Herne Bay

[TR 185 685]–[TR 224 693]

Introduction

Herne Bay has yielded one of the most diverse fruit and seed floras from the Eocene London Clay. More than 130 species have been reported to date, and include six genera that are unique to here.

The palaeobotany of the Palaeocene and Palaeocene–Eocene transition strata at Herne Bay is discussed in Chapter 7. However, the site is also of considerable interest for early Eocene palaeobotany. Plant fossils are known from the A2 division of the London Clay Formation and were first described in detail by Reid and Chandler (1933), with further records provided by Chandler (1961a, 1964). Most of the species are listed by Cooper (1977) and Collinson (1983b), the latter including illustrations of some of the characteristic taxa. Brett (1972) described petrified wood from here.

Description

Stratigraphy

The fossil-bearing beds dealt with here are in the A2 division of the London Clay (*sensu* King, 1981) and are thus from a different stratigraphical level than Sheppey (divisions D and E) and Bognor (divisions B1 and B2). Further details of the stratigraphy here can be found in the previous chapter.

Palaeobotany

The most abundant fossil plants at Herne Bay come from the London Clay Formation. Collinson (1983b) states that over 130 species of angiosperm fruits and seeds have been found here (see (Table 8.1)). In addition, rare conifer fragments occur: *Cupressinites curtus* Bowerbank (cypress family) and *?Pinus macrocephalus* (Lindley and Hutton) Gardner (pine family).

Interpretation

Herne Bay has yielded one of the best London Clay floras in Britain (Table 8.1); see also (Figure 8.13) and (Figure 8.14), equal in diversity to that at Bognor and only being significantly bettered by the classic Sheppey flora. It adds considerably to our understanding of the biodiversity of the paratropical rain forests growing in Britain during early Eocene times, with 37 species, five genera and two families having only been found in Britain in the London Clay at Herne Bay (Collinson, 1983b). It is furthermore the type locality for 38 species and for the genera *Palmospermum, Shrubsolea, Sapindospermum, Citrispermum* and *Palaeobruguiera* (also for *Jenkinsella,* which is now included within *Nyssidium*; (Figure 8.13)).

Of the two unique families mentioned by Collinson (1983b), the alangias are represented by a single fruit described and figured by Chandler (1961a, p1. 27, figs 4 and 5). Although extremely rare, the one known example from here was almost identical to that of the living *Alangium,* a genus of mainly trees and shrubs found throughout most of the tropics. The determination to *Alangium* was accepted by Mai (1970) in his revision of the group. Although not known from any other British flora, *Alangium* has been described from the Eocene Clarno Beds of Oregon (Manchester, 1994) and Geiseltal flora of eastern Germany (Mai, 1976), and the Oligocene Brandon Lignite of Vermont (Eyde *et al.,* 1969).

The second unique family at Herne Bay according to Collinson (1983b) is that of the posidonias, which contains rare aquatic angiosperms that today are only found around the Mediterranean and the southern coast of Australia. Such a disjointed distribution suggests that it was more widely occurring in the past but according to Collinson *et al. (1993b*), its fossil record is very poor. The Herne Bay fossils consist of putative rhizomes with helically arranged ridges and pits

(Chandler, 1961a), which are very similar to fossils from the Eocene strata of France that Fritel (1909) claimed to be indistinguishable from the rhizomes of living *Posidonia.*

Of the other genera that are unique as London Clay fossils to Herne Bay, two are living genera: *Calycocarpum* (moonseed family) and *Talauma* (magnolia family). The former genus is known today from just one species, a deciduous liana from south-western North America (*C. lyonii* Nutt). The one specimen tentatively assigned to the genus by Chandler (1961a) was indisputably a distinctive member of the Tinosporeae section of the moonseeds, but the preservation was not sufficiently good for an unequivocal generic assignment and Manchester (1994) has suggested that it might belong to a different genus.

Talauma is a genus that was used for a group of tropical lowlands plants, which are very similar to *Magnolia.* Chandler (1964) described a single seed from Herne Bay that was very similar in form and structure to that of *Talauma angatensis* (Blanco) F.-Vill. Later (Chandler, 1978) she referred to it as a 'convincing specimen of the lowland *Talauma'.* It has been argued that the living *Talauma* is insufficiently different from *Magnolia* to justify a generic separation (Nooteboom, 1985) and the taxonomic position of the Herne Bay fossil may have to be reconsidered in the light of this. Nevertheless, it will almost certainly remain distinctive at the specific or subgeneric level.

Sbrubsolea was based on a single specimen of a large seed with clear characteristics of the rue family (Reid and Chandler, 1933). It is much larger than the seeds of most living plants of this family and was placed in its own form-genus. Knobloch and Mai (1986, 1991) recognized *Sbrubsolea* in the Upper Cretaceous Series of the Czech Republic.

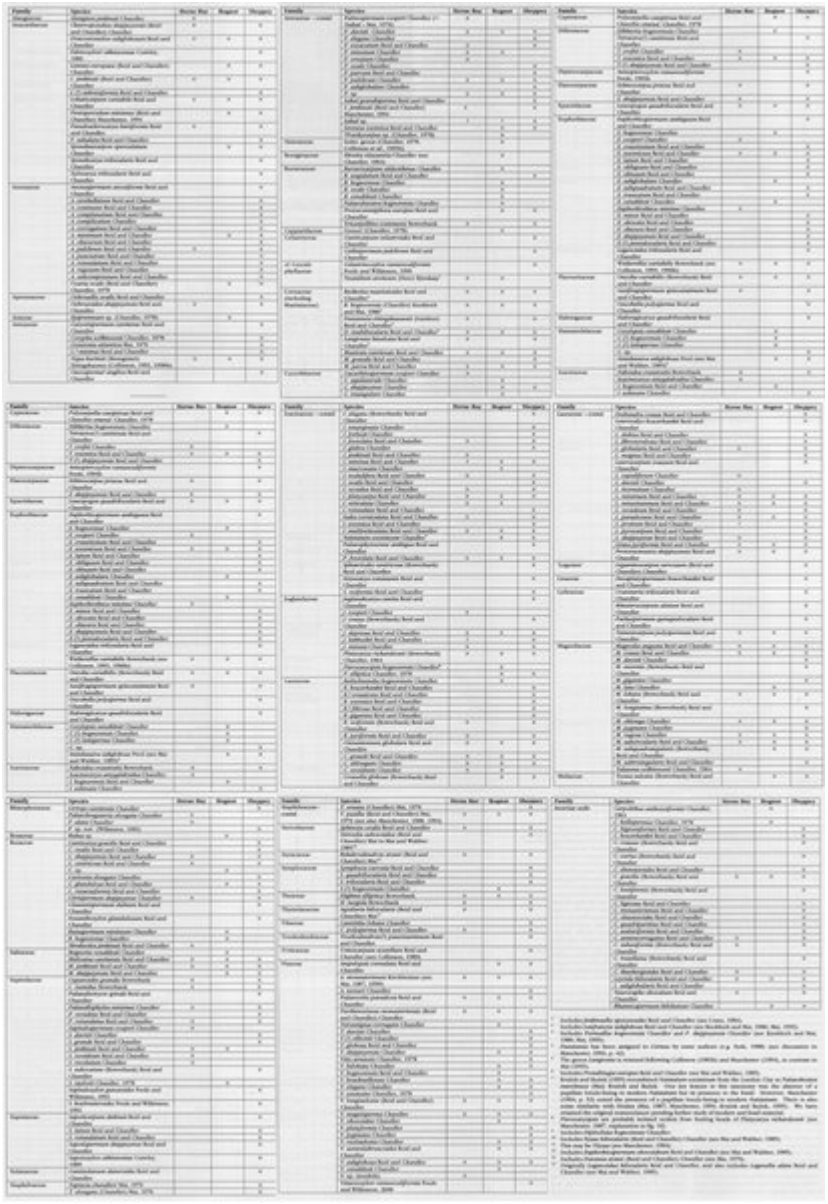
Chandler (1961a) described two species of what she intepreted as embryos of a red mangrove (Rhizophoraceae). They are broadly similar to those of the living *Bruguiera,* one of the mangoves growing today in Asia and Africa, but there are sufficient differences to justify placing the fossil embryos in a separate form-genus, *Palaeobruguiera.* Wilkinson (1983, fig. 2a,b) figured starch grains in the cortical tissue of the hypocotyls of *Palaeobruguiera. Palaeobruguieria* was among the genera listed by Collinson (1983b) as unique in the London Clay to Herne Bay, although Wilkinson (1983) has since recorded examples from Sheppey.

Herne Bay has yielded the most abundant examples of the fruit originally described as *Jenkinsella apocynoides* Reid and Chandler (Figure 8.13), which Crane (1984) has reassigned to *Nyssidium arcticum* (katsura-tree family). Although more complete material is known from other localities such as Cold Ash (see Cold Ash GCR site report, this volume), the Herne Bay pyritized petrifactions provide additional details of the fruits of this important Palaeocene–Eocene plant.

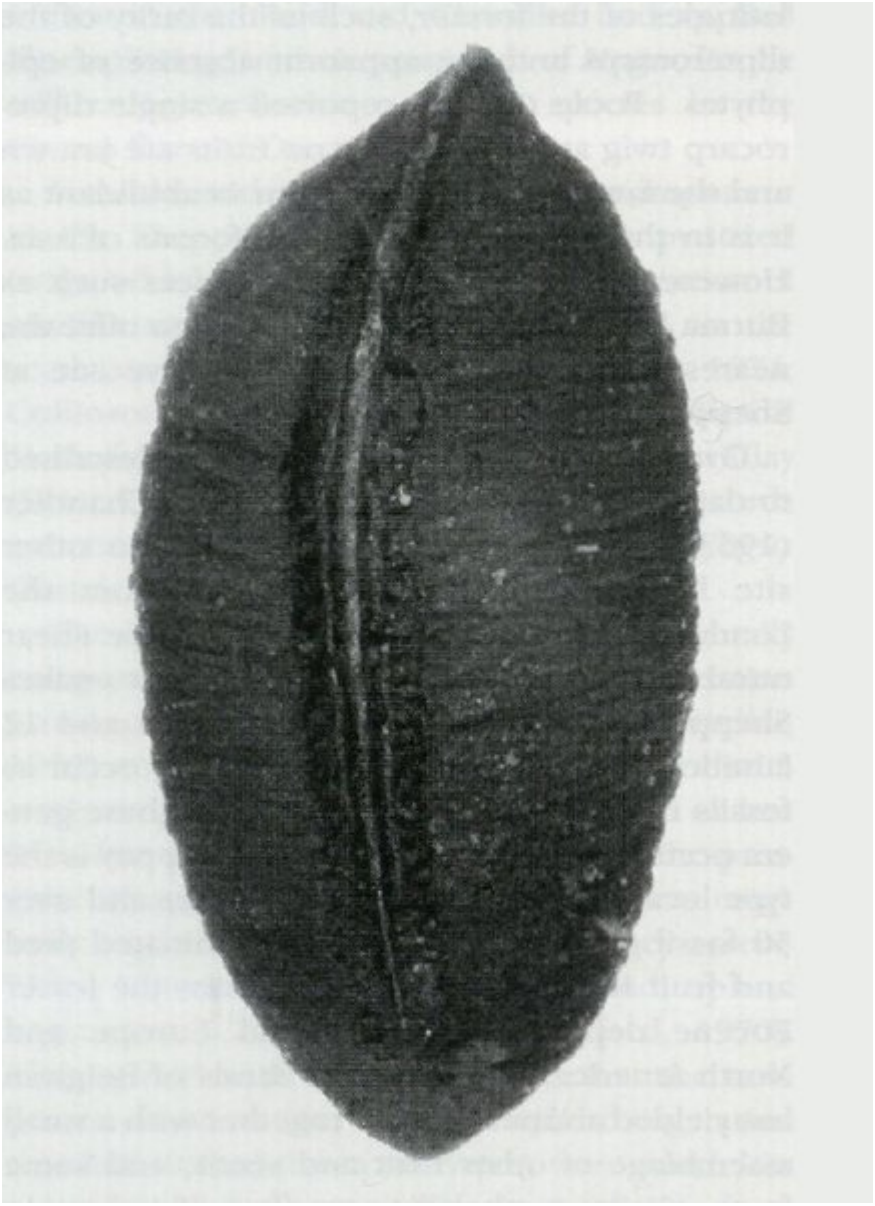
Conclusions

Herne Bay has yielded an internationally important fruit and seed flora of early Eocene age. Among the London Clay floras, it is second in diversity only to the classic Sheppey flora, having yielded over 130 species, 32 of which are unknown from Sheppey. The flora has been particularly important for the study of the alangia, posidonia, mangrove and katsura-tree families in these floras. It provides important insights into the paratropical rain forests that covered much of southern Britain about 51 Ma ago.

References



(Table 8.1) Angiosperm fruit, seed, wood and twig fossils from the Eocene London Clay GCR sites. Species and details from Reid and Chandler (1933) and Chandler (1961a), unless otherwise referenced. The family classification used here is summarized in Chapter 1 of the present volume.



(Figure 8.13) Locule cast of Nyssidium arcticum (= Jenkinsella apocynoides) preserved in pyrite, × 7.5 (see Collinson, 1983b), from the Herne Bay GCR site. (Photo: M.E. Collinson.)

(Figure 8.14) Compound fruit of Platycarya richardsonii preserved in pyrite, × 3.5, from Herne Bay (see Collinson, 1983b). (Photo: M.E. Collinson.)