
Excursion guide to the geology of East Sutherland and Caithness

Edited by N. H. Trewin and A. Hurst

Second Edition

Aberdeen Geological Society

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The Geological Society of Aberdeen

Membership of the Society is open to all with an interest in geology. A programme of lectures, excursions and social events is organised each year. For further details visit the Society website or write to:

The Secretary Aberdeen Geological Society c/o School of Geoscience Department of Geology and Petroleum Geology
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The Petroleum Exploration Society of Great Britain

The Petroleum Exploration Society of Great Britain (PESGB) was set up in 1964 as a non-profit making organisation and is a registered charity. It has a membership of 5,500 individual members and over 80 Sustaining (company) members. The object of the Society is to promote, for the public benefit, education in the scientific and technical aspects of petroleum exploration.

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The Society runs field trips to areas of petroleum and geological interest, both in the UK and abroad, and organises occasional core workshops.

The Society produces a monthly Newsletter and an annual Membership Directory, which are distributed to all members. Recent additional benefits to members include: each new edition of The North Sea Map, the Millennium Atlas DVD, and DVDs of the PGC IV, V and VI Proceedings.

There are four classes of members — Active, Associate, Student and Sustaining. The annual membership subscription is £25.

For further information about the PESGB, please contact the PESGB Office, 5th Floor, 9 Berkeley Street, London W1J 8DW, Tel: +44 (0)20 7408 2000, Fax: +44 (0)20 7408 2050, email: pesgb@pesgb.org.uk; web: www.pesgb.org.uk.

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Editorial introduction

The Jurassic rocks of the Brora–Helmsdale area form a coastal strip from Golspie in the south to Helmsdale in the north and are bounded on the landward side by the Helmsdale Fault. To the west of the fault the country rocks consist of Moinian metamorphics intruded by the late Caledonian Helmsdale Granite, and these rocks are overlain unconformably by the Old Red Sandstone of Devonian age.

This area has an interesting and varied geological history and has been the focus of considerable geological research from the early work of Murchison (1827) right up to the present day. Early interest was stimulated by the presence of Jurassic coal at Brora, which was mined from as early as 1598 until 1974. Bricks were made from Jurassic clays at Brora but the site of the brickpits has now been landscaped. A brief 'gold rush' to Kildonan took place in 1868, and gold can still be panned at Baille an Or.

Numerous geological field parties visit the area each year, usually to look at the spectacular Upper Jurassic 'Boulder Beds' which were deposited in deep water on the downthrow side of the Helmsdale Fault at a time when the fault was active. Other geologists are drawn to the area to see the lower part of the Jurassic succession, which has affinities to the rocks of the Beatrice Oilfield whose production platforms can be seen some 12 miles off Helmsdale on a clear day. To the north of Helmsdale lie the famous Old Red Sandstone deposits of Caithness, dominated by cyclic lake deposits with spectacular faunas of fossil fish.

The purpose of this volume is twofold; the first being to introduce the reader to the geology of the area by means of a chapter on the geological history of the region, and the second to provide a series of excursions to illustrate the geology. Some previous knowledge of geology is generally assumed, but all excursions are intended to provide interest for the amateur geologist, student and professional geologist. A checklist of major topics covered in the excursions, together with details of restricted access to some localities, is given in the Excursion Planner section of this guide. A geological map of the area is included as (Figure 1) and the symbols used on this map have been utilised throughout the volume as far as possible.

A range of excursions is provided which would occupy a party for a week or more. There are good hotels, guest houses, caravans, youth hostels and camping sites in the area, details of which can be obtained from the Tourist Information outlets. The towns of Golspie, Brora and Helmsdale are convenient for the Jurassic outcrops, and Wick and Thurso for the Devonian, but all excursions are within day-trip range of Helmsdale. Mention must be made of the excellent geological exhibition at the Orcadian Stone Company in Golspie. The Timespan Heritage Centre exhibition beside the old bridge in Helmsdale has good exhibits relating to local history and the history of the gold rush of 1868.

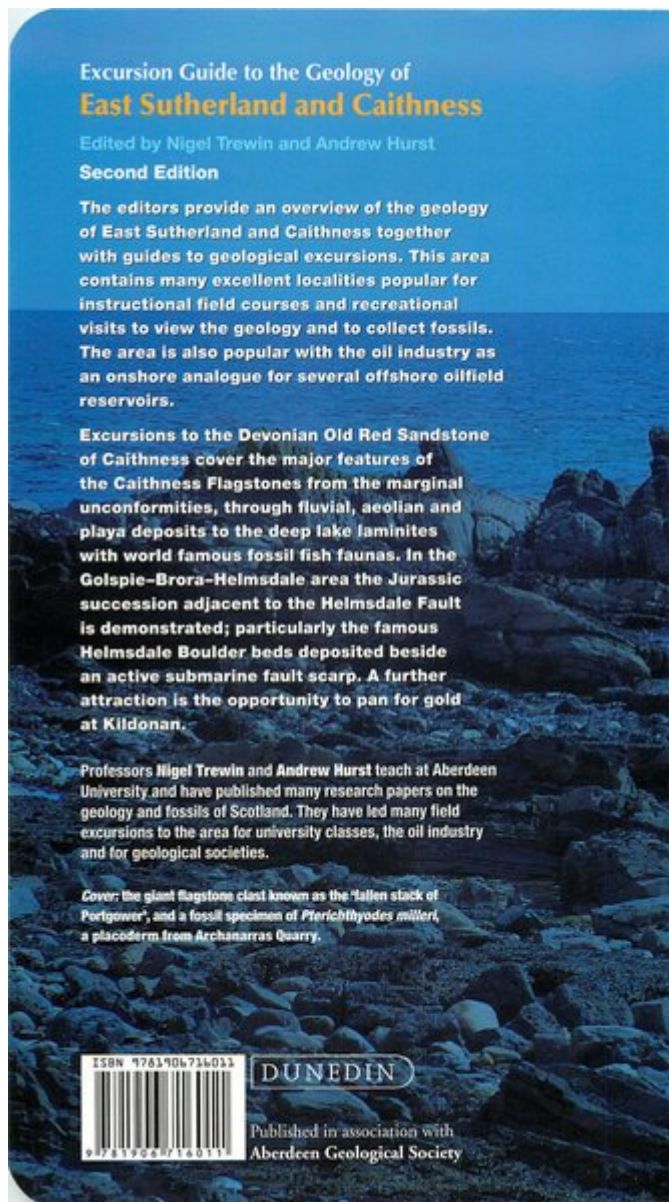
In following the enclosed excursions, always heed the Country Access Code by sensible parking, closing gates and avoiding growing crops and lambing ewes. Also follow the Scottish Fossil Code published by Scottish Natural Heritage. Seek permission to visit exposures in farmland and quarries, and take extreme care crossing the railway line. Do not hammer needlessly at any outcrops, or excavate exposures in a search for fossils; others will come after you wishing to see and photograph outcrops. Specimens can usually be obtained from loose material. In particular, do not hammer or remove bedrock at any Sites of Special Scientific Interest; SSSI — these are noted in the text. Never ignore personal safety, particularly in cliff and moorland areas. The weather in the area can be severe and change very quickly.

Since the publication of the first edition of this guide in 1993 there have been a number of changes in the area affecting access and exposure. Hence some of the original localities have been omitted and others added.

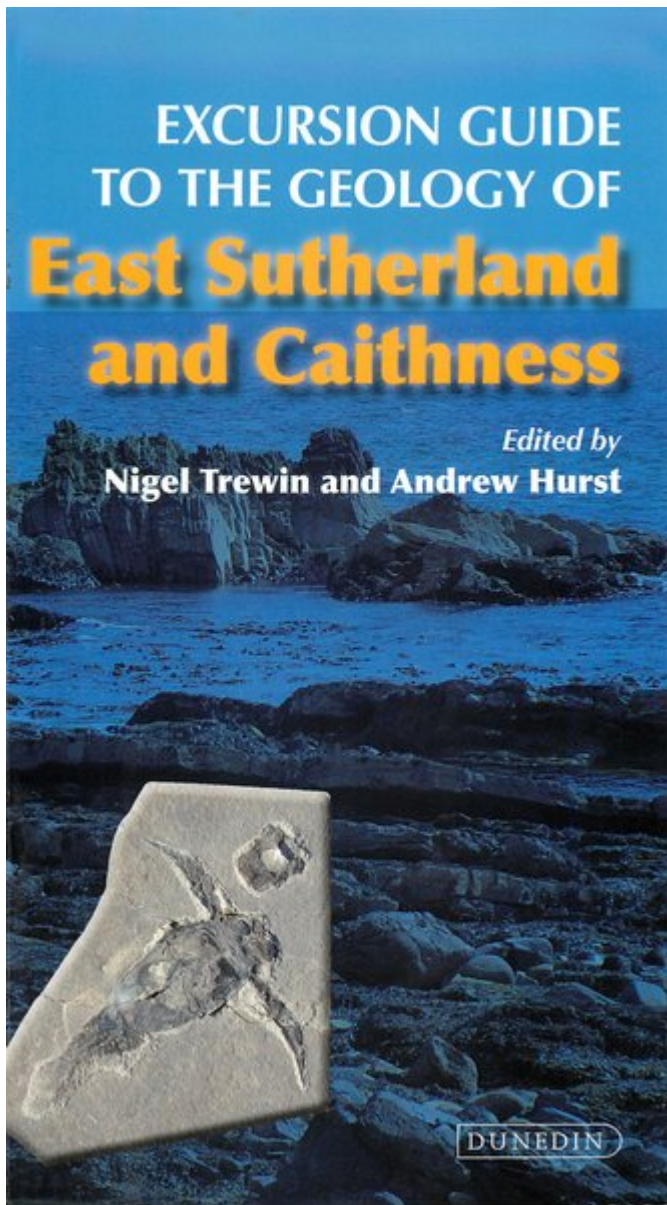
We hope that some of the different views and emphasis provided in the excursions will prove stimulating for the reader. Individual authors are responsible for the scientific content of each excursion, and excursions should be referenced under the author's name.

Nigel H. Trewin, Andrew Hurst — April 2009

[References](#)



(Rear cover) Rear cover.



(Front cover) Front cover.

STRATIGRAPHIC UNITS		OFFSHORE
Cretaceous (Lr)	Offshore sea bed outcrop only	KI
U	Kimmeridgian Boulder Beds, Ait na Cùile Sst.	J
Jurassic M-U	Brora Coal, Argillaceous Fms., Balintore Fm.	
L	Dunrobin Bay Fm.	
	Minor Unconformity	
Trias	Mainly Sandstones (Undiff Permo-Trias offshore) Unconformity	PT
Devonian (UORS)	Dunnet Head Sst. Faulted contact	
Devonian (MORS)	John o'Groats Sst. Upper Flagstone Gp Achanarras Lst. Lower Flagstone Gp Conglomerates and Sst. Normally unconformable	Undiff. Devonian offshore
Devonian (Lr ORS)	Conglom. Sst. Mdst. Unconformity	
IGNEOUS ROCKS	Mainly Granite Basic dykes Vents cutting Devonian (? Permian age)	
METAMORPHIC ROCKS	Moine metasediments quartzites to pelites Strathgairn Basement Complex Area of intense granite veining Amphibolite Granite dykes / veins	



Key to Figure 1, opposite 1 Sketch map of the geology of East Sutherland and Caithness.

(Figure 1) Sketch map of the geology of East Sutherland and Caithness.