Paddy's Gap

[SZ 282 915]

Introduction

The site (Figure 9.9) is a short distance to the east of the Hordle Cliffs site discussed earlier in this chapter, and it exposes strata of only slightly younger age. Paddy's Gap is the best site for the late Eocene *Limnocarpus* band, which yields abundant fruits and seeds of the aquatic plant *L. forbesii* (Figure 9.10). The specimens described by Reid (1898) probably originated from here. The site is also included in the monograph on the flora of the Totland Bay Member (lower Headon Beds of earlier authors) by Chandler (1961c).

Description

Stratigraphy

The cliffs below Paddy's Gap expose the upper strata in the Totland Bay Member, often referred to as the '*Unio* Bed' or '*Limnocarpus* Band' (Bed 31 of Tawney and Keeping, 1883). They are mainly laminated clays in the lower part, grading up into coarse sands.

Palaeobotany

The plant fossils at Paddy's Gap consist almost exclusively of carbonaceous fruits of the aquatic plants, including *Limnocarpus forbesii* (Heer) Chandler *emend.* Collinson 1982a, *Stratiotes headonensis* Chandler, *Aldrovanda ovata* (Chandler) Chandler and *Sabrenia chandlerae* Collinson (Chandler, 1961c; Collinson, 1978a, 1980a, pers. obs.). Collinson (1980b, pl. 24, fig. 11) also documented from here *Azolla prisca* Reid and Chandler *emend.* Fowler. *L. forbesii is* especially abundant here.

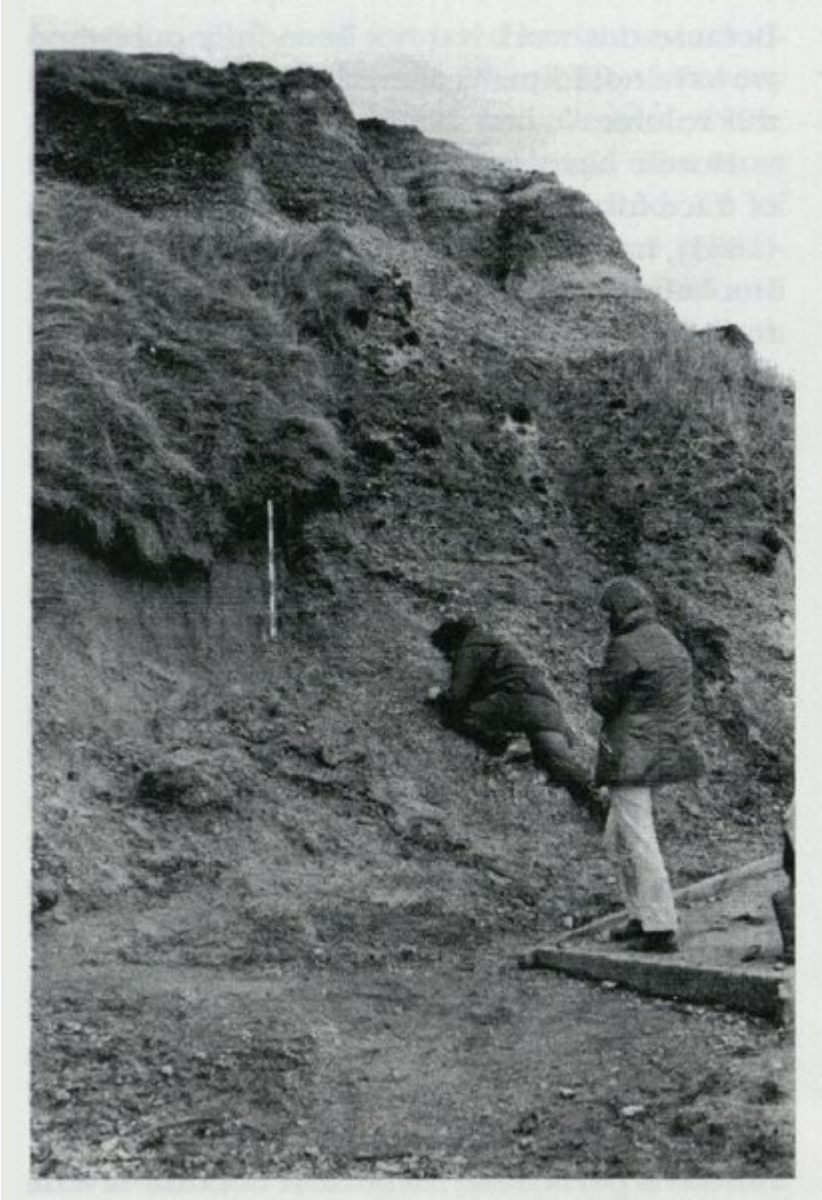
Interpretation

The abundant remains of the aquatic plant *Limnocarpus forbesii* have attracted considerable attention from palaeobotanists over the years. Tawney and Keeping (1883) noted the presence of 'little black seeds' in what they termed the '*Unio* Bed', and Reid (1898) described them as *Limnocarpus headonensis.* Chandler (1961b) demonstrated that they should more correctly be referred to as *L. forbesii.* Most recently, the species has been reviewed and emended by Collinson (1982a), who included it in a cladistic analysis of extant and fossil potamogetonean fruits. She suggested that it was probably a primitive member of this tribe of pondweeds, being distinguished from the other members by the fruits being bicarpellate rather than individual (Figure 9.11). The fossils from Paddy's Gap have been crucial in demonstrating this phylogenetically important feature (first documented by Reid and Chandler, 1926, p. 69); only five specimens preserved in the original bicarpellate condition were recovered from a sample of 8000 (Collinson, 1982a, p. 87). The concentrated remains of *Limnocarpus* are significant in understanding the growth site of the plant, which is thought to have tolerated both fresh and slightly brackish water (Collinson, 1996b). Furthermore, the abundance of specimens is valuable for new, organic geochemical or isotopic approaches, which involve destructive analyses. Van Bergen *et al.* (2000) have shown that *Limnocarpus* carries a chemosystematic signature confirming an affinity with the pondweeds, as originally proposed on morphological grounds (Collinson, 1982a).

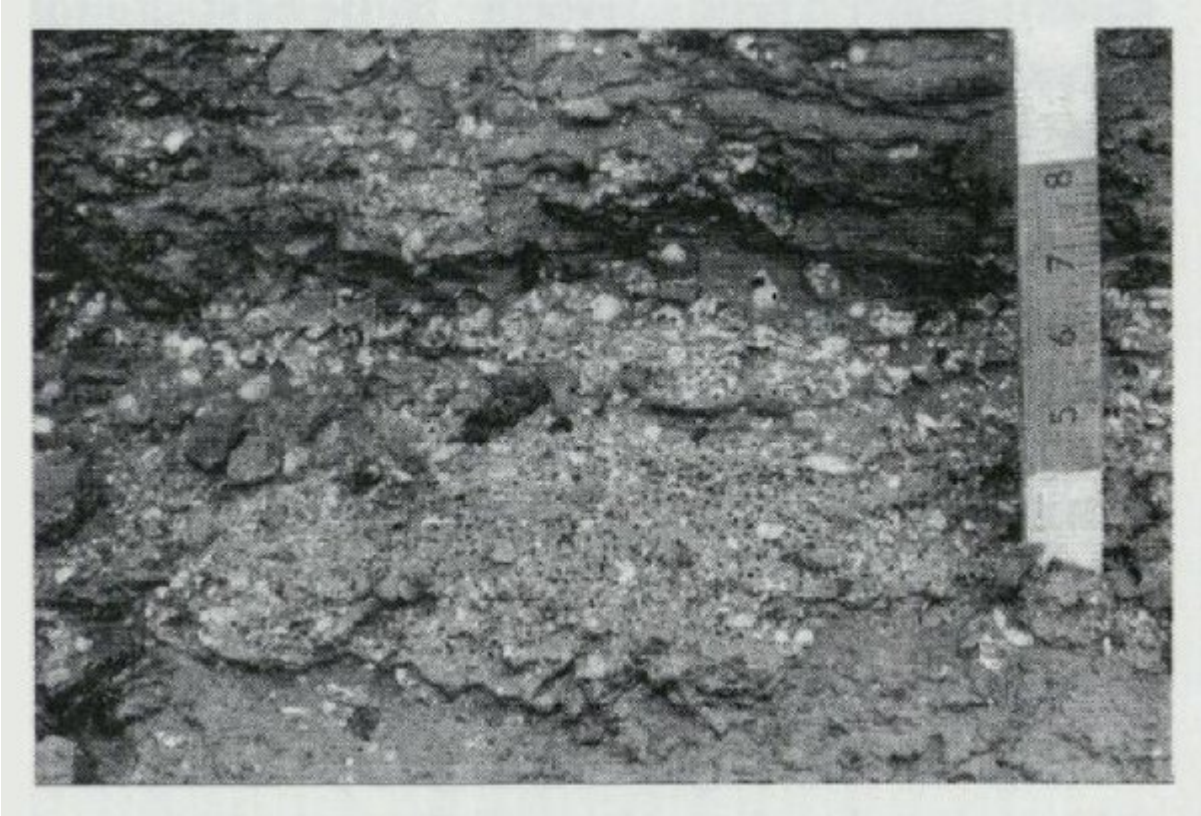
Conclusions

Paddy's Gap is the best site in Britain for the fruits of the primitive pondweed *Limnocarpus forbesii,* one of the most characteristic plants of the British late Eocene floras (*c.* 36 Ma old).

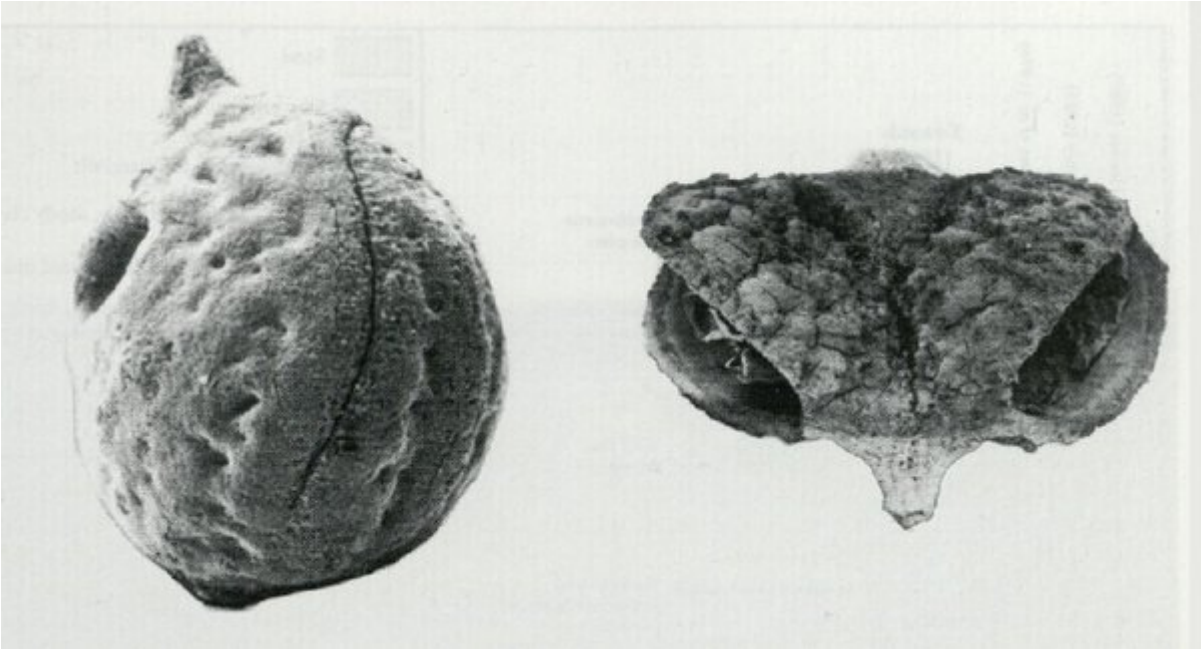
References



(Figure 9.9) Low cliff at Paddy's Gap with exposure of Limnocarpus band in the Unio Bed, Headon Hill Formation. The photograph was taken in the mid 1970s. The section is now largely obscured by new sea defences. (Photo: M.E. Collinson.)



(Figure 9.10) Detail of the exposure of the Limnocarpus band at Paddy's Gap, showing numerous small, black Limnocarpus fruits in situ. (Photo: M.E. Collinson.)



(Figure 9.11) Fruits of the extinct pondweed Limnocarpus, viewed under Scanning Electron Microscope (see Collinson 1982a). On the left is a single fruit, in which the bicarpellate condition is indicated by the straight margin opposite the germination valve, × 37. On the right is a bicarpellate fruit, × 30. Only sites such as Paddy's Gap, where large numbers of specimens can be studied, have ever yielded the bicarpellate fossils themselves. (Photo: M.E. Collinson.)