Journal of Micropalaeontology, **19:** 163–164. 0262-821X/00 $15.00 © 2000 British Micropalaeontological Society

MICROPALAEONTOLOGY NOTEBOOK

Kinnekullea comma (Jones, 1879), a trans-Iapetus ostracod locum for the late Ordovician *Dicellograptus anceps* graptolite Biozone

M. WILLIAMS[1], J. D. FLOYD[2], C. G. MILLER[3], D. J. SIVETER[4] & P. STONE[2]

[1] British Geological Survey, Keyworth, Nottingham NG12 5GG, UK
[2] British Geological Survey, Murchison House, West Mains Road, Edinburgh EH9 3LA, UK
[3] Natural History Museum, Department of Palaeontology, London SW7 5BD, UK
[4] Department of Geology, University of Leicester LE1 7RH, UK

ABSTRACT - The ostracod *Kinnekullea comma* occurs in the upper part of the Cautley Mudstone Formation (Ashgill Series) in the Cautley district of northern England, thus geographically extending the stratigraphical value of *K. comma* as a locum for the *Dicellograptus anceps* graptolite Biozone in Ordovician shelly marine facies of Britain and Ireland. Its occurrence, in Scotland and England, confirms it as one of the earliest trans-Iapetus Ocean ostracod species. *J. Micropalaeontol.* **19**(2): 163–164, December 2000.

INTRODUCTION

Extensive Ashgill age ostracod faunas are known from southern Britain (Jones, 1987; Siveter, in press), but are mostly undocumented. Nevertheless, they occupy a time interval crucial for tracking the palaeogeography of palaeocontinents fringing the early Palaeozoic Iapetus Ocean. Recently Floyd *et al.* (1999) documented Ashgill age ostracods from the Girvan district of southwest Scotland. Their material includes *Kinnekullea comma* (Jones, 1879), a species characterized by its distinctive 'embryo-shaped' lobation (Fig. 1). The presence of *K. comma* can now be confirmed from strata of Ashgill age in the Cautley district of northern England. This southern British record extends its geographical occurrence and further demonstrates the value of *K. comma* as a marker fossil for the *Dicellograptus anceps* graptolite Biozone.

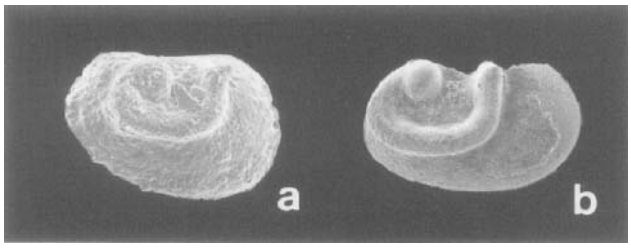

Fig. 1. Scanning electron photomicrographs of *Kinnekullea comma* (Jones, 1879): (**a**) lateral view of latex cast of left valve (British Geological Survey no. 16E913), from the South Threave Formation, Girvan district, south-west Scotland (locality 1 of Floyd *et al.*, 1999, text-fig. 2); (**b**) lateral view of anterior and antero-dorsally incomplete left valve (Sedgwick Museum no. A108475), from the Cautley Mudstone Formation, *c.* 50 cm below the Cystoid Limestone, Ecker Secker Beck (also known as Taythes Gill), Cautley district, northern England (locality ESB2 of Orchard, 1980). Magnifications ×30.

BIOSTRATIGRAPHY

In the Girvan district *K. comma* occurs in the Lady Burn and South Threave formations of the Drummuck Group, its range restricted to the *pacificus* Subzone of the *anceps* graptolite Biozone (Floyd *et al.*, 1999; see Fig. 2). Floyd *et al.* (1999) also note the occurrence of *K. comma* in the Portrane Limestone of southern Ireland at a slightly older, early *anceps* Biozone horizon. They further suggest that some of the Ashgill age Baltic species of *Kinnekullea* might be conspecific with *K. comma*.

Examination of M. J. Orchard's microfossil collections from the Ordovician of northern England (housed at the Sedgwick Museum, Cambridge), has identified *K. comma* from a horizon *c.* 50 cm below the Cystoid Limestone in the Taythes Inlier of the Cautley district (see Fig. 1b). According to Orchard (1980), this horizon is of early Rawtheyan age, equivalent to Ingham's (1966) zone 5. It thus equates with the upper part of the *anceps* Biozone (the *pacificus* Subzone; Fig. 2). Ingham recovered the trilobites *Tretaspis* cf. *seticornis hadelandica* and *Kloucekia* cf. *robertsi* (his loc. T9) from strata he referred to zone 5 in Ecker Secker Beck (also known as Taythes Gill; see Ingham, 1966, pl. 27). The ostracod-bearing locality lies within the Cautley Mudstone Formation of the Dent Group, the Ordovician part of the Windermere Supergroup (Kneller *et al.*, 1994). This new record of *K. comma* confirms its value as a locum for the *anceps* Biozone in shelly marine facies of the Ordovician of Britain and Ireland.

PALAEOBIOGEOGRAPHY

The Girvan district lay on the margin of the Laurentia palaeocontinent during the Ordovician, whilst the Cautley district was situated on the East Avalonia micro-continent to the south, with the Iapetus Ocean intervening. During late Ordovician times, as the Iapetus Ocean narrowed, these palaeocontinents approached each other, a notion indicated not least on faunal evidence (McKerrow & Cocks, 1976; Cocks & Fortey, 1982; Cocks, 2000), including ostracod distributions (Schallreuter & Siveter, 1985; Vannier *et al.*, 1989). Ordovician ostracods are considered to have been mostly benthic and shelf-marine, and to have had limited dispersal capability (see Schallreuter & Siveter, 1985). Hence, the supposed provinciality of Laurentian and Avalonian ostracods has been used as one argument for the continued separation of Laurentia and Avalonia into Silurian times (e.g., McKerrow & Cocks, 1976; Cocks & Fortey, 1982; McKerrow *et al.*, 1991; Cocks, 2000). In contrast, Schallreuter & Siveter (1985) demonstrated increasing faunal similarity at the generic-level between mid to late Ordovician Avalonian, Baltic and Laurentian ostracod faunas.

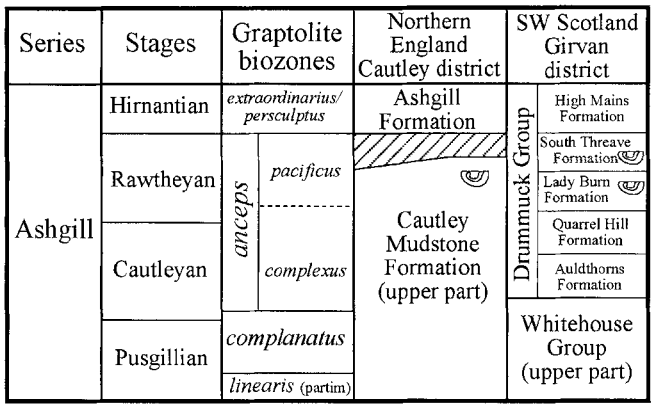

Fig. 2. Stratigraphical distribution of *Kinnekullea comma* (icon) within the Girvan district of SW Scotland and the Cautley district of northern England.

The presence of *K. comma* in Laurentia (Girvan district) and East Avalonia (Cautley district and Portrane) indicates that some marine-shelf ostracod species could cross the Iapetus Ocean by Ashgill times. Indeed, Siveter (in press) has noted the presence of several ostracod species in the Portrane Limestone (late Ordovician and Avalonia micro-continent) of southern Ireland which also occur in Laurentian sequences. Thus, as argued on tectonic and other grounds, the Iapetus Ocean may have been narrower at some point along its length by this time (see Pickering & Smith, 1995). Or, some Ordovician ostracods (*K. comma* included?) might have evolved lifestyles which facilitated their wider dispersal. There is little evidence for the latter suggestion, though ongoing study of the distribution and mode of life of other Ashgill age ostracod species common to Laurentia and Avalonia (Siveter, in press, and unpublished information of the authors) may further elucidate the palaeogeographical significance of these trans-Iapetus Ocean ostracod pioneers.

ACKNOWLEDGEMENTS

We thank Mike Orchard (Geological Survey of Canada) and Mike Dorling (Cambridge) for making collections freely available, and Malcolm Hart (Plymouth) and an anonymous referee for improving the manuscript. MW, JDF and PS publish with permission of the Director, British Geological Survey.

Manuscript received 3 August 1999
Manuscript accepted 3 March 2000

REFERENCES

Cocks, L. R. M. 2000. The early Palaeozoic geography of Europe. *Journal of the Geological Society, London*, **157**: 1–10.

Cocks, L. R. M. & Fortey, R. A. 1982. Faunal evidence for oceanic separations in the Palaeozoic of Britain. *Journal of the Geological Society, London*, **139**: 465–478.

Floyd, J. D., Williams, M. & Rushton, A. W. A. 1999. Late Ordovician (Ashgill) ostracodes from the Drummuck Group, Craighead Inlier, Girvan district, southwest Scotland. *Scottish Journal of Geology*, **35**: 15–24.

Ingham, J. K. 1966. The Ordovician rocks in the Cautley and Dent Districts of Westmorland and Yorkshire. *Proceedings of the Yorkshire Geological Society*, **35**: 455–505.

Jones C. R. 1987. *Ordovician (Llandeilo and Caradoc) beyrichiocope Ostracoda from England and Wales. Part 2.* Monograph of the Palaeontographical Society, London. pp. 77–114. (Publ. No. 571, part of vol. **139** for 1985).

Jones, T. R. 1879. Order Ostracoda. *In* Nicholson, H. A. & Etheridge, R. *A monograph of the Silurian fossils of the Girvan district in Ayrshire with special reference to those contained in the 'Gray collection'.* Volume **1**, Fasciculus II. William Blackwood and Sons, Edinburgh and London, 216–223.

Kneller, B. C., Scott, R. W., Soper, N. J., Johnson, E. W. & Allen, P. M. 1994. Lithostratigraphy of the Windermere Supergroup, Northern England. *Geological Journal*, **29**: 219–240.

McKerrow, W. S. & Cocks, L. R. M. 1976. Progressive faunal migration across the Iapetus Ocean. *Nature*, **263**: 304–306.

McKerrow, W. S., Dewey, J. F. & Scotese, C. R. 1991. The Ordovician and Silurian development of the Iapetus Ocean. *Special Papers in Palaeontology* **44**: 165–178.

Orchard, M. J. 1980. Upper Ordovician conodonts from England and Wales. *Geologica et Palaeontologica*, **14**: 9–44.

Pickering, K. T. & Smith, A. G. 1995. Arcs and backarc basins in the early Paleozoic Iapetus Ocean. *The Island Arc*, **4**: 1–67.

Schallreuter, R. E. L. & Siveter, D. J. 1985. Ostracodes across the Iapetus Ocean. *Palaeontology*, **28**: 577–598.

Siveter, D. J. in press. The Ordovician. *In* Wilkinson, I. P. *et al.* (Eds), *A stratigraphical Index of British Ostracoda.* British Micropalaeontological Society.

Vannier, J. M. C., Siveter, D. J. & Schallreuter, R. E. L. 1989. The composition and palaeogeographical significance of the Ordovician ostracode faunas of southern Britain, Baltoscandia and Ibero-Armorica. *Palaeontology*, **32**: 163–222.