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## Bognor Regis

[SZ 889 970]–[SZ 934 987]

### Introduction

The coastal exposures of London Clay at Bognor Regis (Figure 8.15) and (Figure 8.16) have yielded one of the most diverse early Eocene fruit and seed floras in Britain, second only to the classic flora at Sheppey. This is the only site in the Hampshire Basin to yield abundant fossilized fruits and seeds of the London Clay, and the only rich flora to have come from Division B of the London Clay anywhere in England. It has yielded some 130 species, of which 40 are only known from here. It is also the only known London Clay site to yield seeds of the arum family. The palaeobotany of this site thus provides valuable additions to our understanding of the paratropical rain forests that extended over much of Britain during early Eocene times.

In contrast to Sheppey, the plant fossils from Bognor Regis were unknown for many decades, owing to the poor exposure along the crucial part of the shore at Bognor. In a detailed description of the geology of this section of coast, Venables (1929) noted that the sequence between the Bognor Rock and Barn Rock (where the plant-rich levels were later discovered by him) was virtually unexposed and a detailed stratigraphical description impossible. Reid and Chandler (1933) described species of *Icacinicarya* and *Vitis* from the Bognor Rock Sandstone. The main plant bed was discovered by Venables two years later, in 1935 (Venables, 1962), and most of the subsequent collecting was done by Venables. The first detailed account of the fossil fruits and seeds here was in Chandler (1961a), whose species list was essentially repeated by Venables (1962). Chandler (1964, 1978) described further material, and a summary of the assemblage was provided by Collinson (1983b).

### Description

#### Stratigraphy

Unlike the other London Clay sites described in this volume, Bognor is in the Hampshire Basin. The best account of the geology is by Venables (1962). He records about 90 m of London Clay as being exposed along the foreshore at Bognor, which he divided into three 'groups' or members separated by discrete sandy layers, the Bognor Rock and Barn Rock (Figure 8.15) and (Figure 8.16). The plant fossils mainly originate from the Upper Fish Tooth Bed and Beetle Bed, in the Middle Clay Member, just above the Bognor Rock. As with most London Clay pyritized fruit and seed localities, collecting is easiest from loose material washed out of the clays by the action of the sea. However, it should be noted that the fossils have not been sorted and concentrated by the waves to the same extent as they have at Sheppey. Daley (in Daley and Balson, 1999) provides a more recent review of the geology here.

In the current classification of the London Clay (King, 1981), the Bognor plant beds are in the B1 and lowest B2 divisions, and are early Eocene (Ypresian) in age.

#### Palaeobotany

Fruits and seeds are preserved here mainly as pyrite petrifications (Figure 8.17) and (Figure 8.18). It is, in theory, possible to collect them directly from the strata, but the poor exposure makes this for the most part impractical, and material is better collected loose from the foreshore. Although it is not as easy to collect large numbers of specimens compared to Sheppey, Collinson (1983b) has reported that nearly 130 species have been found in the Bognor London Clay. Of these the angiosperms are by far the most common and diverse (see (Table 8.1)). There are also rachides of a ?dennstaedtioid fern, which occurs elsewhere in the London Clay (Collinson, 1996a, in press a). The conifer ?*Libocedrus* sp. (cypress family) is unique to this site.

## Interpretation

The compositional balance of the Bognor flora seems to be broadly compatible with that seen at the other London Clay sites, with abundant examples from the frankincense, grape vine, icacina, laurel, moonseed, palm and sumac families, all suggesting a paratropical vegetation of the shoreline and adjacent land areas.

While the assemblage has many taxa in common with other London Clay floras, such as that found at Sheppey, there are several distinctive aspects to the Bognor flora. It is the only place to yield the arum family from the London Clay.

The genus *Bognoria* is unique to this site, and represents an enigmatic type of fruit that is similar to the sabiacean genus *Meliosma*. Chandler (1961a) expressed some reservations as to its affinities with that family, due to the uncertainty as to whether or not the endocarp completely surrounded the basal aperture of the fruit. Records of *?Trachycarpus* and *Palaeobursera* (Chandler, 1961a, 1978) are unique to Bognor among the London Clay sites.

As at Sheppey, the moonseed family is well represented at Bognor. For three of the genera (*Diploclisia*, *Parabaena* and possibly *Menispermum*) Bognor was the only locality where they were known as fossils (Collinson, 1983b), though a single specimen of *Diploclisia* has now been recorded at Sheppey. *Diploclisia* was subsequently reported from the Clarno Formation of Oregon (Manchester, 1994) and is one of 30 genera showing common occurrence and hence biogeographical similarity between the early and middle Eocene deposits of North America and Europe (Manchester, 1994, 1999). *Parabaena* has now been recognized in the much younger lower Miocene deposits of continental Europe (Mai and Walther, 1991).

Bognor is also the only known locality for fossils of the living dilleniacean genus *Hibbertia*. All of these genera, except the widely distributed *Menispermum*, are restricted today to southeastern Asia or northern Australasia and provide added confirmation of the similarities between the Eocene London Clay flora and the Indo-Malaya vegetation of today.

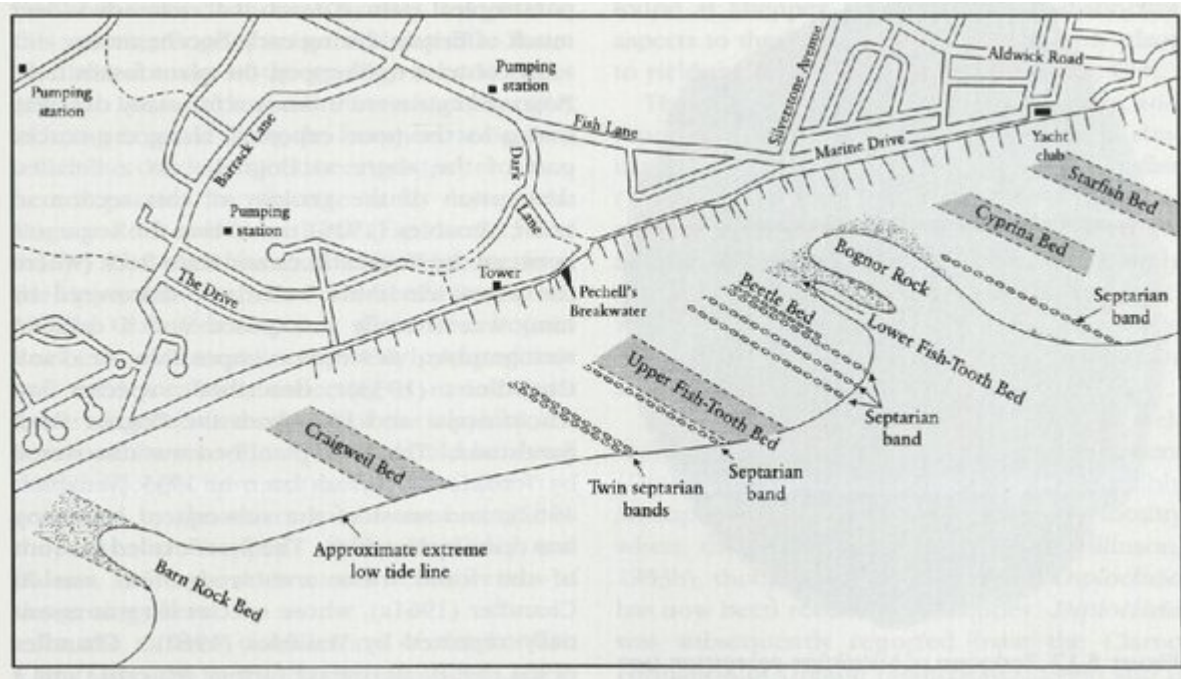
Bognor is particularly important for the smaller fruits and seeds (Chandler, 1978), which probably explains the large number of seeds of the grape family described from here. The seeds of *Vitis* can be difficult to differentiate one from another when separated from the parent plant and it is far from certain that all the morphotypes described by Chandler (1961a) are natural species. They nevertheless give an impression of the diversity of this group of plants in the Eocene vegetation of southern Britain.

Bognor is the only known British site yielding fruits and seeds from the B2 division of King (1981). It also complements the other London Clay plant sites in being the only known locality in the Hampshire Basin to have yielded a diverse fruit and seed flora. These factors, together with the distinctive balance of its flora, make Bognor a key British site for Tertiary palaeobotany.

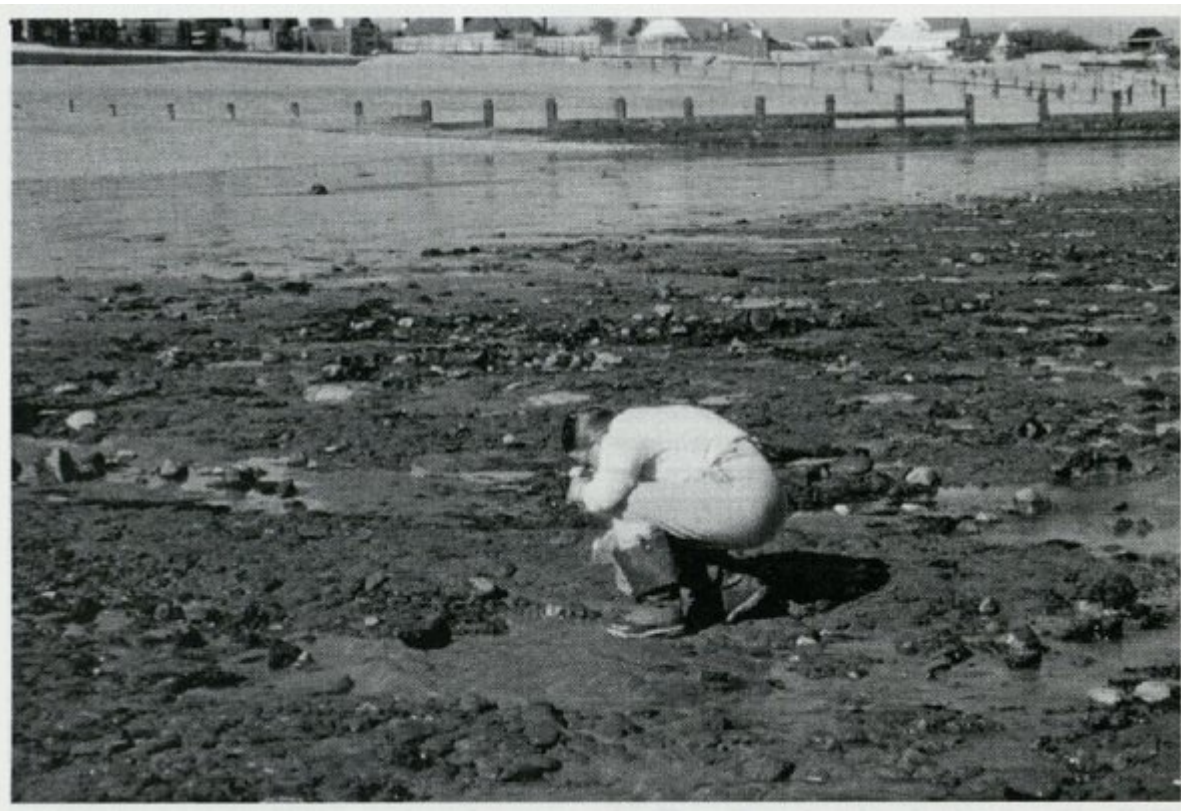
## Conclusions

Bognor is one of the best sites in Britain for yielding fruits and seeds of Ypresian age, c. 50 Ma old. Only Sheppey has yielded significantly more species, but Bognor has many species not so far known from there. Bognor is also much further west and of a different age than the other London Clay plant sites, demonstrating the wide distribution of the paratropical rain forest from which its fruits and seeds originally came.

## [References](#)



(Figure 8.15) Foreshore exposure of Division A3 and Division B (King, 1981) of the London Clay at Bognor Regis. (After Venables, 1962.)

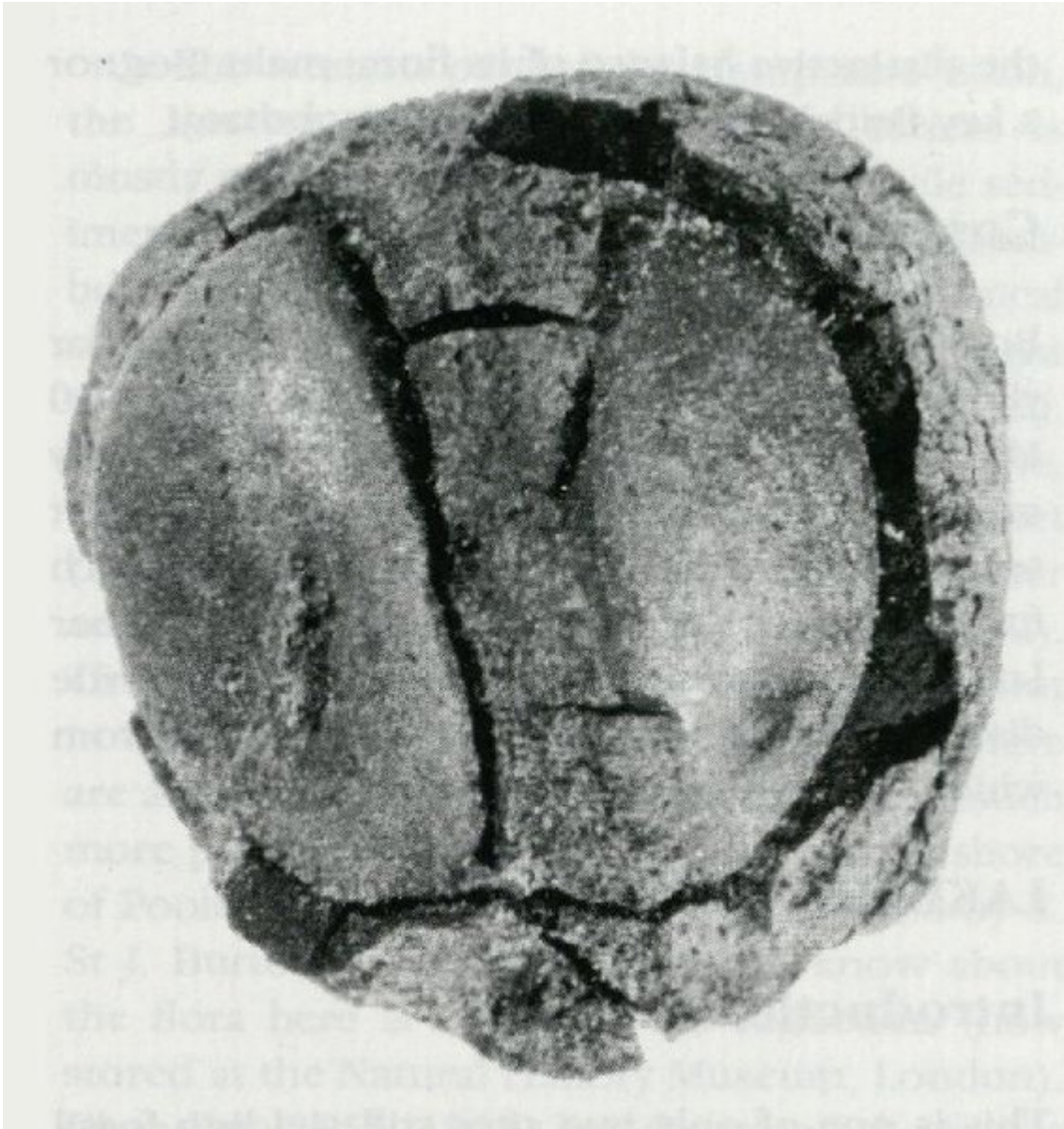


(Figure 8.16) Collecting on the foreshore at Bognor Regis, Summer 1990. (Photo: M.E. Collinson.)



(Figure 8.17) Endocarp of *Natsiatum eocenicum* (see footnotes to Tables 8.1 and 8.2), partially pyritized preservation,  $\times 7.5$  (see Collinson, 1983b). Bognor Regis GCR site. (Photo: M.E. Collinson.)





(Figure 8.18) Fruit of *Leucopogon quadrilocularis* showing locule casts, partly preserved in pyrite,  $\times 15.5$  (see Collinson, 1983b) from the Bognor Regis GCR site. (Photo: M.E. Collinson.)

