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## Cliff End

[TQ 887 127]

### Introduction

The succession at Cliff End contains the only known examples of in-situ remains of a lycopsid, which has hitherto been informally identified as *Isoetites* Oarzewowski *et al.*, 1996). The name implies that the plant has a sufficient number of morphological characteristics for it to be compared closely with the extant genus *Isoetes*. This may not prove to be correct once its anatomy has been fully described (at the time of writing, this work is in progress). However, for the sake of consistency it will continue to be referred to here as '*Isoetites*'.

There is no detailed published account of the plant fossils found at Cliff End, although Hughes (1976) and others have previously noted that water-worn pebbles and cobbles of portions of the silicified tree-fern trunk of *Tempskya schimperi* Corda can be found loose on the shore; indeed these may be found occasionally almost anywhere along the beach from Cliff End to Hastings. This is the only known location in Britain of representatives of the now extinct family Tempskyaceae.

The occurrence of *Tempskya* at outcrop was first recorded, as *Endogenites erosa* Stokes and Webb, in the thin basal shales of the Wadhurst Clay in the old sea cliffs behind White Rock Place ([TQ 8132 0925]; Fitton, 1836), just north-east of Hastings Castle at Ladies Parlour ([TQ 821 095]; Tylor, 1862), and in the East Hill succession to the east of the Old Town, Hastings ([TQ 827 095]; Fitton, 1836; Tylor, 1862). These deposits, which became known as the '*Endogenites*' Beds, crop out beneath a massive sandstone, both here and at Cliff End, from whence its name: the Cliff End Sandstone (Figure 6.14).

### Description

#### Stratigraphy

The exposure at Cliff End comprises upper Ashdown and lower Wadhurst Clay formations. The former is dominated by sandstones that display many sedimentary structures, among the most abundant of which are small-scale cross-lamination and mud-draped rippled surfaces. The overlying Wadhurst Clay is composed of sandstones with subordinate siltstone-mudstone beds. The latter occur at the base ('*Endogenites*' Beds) and the top of the cliff with the prominent Cliff End Sandstone in between.

#### Palaeobotany

The grey silty beds of the Ashdown Formation have yielded many plant microfossils (small spores, megaspores and gymnosperm pollen grains). They are particularly abundant in channel-fill deposits in the coastal section (Batten, 1969; Hughes, 1976). The Wadhurst Clay contains *Equisetites* rootlets and rhizomes in position of growth, but not at Cliff End, although roots of unknown plants *in situ* occur in both this formation and the Ashdown Beds here and at other points along the coast towards Hastings.

The beds containing '*Isoetites*' are fine, well-sorted, uncemented sandstones that weather rapidly and contain almost no particulate organic matter. The in-situ remains are irregularly dispersed within the sediment; although some are close together, they are not tightly packed. Superficially they may have a root-like appearance, and indeed may have been mistaken for roots in the past. Alternatively, it is possible that their occurrence is very local and that erosion of the cliffs has led to their current exposure. It would be premature to comment further on this plant until it has been formally described.

No study has been made of the occurrence of *Tempskya* in the Hastings-Pett Level succession. This is no doubt at least partly because the basal Wadhurst Clay is accessible in only a few places in the cliffs. The silicified remains on the beach are presumed to reflect a local stand of the ferns at the time of deposition of the enclosing sediment.

The anatomy of *Tempskya* indicates that it had an unusual pattern of growth. The trunk, to which the name is applied, is false in that it consists of several intertwining stems and roots. All of the fronds were small and produced from the sides of the upper portions of the trunks. Other Mesozoic tree ferns grew from an apical crown, as do all extant species.

## Interpretation

The Cliff End site, and the foreshore from this locality along the beach towards Hastings, have considerable potential for broadening our understanding of two important groups of Mesozoic plants: the lycopsids and ferns. More work is needed to determine why the particular species concerned should have been preserved in this part of the succession. They have not so far been found anywhere else in the Wessex–Weald Basin. The site exposes the basal Wadhurst beds that closer to Hastings are known to have yielded remains of *Tempskya*. It is possible that they may also be recorded from here in due course.

## Conclusion

The only known occurrences of Wealden lycopsids *in situ*, and of the tree fern *Tempskya* that has clearly been preserved close to, or within, the site in which it grew, have considerable potential importance for improving current knowledge of the biology and palaeoecology of the two families they represent.

## [References](#)



(Figure 6.14) Cliff End. The sea is washing beds of the upper Ashdown Formation within which the *Isoetites* plant fossils are found. The massive sandstones above belong to the Cliff End Sandstone within the Wadhurst Clay Formation.

(Photo: D.J. Batten.)