Lennel Braes

Highlights

Lennel Braes is of considerable historical interest as being the origin of some of the earliest described thin sections of fossil wood. The techniques developed here were of fundamental significance to the development of palaeobotany and petrology.

Introduction

This locality, in the bed of the River Tweed, near Coldstream, Borders Region, Scotland [NT 855 410], is one of many Cementstone Group sites in the Scottish borders to yield plant petrifactions.

It is of particular historical interest, however, as the origin of some of the specimens used in Witham's pioneering work on fossil wood thin sections (Witham, 1831, 1833; see also Scott, 1899). Subsequently, adpressions were recorded from here by Kidston (1901a, 1923c, 1924), and further petrifactions by Long (1963, 1964a, 1975).

Description

Stratigraphy

The only account of the stratigraphy is that given by Witham (1831). It is unclear where precisely in the Cementstone Group the concretion-bearing shales lie. Not all the 14 metres of rock described by Witham can still be seen, but the shales at the base of the section are still exposed and are where Long (1963) reported plant fossils. Stratigraphically diagnostic faunas have not been reported from here and so its exact age is uncertain. However, evidence from other localities suggest that the Cementstone Group is mainly late Tournaisian (Scott *et al.,* 1984). The environment represented was probably lacustrine.

Palaeobotany

Only a limited assemblage has been reported from here to date, including the following petrifactions, all of which are pteridosperm (probably Lagenostomopsida and Calamopityales) remains.

Pitus antiqua Witham

Lyginopteris papilio Kidston

Stenomyelon tuediana Kidston and Gwynne-Vaughan

Dolichosperma pentagonum Long

Eurystoma burnense Long

In addition, the following adpressions have been found:

Lycopsida:

Lepidodendron sp.

Stigmaria ficoides (Sternberg) Brongniart

Lagenostomopsida:

Diplothmema patentissima (Ettingshausen) Stur

Calamopityales (*incertae sedis*)*:*

Alcicornopteris convoluta Kidston

Interpretation

The preparation of thin sections of fossil wood was first developed in the 1820s by George Sanderson and an early example of its application was by Sprengel (1828). However, it was not until the method was refined by William Nicol, to enable the sections to be mounted on glass slides (Nicol, 1834), that its full potential could be realized. One of the most widely read studies on sections of fossil wood was by Nicol's friend Henry Witham (1831, 1833), who included specimens from Lennel Braes. Although he did not himself invent the technique, Witham was the first person to popularize it and bring it to the attention of the wider palaeontological community (Scott, 1911; Gordon, 1935b; Long, 1959a and Andrews, 1980 for an historical account). It had important consequences for the future of palaeobotany since, without the use of thin sections, the discoveries in the Rhynie Chert (see Chapter 4) and the Pennsylvanian coal-balls would have been impossible. It was also of major importance in petrology, since the experience obtained from sectioning such fossils was later applied to making rock sections (Sorby, 1858). As pointed out by Gordon (1935b), however, a more regrettable side-effect was that it tended to cause palaeobotany to be divided into biological and geological camps, a problem which still hinders the development of the subject today.

Witham described sections from a number of other Carboniferous and Jurassic localities, as well as Lennel Braes. The latter is the only one for which he gives a detailed account of the geology, however, and the only one from which material can still be collected.

Witham concluded that the fossil wood from Lennel Braes was coniferous, which appears to explain his use of the generic name *Pitus* (Witham, 1833). However, this has since been recognized to be incorrect, and at various times it has been assigned to the cordaites (Scott, 1902) and progymnosperms (Beck, 1960); but the currently available evidence now points to it being from lagenostomalean pteridosperm trunks (Long, 1963, 1979a).

Conclusion

Lennel Braes is of considerable historical interest as being the origin of some of the earliest described thin sections of fossil wood. The techniques of making thin sections developed here were of fundamental significance to the development of palaeobotany and petrology. Stratigraphically the locality is the same age as the Whiteadder limestones (see below) with an age of some 350 Ma.

References