



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

The Contribution of Serendipity to the Exploitation of Geoscience Collections

Mike Howe

Chief Curator, British Geological Survey

Kingsley Dunham Centre
Keyworth
Nottingham NG12 5GG
Tel 0115 936 3100

© NERC All rights reserved



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

Talk Outline

1. Serendipity – any place in strategy lead science?
2. Case study: the conodont animal
3. Case study: the fish – tetrapod transition
4. A strategy for aiding serendipity

Kingsley Dunham Centre
Keyworth
Nottingham NG12 5GG
Tel 0115 936 3100

© NERC All rights reserved





British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

1. Serendipity – any place in strategy lead science?
2. Case study: the conodont animal
3. Case study: the fish – tetrapod transition
4. A strategy for aiding serendipity

Kingsley Dunham Centre
Keyworth
Nottingham NG12 5GG
Tel 0115 936 3100

© NERC All rights reserved

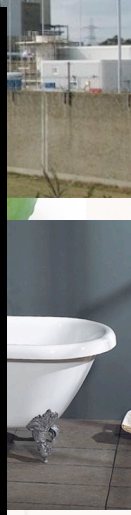
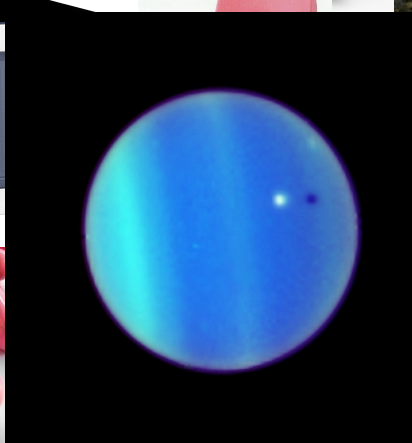


British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk



© NERC All rights reserved



- **Vulcanized rubber**
- 1839 – Charles Goodyear accidentally dropped a piece of rubber sprinkled with sulphur on a stove
- **Telephone**
- 1875 – Alexander Graham Bell was developing a “Speaking telegraph” when metal reed became stuck
- **X-Rays**
- 1895 - Wilhelm Röntgen was investigating cathode ray tubes when fluorescent papers became illuminated
- **Radioactivity**
- 1896 - Henri Becquerel was investigating phosphorescent materials with photographic plates
- **Penicillin**
- 1928 – Sir Alexander Fleming noticed a mould killed staphylococcus bacteria on a culture dish
- **Microwave Oven**
- 1945 - Percy Spencer was testing radar set when he noticed his chocolate bar had melted in his pocket
- **Polypropylene**
- 1951 – Two Phillips Petroleum chemists were experimenting with catalysts to make higher-octane gasoline from propylene and ethylene



Most major innovations depend on serendipity

Yet science is increasingly dominated by strategies, deliverables, assessments and scorecards



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk



Next Generation Science for Planet Earth

NERC Strategy 2007-2012



© NERC All rights reserved

Contents


| | |
|---|----|
| Context, direction and goal | 2 |
| Science themes | |
| Climate system | 6 |
| Biodiversity | 8 |
| Sustainable use of natural resources | 10 |
| Natural hazards | 12 |
| Environment, pollution and human health | 14 |
| Earth system science | 16 |
| Technologies | 18 |
| Responsive funding | 20 |
| Knowledge | 22 |
| People | 24 |
| Research facilities and equipment | 26 |
| Partnerships | 28 |
| Delivering the strategy | 30 |

Je-S - Microsoft Internet Explorer provided by The British Geological Survey

File Edit View Favorites Tools Help

Address <https://je-s.rcuk.ac.uk/JeS2WebLoginSite/Login.aspx> Go

Links BGS Google IDA Main Journals RECALL Released wells Beta Login - CEH Wiki Directors TWiki IM TWiki BGS Staff Directory

**Research Councils UK**
Joint electronic Submission

The Portal for the Research Councils' Electronic Grant Services

Je-S Programme Seminars - May/June 2008

We are planning a series of seminars in May and June 2008, at venues across the UK.

The objective of the seminars is to provide information about the Je-S Programme with an overview and update of remaining projects as well as looking to the future.

Contact JeSHelp@rcuk.ac.uk for further information and enrolment details

Login to Je-S

User Id:

Password:

Login

If you have forgotten your login details, [CLICK HERE](#).

[Terms and Conditions of Use](#)
[Supported Browsers](#)
[Contact Us](#)

[About Je-S](#) [Create Account](#) [Registration](#) [System Help](#) [Tutorials](#)

Je-S Version 4.0.36 • Copyright © Research Councils • All rights reserved.

From: <https://je-s.rcuk.ac.uk/JeS2WebLoginSite/Login.aspx>



The Description of the Proposed Research should address the following points:

- Underlying rationale, scientific and technological issues to be addressed, relevance to users and the potential scientific, practical and socio-economic benefits.
- Specific objectives of the project, including their potential relevance to UK and international research work in the field, relevance to the NERC mission (Annexe B) and anticipated achievements and outputs, including datasets.
- Methodology and approach.
- Programme and/or plan of research

.....



Quarterly Progress Report
Quarter Four (January-March)
2007-2008



Progress Monitoring

The Scorecard Approach

Introduction

This report provides information on:

- The summary progress of the NERC Scorecard at quarter four (page 1);
- Progress reports for all targets for quarter four (page 2); and

1. The summary progress of the NERC Scorecard at quarter four

| | |
|-------------------|----|
| Number of Targets | 79 |
| Green | 26 |
| Amber | 3 |
| Red | 0 |
| Completed | 50 |
| Nil Returns | 0 |

Definition of the traffic light system for progress reporting:

| | |
|-------|--|
| Red | Outside boundary condition, action required. There has been no progress on target, or, if work on the target has started, it is likely that the target will not be delivered in specified financial year. The delivery date and/or the detail in the target may have to be changed substantially. |
| Amber | Some deviation from plan, action taken. Progress is being made but the target may not be delivered on time or there have been or will be other problems. Some aspects of the work (e.g. delivery date) may have to be changed to ensure delivery of the target. |
| Green | Proceeding to plan, no action required. Progress on the target is as planned and no problems are envisaged. |

rae2008

Research Assessment Exercise

Search Go

News

Publications

Panels

Data collection

FAQs

Events

About RAE2008

Policies and procedures

Contact us

RA Review

RAE2001

The Research Assessment Exercise is conducted jointly by the Higher Education Funding Council for England ([HEFCE](#)), the Scottish Funding Council ([SFC](#)), the Higher Education Funding Council for Wales ([HEFCW](#)) and the Department for Employment and Learning, Northern Ireland ([DEL](#)).

The primary purpose of the RAE 2008 is to produce quality profiles for each submission of research activity made by institution. The four higher education funding bodies intend to use the quality profiles to determine their grant for research to the institution which they fund with effect from 2009-10. Any higher education institution (HEI) in the UK that is eligible to receive research funding from one of these bodies is eligible to participate in the exercise.

Latest

Latest news
 29 April 2008 - [Arrangements for publishing RAE2008 results](#)
 28 November 2007 - [panel membership published](#)

Key publications
[RAE 01/2007](#) - Data collection system user guide
[RAE Circular letter 2006/02](#) - Invitation to make submissions
[RAE 01/2006](#) - Panel criteria and working methods
[RAE 03/2005](#) - Guidance on submissions

[[Home](#) | [Site index](#) | [Contact us](#) | info@rae.ac.uk]



Higher Education Funding Council for Wales



HEFCE



HEFCE




Scottish Funding Council
Promoting further and higher education




Department for Employment and Learning
www.delni.gov.uk

Done
Internet



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL




www.bgs.ac.uk

1. Serendipity – any place in strategy lead science?
2. Case study: the conodont animal
3. Case study: the fish – tetrapod transition
4. A strategy for aiding serendipity

Kingsley Dunham Centre
Keyworth
Nottingham NG12 5GG
Tel 0115 936 3100

© NERC All rights reserved



NATURAL ENVIRONMENT RESEARCH COUNCIL

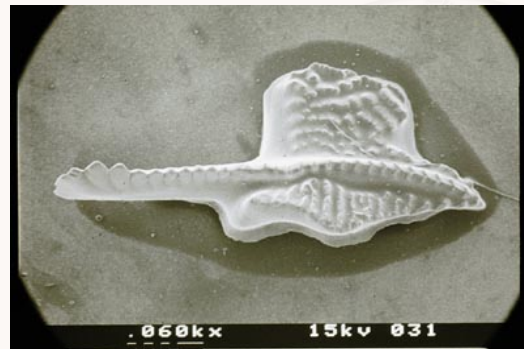
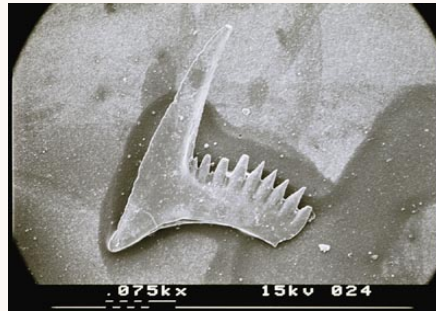


British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk



© NERC All rights reserved



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

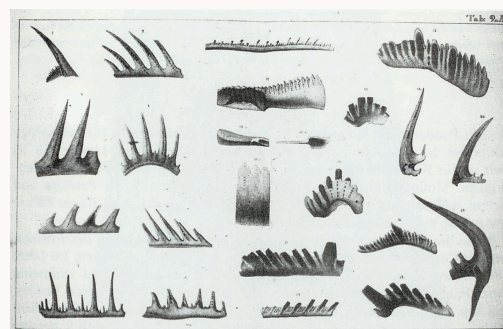
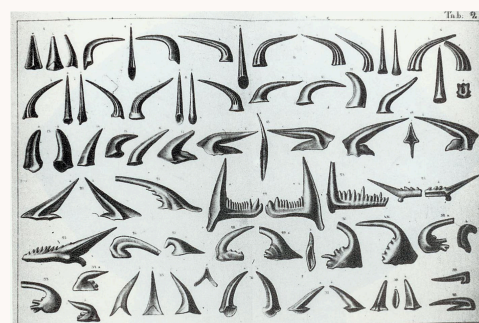


www.bgs.ac.uk

MONOGRAPHIE
DER
FOSSILEN FISCHE
DES
SILURISCHEN SYSTEMS
DER
RUSSISCH-BALTISCHEN GOUVERNEMENTS.

VON
Dr. Christian Heinrich Pander.

ST. PETERSBURG.
BUCHDRUCKEREI DER KAISERLICHEN AKADEMIE DER WISSENSCHAFTEN.
1856.



© NERC All rights reserved



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

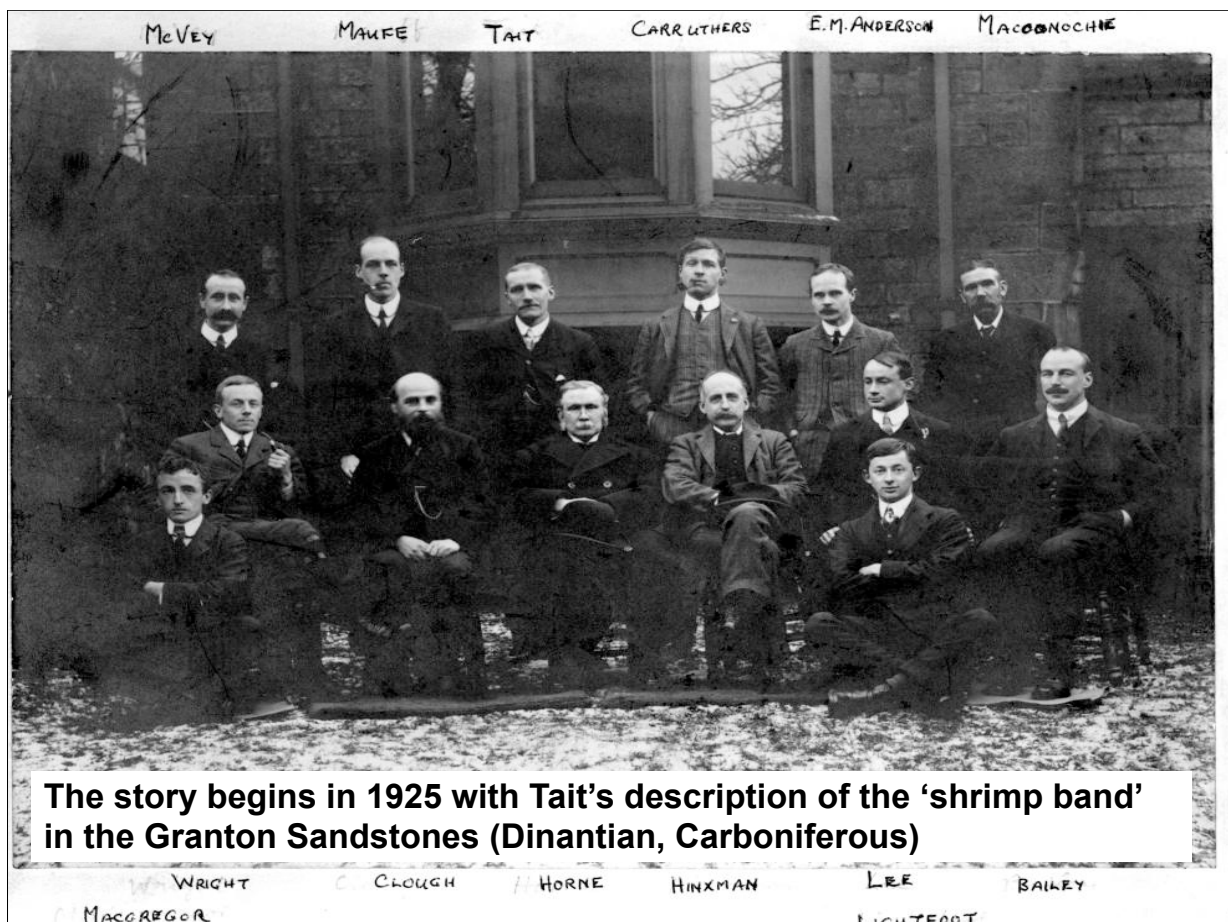


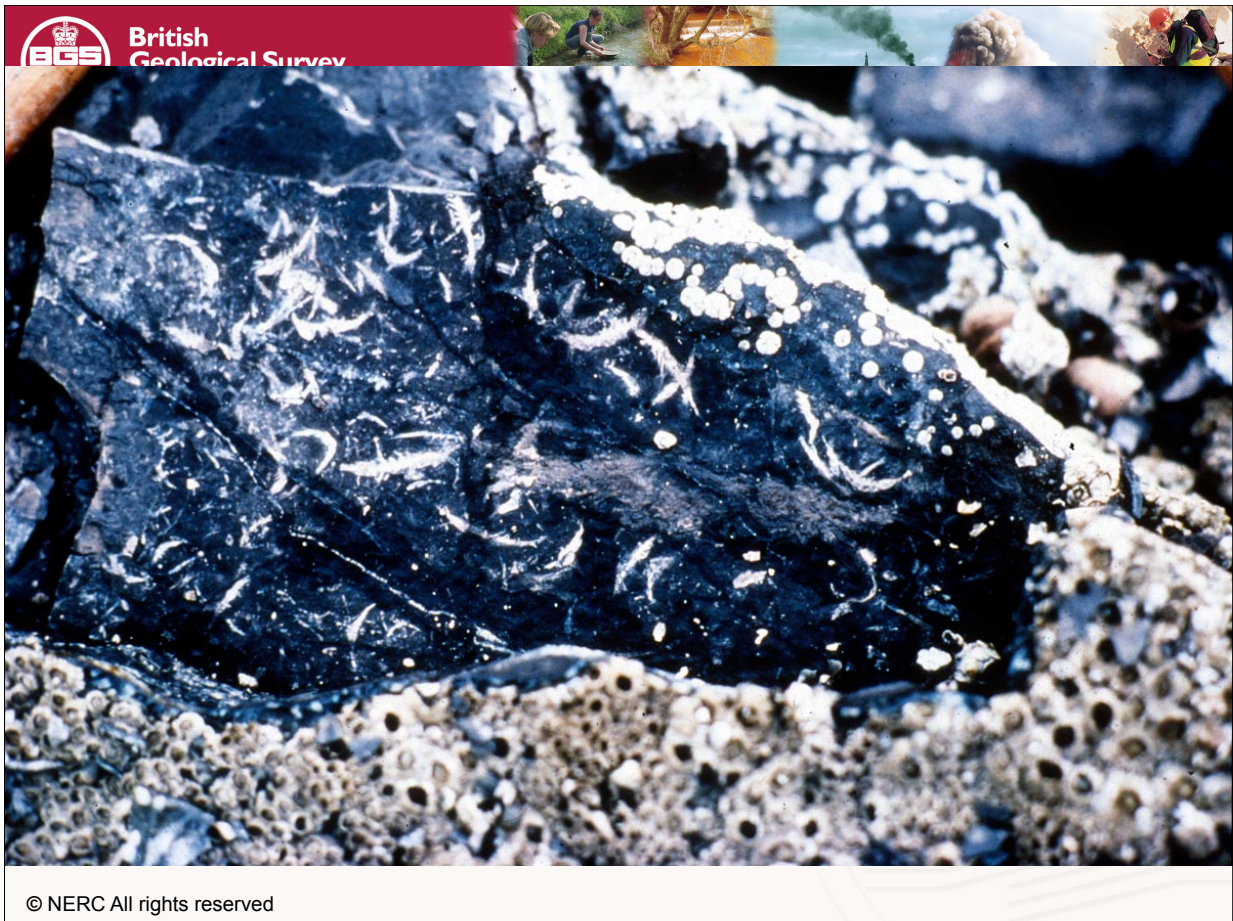
www.bgs.ac.uk

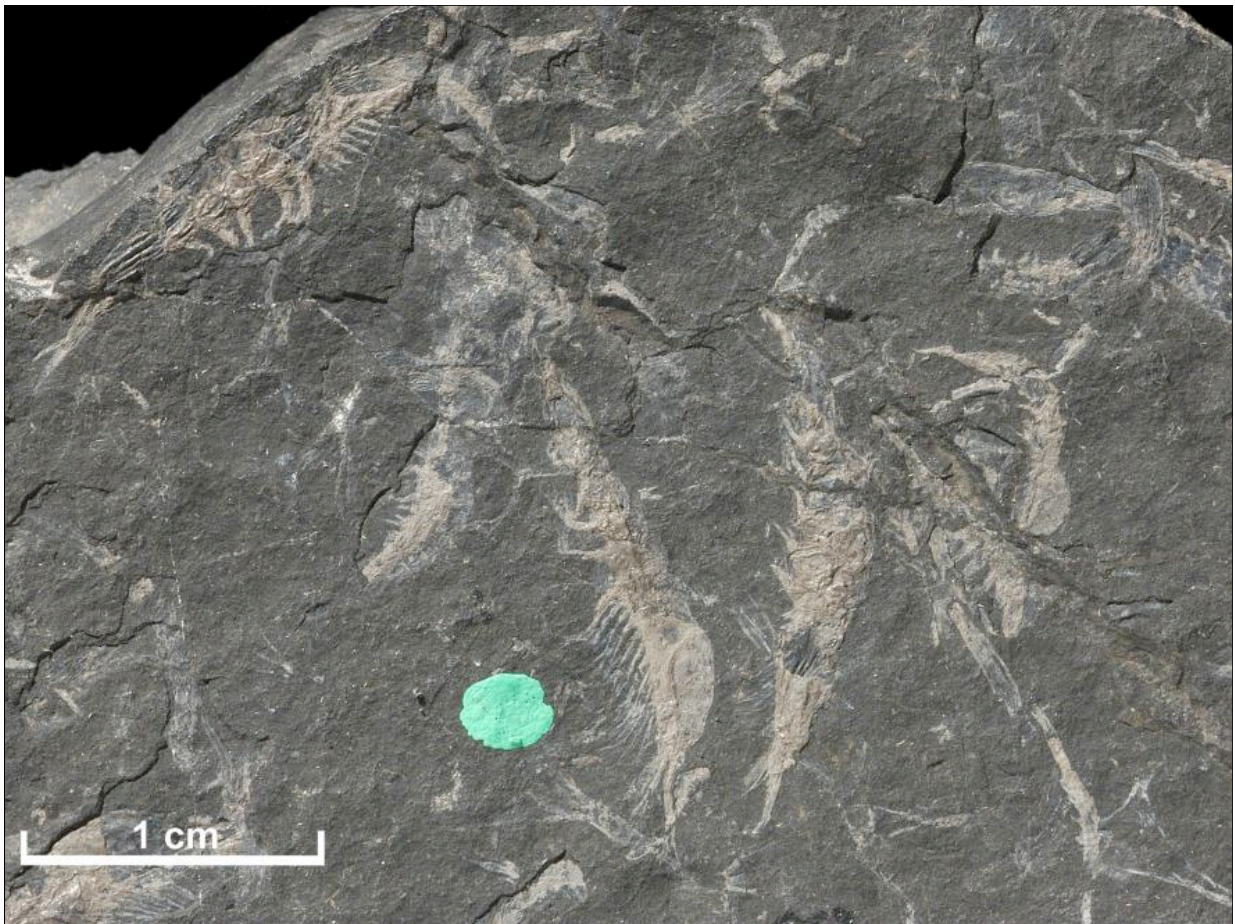
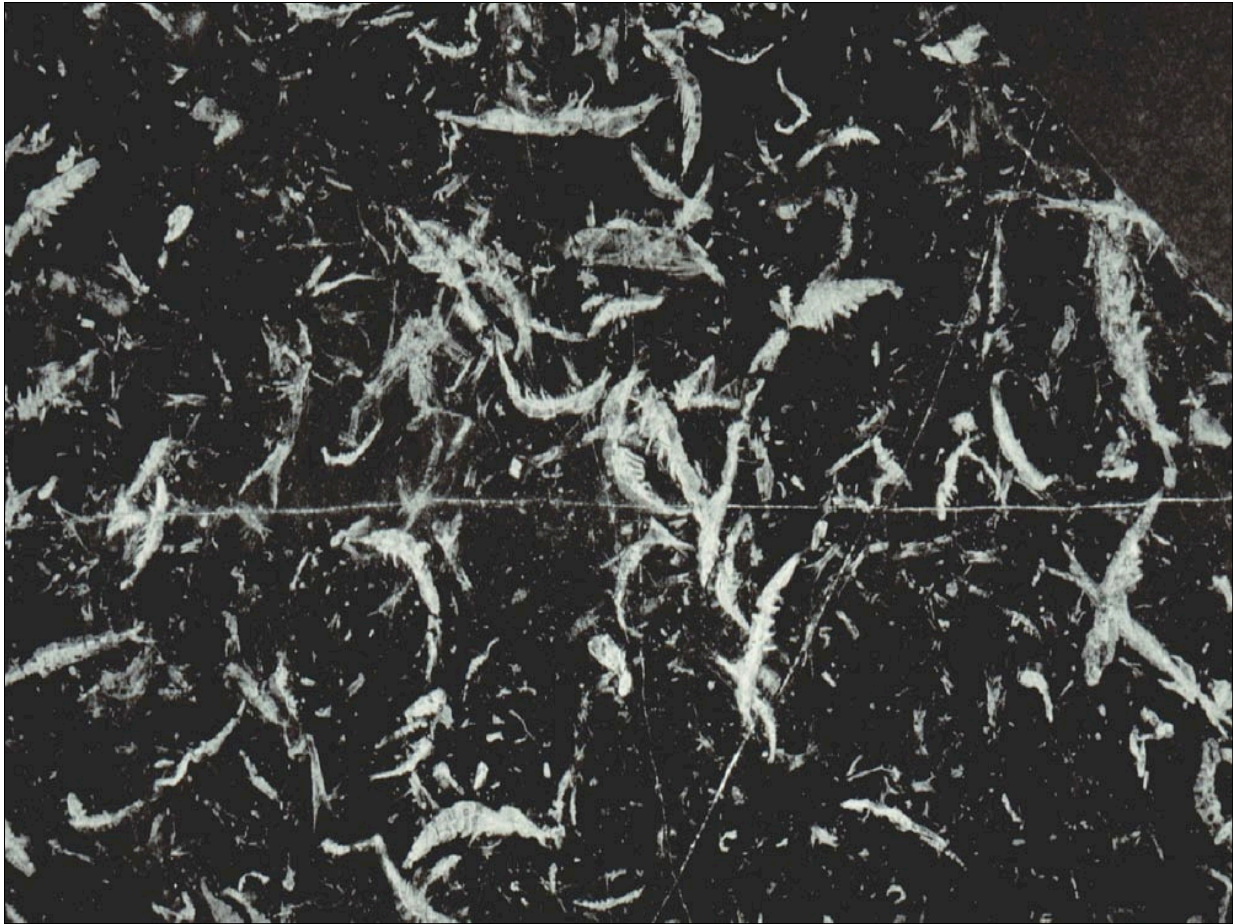
“The origin of conodonts is considered by many paleontologists to be one of the most fundamental unanswered questions in systematic paleontology.”

Klaus Müller, 1981

© NERC All rights reserved









British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk



Tait's collections were preserved in the BGS's Edinburgh offices.

© NERC All rights reserved



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk



Euan Clarkson



Peter Brand (right) with Bill Read



In Feb 1982 Euan Clarkson visited BGS while preparing a paper with Derek Briggs on the Granton Shrimp Beds

© NERC All rights reserved





British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



Euan Clarkson loaned the specimens and took them to London to discuss with Derek Briggs: "Surely those are conodonts. You don't suppose we've found the conodont animal?"




© NERC All rights reserved



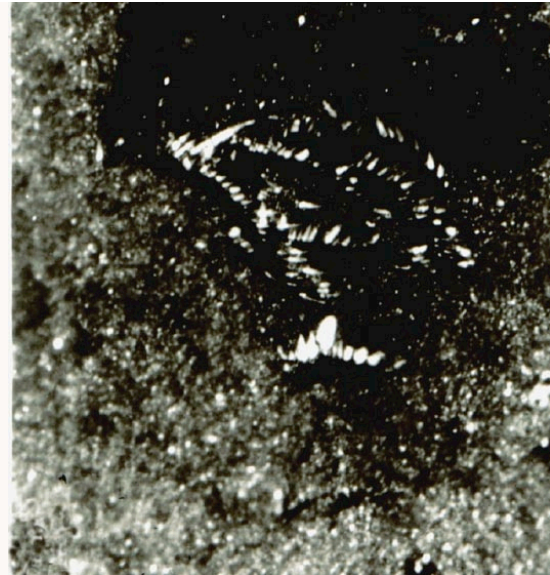
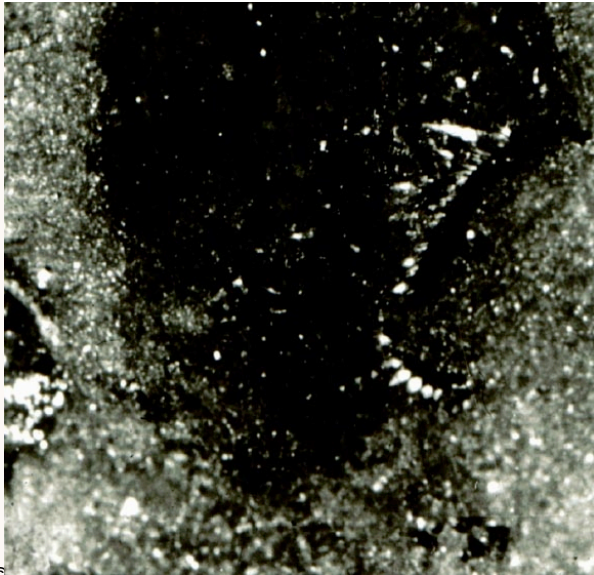
British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

Dick Aldridge was in London for a Palaeontological Association Council Meeting. He called in on his way home and confirmed that they were conodonts. The discovery was announced in Briggs, Clarkson & Aldridge (1983), *Lethaia*, 16, 1-14.



© NERC All rights reserved



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk



©



Deuterostomes Chordata

Ambulacraria



Tunicata

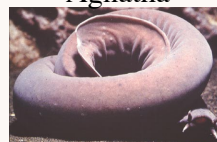


Cephalochordat



Vertebrata

Agnatha



Gnathostoma



Conodont

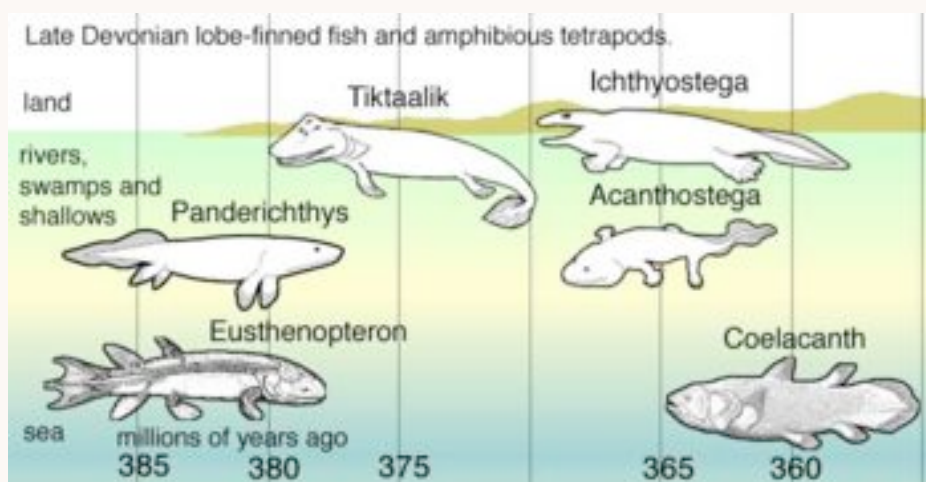




1. Serendipity – any place in strategy lead science?
2. Case study: the conodont animal
3. Case study: the fish – tetrapod transition
4. A strategy for aiding serendipity

Kingsley Dunham Centre
Keyworth
Nottingham NG12 5GG
Tel 0115 936 3100

© NERC All rights reserved



It has long been accepted that there is an evolutionary lineage between lobe finned fish and tetrapods – but intermediates have been hard to find.

Image reproduced from Wikipedia

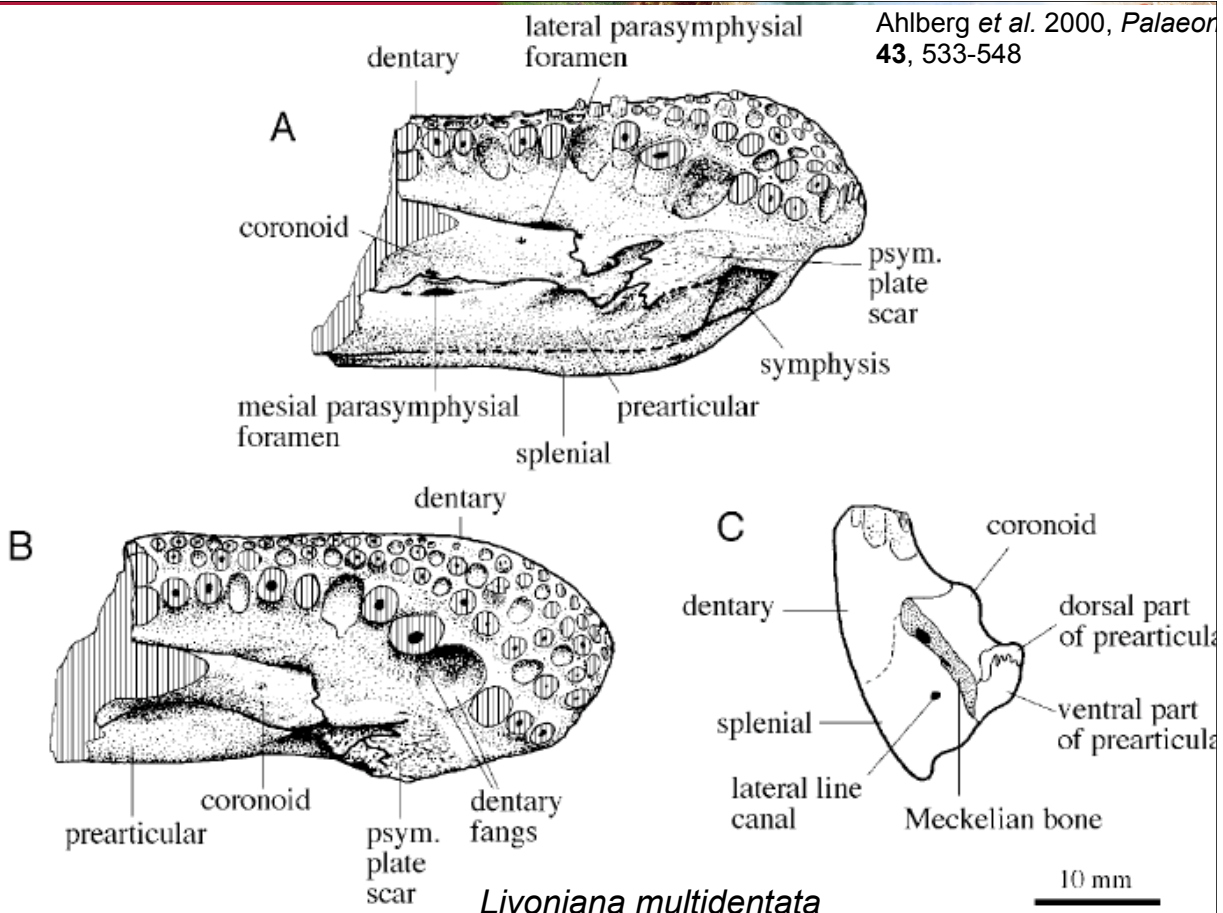


Then in late 90's, Per Ahlberg was examining drawers in the Latvian Museum of Natural History.

He discovered LDM257/1413, collected by an amateur collector in 1964

© NERC All rights reserved

Ahlberg *et al.* 2000, *Palaeontologia*
43, 533-548





British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

1. Serendipity – any place in strategy lead science?
2. Case study: the conodont animal
3. Case study: the fish – tetrapod transition
4. A strategy for aiding serendipity

Kingsley Dunham Centre
Keyworth
Nottingham NG12 5GG
Tel 0115 936 3100

© NERC All rights reserved



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

Improving the odds

Increase accessibility



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

Geoscience for decision making

[Home](#) | [Our research](#) | [Our services](#) | [Popular geology](#) | [News & events](#)

[Contact us](#) | [About us](#) | [Help](#)

About BGS

What is the BGS? What we do, organisation, annual reports, data licensing and copyright [more...](#)

Our research

UK geology, climate change, energy, water quality, natural hazards, land use, minerals, environment & health, marine & coastal [more...](#)

Our services

For business, research and the public. Geological reports, site investigations, digital data, laboratories. Online shop [more...](#)

Popular geology

Free resources for teachers & students, Britain beneath our feet, Make-a-map, geological timeline & timechart, historical photographs [more...](#)



Researchers and universities
Online databases, paper records, laboratories. Map, fossil and core collections ...



Government & agencies
Local government & agencies for international projects ...



Homeowners
Radon, subsidence, ground conditions, flooding ...



Teachers & students
Educational resources, free downloads, fossils, earthquakes, volcanoes ...



Businesses & consultants
Site specific reports, geohazards, data and advice ...



For everyone
What is the BGS and what does it do? Books, maps, reports ...

Quick Links

- Downloads
- Enquiries
- Hosted websites
- GeoIndex
- National Geoscience Data Centre

Featured Article

'Emerging Technologies in Rapid Measurement Tools in the Environmental Sector' Conference - 27 March 2008 [more...](#)

Latest News

The Groundwater Experience, Oxford

EMRG lecture - OneGeology

Scientists focus on proposed EC Directive for geological storage of carbon

© NERC All rights reserved

© HERC 2008 | [Feedback](#) | [Freedom of Information](#) | [Privacy](#) | [Research archive](#) | [Terms of use](#) | [Webmaster](#)



Dataset description

Collection of individually registered specimens and cuttings from onshore boreholes drilled in England and Wales by BGS, commercial and public bodies since the establishment of BGS in 1835. The collection has been developed as part of the BGS responsibility to establish and maintain a National Borehole Collection. The collection is updated on a daily basis by the addition of new data and by the modification of existing data. The collection contains all registered borehole samples for England and Wales, Scottish borehole samples are excluded. Details of the collection are held on the 'Borehole Materials Database', and may be accessed over the internet from the BGS web site.

Constraints

The collection contains confidential data, and can be accessed only by BGS staff.

For more information please contact :

Enquiries
British Geological Survey
Keyworth
Nottingham
NG12 5GG

Tel : +44 (0)115 936 3143
Fax : +44 (0)115 936 3276
Email :enquiries@bgs.ac.uk

Associated dataset(s)

Borehole Geology Database.
Onshore Borehole Collection.
Single Onshore Borehole Index

Location

W -6.33 55.83 N



S 49.77 2 E

**Discovery Metadata / Collection level
descriptions**

Reviewed 15th November 2006



- About BGS
- What's New
- Products & Shopping
- BGS Science
- BGS Services
- Information & Data
 - ▶ Borehole ordering
 - ▶ Digital data catalogue
 - ▶ Discovery metadata
 - ▶ GeolIndex
 - ▶ Geological photographs
 - ▶ GeoPortal
 - ▶ Geoscience dictionaries
 - ▶ Geoscience information
 - ▶ Holostrat
 - ▶ Hydrocarbons data
 - ▶ Lexicon of rock units
 - ▶ Library
 - ▶ Map symbols
 - ▶ NGDC
 - ▶ PalaeoSaurus Online
 - ▶ Reference reports
 - ▶ Rock classification
 - ▶ Taxonomy online
 - ▶ Water watch
 - ▶ World maps
- Popular Geology and Education
- Search BGS
- Hosted Sites
- Most visited pages

PalaeoSaurus Online Collections Database

The palaeontological collections of the BGS are being entered onto the PalaeoSaurus database, which currently totals over 50 000 samples. Most of the Cambrian – Lower Carboniferous reference specimens (which include type, figured and cited material) have been entered.

To search the PalaeoSaurus database, please enter a search term in one or more fields and click on "Submit". You may use % as a wildcard symbol.

| | |
|---|--|
| Taxonomic group : | <input type="text" value="Graptolithina"/> |
| Genus or subgenus : | <input type="text"/> |
| Species : | <input type="text"/> |
| Chronostratigraphy : | <input type="text"/> |
| Locality : | <input type="text"/> |
| Collector / donor : | <input type="text"/> |
| Publication (author) : | <input type="text"/> |
| Type of specimen : | <input type="text"/> |
| Specimen registration No : | <input type="text"/> |
| <input type="button" value="Reset Defaults"/> <input type="button" value="Submit Query"/> | |



- About BGS
- What's New
- Products & Shopping
- BGS Science
- BGS Services
- Information & Data
 - Borehole ordering
 - Digital data catalogue
 - Discovery metadata
 - GeolIndex
 - Geological photographs
 - GeoPortal
 - Geoscience dictionaries
 - Geoscience information
 - Holostrat
 - Hydrocarbons data
 - Lexicon of rock units
 - Library
 - Map symbols
 - NGDC
 - PalaeoSaurus
 - Reference reports
 - Rock classification
 - Taxonomy online
 - Water watch
 - World maps
- Popular Geology and Education

- Search BGS
- Hosted Sites
- Most visited pages

PalaeoSaurus - search results



viewing rows 1 to 20 of 7797



Please click on the underlined registration number of the fossil sample you are interested in to see the available information.

| | | | |
|---|----------------------------|--------------------------------|-----------------------|
| 1 | 10E 3748 . | <i>Cyrtograptus cf ramosus</i> | Alison Burn,Riccarton |
|---|----------------------------|--------------------------------|-----------------------|

PalaeoSaurus - single record view

[Return to list of results](#)

| | | | | |
|----------------------|------------------------|--------------------------------|-----------------------|-----------------|
| Registration No. : | 10E 3748 . | Type : | Not Designated a Type | eddar, New Luce |
| Identifications : | | | | Water |
| Current : | Graptolithina | Cyrtograptus cf ramosus Boucek | | Water |
| Locality : | Alison Burn,Riccarton | | | Water |
| Grid Reference : | Not available | Country : | England and Wales | Water |
| 1:50K map : | | | | Water |
| Chronostratigraphy : | Wenlock | | | Water |
| Lithostratigraphy : | RICCARTON GROUP | | | Water |
| Collector / Donor : | Available from curator | | | Water |
| References : | | | | Water |
| | | | | Water |

| | | | |
|----|----------------------------|------------------------|-----------------|
| 16 | 11E 3815 . | <i>Climacograptus?</i> | Blackhope Water |
| 17 | 11E 3816 . | <i>Climacograptus?</i> | Blackhope Water |
| 18 | 11E 4947 . | <i>Climacograptid?</i> | Cardrona Forest |
| 19 | 11E 4948 . | | Cardrona Forest |
| 20 | 11E 4949 . | | Cardrona Forest |



- About BGS
- What's New
- Products & Shopping
- BGS Science
- BGS Services
- Information & Data
 - Borehole ordering
 - Digital data catalogue
 - Discovery metadata
 - GeolIndex
 - Geological photographs
 - GeoPortal
 - Geoscience dictionaries
 - Geoscience information
 - Holostrat
 - Hydrocarbons data
 - Lexicon of rock units
 - Library
 - Map symbols
 - NGDC
 - PalaeoSaurus Online
 - Reference reports
 - Rock classification
 - Taxonomy online
 - Water watch
 - World maps
- Popular Geology and Education

- Search BGS
- Hosted Sites
- Most visited pages

Welcome to GeolIndex



This site provides a map-based index to datasets that we have collected or have obtained from other sources. Our [Britain Beneath our Feet](#) website provides more generalised maps based on data we have collected.

GeolIndex

Enter GeolIndex



Images above based on the Ordnance Survey maps appear with the permission of The Controller of Her Majesty's Stationery Office © Crown Copyright.
Ordnance Survey licence number 100017897/2008.

[What's new](#)

[E-Mail your comments](#)

http://194.66.252.141 - GeoIndex - Microsoft Internet Explorer provided by The British Geological Survey

British Geological Survey **GeoIndex**

Change Map Theme Collections BGS Atlas Data Enquiries Feedback Help

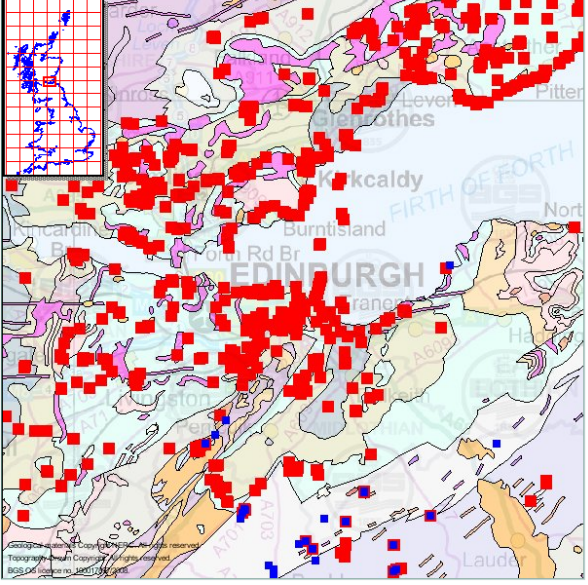
Click layer names for details of the dataset

Current query layer: NONE

☐ BGS Rock Samples
☐ Borehole Samples
☐ Geochemical Samples
☒ Fossil Specimens
☒ Fossil Localities
☐ Superficial deposits 1:625000
☒ Bedrock 1:625000
☒ Topography

Redraw Map Show Legend

Zoom in or out (-) to activate greyed out data layers



Geoindex Toolbar

Display

Navigate

Query

Printing

Reports

Oxford University Museum of Natural History

Home Visiting Us Collections & Research Teaching & Learning Services News

The Collections

Entomology
 Geology
 - Staff
 - Databases
 - Library
 - Collectors
 Mineralogy & Petrology
 Zoology
 Research libraries
 Archaeology unit
 Collections: home
 Contact us
 Site search
 Accessibility
 Sponsors
 Copyright

Geology: type, figured and cited database

Specimen details for Registration Number BU.00024

Species name: *Glossograptus ciliatus* Emmons var. *douglasi*
Author: Bulman, 1931
Taxonomic Group: Graptoloidea
Nature of Specimen:
Preparation:
Horizon: Normanskill, Llandello Series, Ordovician
Locality: Chaquimayo River, Peru, South America
Collector: J.A. Douglas, 1910 - 1912
Donor: J.A. Douglas
Conservation:
Notes: 1. BU 23-BU.26 are all on the same slab. 2. Douglas colln. no. P20 C21. 3. BU.24a is counterpart. 4. BU.11-BU.53, BU.154-BU.178, BU.196-BU.197, are specimens collected by J.A. Douglas on the Balston expeditions: 1910-1912, (named for W.E. Balston who financed the expeditions), and are referred to by O.M.B. Bulman, in his paper of 1931, as the "Balston Collection".



Length = 19 mm

Add photographs or 3D digital models as resources allow

Conservation: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000, 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 3050, 3051, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 3060, 3061, 3062, 3063, 3064, 3065, 3066, 3067, 3068, 3069, 3070, 3071, 3072, 3073, 3074, 3075, 3076, 3077, 3078, 3079, 3080, 3081, 3082, 3083, 3084, 3085, 3086, 3087, 3088, 3089, 3090, 3091, 3092, 3093, 3094, 3095, 3096, 3097, 3098, 3099, 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156, 3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3206, 3207, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3218, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 3556, 3557, 3558, 3559, 3560, 3561, 3562, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3570, 3571, 3572, 3573, 3574, 3575, 3576, 3577, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3688, 3689, 3690, 3691, 3692, 3693, 3694, 3695, 3696, 3697, 3698, 3699, 3700, 3701, 3702, 3703, 3704, 3705, 3706, 3707, 3708, 3709, 3710, 3711, 3712, 3713, 3714, 3715, 3716, 3717, 3718, 3719, 3720, 3721, 3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835, 3836, 3837, 3838, 3839, 3840, 3841, 3842, 3843, 3844, 3845, 3846, 3847, 3848, 3849, 3850, 3851, 3852, 3853, 3854, 3855, 3856, 3857, 3858, 3859, 3860, 3861, 3862, 3863, 3864, 3865, 3866, 3867, 3868, 3869, 3870, 3871, 3872, 3873, 3874, 3875, 3876, 3877, 3878, 3879, 3880, 3881, 3882, 3883, 3884, 3885, 3886,



- Data quality – it is better to have 95% correct palaeontological data available today than wait 10 years for 98% correct. It will never be 100% correct.
- Address the problem of variant forms of a single term. 25 years ago, the Sedgwick Museum, Cambridge GOS database satisfactorily addressed this problem.... (Price, D. 1982, *Geological Curator*)



For example, searching for lithostratigraphic terms similar to
Sholeshook Limestone

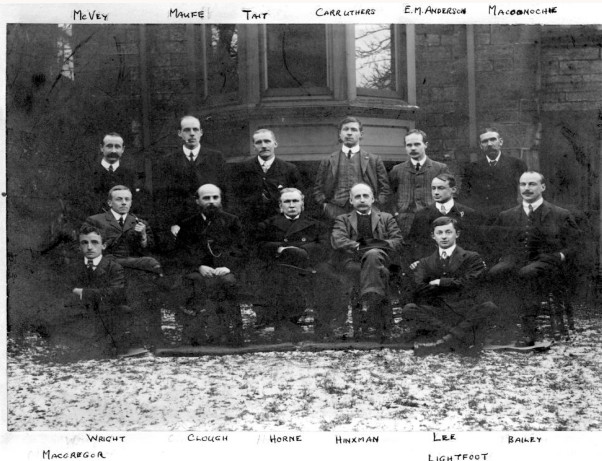
- **Sholeshook Limestone** (384)
- **Sholeshook Limestone Formation** (83)
- **Sholeshook Limestone Horizon** (33)
- **Highsholeshook Limestone** (12)
- **Sholeshock Limestone** (16) Miss-spelling
- **Shoalshook Limestone** (485) Alternative spelling
- **Shoalsshooksholeshookli** (2) Both spellings
- **Akpatoklimestone** (375)
- **Potholelimestone** (2)
- **Ardwicklimestone** (14)

856 results rather than original 384

(Price, D. 1982, *Geological Curator*)



- Consider incentivising the curator / data manager with a co-authorship and not just an acknowledgement.



© NERC All rights reserved

"Serendipity islooking in a haystack
for a needle....

and discovering a farmer's daughter."

Pek van Andel

Dick Aldridge kindly provided
most of the conodont images

Photograph: T.S. Bain

Sunset from Granton