

---

# Hayburn Wyke

[TA 011 969]

## Introduction

The Hayburn Wyke plant beds have long been known to yield a diverse and well-preserved fossil flora of Aalenian age. It is a key Yorkshire Jurassic plant fossil locality with unique floral elements, especially of cycads. The marchantialean liverwort *Hepaticites haiburnensis* is known only from this locality.

Hayburn (or 'Haiburn') Wyke is a small bay near Cloughton (Figure 3.29) and (Figure 3.30), and is an important source of plant fossils from the Saltwick Formation (the 'Lower Deltaic Series' of earlier authors). The earliest records seem to be by Phillips (1829) and Lindley and Hutton (1837). Leckenby (1864) also collected from here and some of his specimens were mentioned by Phillips (1875) (Leckenby's specimens are stored in the Sedgwick Museum, Cambridge). The 19th century records were summarized by Seward (1900a). Hamshaw Thomas collected extensively from the section in the early 20th century, although does not appear to have published descriptions of this material. Harris (1944a, 1945a, 1948, 1949a,b, 1950, 1951, 1952a, 1953) and Bose (1955) have described various species of bennettite, ginkgophyte, czekanowskialean and conifer foliage. However, the full spectrum of the flora at Hayburn Wyke was not revealed until the publication of Harris' monograph on the Yorkshire Jurassic floras (1961a, 1964, 1969, 1979a; Harris *et al.*, 1974).

## Description

### Stratigraphy

The section exposed at Hayburn Wyke includes parts of the Saltwick and Eller Beck Formations (Figure 3.31). The plant beds are in the argillaceous floodplain sediments exposed in the centre of the small bay. The succession dips gently southwards, the Eller Beck Formation reaching beach level at Lion Scar. The exposure is scattered over the rocky beach and often covered by landslip. The sandy units contain fragmentary plant remains, many of which are charcoalified. The finer-grained beds contain much abundant, more diverse, and better-preserved plants. Van Konijnenburg-van Cittert and Morgans (1999) have provided details of the field geology of this site.

Harris' unpublished notebooks refer to 12 separate plant beds in the vicinity of Hayburn Wyke (see (Table 3.3)), although some of these lie in the Cloughton Formation and are beyond the boundaries of the GCR site. The principle source of plant fossils is the main Hayburn Wyke Plant Bed, which probably corresponds to the Hayburn Beck and *Zamites* Beds of Harris.

(Table 3.3) The locations of the 'plant beds identified by T. M. Harris (in manuscript) along the coast at Hayburn Wyke

				[GR added 2023]
	Hayburn Beck <i>Zamites</i> Bed	54° 21' 32"	0° 26' 50"	[TA 01003 97040]
	Hayburn Beck Bed 1	54° 21' 40"	0° 27' 39"	[TA 00113 97268]
	Hayburn Beck Bed 2	54° 21' 35"	0° 27' 4"	[TA 00748 97127]
Lower Deltaic Series (= Saltwick Formation)	Hayburn Wyke <i>Zamites</i> Bed	54° 21' 27"	0° 26' 32"	[TA 01332 96893]
	Hayburn Tindall Point Plant Bed	54° 21' 25"	0° 26' 12"	[TA 01694 96839]
	Hayburn <i>Phlebopteris</i> Bed below Iron Scar	54° 21' 9"	0° 26' 4"	[TA 01849 96348]

	Hayburn Wyke 25 ft (c.8m) above Iron Scar	54° 21' 9"	0° 26' 4"	[TA 01849 96348]
Sycarham Series, Middle Deltaic Series	Hayburn Wyke 5 ft (c. 2.7m) above Iron Scar	54° 21' 9"	0° 26' 4"	[TA 01849 96348]
(= Sycarham Member of Cloughton Formation)	Hayburn Gorse Bed	54° 21' 3"	0° 26' 16"	[TA 01637 96157]
	Hayburn Gorse Bed (B5)	54° 21' 3"	0° 26' 16"	[TA 01637 96157]
	Hayburn Thomas Bed 2	54° 21' 57"	0° 28' 18"	[SE 99398 97778]
	Hayburn–Top of Eller Beck Bed	54° 21' 25"	0° 26' 28"	[TA 01405 96832]

## Palaeobotany

The complete list of about 60 plant species that have been found at Hayburn Wyke is given in (Table 3.1). It includes the marchantialean liverwort *Hepaticites haiburnensis* for which this is the type locality. The 12 ferns include *Cladophlebis haiburnensis*, which was first described from here by Lindley and Hutton. There are relatively few cycads and pteridosperms, although there are 11 bennettites, of which *Bucklandia gigas*, *Otozamites leckenbyi*, *O. mimetes*, *O. parallelus*, *O. tenuatus* (see also (Figure 3.32)), and *Weltrichia sol* were first described from here. The site is also the locality of the ginkgoalean *Baiera furcata*.

Van Konijnenburg-van Cittert (1978, 1989) used specimens of *Coniopteris hymenophylloides* (Figure 333), *C. murrayana*, *C. simplex* and *Todites princeps* from Hayburn Wyke in her studies of in-situ spores of these species. Morgans (1999) has described charcoalfied conifer wood from floodplain mudstone and crevasse-splay sandstones at the site as *Cedroxylon* spp., *Cupressinoxylon* spp., *Taxodioxylon* spp. and *Xenoxylon phyllocladoides* Gothan, 1906.

## Interpretation

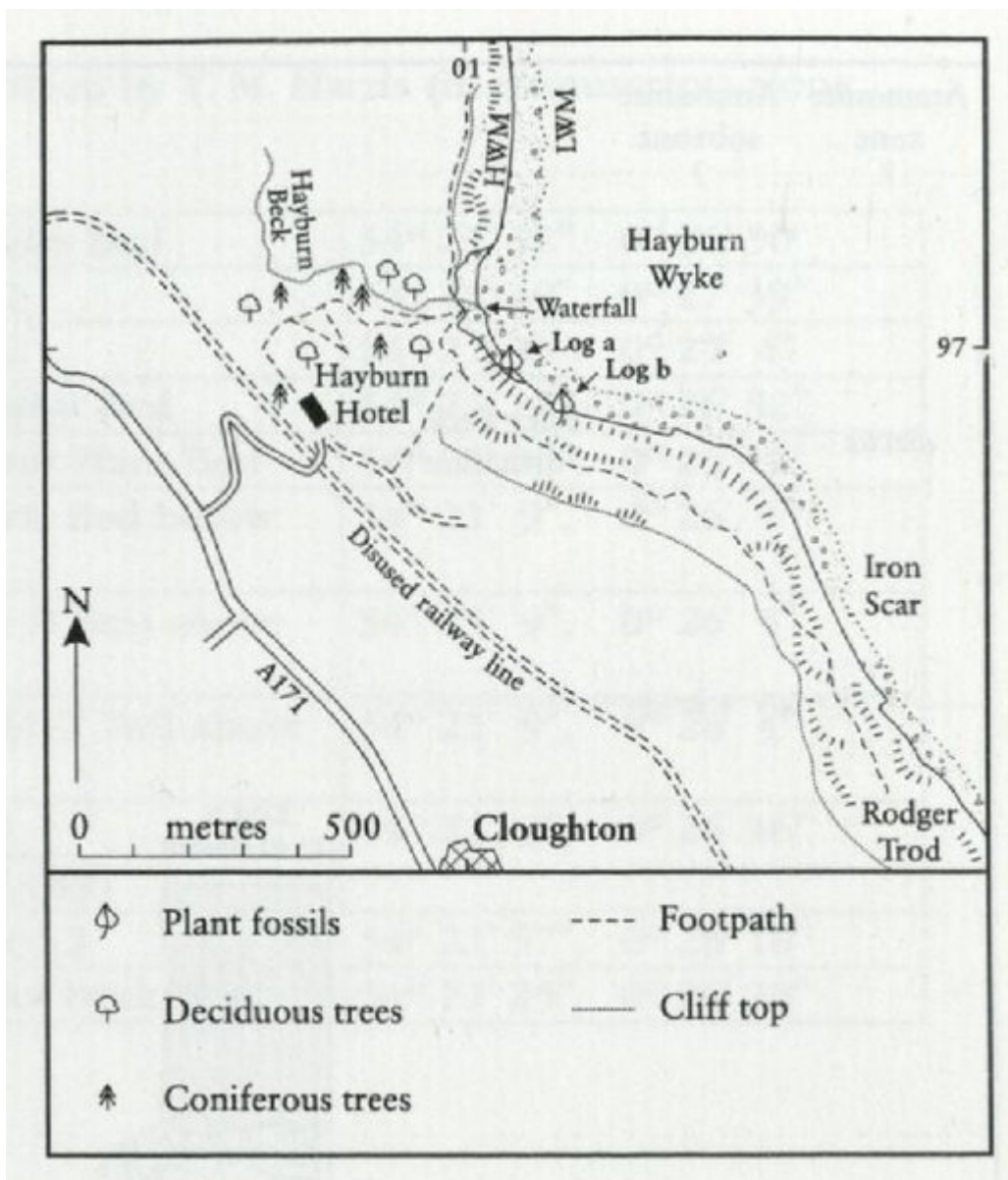
There are several horizons at Hayburn Wyke that yield different assemblages. The *Zamites* Bed is the richest and most important although it shows intense localization, both vertically and horizontally. Ferns are frequently common with *Clathropteris obovata*, *Coniopteris bella*, *C. hymenophylloides*, *C. murrayana*, *C. simplex*, *Matonidium goeppertii* and *Phlebopteris woodwardii*. The pteridosperm *Pachypteris lanceolata* is also common in places. At one point the only gymnosperms found by Harris (1969) were great numbers of *Zamites gigas* leaves (Figure 3.34), a few pieces of *Williamsonia* (*Bucklandia*) stem, a few *Williamsonia gigas* flowers and a few good specimens of *Weltrichia sol*, suggesting that these three organs were parts of a single plant species.

In contrast, the *Equisetum* bed, which is just above the Iron Scar (Figure 3.29), is only rich in *Coniopteris simplex*, possibly reflecting a very local plant community immediately surrounding a small lagoon.

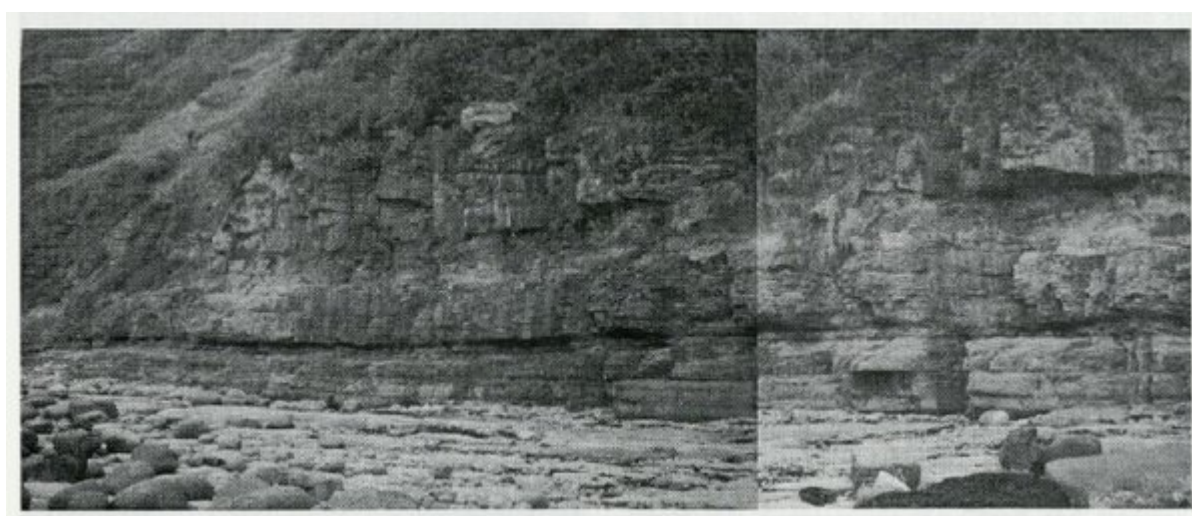
## Conclusion

The Hayburn Wyke plant beds contain an important and rich flora including several species that were first described from here and the only known occurrence of the liverwort *Hepaticites haiburnensis*. A reassessment of the species content of the various horizons should reveal valuable ecological information.

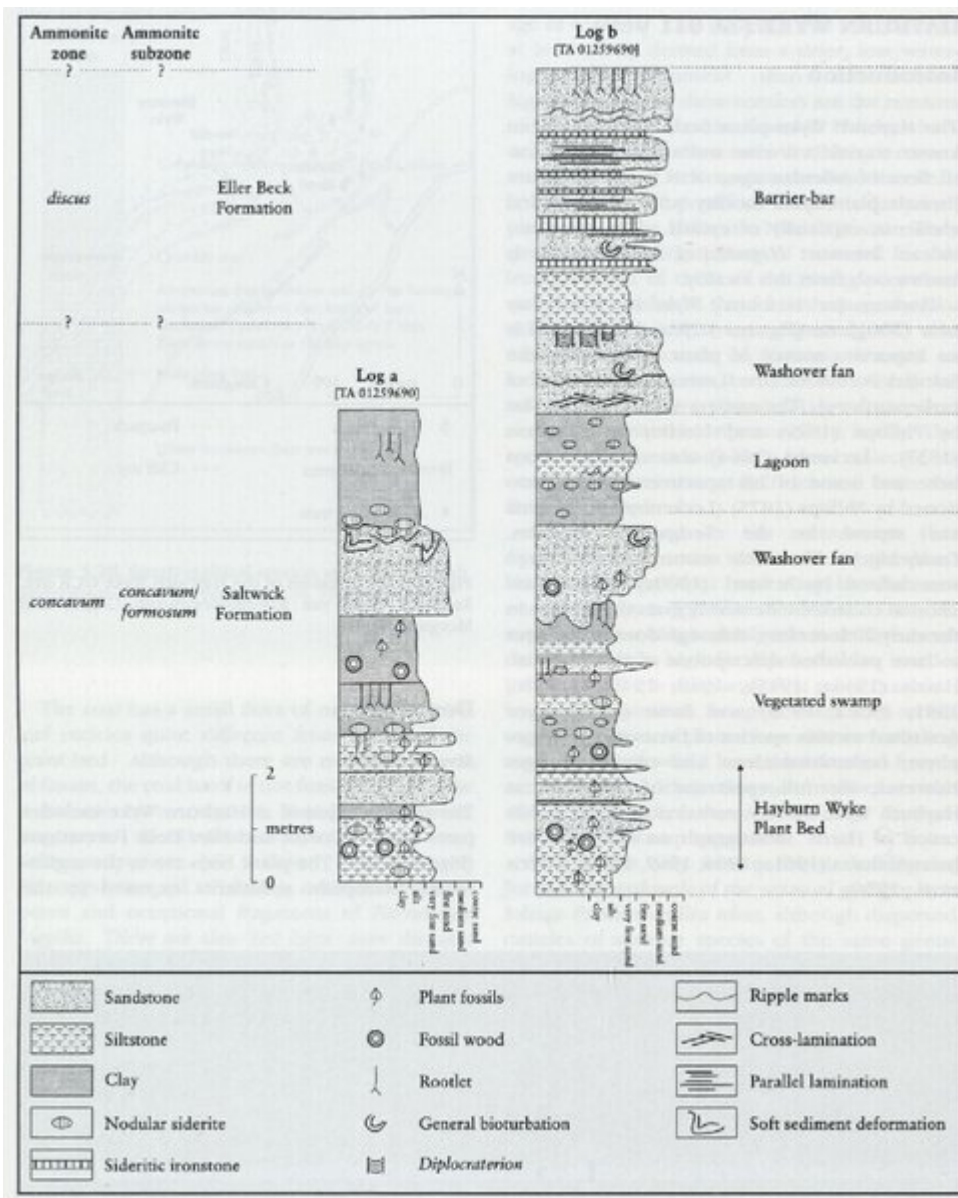
## [References](#)



(Figure 3.29) Location of the Hayburn Wyke GCR site. Redrawn from van Konijnenburg-van Cittert and Morgans (1999).



(Figure 3.30) Cliffs just to the north of Hayburn Wyke, where *Equisetum* stems can be found in situ. (Photomosaic: H. S. Morgans.)



(Figure 3.31). Stratigraphical section exposed at Hayburn Wyke, showing position of main plant beds. The locations of the logs are shown in Figure 3.29. (After van Konijnenburg-van Cittert and Morgans, 1999.)

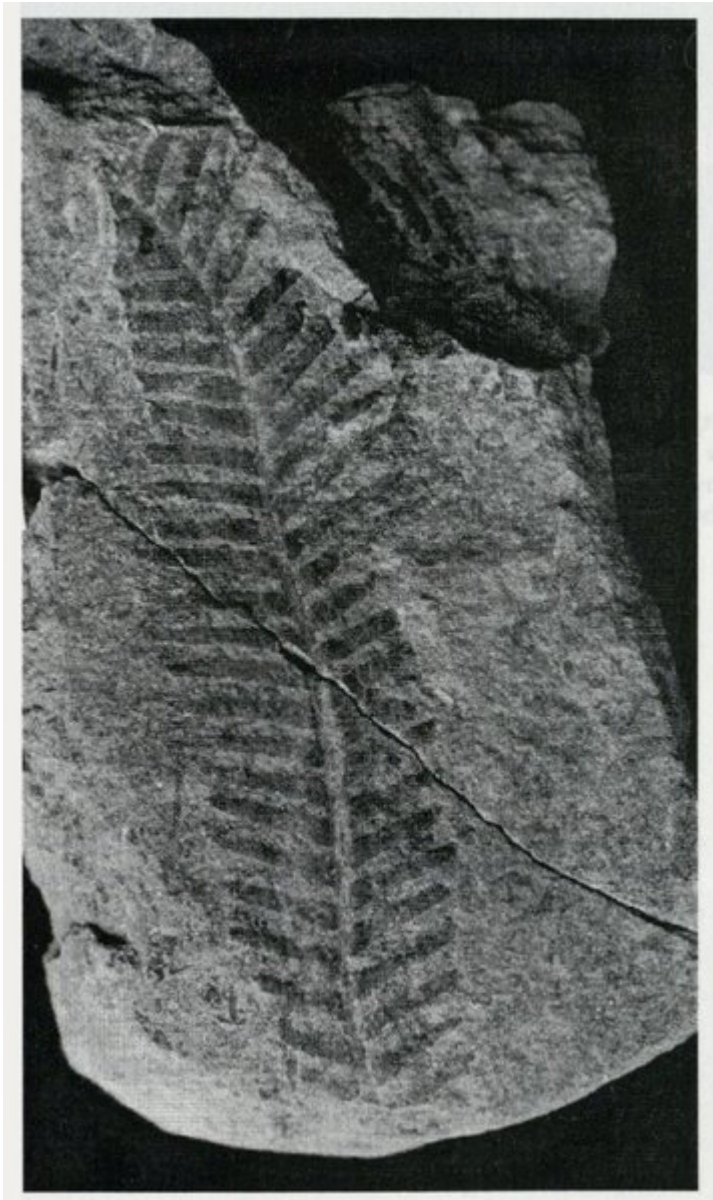
Lower Deltaic Series (= Saltwick Formation)	Hayburn Beck <i>Zamites</i> Bed	54° 21' 32", 0° 26' 50"
	Hayburn Beck Bed 1	54° 21' 40", 0° 27' 39"
	Hayburn Beck Bed 2	54° 21' 35", 0° 27' 4"
	Hayburn Wyke <i>Zamites</i> Bed	54° 21' 27", 0° 26' 32"
	Hayburn Tindall Point Plant Bed	54° 21' 25", 0° 26' 12"
	Hayburn <i>Phleboteris</i> Bed below Iron Scar	54° 21' 9", 0° 26' 4"
Sycarham Series, Middle Deltaic Series (= Sycarham Member of Cloughton Formation)	Hayburn Wyke 25 ft (c.8m) above Iron Scar	54° 21' 9", 0° 26' 4"
	Hayburn Wyke 5 ft (c. 2.7m) above Iron Scar	54° 21' 9", 0° 26' 4"
	Hayburn Gorse Bed	54° 21' 3", 0° 26' 16"
	Hayburn Gorse Bed (B5)	
	Hayburn Thomas Bed 2	54° 21' 57", 0° 28' 18"
	Hayburn-Top of Eller Beck Bed	54° 21' 25", 0° 26' 28"

(Table 3.3) The locations of the 'plant beds identified by T. M. Harris (in manuscript) along the coast at Hayburn Wyke

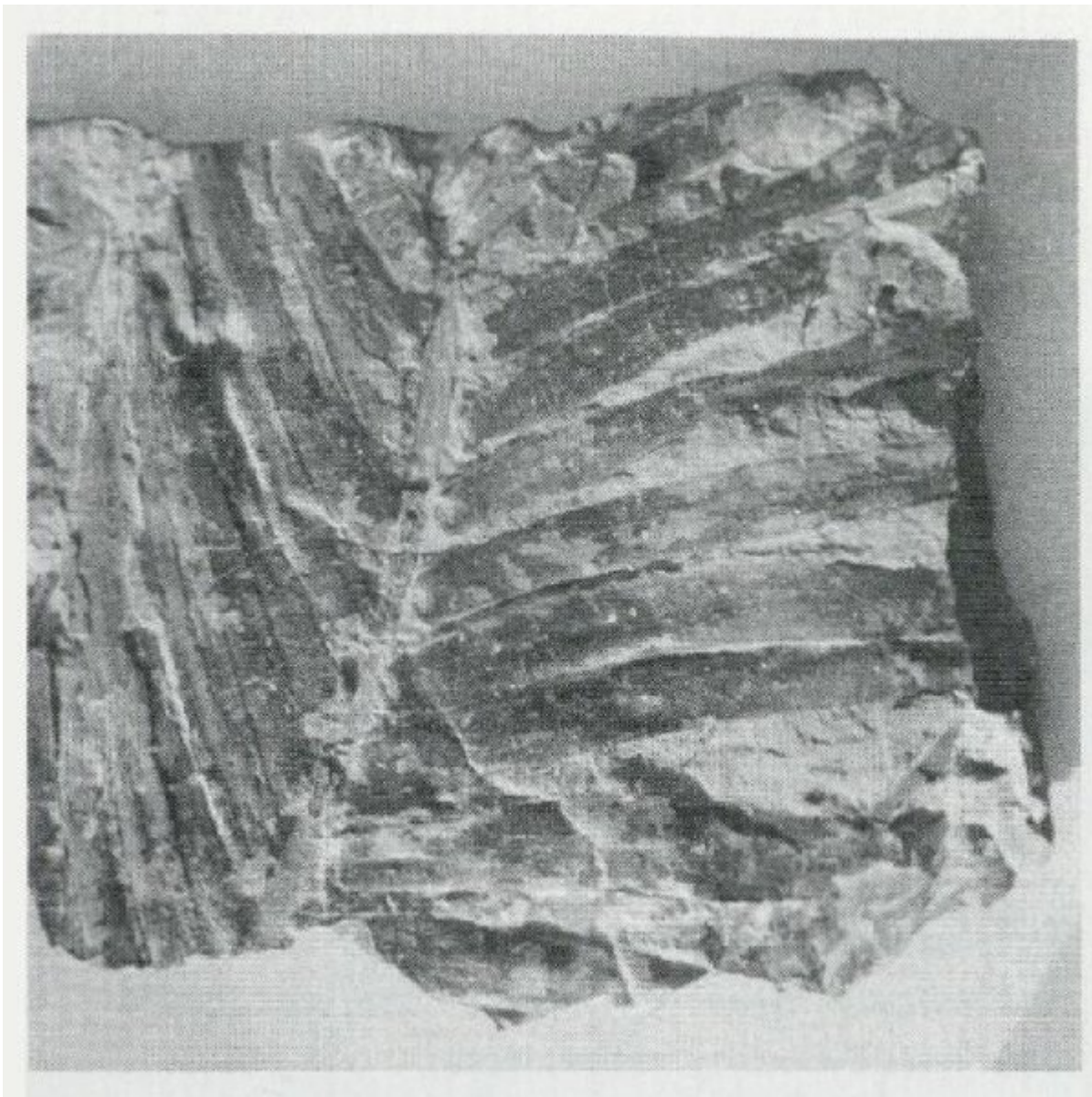
**Table 3.1** Records of plant fossils from the Yorkshire Jurassic GCR sites. These records have been gleaned from published accounts, largely by Harris (1961a, 1964, 1969, 1979a,b), Harris et al. (1974), Hill et al. (1985), Hill and van Konijnenburg-van Cittert (1971, 1975a,b, 1978, 1981, 1987, 1989), and van Konijnenburg-van Cittert and Morgans (1999), from archived field notes in the Natural History Museum (London), and from examining collections in that museum and the National Museum and Gallery, Cardiff. Records known to fall outside the boundaries of the sites have been omitted, but those over which there is some doubt have been included.

	1	2	3	4	5	6	7	8	9	10	11	12
<b>1. Wharfedale</b>												
<b>2. Airedale</b>												
<b>3. West Yorkshire</b>												
<b>4. Yorkshire</b>												
<b>5. East Yorkshire</b>												
<b>6. North Yorkshire</b>												
<b>7. East of Yorkshire</b>												
<b>8. West of Yorkshire</b>												
<b>9. North of Yorkshire</b>												
<b>10. South of Yorkshire</b>												
<b>11. East of Yorkshire</b>												
<b>12. West of Yorkshire</b>												
<b>13. North of Yorkshire</b>												
<b>14. South of Yorkshire</b>												
<b>15. East of Yorkshire</b>												
<b>16. West of Yorkshire</b>												
<b>17. North of Yorkshire</b>												
<b>18. South of Yorkshire</b>												
<b>19. East of Yorkshire</b>												
<b>20. West of Yorkshire</b>												
<b>21. North of Yorkshire</b>												
<b>22. South of Yorkshire</b>												
<b>23. East of Yorkshire</b>												
<b>24. West of Yorkshire</b>												
<b>25. North of Yorkshire</b>												
<b>26. South of Yorkshire</b>												
<b>27. East of Yorkshire</b>												
<b>28. West of Yorkshire</b>												
<b>29. North of Yorkshire</b>												
<b>30. South of Yorkshire</b>												
<b>31. East of Yorkshire</b>												
<b>32. West of Yorkshire</b>												
<b>33. North of Yorkshire</b>												
<b>34. South of Yorkshire</b>												
<b>35. East of Yorkshire</b>												
<b>36. West of Yorkshire</b>												
<b>37. North of Yorkshire</b>												
<b>38. South of Yorkshire</b>												
<b>39. East of Yorkshire</b>												
<b>40. West of Yorkshire</b>												
<b>41. North of Yorkshire</b>												
<b>42. South of Yorkshire</b>												
<b>43. East of Yorkshire</b>												
<b>44. West of Yorkshire</b>												
<b>45. North of Yorkshire</b>												
<b>46. South of Yorkshire</b>												
<b>47. East of Yorkshire</b>												
<b>48. West of Yorkshire</b>												
<b>49. North of Yorkshire</b>												
<b>50. South of Yorkshire</b>												
<b>51. East of Yorkshire</b>												
<b>52. West of Yorkshire</b>												
<b>53. North of Yorkshire</b>												
<b>54. South of Yorkshire</b>												
<b>55. East of Yorkshire</b>												
<b>56. West of Yorkshire</b>												
<b>57. North of Yorkshire</b>												
<b>58. South of Yorkshire</b>												
<b>59. East of Yorkshire</b>												
<b>60. West of Yorkshire</b>												
<b>61. North of Yorkshire</b>												
<b>62. South of Yorkshire</b>												
<b>63. East of Yorkshire</b>												
<b>64. West of Yorkshire</b>												
<b>65. North of Yorkshire</b>												
<b>66. South of Yorkshire</b>												
<b>67. East of Yorkshire</b>												
<b>68. West of Yorkshire</b>												
<b>69. North of Yorkshire</b>												
<b>70. South of Yorkshire</b>												
<b>71. East of Yorkshire</b>												
<b>72. West of Yorkshire</b>												
<b>73. North of Yorkshire</b>												
<b>74. South of Yorkshire</b>												
<b>75. East of Yorkshire</b>												
<b>76. West of Yorkshire</b>												
<b>77. North of Yorkshire</b>												
<b>78. South of Yorkshire</b>												
<b>79. East of Yorkshire</b>												
<b>80. West of Yorkshire</b>												
<b>81. North of Yorkshire</b>												
<b>82. South of Yorkshire</b>												
<b>83. East of Yorkshire</b>												
<b>84. West of Yorkshire</b>												
<b>85. North of Yorkshire</b>												
<b>86. South of Yorkshire</b>												
<b>87. East of Yorkshire</b>												
<b>88. West of Yorkshire</b>												
<b>89. North of Yorkshire</b>												
<b>90. South of Yorkshire</b>												
<b>91. East of Yorkshire</b>												
<b>92. West of Yorkshire</b>												
<b>93. North of Yorkshire</b>												
<b>94. South of Yorkshire</b>												
<b>95. East of Yorkshire</b>												
<b>96. West of Yorkshire</b>												
<b>97. North of Yorkshire</b>												
<b>98. South of Yorkshire</b>												
<b>99. East of Yorkshire</b>												
<b>100. West of Yorkshire</b>												

(Table 3.1) Records of plant fossils from the Yorkshire Jurassic GCR sites. These records have been gleaned from published accounts, largely by Harris (1961a, 1964, 1969, 1979a,b; Harris et al., 1974), Hill et al. (1985), Hill and van Konijnenburg-van Cittert (1973), Spicer and Hill (1979), van Konijnenburg-van Cittert (1971, 1975a,b, 1978, 1981, 1987, 1989), and van Konijnenburg-van Cittert and Morgans (1999), from archived field notes in the Natural History Museum (London), and from examining collections in that museum and the National Museum and Gallery Cardiff. Records known to fall outside the boundaries of the sites have been omitted, but those over which there is some doubt have been included.



(Figure 3.32) *Otozamites gramineus* (Phillips) Phillips. The leaves of this bennettitalean can be up to 300 mm long and 50–70 mm wide, and are composed of slender pinnae in which the upper angles of their bases are enlarged as auricles. Laboratory of Palaeobotany and Palynology, Utrecht, specimen S.6432, Saltwick Formation, Hayburn Wyke,  $\times 0.9$ . (From van Konijnenburg-van Cittert and Morgans, 1999; photo: J.H.A. van Konijnenburg-van Cittert.)



(Figure 3.34) *Zamites gigas* (Lindley and Hutton) Morris. This common bennettite leaf is typically 300 mm long and 120 mm wide with large pinna that are parallel-sided and tapering in their upper third towards an acute apex. Laboratory of Palaeobotany and Palynology, Utrecht, specimen S.1319, Saltwick Formation, Hayburn Wyke,  $\times 0.25$ . (Photo: J.H.A. van Konijnenburg-van Cittert.)