Arne

[SY 970 892]

Introduction

This exposure on the shore of Wareham Channel is one of only two sites still yielding fossil plants from the Lower Eocene beds traditionally called the 'Dorset Pipe Clays'. It complements the more diverse Lake flora by containing a number of species not found there (see (Table 8.2)).

The site was not discovered to be of palaeobotanical interest until some time after the better-known site at Lake. The only account of the fossils from the Arne exposures is by Chandler (1962).

Description

Stratigraphy

The low cliff and foreshore at Arne exposes sands and clays of the Dorset Pipe Clays (Poole Formation), which is early Eocene (Ypresian) in age. Within the sands are thin seams of carbonaceous material, probably deposited near the limits of a flood channel, and which contain numerous fossil fruits and seeds. There was also exposed (now apparently covered by silt) a band of densely packed fossil ferns.

Palaeobotany

Chandler (1962) has reported 39 species from Arne, which are listed in (Table 8.2). Most are angiosperm fruits and seeds, but there are also schizaeacean and pteridacean ferns, and foliage of a redwood conifer. As at Lake, the dominant fossil is usually the fruit of the enigmatic plant '*Scirpus'* (Figure 8.20), although the pteridacean fern *Acrostichum* dominates at least one level. The fossils are mainly carbonaceous fragments. Coarse pyrite overgrowth sometimes occurs but unfortunately does not preserve the anatomy of the plants, as in the London Clay flora.

Interpretation

Arne is only the second site now known to yield fossil fruits and seeds from the Dorset Pipe Clays (the importance of the plant fossils from these deposits is discussed in the account of the Lake site). It is thus of national importance for understanding the paratropical forests that grew over much of southern Britain during early Palaeogene times. The Arne flora is neither as diverse nor as well preserved as the Lake flora. Arne is nevertheless of considerable interest as it yields taxa not found at Lake, including members of the pteridacean, arum, flacourtia, nightshade, moonseed and sapodilla families. Arne is the type locality for 11 species.

The presence here of the pteridacean fern *Acrostichum,* also recorded in a nearby borehole (Collinson, 1978b), is of considerable interest as it is far outside its current geographical distribution. It is also notable that these Eocene examples were growing in freshwater swamps, whereas today it is normally found in mangrove settings (Collinson, 1996a, in press a).

Conclusions

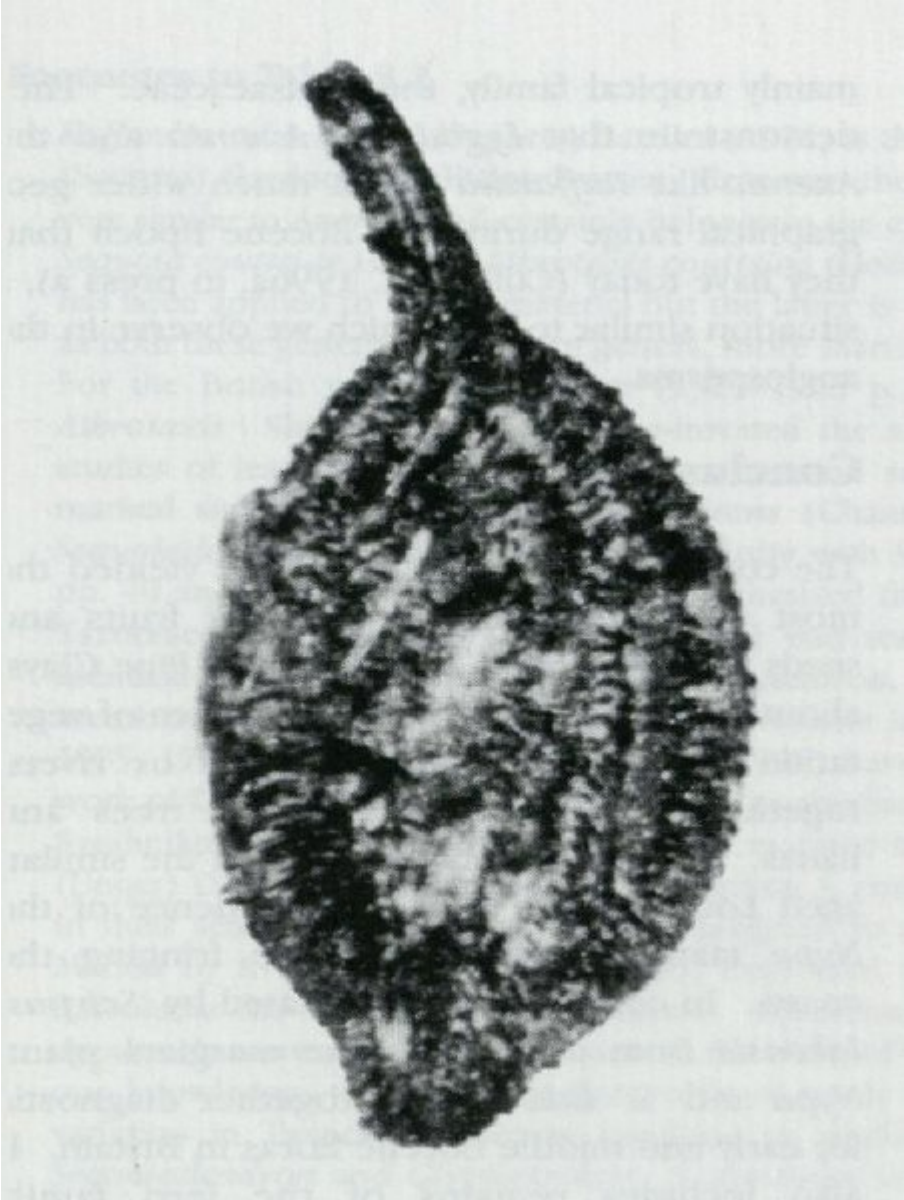
The exposures at Arne have yielded a nationally important assemblage of early Eocene fruits and seeds from the Dorset Pipe Clays, about 50 Ma old. It is not as diverse or well preserved as the flora from Lake, but includes a number of plant groups not found there, such as the pteridacean ferns, arums, flacourtia, sapodilla and nightshade families.

References

Family	Species	Lake	Arne	Studland
Pteridaceae	*Acrostichum lanzueanum* (Visiani) Chandler		×	×
Schizaeceae	*Lygodium kaufflussii* Heer *emend.* Gardner and Ettingshausen			×
	L. poolensis Chandler	×		
	Anemia poolensis Chandler	×	×	
	Ruffordia subcretacea (Saporta) Barthel, 1976[1]		×	
Taxodiaceae	*Taxodium lakensis* Chandler	×	×	
	Sequoia couttsiae Heer[2]			×
Actinidiaceae	*Saurauia crassisperma* (Chandler) Mai[3]	×		
	S. poolensis (Chandler) Mai, 1970[4]	×		
Anacardiaceae	*Dracontocarya glandulosa* Chandler	×		
	?*Lannea* sp.	×		
	Rhus lakensis Chandler	×		
	R. spp.	×		
Apocynaceae	*Apocynospermum acutiforme* Chandler[5]	×		
	A. lakense Chandler[5]	×		
Arecaceae	*Calamus daemonorops* (Unger) Chandler	×		
	?*Sabal* sp.		×	
Boraginaceae	*Ehretia lakensis* Chandler	×		
Burseraceae	*Palaeobursera lakensis* Chandler	×		
Capparaceae	*Bartonella emarginata* Chandler	×	×	×
	Palaeocleome lakensis Chandler	×		
	Capparidispermum eocenicum Chandler	×		
Caprifoliaceae	*Sambucus parenda* Chandler	×		
Cornaceae (including Mastixiaceae)	*Dunstania lakensis* Chandler[6]	×		
	Eomatixia rugosa (Zenker) Chandler (see Mai, 1995)	×	×	
	E. urceolata Chandler	×		
	?*Mastixia cantiensis* Reid and Chandler[7]		×	
	Mastixicarpum crassum Chandler (see Mai, 1995)	×		
	Sutela quadrilocularis (Chandler) Mai, 1999[8]	×		
Cucurbitaceae	*Cucurbitospermum lakense* Chandler	×		
	C. obliquum Chandler	×		
Cyperaceae	'*Scirpus*' *lakensis* Chandler	×	×	
	?*Scirpus* sp.	×		
	Caricoidea arnei Chandler		×	
	C. obscura Chandler	×		
	?*Caricoidea* sp.	×		
	Gladiocarya minima (Chandler) Mai in Mai and Walther, 1978[9]		×	
Ebenaceae	*Diospyros headonensis* Chandler	×		
Euphorbiaceae	*Euphorbiotheca lakensis* Chandler	×		
	E. platysperma Chandler	×		
	E. tuberculata Chandler	×		
	E. digitata Chandler	×		
	Euphorbiospermum punctatum Chandler	×		
	Wetherellia variabilis Bowerbank		×	
Flacourtiaceae	*Oncoba rugosa* Chandler		×	
Hamamelidaceae	*Strinbauera subglobosa* Prest[10]	×		

Family	Species	Lake	Arne	Studland
Icacinaceae	*Iodes acutiformis* Chandler	×	×	
	Natsiatum eocenicum Chandler[11]	×		
	?*Palaeophytocrene foveolata* Reid and Chandler	×		
	Icacinicarya inornata Chandler	×	×	
Lauraceae	*Laurocarpum* spp.	×		
Lythraceae	*Ammannia lakensis* Chandler	×		
	Alatospermum lakense Chandler	×		
Menispermaceae	?*Tinospora armensis* Chandler	×	×	
	Palaeococculus lakensis Chandler	×	×	
	Wardenbeppeya poolensis (Chandler) Eyde, 1970		×	
Moraceae	*Ficus lucidus* Chandler (see Collinson, 1989)	×		
	F. sp.			×
?Moraceae	*Ovicarpum reticulatum* Chandler (see Collinson, 1989)		×	
Nymphaeaceae	*Palaeonymphaea eocenica* Chandler (see Collinson 1980a)	×		
Nyssaceae	*Nyssoidea eocenicum* Chandler	×	×	
Rosaceae	*Rubus acutiformis* Chandler			×
Rutaceae	*Phellodendron costatum* Chandler		×	
	Rutaspermum excavatum Chandler		×	
	R. glabrum Chandler	×		
	R. magnificum Chandler		×	
	R. striatum Chandler	×		
Sabiaceae	?*Meliosma sheppeyensis* Reid and Chandler	×		
Sapotaceae	?*Sapoticarpum* sp.		×	
Solanaceae	*Solanum armenae* Chandler		×	
	Solanispermum reniforme Chandler		×	
Styracaceae	*Styrax elegans* Chandler	×		
Symplocaceae	*Symplocos headonensis* Chandler		×	
	S. lakensis Chandler	×	×	
Theaceae	*Cleyera*? *obliqua* Chandler	×		
	?*Gordonia* sp.	×		
Thymelaeaceae	*Thymelaeaspermum lakense* Chandler	×	×	
	T.? *sulcatum* Chandler	×		
Vitaceae	*Vitis ambigua* Chandler	×		
	V. armensis Chandler		×	
	V. cuneata Chandler	×		
	V. excavata Chandler	×		
	V. lakensis Chandler	×		
	V. lusatica Czeczott and Skirgiello[12]	×	×	
	V. platysperma Chandler	×	×	
	V. poolensis Chandler	×		
	V. pygmaea Chandler	×	×	
	V. goodhartii Chandler	×	×	
	V. symmetrica Chandler	×		
	V. triangularis Chandler		×	
	Tetrastigma acuminata Chandler		×	
	?*T. lobata* Chandler	×		
Zingiberaceae	*Alpinia armense* (Chandler) Mai in Mai and Walther, 1985[13]		×	
Incertae sedis	*Rhamnospermum bilobatum* Chandler	×	×	
	Carpolithus armense Chandler		×	

(Table 8.2) Composition of floras from the Dorset Pipe Clays, Hampshire Basin. Species descriptions, or references to them, can be found in Chandler (1962), unless otherwise referenced. Discussions on some of these species can also be found in Manchester (1994), Mai and Walther (1978, 1985), Mai (2000) and Collinson (1996b, in press a). The family classification used here is summarized in Chapter 1 of the present volume



(Figure 8.20) Scirpus lakensis in carbonaceous preservation (specimen number BMNH V40396), found at Arne, × 50 (see Chandler, 1962; Collinson, 1996b). (Photo: M.E. Collinson.)