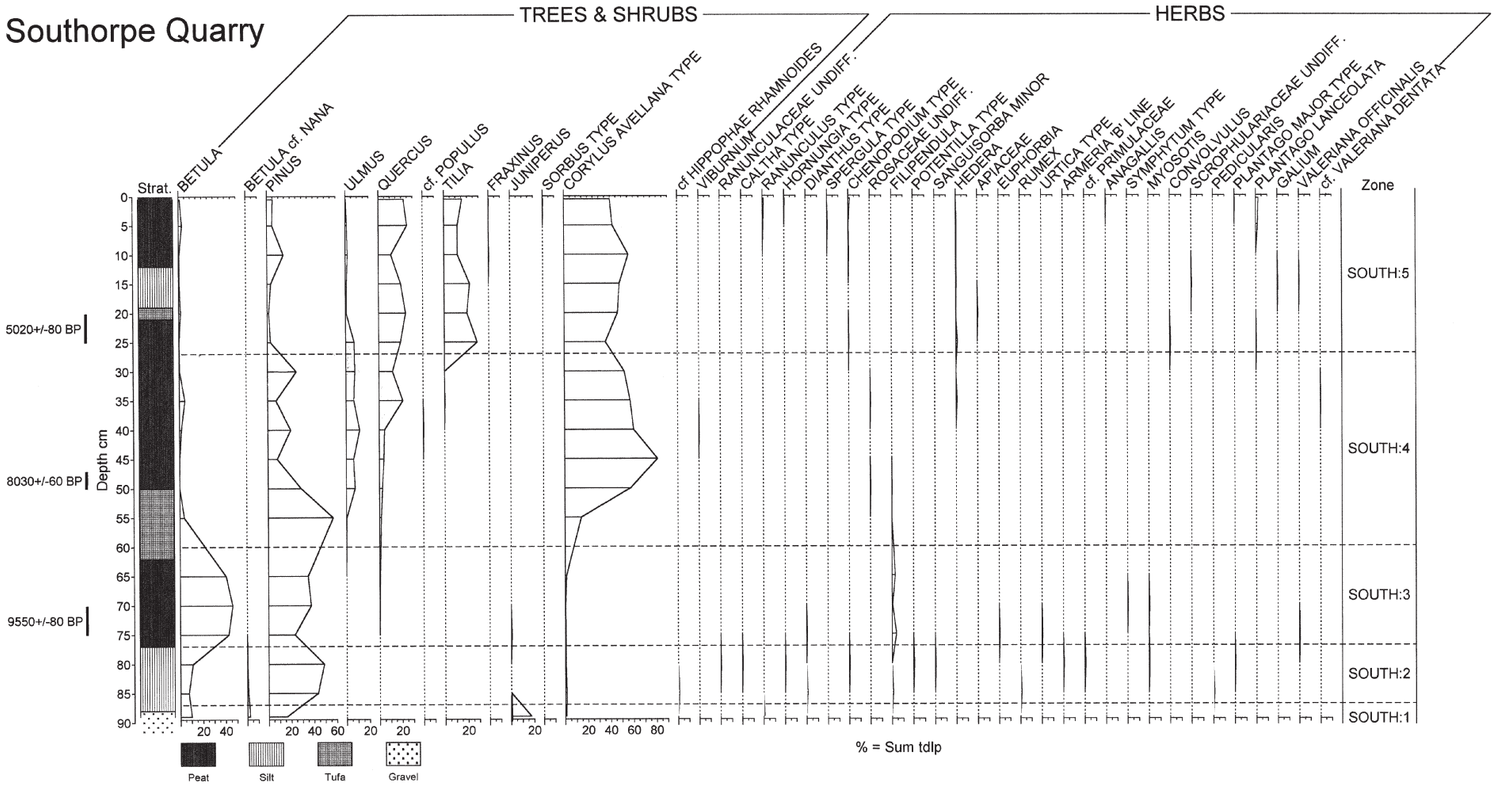

Figure 8 (part 2) Pollen diagram of the valley peat sequence at Southorpe Quarry

V. Palynological analysis of the valley peat deposits at Southorpe

R. G. Scaife

Introduction

In addition to the palaeochannel profiles examined, recent archaeological work on the adjacent chalk upland to the west has revealed a well-dated, early/middle Holocene pollen sequence at Southorpe. This study was part of an archaeological investigation in advance of gravel extraction (Doel 1999), and provides an unusually good glimpse of the contemporary upland vegetational complex associated with the Etton Landscape area.

This valley is now pasture land due to past and extensive land drainage and reclamation. However, underlying the topsoil is a laterally very variable sequence of organic peat and sediments and discontinuous layers of tufaceous calcareous material which is believed to be tufa. The site has provided well preserved pollen data which is extremely unusual for such a calcareous environment and is attributed to the fact that in spite of the extensive drainage mentioned above, the groundwater table of the valley has remained high. Thus, data pertaining to the vegetation and environment of the nearby Jurassic limestone area has been gained providing the first pollen evidence for this physiographic zone. Two broad temporal spans are present, separated by a hiatus of some 2500 years from *c*. 7500–5000BP. The lower is clearly of early Holocene (present interglacial) age; that is, from *c*.10,000BP to the late Boreal period or 7500BP. This provides evidence for the environment of any local, early Mesolithic human activity. The upper peats above the hiatus are of late Holocene (late prehistoric) age from 5000BP providing a short representation of the Neolithic period.

Methodology

The same sampling and processing procedures were used as for the Etton Landscape rivers profiles described on p.8 above (Moore and Webb 1978 and Moore *et al.* 1991) with the data presented in standard pollen diagram form (Fig. 8).

Taxonomy in general follows that of Moore and Webb (1978) modified according to Bennett *et al.* (1994) for pollen types and Stace (1992) for plant descriptions.

Stratigraphy

The profile was sampled from the base of the modern topsoil (at 30cm) downwards to 120cm using two overlapping monolith profiles. Although some slightly deeper sequences were observed, the one chosen for analysis contained the most representative profile available with the thickest sequences of organic silts and peat. The profile as sampled for pollen was described in the laboratory as follows. The top of the pollen profile/diagram at 0cm represents a depth of 30cm below the contemporary land surface. Colour descriptions were made using Munsell colour charts.

Depth (cm)	
	humic topsoil (30cm thick)
0 – 12	brown detrital peat containing fine monocot. Rootlets
12 – 19	peaty silt (grey 10YR 3/2)
19 – 21	white to pale grey calcium carbonate (*cf*. tufa) with some black organic banding
21 – 50	black fibrous peat (10YR 2/1) with monocot. rootlets and occasional twigs
50 – 55	white calcareous ?tufa layer more organic and greyer than below (10YR 7/2); discontinuous horizontally
55 – 62	white (10YR 8/1) ?tufa with some vertical root penetration
62 – 77	black/brown humic detrital peat with some monocot remains — rootlets (10YR 2/2 or 10YR 2/1)
77 –82	grey organic silt with penetrating root wood (10YR 3/1)
82 – 88	grey organic silt with sand becoming coarser to base; wood (tree root)
88+	basal calcareous gravels

Radiocarbon dating

Samples for radiocarbon dating were taken from the same monoliths that were used in pollen analysis. Three samples were submitted to Beta Analytic Inc. These were chosen to establish the principal vegetation and stratigraphical features which are evident in the peat profile. The results of these measurements are as follows.

Beta-137366	20–25cm	5020±80BP	3975 to 3650 cal BC
Beta-137367	47–50cm	8030±60BP	7090 to 6715 cal BC
Beta-137368	70–75cm	9550±80BP	9215 to 8630 cal BC

Pollen zonation and inferred vegetational history

Five local pollen assemblage zones (l.p.a.z.) have been recognised in the 80cm of analysed stratigraphy (Fig. 8). These are delimited, characterised and interpreted as follows.

l.p.a.z. 1: 90cm. *Juniperus*

This zone is characterised by *Juniperus* (to 18%) in this one basal level. Other trees/shrubs comprise B*etula* (10%), *Pinus* (15%) and the possible dwarf shrub, *Betula nana*. Herbs are dominant (54%) with Poaceae most important (49%). Marsh taxa are dominated by Cyperaceae (55%). Pre-Quaternary palynomorphs are at their highest value (64%) in these basal silts.

The high values of *Juniperus* (juniper) here is a characteristic of the transition from the late-Devensian to Holocene caused by rapid temperature amelioration at *c*.10,000BP. Pre-existing juniper, stunted by harsh environmental conditions and prevented from flowering, was able to rapidly expand its range prior to being ousted by incoming birch and/or pine woodland. Such expansion is typically associated with peaks of meadow sweet (*Filipendula*) pollen which similarly responded to temperature rise. The dominance of Arctic/Alpine herb communities remained with sedge mire growing on-site.

l.p.a.z. 2: 87–77cm. *Pinus*-Poaceae-Cyperaceae

This zone is delimited by highest values of *Pinus* (50%), dominance of herbs (40%) and overall herbaceous diversity. There are also substantial numbers of derived, pre-Quaternary (Jurassic) palynomorphs (conifer pollen and spores). Tree pollen is dominated by *Pinus* (50%) with *Betula* (10%). Herbs are dominated by Poaceae (25%) and Cyperaceae (43%). There are a substantial number of sporadic occurrences of herbs which include *Armeria* 'B' line, *Sanguisorba minor,* and *Plantago major* type. Spores include *Dryopteris* (monolete) type (29%) with *Botrychium lunaria, Selaginella selaginoides* and *Pteridium aquilinum.*

The palynological characteristics of this pollen zone are typical of the very early Holocene (Flandrian Chronozone Ia, the Pre-Boreal) and this is confirmed by a