



**THE  
GEOLOGICAL  
SOCIETY OF  
GLASGOW**

# **PROCEEDINGS**

**Session 167  
October 2024 to September 2025**



Dun Telve Broch in Glenelg. Members of the Society attended a residential excursion to the area in September 2025. The Broch is the second-largest surviving such structure in Scotland and has some 'gneiss' stones in the wall.

Registered Scottish Charity No. SC007013

**President: Margaret Greene**

[www.geologyglasgow.org.uk](http://www.geologyglasgow.org.uk)

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## President's Report



I have been the chair of Strathclyde Geoconservation Group for a number of years, but being voted in as the President of the Society is a totally different affair. The members of Council have been a great help in keeping me informed and on the right track. A big thanks also goes to the members of the Society who have turned out for lecture nights and who have taken part in the excursions.

There have been a number of interesting lectures in the past year, with a good attendance at lectures and many viewing the recordings. Last year we started off in the Boyd Orr building, but due to non-availability of the hall, the April lecture was on zoom and the May Member's night was held in the St Andrews Building, where, after some technical difficulties we were settled in a very comfortable room. This session all the lectures are being held in the Kelvin Hall lecture theatre, with the benefit of convenient parking and a separate room for post-lecture catch-ups and refreshments.

Thanks to Lindsay Smith and her team, there have been a variety of excursions this year, some local, such as to Holmwood House and the Necropolis and some further afield. The weekend excursion to Glenelg hit a snag when Simon Cuthbert as leader had to pull out, but everyone was very grateful to Con Gillan for stepping in at the eleventh hour.

Lindsay also has to be thanked for carrying on her role as librarian and leading her team in the onerous task of selecting suitable titles to be transferred from the geology library in the Molema building to the University Library.

Many thanks go to the members of Council, the small body of folk who keep everything in the Society ticking over. We have had two people resign during the year; Simon Cuthbert and Gary Hoare, both have been a tremendous asset to the Council, Simon has been a long-standing member and a previous President. Gary has been responsible for Publications working on the geology book store and library. Gary also commissioned a copy of a terrifying *Arthropleura*, which will be on display in the Fossil Grove on Open Days.

At the December AGM other members of Council are standing down, namely Margaret Anderson who has been Archivist for a good number of years, Bill Gray who has been guardian of the website for more years than I can remember and Bobby Alexander who has been involved in the excursions, meetings and the library project. All of whom I know will continue helping the Council members from the 'outside' as it were.

We welcome two new members to Council, both co-opted for this session; Lily Deadman, who replaces Ben Hardman as Junior representative and Iain Neill as representative of the Scottish Journal of Geology. Ian points out that attracting contributions to the SJG is challenging and he encourages anyone undertaking geological research to consider contributing. Of the present members, David Webster is moving from Hon Secretary to Meetings Secretary and Ian Miller is taking over as Hon Secretary along with his post as Membership Secretary. Many thanks to both for carrying out those jobs so brilliantly. I cannot miss out thanking the other members of the team; Ian Veitch (Treasurer), Maggie Donnelly and Campbell Forrest (Vice-Presidents) and John Guerrier, Neil Clark and Luisa Hendry, for their valuable contribution to our meetings.

We are pleased to say that we have had a great response to our request for new members of Council and we will welcome them at the AGM.

As I look forward to another interesting and challenging year, I wish you all best wishes for the coming season.

*Margaret Greene*

## Council Members Session 167

Following the adoption of the new Constitution at the AGM in December 2023, the management structure of the Council comprises President, Secretary, Treasurer, 2 Vice Presidents (usually ex-Presidents), 9 Ordinary Members, a co-opted Junior Member, and two further co-opted members - A total of 17.

### Elected Officers

At the AGM on December 12th 2024 the highlighted members in the table below were elected to Council. Existing Council members are also shown along with the three Council members co-opted directly by the Council.

Position	Candidate	Proposed	Seconded
President	<b>M Greene</b>	S Cuthbert	N Clarke
Secretary	<b>D Webster</b>		
Treasurer	<b>I Veitch</b>		
Vice President	<b>M Donnelly</b>		
Vice President	<b>C Forrest</b>	S Cuthbert	D Webster
Ord. member	<b>M Anderson</b>		
Ord. member	<b>J Guerrier</b>		
Ord. member	<b>R Alexander</b>		
Ord. member	<b>N Clark</b>	S Cuthbert	L Smith
Ord. member	<b>S Cuthbert</b>	N Clark	G Hoare
Ord. member	<b>W Gray</b>		
Ord. member	<b>I Millar</b>		
Ord. member	<b>L Smith</b>		
Ord. member	<b>G Hoare</b>	M Greene	C Forrest
Co-opted Member	<b>L Hendry</b>		
Junior Member (co-opted)	<b>B Hardman</b>		
SJG Editor (co-opted)	<b>H Stewart</b>		

### Roles and Responsibilities

Under the new constitution the assignment of various roles and responsibilities and the setting up of appropriate Working Groups are matters for the Council. During the session the following Council Members adopted roles as follows:

Membership and Webcollect System Admin- **Ian Millar**

Publications - **Gary Hoare**

Meetings - **Simon Cuthbert**

Excursions - **Lindsay Smith**

Library - **Lindsay Smith**

Archivist - **Margaret Anderson**  
Website - **Bill Gray**  
Newsletter Editor - **David Webster**  
Proceedings Editor - **David Webster**

### **Working Groups**

The **Field Trips Working Group** continued its work, led by Lindsay Smith

The **Communications Working Group** - continued to be led by Bill Gray

The **Library Group** continued, led by Lindsay Smith

A **Meetings Working Group** was set-up, led by Simon Cuthbert

### **Fossil Grove Trust**

The Fossil Grove Trust has ten Trustees - four of whom are appointed by the Society. At present these four are Walter Semple (Chair and Secretary), Ian Veitch (Treasurer), Campbell Forrest and Katie Strang. David Webster remains a Trustee but now represents the Victoria Park Community Trust.

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# Treasurer's Report

## 1. Basis of Accounting

These accounts have been prepared on the Receipts and Payments basis in accordance with the Charities & Trustees Investment (Scotland) Act 2005 and the Charities Accounts (Scotland) Regulations 2006 (as amended)

## 2. Nature and purpose of funds

Unrestricted funds are those that may be used at the discretion of the trustees in furtherance of the objects of the charity.

Designated funds are those that have been allocated by the trustees for a specific purpose, in this case the making of grants and awards.

Restricted funds may only be used for specific purposes. Restrictions arise when specified by the donor or when funds are raised for a specific purpose. The restricted funds are:

The T N George Fund: to be used to engrave a medal for the annual T N George lecture

The Brian Bluck Fund: to be used to award a prize to the top student in the final year of Geology at Glasgow University

## 3. Related party transactions

The Society's insurance policy includes Trustee Indemnity Insurance for all council members. No remuneration was paid to the trustees during the year (2024: nil)

## 4. Grants and Awards

Quaich - C Braithwaite	47
Friends of Hugh Miller	50
Geonatter	166
Strathclyde Geoconservation Group	300
Victor Hunderboll Grant	1,000
Haaris Aswat - Grant	500
Rebecca Richardson - Grant	623
Keyron Hickam of Birbeck College - Grant	980
Olivia Grimes - Grant	1,000
U of St Andrews - Dan Turkington Grant	1,000
Phillipe Mongeau - Grant	1,000
Bearden Shark Group Grant	<u>1,000</u>
<b>Total Grants and Awards</b>	<u><u>7,666</u></u>

## 5. Analysis of Expenditure

As Glasgow University generously allows the society to use a lecture room free of charge our income continues to exceed expenditure.

To encourage members to attend excursions the cost of day excursions is subsidised by the society. Additional costs were incurred from the last minute cancellation of a day excursion due to a storm and on a residential excursion where there was a last minute change of leader. The net cost of excursions for the year was £1,128.

## 6. Restricted Funds

	T N George Fund	Brian Bluck Fund	Total
Balance at 1 October 2024	340	7,500	7,840
Income	10	225	235
Grants & Awards	0	0	0
Fund repaid	0	0	0
Balance at 30 September 2025	<u>350</u>	<u>7,725</u>	<u>8,075</u>

### Notes

The T N George Medal was not awarded this year.

The Brian Bluck Prize has not yet been awarded for 2025

## 7. Payments Due at the year end

	30/09/25	30/09/24
Independent Examiners Fee	200	150
Day Excursion Costs for 2024	0	80
Due to EGS for Scottish Journal of Geology	<u>0</u>	<u>160</u>
Total Payments due	<u>200</u>	<u>390</u>

## 8 Investments

The investments are held in an Endowment Fund as approved by the Council with the proceeds to be used for making grants and awards. The Endowment Fund is shown as a Designated Fund in the accounts.

The investments consist of 4 income generating managed funds which paid £4,451 of income.

At the year end the investments were valued at £94,087, an increase in value of £6,684.

## **Details of Grants Awarded**

### **Victor Hunderboll, University of Glasgow**

An MSc project looking at the tectono-magmatic evolution of the Kintyre peninsula, focusing on geochronology and geochemistry from Devonian, Carboniferous and younger igneous units. A grant of £1,000 was awarded to help with their field work on Sanda island and for U/Pb dating on tuffaceous sandstones and cross-cutting igneous bodies.

### **Haari Aswat, University of St. Andrews**

An MSc project investigating source and evolution factors affecting Li enrichment of the East Grampian granites. A grant of £500 was awarded to help fund Hf isotope work.

### **Rebecca Richardson - University of St. Andrews**

An undergraduate dissertation project investigating factors controlling macro and micro-fabrics of the Rum Eastern Layered Intrusion, and influences on chromite and other mineralisation. A grant of £623 was awarded for field work expenses.

### **Keyron Hickman - Birkbeck, University of London**

A post-doctoral project investigating palaeoenvironments and palaeoecology of the Proterozoic Torridon Group, Scotland. A grant of £980 was awarded to cover thin section preparation, SEM sample preparation and isotope/rare earth geochemical analyses.

### **Olivia Grime, University of St. Andrews**

Field work on the Bjerkreim-Sokndal (BKSK) Layered Intrusion, Norway by three students (one undergraduate, two Masters). A grant of £1,000 was awarded to cover field trip expenses (food and H&S equipment).

### **Dan Turkington, University of St. Andrews**

Field work by four undergraduates studying early continental rifting; North Qooroq, South Greenland. A grant of £1,000 was awarded to cover field trip expenses.

### **Phillipe Mongeau, Edinburgh University**

A PhD project on controls on precious and critical metal enrichment in the Caledonian-Appalachian orogeny. A grant of £1,000 was awarded to cover 10 LA-ICP-MS trace element analyses of sulphides.

### **Neil Buchanan, Bearsden Shark Group**

The Group is undertaking a project to increase awareness of the discovery in 1982 of the unique shark fossil now known as the Bearsden Shark and recognise Stan Wood whose finds made an important contribution to palaeontology. A grant of £1,000 was awarded towards the design, manufacture and display of a life size bronze sculpture of the Shark in Bearsden's Town Centre.

## Income and Expenditure Account for year ending 30th September 2025

	Note	Un- restricted Funds	Designat- ed Funds	Restricted Funds	Total	Year Ended 30/9/24
<b>Income</b>						
Subscription Income		6,987		0	6,987	6,816
Interest & Investment Income		538	4,451	235	5,224	4,412
Gift Aid		1,129		0	1,129	800
Publication Sales		258		0	258	743
Donations & Grants Received		38	2,454	0	2,492	0
Miscellaneous Income		0		0	0	0
<b>Total income</b>		<b>8,950</b>	<b>6,905</b>	<b>235</b>	<b>16,090</b>	<b>12,771</b>
<b>Expenditure</b>						
<b>Cost of Charitable Activities:</b>						
Lectures	5	1,060		0	1,060	1,946
Excursions	5	1,128		0	1,128	575
Printing & Postage		795		0	795	445
Insurance & Fees		811		0	811	686
Website		610		0	610	187
Outreach		559		0	559	0
Publication costs		154		0	154	544
Books write off		0		0	0	1,700
Grants and Awards	4	0	7,666	0	7,666	4,350
Miscellaneous		0	0	0	0	93
<b>Total Charitable Activities</b>		<b>5,117</b>	<b>7,666</b>	<b>0</b>	<b>12,783</b>	<b>10,526</b>
<b>Governance Costs</b>						
Independent Examiner Fees		200	0	0	200	150
<b>Total expenditure</b>		<b>5,317</b>	<b>7,666</b>	<b>0</b>	<b>12,983</b>	<b>10,676</b>
<b>Surplus (Deficit)</b>		<b>3,633</b>	<b>-761</b>	<b>235</b>	<b>3,107</b>	<b>2,095</b>
Gain (Loss) on Investments	8	0	6,684	0	6,684	5,610
<b>Surplus (Deficit) for the year</b>		<b>3,633</b>	<b>5,923</b>	<b>235</b>	<b>9,791</b>	<b>7,705</b>

**Statement of Balances at 30 September 2025**

	Note	Un restricted Funds	Designated Funds	Restricted Funds	Year Ended 30/9/25	Year Ended 30/9/24
Funds Balance as at 1st October 2024		9,270	96,839	7,840	113,949	117,711
Transfer to (from) funds		0	0	0	0	-11,467
Surplus (deficit) for the year		3,633	5,923	235	9,791	7,705
<b>Funds at 30 September 2025</b>		<b>12,903</b>	<b>102,762</b>	<b>8,075</b>	<b>123,740</b>	<b>113,949</b>

Represented by:

Bank and Cash Deposits						
Royal Bank of Scotland		12,616	7,678	8,075	28,369	24,962
National Savings		0			0	0
Income Bond		0			0	0
National Savings		0			0	0
Investment Account						
Investments	8	0	94,087		94,087	87,403
On deposit with		0	997		997	958
Redmayne Bentley						
Cash in Hand (float)		18			18	200
<b>Total Cash and Savings</b>		<b>12,634</b>	<b>102,762</b>	<b>8,075</b>	<b>123,471</b>	<b>113,523</b>

Stock of Publications		644			644	667
Prepayments		0			0	630
Less Liabilities:						
Subscriptions paid in advance		-175			-175	-481
Payments Due	7	-200			-200	-390
<b>Net Assets</b>		<b>12,903</b>	<b>102,762</b>	<b>8,075</b>	<b>123,740</b>	<b>113,949</b>

The financial statements were approved by the Trustees on 20<sup>th</sup> November 2025

*Ian Veitch*

[treas@gsocg.org](mailto:treas@gsocg.org)

## Membership Secretary's Report

As I compile this report for session 167, I would like to thank my predecessor Gary Hoare and our Treasurer Ian Veitch for their great assistance to me in the role.

The session saw continuing growth in the Society's membership with an increase of 38 members (+12.5%) in all the main classes and especially Ordinary, Senior & Junior Associates.

### Membership at the end of Session 167

Class	No	Change	% change
Honorary	3	0	0
Ordinary	206	+17	+9%
Ordinary & Family Associates	17	+1	+6.25%
Senior Associates	76	+16	+26.7%
Junior Associates	26	+3	+13%
EGS Associates	2	+1	+8.3%
Special	1	0	0
<b>Total</b>	<b>341</b>	<b>+38</b>	<b>+12.5%</b>
Admin	8	0	0

It is heartening to see our appeal and support extend across such a broad spectrum of society, which we really appreciate. Thanks to your interest and support we can promote the science through lectures, field trips and grant awards to early career geoscientists.

Of course, it would be remiss of me not to remind you of some of your additional membership benefits which you may have overlooked.

Free membership (Special reader) of the University of Glasgow Library. This benefit enables you to access any of the library books and would normally cost between £40 - £80 a year. Contact me for more details on how to apply for this.

Free online access to the Scottish Journal of Geology via the Lyell Collection. Guidance on accessing this can be found on our website or by contacting me directly.

*Ian Millar*

[memsec@gsocg.org](mailto:memsec@gsocg.org)

# Meetings Secretary Report

Lecture meetings continued in the Boyd Orr Building, with the exceptions of the April lecture which was held by Zoom and Member's Night which was held in the St. Andrew's Building. Lectures continued to be recorded and uploaded to the Society's YouTube channel <https://www.youtube.com/channel/UCfNSIvgEbUfLWMSceNiRm1w/>

## **Thursday 12<sup>th</sup> September 2024**

### ***University of St. Andrew's Students (Grant Awardees)***

Undergraduate Geology Students from the University of St Andrews undertook six weeks of mapping in Qassarsuk, studying various structures and igneous phenomena for their dissertations. They didn't just experience fascinating geology but had a proper adventure, from close calls with polar bears, glacial walks and backcountry mountain huts. They thank



all their sponsors and particularly the Glasgow Society of Glasgow for helping them partake in such a magnificent opportunity and enjoyed sharing their findings with the GSG community.

Recording at <https://youtu.be/giy1WE9L-Cw>

## **Thursday 10<sup>th</sup> October 2024**

### ***Prof. Stuart Hazeldine, University of Edinburgh***

#### **“Climate and carbon, control or catastrophe”**



Scotland and the UK were cradles of the industrial revolution – built on low cost coal energy creating vast wealth and empire. But since the 1850s and 1930s, and certainly from the 1970s it has been clear that huge emissions of CO<sub>2</sub> from burning fossil fuels are driving global heating, creating ocean acidification, causing sea level rise and accelerating dangerous climate change. Combating that requires: greatly decreased use of fossil carbon, capturing all CO<sub>2</sub> released by use of fossil carbon, and replacing all possible CO<sub>2</sub> into permanent geological storage. Features of UK offshore geological storage sites will be explained, and can mimic hydrocarbon accumulations. But to achieve this at industrial scales of tens of millions tonnes CO<sub>2</sub> per year in Scotland and Europe requires commercialisation equivalent to the present North Sea oil industry. Many successful pilot tests have been made, and recent legal victories in UK courts may now presage compulsory storage enacted on coal, oil and gas company producers. The weakest link

remains the timidity of global governments to disturb the profitable status-quo, far harder to explain benefits in the 30, 100 and 10,000 yr future. Complete success is possible, but unlikely.

Recording at: <https://youtu.be/oXilQD7eHdk>

### **Thursday 14<sup>th</sup> November 2024**

***Asst. Prof. Heather Stewart, Director, Kelpie Geoscience***

**“The abyss gazes also into you: exploring the deepest oceans”**

The deepest parts of the ocean are one of the final remaining frontiers of discovery on our planet. Much of the deep ocean is unmapped and draws in explorers, scientists, cartographers and environmentalists, keen to discover its secrets. Underwater seascapes, comparable in size and complexity to our known continents, unknown ecosystems and processes that defy study from the surface means there are many gaps in our knowledge that science is hoping to fill. Due to the challenges of research at even moderate depths, almost every expedition venturing below 3000 m throws up a surprise.



Recording at: <https://youtu.be/-6b9bi-AehM>

### **Thursday 12<sup>th</sup> December 2024**

***Dr. Paige dePolo, Liverpool John Moores University***

**“The taphonomy of a pantodont-rich assemblage from the San Juan Basin, New Mexico, USA”**



66 million years ago, an asteroid hit the earth and kicked off the Cretaceous-Paleogene mass extinction. In the wake of this extinction, many weird and enigmatic mammals began radiating into empty niches. One group, the plant eating, herbivorous pantodonts, quickly grew to the largest mammals yet known in Earth history. In this talk, she showed us a collection of fossils from Torreon Wash in the San Juan Basin of New Mexico and talked about their taphonomy (what happened to the animals after death). She then developed an argument for gregariousness within Pantolambda bathmodon (a small pantodont), that illustrates grouping behaviour is wide-spread within this clade (a grouping that includes a common ancestor and all the descendants of that ancestor).

Recording at: <https://youtu.be/RWamAw6uo10>

**Thursday 9<sup>th</sup> January 2025**

***Luisa Hendry ‘Scottish Geologist’***

**“Rocking the Digital World: Promoting Geology through Social Media and why it’s important”**

Luisa’s talk explored the power of social media as a tool for promoting geology and engaging diverse audiences in Earth science. She highlighted innovative strategies for making geology accessible, relatable, and exciting through platforms like Instagram, Facebook, Twitter, and TikTok and talked about the importance of doing so. From creating engaging, educational and captivating content and building a passionate online community, the presentation demonstrated how social media can inspire a new generation to connect with the natural world and understand its geological foundations.

Recording at: <https://youtu.be/ksMcrTyCg8>



**Thursday 6<sup>th</sup> February 2025**

***Dr. Alex Dunhill, University of Leeds***

**“Species loss, community collapse and ecosystem recovery during times of mass extinction”**



Our planet has suffered repeated mass extinctions that have shaped the evolutionary history of biodiversity through time. Although current state-of-the-art research has given us a thorough understanding of the causes and consequences of mass extinction events, existing research ignores the role of ecosystem structure in providing resilience to environmental change. Ecological theory states that primary extinctions, which are a function of stress type or organism sensitivity, can lead to cascading secondary extinctions where species perish because they are unable to meet energetic requirements from available prey. Extinction selectivity studies always assume extinctions are primary despite ecological theory

hinting that many victims of mass extinctions are unlikely to have become extinct as a direct effect of abiotic stress, but probably did so in response to cascading secondary effects. Furthermore, whilst almost all major environmental change events of the Palaeozoic and Mesozoic resulted in catastrophic losses of biodiversity, more recent events in the Cenozoic only lead to modest or no rise at all in extinction rates despite profound environmental changes. A number of Earth system mechanisms have been

proposed for the lack of Cenozoic mass extinctions, relating to carbon cycle buffering via supercontinent fragmentation and calcareous nannoplankton evolution. However, it has also been hypothesized that modern community structure was established in the aftermath of the Cretaceous-Palaeogene (K/Pg) mass extinction and thus the lack of Cenozoic mass extinctions is a function of increased resilience of marine ecosystems. In this lecture, Alex detailed the cutting-edge advancements in ecological modelling that I am applying to the fossil record. This is to investigate how marine ecosystem structure changed through the Phanerozoic and whether modern marine ecosystems are more resilient to major disturbance in comparison to ancient communities in an attempt to shed light on the resilience of marine communities to future climatic stress.

Recording at: <https://youtu.be/uR3zB0XpyQM>

## **Thursday 13<sup>th</sup> March 2025**

**David Webster**

### **“The Geology of Colonsay”**

A late replacement to the advertised talk by Simon Cuthbert. David’s talk on Colonsay covered its Palaeoproterozoic basement, the overlying Colonsay Group and spectacular igneous intrusions plus the earliest radiometric dating and ‘granitisation’ using five excursions in his recent book ‘*A Guide to the Geology of Colonsay*’.

Recording at: <https://youtu.be/CMCq0nMHG8s>



## **Thursday 3<sup>rd</sup> April 2025**

### **Two Grant Awardees’ Lectures**

**Kiara Brooksby**, *Camborne School of Mines, Exeter University.*

#### **“Paragenetic evolution of tin-dominated lode systems in the Pool Mining District, Cornwall”**



SW England hosts a world-class, W-Sn-Cu-As-Zn-Pb-Li ore field associated with the Early Permian granites of the Cornubian Batholith. In the Pool Mining District, which includes South Crofty Mine, magmatic-hydrothermal mineralisation is largely associated with steeply dipping ENE-WSW striking extensional fault systems (lodes). Recent drilling by Cornish Metals has included boreholes that intercept the principal South Crofty lodes and the Great Flat Lode. This study provides a paragenetic sequence and characterisation of mineralising fluids through detailed core logging, optical microscopy, QEMSCAN (quantitative evaluation of minerals by scanning electron microscopy) imagery, hot cathodoluminescence

(an optical and electromagnetic phenomenon in which electrons impacting on a luminescent material such as a phosphor, cause the emission of photons which may have wavelengths in the visible spectrum), microthermometry and LA-ICP-MS (Laser Ablation Inductively Coupled Plasma Mass Spectrometry) analysis of fluid inclusions. These new data, combined with historic descriptions, contribute to a revised model of tin mineralisation within the district.

*Ella Davis, Department of Geosciences, Virginia Tech.*

### **“Tectonic transport directions and timing of metamorphism in the southern part of the Northern Highlands Terrane, Scotland”**



We have collected samples from four E-W transects crossing the Sgurr Beag thrust near Loch Monar, Glen Sheil, Kinloch Hourn, and Lochailort as well as from the “Flat Belt”, the structurally simpler eastern extent of southern NHT. Mineral fabrics in samples collected from the western transects show a top-down to the SE shear sense while those collected from the east show a top-up to the NE shear. Shear senses from these western fabrics contradict the shear directions that are well recorded in the north where there is a top to the NW shear sense. It remains to be determined what deformational

event caused these different fabrics.

Analyses of U-Pb isotopic ages collected from titanite, monazite, and xenotime show multiple recorded periods of metamorphism in the southern NHT. Radiometric dating on samples from the northern NHT show that the region experienced multiple tectonic events, including the Knoydartian (870-720 Ma) and Caledonian orogenies, the latter divided into Grampian (~475- 460 Ma) and Scandian (~435-420 Ma) events. Our preliminary data shows a Caledonian period of metamorphism ranging from ~450-415 Ma and earlier Knoydartian-related metamorphic events ranging from 750-690 Ma.

Recordings at: <https://youtu.be/YEO-pAOd3j4>

### **Thursday 9<sup>th</sup> May 2024**

#### **Members’ Night**

**Talk 1:** Campbell Forrest & Ian Veitch: Climbing and Geology of Ardverikie Wall, Binnean Shuas: A different angle.

Recording at: <https://youtu.be/UDk8oErdvE8>

**Talk 2:** Katy Strang: Women in Geology

Recording at: <https://youtu.be/-7dTfdTEhHA>

**Talk 3:** David Webster: Geosites Database - how to use it (demo)

*David Webster*

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## Day Excursions 2025

During session 167, 6 excursions were arranged, plus one in October as part of the Scottish Geology Festival. Lindsay Smith coordinated the Field Trips Group.

### Kelvin Walkway - 9 April 2025

**Leaders: Ian Allison & Katie Strang. 20 participants**

It is easy to forget that opportunities exist for geological investigation right on our very doorstep, even in the heart of the city. And so it was that, on a lovely day in April a group of 20 society members met at Dawsholm Park for a leisurely walk in the sunshine along the River Kelvin, taking in the local Carboniferous geology exposed in the river bank and admiring the Victorian industrial and architectural heritage along the way.

This is the Kelvin Walkway Geological Trail as described in the society's pocket leaflet but, for logistical reasons, we conducted the walk in reverse, starting at Dawsholm Bridge and ending at Kelvin Bridge, where the river passes under Great Western Road. We were ably led on the day by Iain Allison and Katie Strang.



The walk started at Dawsholm Bridge in the Upper Limestone Formation and the first exposures we saw were thick channel sandstones both on the western bank of the river and, after crossing to the eastern side, at Bell Crag (photo L). These sandstones stand out owing to their greater resistance to erosion than the underlying shales and siltstones and display excellent examples of cross-bedding. Bell Crag was once quarried for building stone.

Walking south we passed under a number of Victorian bridges, one of the most impressive of which was Kirklee Bridge, built of Permian red sandstone with supporting pillars of Peterhead granite (photo below).

Continuing south along the river we passed down stratigraphically into sediments of the Limestone Coal Formation, although the formation name might seem to be a misnomer in this area as coals are not much in evidence – any that do exist are very thin and possibly hidden by vegetation or may have been previously worked by hand for local use. We were, however, able to see examples of channelised sandstones (lens-shaped in cross-section) and coarsening upward sequences, typical of fluvial deposition in a coastal setting.

As we neared the end of our walk we were reminded that rivers were the focus of local industrial activity when



we came upon remnants of the long-abandoned North Woodside Flint Mill. Using the river flow to drive a water wheel, the mill initial ground corn but was later used to grind flint nodules to produce powdered flint for use in the pottery industry. It was a little surprising to some that flint was the primary material being processed as there are no flint-bearing formations in the local area, nor even within Scotland!

A delightful walk ended at Kelvin Bridge itself, right in the heart of the West End and conveniently close to one or two sources of refreshment.

## **Portencross - 2 May 2025**

**Leaders: Austen Brown & David Webster. 22 participants**

The aim of this excursion was to study the Old Red Sandstone rocks in the neighbourhood of Portencross shore. A secondary objective was to review the Strathclyde Geoconservation Group's leaflet "Portencross. A Shoreline Geological Trail" before its publication. This leaflet covers the northern part of today's excursion, which we visited in the afternoon. In the morning we visited Ardneil Bay to the south. This area, as well as the trail area, is described as part of Excursion 16 in the Glasgow and Girvan excursion guide (Lawson and Weedon, 1992).

The study area belongs to two different geological times. The northern and southern sections belong to the Upper Old Red Sandstone (UORS) of the Upper Devonian, while the central section is a triangular-shaped inlier of Lower Old Red Sandstone (LORS) from the Lower Devonian.

The starting point was Yonderfield Farm. As we set off along the road westwards towards the shore, Austen pointed out a large Carboniferous-age dolerite dyke to the east with a raised beach in front of it; this was one of several levels of raised beach in the area. On the way to the shore we visited an old quarry dug into the same dyke.

We now walked across the golf course to the shore at Ardneil Bay and walked eastwards. The beds here belong to the Kelly Burn Sandstone Formation, part of a sandstone outcrop that extends to Ardrossan, and were laid down by a large river system flowing through a desert environment. The beds we looked at dipped to the south and were intersected by several north-south trending Paleocene dykes.

After about an hour we turned and walked back towards the castle. On the way we passed an exposure of fluvial sandstone on top of aeolian sandstone and an erratic boulder of Carboniferous vent agglomerate.

Around noon we arrived at Farland Head, where we observed a prominent inclined Paleocene basalt dyke. We then moved over the (hidden) fault zone between the UORS and the LORS to the Sandy's Creek



Mudstone beds flanking sandstone "dyke" in Sandy's Creek Formation

Mudstone Formation, which forms in a triangular-shaped outcrop between the Kelly Burn Sandstone Formation (UORS) to the east and the Portencross Sandstone (LORS) to the west. The mudstones and siltstones here contain spores indicating they belong to the LORS, but possibly latest Silurian. There was one exposure where vertical beds of dark mudstone flanked a lighter unit, looking like a dyke. Sandy's Creek is Locality 1 on the SGG leaflet (NS 1774 4860). We walked past the car park to join the B7048 and walk towards the castle. On the way, we stopped to look at a cave in the Portencross Sandstone, in which the beds were steeply dipping.

We arrived at the Portencross Castle (Locality 2, NS 1755 4892) at 13:00 and enjoyed our lunch outside in the sunshine. After lunch, we looked at the Portencross Sandstone beds just to the north of the castle. These are thin beds of conglomerate, dipping to the north. They are flood deposits, fining up, with a flow direction from the S to SE and containing volcanic clasts of basalt and andesite. These clasts are now thought to have originated locally not, as was once thought, from the Caledonian mountains to the north, which are made of different (and older) rocks. The cross-beds show that rivers came from the south, and it is now thought that the rivers were eroding a line of active volcanoes which stretched from Ayr north-eastwards to the Ochil and Sidlaw Hills. The main castle walls are made from this sandstone, but the corners are made from a harder yellow sandstone which is not local.

We then went on to look at a NW-SE trending Carboniferous dyke (about 300 Ma) near the pier. This had fed fissure volcanoes and is the same age as Little Cumbrae. The rock is a quartz-dolerite, with small crystals of feldspar and pyroxene. Some enterprising locals of days past had hewn a swimming pool out of the dyke!



We then passed through the dyke via a road cutting (Locality 3, NS 1759 4925) to go to Locality 4 (NS 1761 4940), which is an inlet which has been formed by erosion along a fault which forms the north-western margin of the LORS inlier. The rocks on the north-west side of the fault are a conglomerate (Skelmorlie Conglomerate, UORS) containing a jumble of large boulders and pebbles, which was deposited after the Acadian Orogeny. The conglomerate, contains

clasts of quartzite, sandstone, vein quartz, cherts and lava fragments and was probably deposited by a sub-aerial debris-flow (photo above)

A little further on we reached an area which showed a sudden transition from the Skelmorlie Conglomerate to the Kelly Burn Sandstone Formation, which we had seen at Ardneil Bay. The present juxtaposition of these different formations is the result of movement along a major fault.

Our next stop was at Locality 5, (NS 1759 4951), a vertical Paleocene (55 Ma) basalt

dyke trending NW, which is the same age as the Arran volcanic centre. We then walked on to Jenny's Dyke (Locality 6, NS 1762 4973), a Carboniferous dyke of the same type and age as that at Locality 3 (the road cutting). This marked the end of the leaflet trail and the end of the excursion. Most of us returned to the car park, but a few of the more energetic members of the party went on to climb Goldenberry Hill.

*Bill Gray*

## **Holmwood House - 22 May 2025**

**Leader: Kevin Farrell. - 11 participants**

Although our planned fossil walk to Linn Park was unfortunately cancelled due to riverbank erosion and hazardous access, we were treated to a truly memorable visit to Holmwood House, one of Glasgow's architectural treasures.

Our tour began in the gardens, where Kevin Farrell, a fellow GSG member, introduced us to the house's remarkable setting and its geological significance.



He explained how the local stone and terrain influenced the materials chosen for this Victorian villa, designed in 1857–58 by the visionary architect Alexander 'Greek' Thomson. Thomson's deep admiration for classical Greek architecture is evident throughout Holmwood, from its symmetrical layout to its bold use of polychrome decoration.

Inside, Kevin guided us through the house's stunning interiors, pointing out the intricate design elements and materials that reflect Thomson's style. Holmwood's dining room frieze, inspired by John Flaxman's illustrations of Homer's Iliad, and the sculptural chimneypiece by George Mossman, are just a few of the highlights that showcase Thomson's fusion of classical art and modern innovation.

Lunch and coffee were accompanied by a hands-on look at minerals used in earth pigments, a colour palette Thomson favoured for his interiors. These natural hues of ochre, umber, and sienna, the tones of ancient Greek temples, added a geological layer to our understanding of his work.

We wrapped up the visit with a relaxed stroll around the garden, reflecting on the house's layered history and the enduring legacy of one of Scotland's most original architects. Thanks to Kevin the Holmwood House tour was a great experience which bridged geology, art, and architecture.

## **Necropolis - 11 June 2025**

**Leader Margaret Greene. 17 participants**

Blue skies and a gloriously hot summer's day added to what was a memorable excursion for the 17 people who attended the Glasgow Necropolis tour led by our current President, Margaret Greene. The trip followed the route laid out in the Glasgow



Necropolis: A Geological Trail booklet, authored by Margaret Greene and David Webster, and published by the Strathclyde Geoconservation Group.

The trail began at the 'Bridge of Sighs', constructed from Carboniferous Kenmure sandstone, and wound its way up past layers of Carboniferous

sandstones past a remarkable array of monuments, each telling a story in stone. The upper part of the Necropolis is perched atop a prominent Permian dolerite sill, and we all stopped for a bit to appreciate the sweeping views over Glasgow.

Highlights included the granite memorial to Lord Kelvin, whose scientific legacy was captured in this commemorative stone. The monument to William Miller, author of the rhyme 'Wee Willie Winkie', in grey Aberdeen granite, was another favourite. Several members who had previously joined the GSG visit to Holmwood House were quick to spot the distinctive masonry style of Alexander 'Greek' Thomson at the Rev. Beattie monument.

The Moorish kiosk of William Rae Wilson, built from bitumen-flecked Binnie sandstone, stood out for its craftsmanship and unusual geological features. At William Black's memorial, the fossiliferous limestone base, rich in Jurassic bivalves, sparked discussion. A particularly exciting moment came when Dr Katie Strang (Hunterian Museum) identified what is likely a large fossil stromatolite embedded in the shelly limestone base of the Henry Monteith obelisk. This unexpected find added a fun palaeontological dimension to the day, particularly with Katie and Dr Neil Clark on their hands and knees with magnifiers in hand, and the rest of the group gathered, with bated breath, for their scientific conclusion as to what this curious discovery was.



One of the most striking aspects of the Necropolis trail was the sheer geographical diversity of the stonework. The monuments showcased materials sourced from across Scotland and beyond: red Peterhead granite from Aberdeenshire; grey granite from Ireland; liver-rock sandstone from West Lothian, and fine-grained sandstones from Ayrshire and Bishopbriggs. Carrara marble from Tuscany adorned several statues; while even more exotic origins were represented by purple-stained granite and a probable Argentinean pillar. This rich lithological palette not only reflects the wealth and global connections of Victorian Glasgow but also offered a vivid geological journey through time.

As we dropped down the steep steps of the old Wester Craigs quarry which was owned by the Merchants' House (1650), we admired the great example of onion skin weathering of the dolerite. From there we had a search for the grave of Agnes

T Neilson, the Hunterian's first woman curator; however the combination of the hill's elevation and the day's constant heat, persuaded us weary folk to leave this for a future visit. The Necropolis, with its blend of geological, historical, and architectural significance, proved a perfect setting for what was an intellectually stimulating summer field trip.



We extend our thanks to Margaret Greene for her expert leadership and to all who joined us for making it such a memorable day... we'll all have our magnifiers ready in pocket, the next time we visit a graveyard!

*Clare Clark*

## **Burnmouth - 19 July 2025**

### **Leader Katie Strang**

18 booked on but unfortunately the difficult decision was made last minute that this trip had to be cancelled on the morning. The forecast had already been for rain but changed overnight to have us right in the middle of a thunderstorm on a very exposed beach with no shelter close by. Also, the afternoon section was likely to be either cut off or made very dangerous by the unusually high swell due to the storm. The thunderstorm did hit the area and it turned out to be the correct decision. Members were very understanding and were refunded.

## **Girvan - 2 August 2025 (Joint excursion with EGS)**

### **Leaders: - Neil Clark and Katie Strang 22 Participants (11 from each Society)**

After a late start from Edinburgh, the bus picked all the participants from the Kelvin Hall in Glasgow and sped off to the first locality at Ardwell Bay south of Girvan. The tardiness of the bus made no difference to our schedule of stops.

The excursion covered some of the crucial Caradoc and Ashgill (Ordovician) sedimentary sequences of the Ayrshire coast from the Ardwell and Whitehouse Formations (south of Ardwell Farm) to the Shalloch Formation closer to Girvan in the north. The field excursion looked at the rocks and fossils of the Girvan southern foreshore that have been studied for well over a century.

Elizabeth Gray, the famous Scottish 19th century fossil collector and facilitator of research grew up here and her fossil discoveries led to our current understanding of the divisions and palaeogeography of the early Palaeozoic. Other well-known researchers who have worked on the fossils from the Girvan area include Sir Alwyn Williams, Charles Lapworth, Keith Ingham and many more.

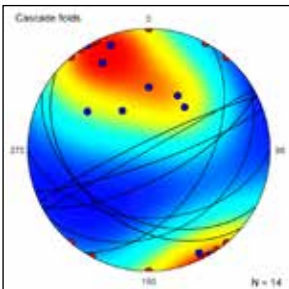
**Ardwell Bay.** The visit started with a look at the Cascade Folds of Ardwell Bay and a beach pebble hunt to see the variety of pebbles associated with the Ordovician rocks of this area. After a short walk from layby to beach we were faced with the

contorted beds of the Cascade Folds (photo over). The Ardwell Flags on this beach form huge folds of alternating laminated sandstones and mudstones. Some of the sandstones have rippled surfaces indicating directional flow of water. These magnificent exposures of 'cascade folding' can be seen which have been interpreted variously as a late Caledonian fold phase or as penecontemporaneous slumping of partly lithified sediment.



'Cascade folding' of the Ardwell Formation.

We measured the dips and strikes of the folds (Fig. below) to attempt to interpret what these folds represented – tectonic folds or sedimentary slump folds. The stereographic projection of the folds (on a Wulff net) produced an interesting, and colourful graph. The prevailing orientation of the fold axes was ENE-WSW plunging at about 15° toward 065° (brighter red and yellow colours on the plot). This suggests a roughly NW-SE shortening direction during deformation which fits in with the regional stress field active during the Caledonian Orogeny in western Scotland. However, due to the spread of the data, and the beds above and below the Cascade folds not being folded, we concluded that it was possible that the folding could still have been caused by slumping rather than tectonics and decided that much more data was needed.



Stereogram of data collected showing the dips and strikes and fold axes of the Cascade Folds collected on the day.

The pebbles on the beach were very varied and included many of the igneous rocks that helped interpret the geological setting of the Ardwell Flags. These included pebbles of gabbro and basalt from the Ballantrae Complex and granite from Ailsa Craig as well as conglomerates with jasper pebbles probably from the Bennane Conglomerate.

**The Whitehouse Shore.** This is where Elizabeth Gray quarried trilobites, brachiopods, graptolites and bryozoa. The fossils Elizabeth Gray collected from the Girvan area ended up mostly at the Natural History Museum

in London, although some also went to the Hunterian museum in Glasgow. The Mill Formation on the Whitehouse Shore is divisible into two members—a lower laminated and largely shaley unit and an upper unit dominated by sandstones and siltstones. Both members are best seen on and around the three small sea stacks mentioned above. The lower member of grey and green banded silty shales yields graptolites indicative of the lower Ashgill *Dicellograptus complanatus* Biozone. Some thin seams contain a cyclopygid biofacies trilobite fauna very similar to the one already referred to in the Myoch Formation but this time the remains have been transported. Some new forms appear, not known from earlier beds, such as *Dindymene* and **Aethidionide**, the latter

only otherwise known from China! It is from this unit that the famous Gray Collection of Upper Whitehouse fossils, now housed in the Natural History Museum, was obtained. The upper, sandy member also yields occasional fossils but is best examined for its cross-bedded sandstone units consisting of fragmented shelly debris (westerly derivation) and its slumped beds, seen best on the seaward side of the middle small stack. At this locality the Upper Whitehouse Group terminates with a thick channel-fill sandstone bed seen just beyond the stacks at about low water mark. Above it is a widespread bed of unfossiliferous, leaden-grey mudstone about a metre or so thick which forms the basal bed of the overlying Shalloch Formation.

Elizabeth Gray was told not to waste her time with the red mudstones as they represented terrestrial deposits and would not contain fossils. The red mudstones, however, also contain fossil trilobites that were worked on by the late Dr Keith Ingham (some of his research is still being published posthumously). Many species new to science were excavated from here by Dr Ingham but few were published on before he died. Upper Whitehouse Group–Myoch Formation consist of deep-water facies faunas, with sandstone dykes, and conjugate faulting. There are two formations in the Upper Whitehouse Group—the Myoch Formation and the Mill Formation. The former is distinctive and consists largely of red and green silty mudstones. In the middle sector of the foreshore the lowest beds of the Myoch Formation consist of greenish silty mudstones followed by reddish and greenish banded beds, these in turn being followed by dominantly reddish beds. It is from the upper part of the latter unit that, with patience, a substantial and strange fauna can be extracted from loose blocks. The fauna consists largely of trilobites and constitutes what is known as the cyclopygid biofacies. Although there are benthic elements, much of the fauna was pelagic. Typical, blind, benthic elements are *Dionide* and the trinucleids *Novaspis* and *Nankinolithus*. Pelagic elements include the all-seeing *cyclopygids* *Cyclopyge*, *Symphyops*, *Degamella* (two species), *Novakella*, *Microparia*, *Psilacella* and *Ellipsotaphrus* together with *Telephina*, *Bohemilla* and the eyeless *Raphiophorus* and a host of others, some rare. This indigenous fauna represents an Ordovician deep-water assemblage and is known from a variety of levels throughout the Ordovician. It is most typical of

southern Britain, central Europe and Asia. Here, at Girvan, it is found on the subtropical fringes of the North American palaeocontinent of Laurentia and reflects the widespread distribution of deep sea, colder water and ocean-going faunas. For the dark, deep-sea bed to accommodate benthic elements, the water to have been oxygenated and this is reflected in the colour of the beds — largely due to iron oxide. It is believed that these reddish silts tones of the Myoch Formation comprise the overbank ‘fines’ of submarine



*Cranidium of Symphysops found and photographed by Ted Simakou.*



Left – Reconstruction drawing of *Symphysops* by JK Ingham - showing the underside of the head (above); the top of the whole animal; and the underside of the pygidium (below).

channels building up a deep-water fan deriving from the west or NW perhaps near the lower ends of submarine canyons. The age is at about the boundary between the Caradoc and the Ashgill Series.

We had been given special permission from Nature Scotland to collect loose material to see if we could find trilobite material ourselves. Several specimens were found including a rather nice cranidia - one with a lovely eye - of *Symphysops* by Jim Floyd and Ted Simakou.

The maps produced by Dr Keith Ingham were impressively accurate with even the boulders on the foreshore being accurately placed. His maps are the most accurate maps of the geology of Girvan ever produced and can be used to interpret the tectonic history as well as the sedimentary environment with a high degree of precision.

Other features which can be observed in these beds locally on the Whitehouse foreshore include sandstone dykes—sand which has been winnowed by bottom currents into deep fissures in partly consolidated sediment—an indication of submarine disturbances.

The Shalloch Formation here contains graptolites and is cut by a Tertiary dyke. Dextral faulting trending roughly E–W is responsible for the progressive ‘stepping back’ of the Shalloch Formation adjacent to the layby on the Whitehouse Shore and this formation then occupies the rest of the foreshore and round into the next bay to the NE—Port Cardloch. The formation is a sandstone flysch sequence consisting of rapidly alternating, fairly thick beds of sandstone and shale. Fossils are few (the old name for the formation was the ‘Barren Flagstones’) but graptolites from a thin fine-grained detrital carbonate rock indicate the *D. complanatus* Biozone.

Adjacent to the Whitehouse shore layby, one of several dolerite dykes which cross the foreshore was examined. The form of this particular one is complex and the multiple branches of it have enclosed tracts of Upper Whitehouse and Shalloch strata. The beds show evidence of baking along the contact. The age of the dykes is Tertiary and they constitute part of the Arran swarm.

Ainslie Manor Silurian conglomerates: the Craigs Kelly Conglomerate (Craigs Kelly and Horse Rock) and the Quartz Conglomerate (Cow Rock).

From the car park we walked south along the beach on the seaward side of the Ainslie Manor Nursing Home (formerly the Haven Hotel). Outcrops between the beach and



Scart Grit conglomerate of angular quartz inclusions, volcanic ash and some rare pieces of red jasper.

the Nursing Home consisted of a coarse, mainly matrix-supported conglomerate containing abundant quartz pebbles and siltstone clasts, many quite angular. A small proportion of metamorphic lithologies is also present. The bed is known informally as the 'quartz conglomerate' and is stratigraphically a part of the Scart Grit. Southwards the number and size of siltstone clasts increases and at Cow Rock the base of the conglomerate can be seen to channel into an underlying siltstone and fine greywacke sequence. This is the Woodland Formation, which contains a sparse shelly fauna of Llandovery age. The topmost few metres of the Woodland Formation, beneath the quartz conglomerate, are much disturbed by slumping.

The Woodland Formation underlies the small sandy beach extending for about 30 m SW towards the next rock outcrop, the Horse Rock. This is also formed of conglomerate but of a very different character to that previously seen. At the Horse Rock the CraigsKelly Conglomerate is well exposed as a polymict (a conglomerate made of diverse angular



Horse Rock CraigsKelly conglomerate (Silurian) with interbedded channel-form turbiditic beds. Ailsa Craig in the background

rocks) and clast-supported lithology. It contains rounded pebbles of acid and basic igneous rock, some metamorphic fragments, jasper and clastic turbidite strata. The beds are quite thick, reaching about 8 m on CraigsKelly, but at the Horse Rock the conglomerate is interbedded with turbidite greywacke units up to about 50 cm thick. The base of the CraigsKelly Conglomerate is exposed on the SW side of the Horse Rock and may be seen at low tide subject to the vagaries of the shifting beach sand. An unconformable but sharp planar contact occurs between the conglomerate and the underlying thin greywacke and shale beds of the Shalloch Formation. The latter is of mid-Ashgill (Ordovician) age and the CraigsKelly Conglomerate is taken to mark the base of the Silurian.

Palaeocurrent evidence, deduced from clast imbrication and bottom structures, indicates that the CraigsKelly and quartz conglomerates were both derived from the NW. The cause of the abrupt change in character of the source terrane during the early Silurian is a matter of speculation.

The trip ended with a trip to the best chip shop in Girvan (Graziano's Harbour Bar) where they had been warned of the arrival of 20+ visitors looking for their supper and dealt with us efficiently. The fish and chips were excellent. Most of the group (11 members from each of the societies) took our chips and gathered around the memorial fountain by the harbour where we all thanked our leaders for the excellent, informative and fun day we had all had. There was much chatter with our fellow Edinburgh society members about how much we had seen and learned and just how many geologists had forgotten how to read a compass clinometer! And those who had never used one before had enjoyed learning a new skill, it was very interesting to be on a site where the exact geology has not quite been settled and properly mapped out.

Katie Strang had also given us some information about Elizabeth Gray while we were at the exact section where she had famously quarried for fossils which made for quite an experience to be given permission to hunt for our own fossils in the loose blocks around here, we were somewhat less successful than Lady Gray and Keith Ingham had been in the past but I don't think that anyone was too disappointed with the experience of having tried! A couple of lovely partial trilobites appeared which caused quite a stir!

## **Rouken Glen - Saturday 25 October 2025**

**Leaders: Margaret Greene and Iain Allison, with assistance from Neil Clark**

This excursion, which was part of the Scottish Geology Festival programme, was originally planned to take place on 4 October but was postponed until today because of Storm Amy. The aim of the excursion was to study the Carboniferous rocks exposed in and around the Auldhouse Burn, in particular the Orchard Beds. These rocks were formed around 325 Ma. The excursion followed the route described in the Strathclyde Geoconservation Group's "Orchard Beds Geo-trail" leaflet and the locality numbers from that leaflet will be used in this report.

19 participants met at the Boathouse beside the pond on a bright cold morning. Margaret gave us an introduction to the geology of the park and explained that the Giffnock Sandstone, which was one of the main rock types we would see, was one of the most important building stones in Glasgow during the 19th century and that Rouken Glen is now the best place to see this formation. The sandstone was formed from deposits of sand in wide river channels.

She then led us to an exposure of Giffnock Sandstone beside the pond (Locality 1). This displayed glacial striations that were formed around 12,000 years ago during the Pleistocene ice age by glaciers dragging rock fragments over the surface of the sandstone. We then went to Locality 2 to look at a conglomerate erratic which was carried to its present location when the ice melted at the end of the Pleistocene.



The group at Picnic Rocks (Locality 5)

We now crossed the bridge over the

waterfall to look at a large exposure of Giffnock Sandstone known as the Picnic Rocks (Locality 5). On our way to the bridge we passed two large fragments of rock beside the path which were rescued from the Auldhouse Burn after one of its banks collapsed in December 2012 and which may be concretions (Locality 11). The Picnic Rocks showed internal layering and what may have been trough bedding. From there, some of us went down to a gully to look at a fossilised fragment of a Carboniferous tree in an overhang (Locality 4).

We now returned to the waterfall (Locality 3) and descended steps that have been carved from the Giffnock Sandstone (Locality 6). At the foot of the steps we went northwards along the path, and followed the Auldhouse Burn downstream. The path starts on the west bank of the burn and crosses the burn 3 times. On the way downstream we passed through progressively younger beds of the Carboniferous succession, which are tilted to the north. The first of these were various beds of the Giffnock sandstone (including a thin bed called the Moor Rock) and then we came to thin beds of sandstone, siltstone and mudstone, which were laid down in shallow, swampy seas. Coal has also been found in these beds, but we didn't see any. Then, just before the second bridge, we came to a small stream flowing into the burn from the west (Locality 8), where there is a thin layer of limestone which was laid down in open sea water and in which crinoid fossils have been found. We then came to a very important group of rocks known as the Orchard Beds (Locality 9).

These are composed of limestones and mudstones and were again laid down in open sea. Each bed constitutes a record of the environmental conditions prevailing when the sediments were deposited. Rouken Glen is the best place in Scotland to see the Orchard Beds and it is their presence that has led to this part of the park being designated an SSSI. We stopped at a clearing beside the river to look at exposures in the river bed and on the far bank (Locality 9). Margaret showed some fossils typical of the area that she had brought with her and Neil found some brachiopod and crinoid fragments in situ in the river bed.



The Orchard Beds at Locality 9

On our way to the final bridge, we passed thinly bedded sandstones and siltstones that are situated above the Orchard Beds and then a thick sandstone layer forming an overhanging prominence on the opposite bank (Locality 10).

We now crossed the third bridge and climbed back up to the level of the waterfall by the path on the east bank of the burn. We then returned to the path beside the pond and completed the circuit back to the Boathouse, after a very enjoyable and informative excursion. Some of us then enjoyed a hot drink and a snack outdoors at the cafe before heading home.

*Bill Gray*

## Geonatter Report

It has been another great year for Geonatter at Kelvin Hall. We have around 15-20 people coming to each monthly session with 35 new faces this year as well as our regular attendees. We would like to thank everyone for bringing along so many interesting specimens for us to look at this year; we never cease to be surprised by the mysteries hidden in rocks.



A special thanks to Dr Katie Strang (Curator of Mineralogy-Petrology) and Dr Neil Clark (Curator of Palaeontology) from the Hunterian without whom Geonatter would not be possible. They have surprised us month after month: a collection of pink minerals to teach us how to use the Mohs hardness scale; how to recognise trace fossils and use this to infer behaviour e.g. trilobite trackways; how to tell the difference between fossil orthocones and belemnites; the mysterious nature of pseudomorphs with Scottish examples. We have also been treated to viewings of rare and delicate specimens such as a very unusual specimen of Pele's hair; and Katie Strang presented a collection of minerals that were curated by the first woman Hunterian curator (1910) Agnes T. Neilson and fossils collected by Elizabeth Gray (1831-1924). Members of the Geonatter group also had the amazing opportunity to get involved in creating the 'Woman on the Rocks' exhibition at Kelvin Hall.

Geonatter continues to be successful due to the contribution of our regulars: our GSG President Margaret Greene brings specimens from her travels as well as her rock collection ... and her geological jewellery collection is not to be missed. Members open our eyes to the wealth of Scottish fossils and always have something new to show us each month, and if we are really lucky the GSG librarian will let us see some historical geology books and papers from the GSG library.

Steven Brown has been slicing rocks for us to get in close and appreciate the detailed matrix of rocks and minerals; Bobby Alexander helps us to appreciate crystallography and better understand the processes of igneous and metamorphic rock formation; Louise Simpson, Marisa Privitera Murdoch, William McLellan, Austin Brown, Barbara Balfour and Allison Drummond regularly bring in specimens from their diverse collections. Our Xmas Quiz and party is always a special event thanks to Susie Gemmell who adds to our cheer with her mulled wine.



Thank you to everyone who comes along to Geonatter and makes it such a fun place to learn about rocks, fossils and minerals. Let's hope 2026 holds as many 'Wow!' geology moments as 2025.

*Clare Clark*

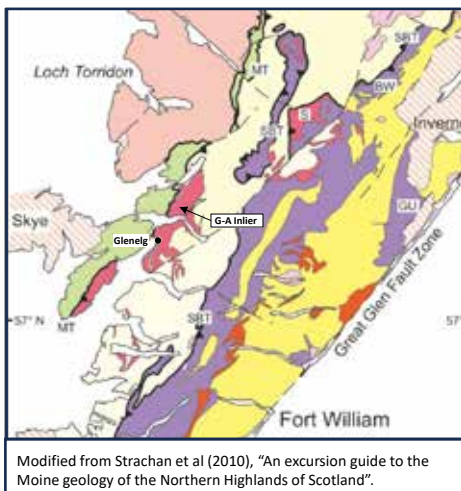
# Residential Field Trip to Glenelg

4-8 September 2025

**Leader: Con Gillen. Attendees 13**

**Introduction (Bobby Alexander)**

The objective of this four-day excursion to Glenelg, in the Lochalsh area of the NW Scotland, was to examine the rocks in and around the Glenelg-Attadale Inlier (GAI), the largest Lewisian basement inlier of the Northern Highlands Terraine, surrounded by younger Moine rocks (Figure 1). This area is the only example in the British Isles of well-preserved eclogite, formed under extreme pressure metamorphism in the early to mid-Proterozoic, and later caught up in the folding and thrusting of the Caledonian orogeny.



The party consisted of thirteen society members, of varying levels of geological

experience, led by Con Gillen, who very generously stepped in at very short notice as replacement for the original leader who withdrew at short notice. Nine of us stayed at the Glenelg Inn, the only hotel/pub/restaurant in the village, while four others stayed in nearby self-catering accommodation, Seaview Cottage, on the shore front.

We arrived in the late afternoon/early evening of Thursday 4th September and assembled for dinner at the inn, after which we gathered in Seaview Cottage for a briefing about the following days' activities. Any notion that we may initially have had to hold such briefings in the inn itself were quickly dispelled when it became obvious that the inn was the centre of village nightlife, and not exactly suitable for 'classroom learning'; although we enjoyed the village nightlife in other respects.

**Friday AM (Bill Gray)**

We assembled at the war memorial above the shore, where Con gave us a summary of the geology that we would see on our first day. He pointed out that the Moine rocks have been subject to three phases of metamorphism and deformation and that the resulting structures contain complex folds and veining. These phases occurred in the Neoproterozoic (Knoydartian Orogeny, 820-725 Ma), the Ordovician (Grampian Orogeny, 470-460 Ma) and the Silurian (Scandian Orogeny, 435-425 Ma).

Both of the localities we went on to visit are associated with the Western Unit of the Lewisian Glenelg-Attadale Inlier (GAI), which is of Archean age (around 2.7 Ga), while the adjacent Moine consists of rocks formed from sediments that were deposited between 1000 and 870 Ma and were subsequently metamorphosed in the three phases described above. The GAI contains predominantly acid gneisses and subordinate

metabasites, with less common meta-sediments (see Saturday report, below).

Both localities are described by Ramsay in *An Excursion Guide to the Moine* (Strachan et al., 2010). The weather in the morning was kind to us, with scattered clouds and occasional light showers.

### **1. Glenelg shore (NG 8092 1921; Locality 6.2 in Strachan et al., 2010)**

All the rocks at this locality are within the GAI and are therefore of Lewisian age. They consist of banded hornblende-biotite gneisses cut by massive sheets of amphibolite. According to the excursion description, these amphibolite sheets are “basic intrusions injected into the gneissic host and subsequently recrystallised in amphibolite facies metamorphic conditions during D2” (i.e. deformation that took place during the Grampian orogeny.)

Starting at the war memorial the gneisses were dark grey, predominantly amphibole, but moving south they became lighter coloured, richer in pink feldspar and with green epidote crystals. The presence of the epidote indicated that this gneiss had undergone retrograde metamorphism, where a metamorphic rock formed under high temperature and pressure (high grade) has been subjected to a later phase of metamorphism at lower temperature and pressure (lower grade). Examples of retrograde metamorphism were a consistent theme throughout the trip. We saw a good example of an amphibolite sheet, which had a very sharp contact with the adjacent gneiss (Photo 1), and a rock showing L-tectonite deformation (grains aligned and cigar-shaped).



*Photo 1: Contact between amphibolite (above) and gneiss (below) on Glenelg shore.*

### **2. North Glenelg Bay (NG 809 205; Locality 6.1 in Strachan et al., 2010)**

We walked back to the Glenelg Inn to collect our packed lunches before driving to north Glenelg Bay. The southern section of this locality lies in the GAI but the northern section lies in the Morar Group of the overlying Moine. We started off in the northern, Moine, section, where the dominant rocks were psammitic mica schists, some with isoclinal folds (Photo 2). A prominent feature was a lamprophyre dyke (a porphyritic igneous rock) dating to around 430 Ma (Scandian Orogeny), which contained square feldspar crystals. We studied this dyke and noted its chilled margin (Photo 3). The boundary between the Moine and the Lewisian is just south of



*Photo 2: Isoclinal fold in schist, north Glenelg Bay.*



*Photo 3: Lamprophyre dyke with chilled margin, north Glenelg Bay.*



*Photo 4: Sedimentary cross-bedding in schist, north Glenelg Bay.*

this dyke, and we crossed the boundary to look at the Lewisian gneisses, which contained hornblende, biotite, quartz and feldspar crystals. We now returned to the Moine section to look for the exposure of schist that Ramsay describes as having “excellent cross bedding” and, after an extensive search, we found a rock which might have been the one in question (Photo 4).

**Friday PM (Ian Veitch)**

Leaving Glenelg, we drove south to visit Sandaig to look for eclogite in the Western Unit of the Lewisian Glenelg inlier. Parking at the side of the road a 1.5 mile walk took us down forest roads and tracks to Sandaig, made famous as Camusfearna in Gavin Maxwell’s book Ring of Bright Water. It is a delightful spot with memorials to Maxwell and Edal the Otter and we had our lunch on the shore.

To get to our first location we had to cross the Allt Mor Shantaig burn, which took a bit of effort, persuasion and some wet feet but was worth it as we found gneiss containing actinolite crystals. Actinolite is an amphibole, related to hornblende, and forms elongated prismatic crystals. It has been incorporated into the gneiss in a later phase of retrograde metamorphism. We found a boulder



*Photo 5: Prismatic actinolite in retrograded gneiss.*

where the actinolite had been preferentially eroded from the gneiss and, once we got our eye in, there were plenty of actinolite crystals in evidence in the outcrops on the shore (Photo 5).

The tide having come in after previously crossing on foot, some of the party decided



*Photo 6: Crossing on the rope bridge.*

to recross the river using an in-place, but somewhat challenging two-strand rope bridge (Photo 6), expertly reknotted by Austen (thank goodness Austen knows his knots!). Fortunately, everyone made it over safely, particularly our leader Con whom we could not afford to lose.

Back at the shore we examined the shear zone of banded gneiss with epidote and chlorite, i.e. of greenschist facies and another example of retrograde metamorphism. In places the gneiss had been converted to schist associated with the conversion of hornblende to chlorite.



*Photo 7: Gneiss affected by mylonitisation*

This area showed evidence of D4 deformation which would have taken place in the final stages of the Caledonian Orogeny. We also identified a highly stretched gneiss taking the appearance of a mylonite, where recrystallisation has taken place as a response to shearing under pressure (Photo 7).

From there we walked south along the shore past a massive brown basalt dyke, of Paleogene age, beyond which we found our eclogite boulder containing red garnets in a matrix of green omphacite (a type of clinopyroxene). Eclogite is formed deep in the crust/upper mantle at high pressures and temperatures and is the high grade metamorphic product from the subduction of basaltic ocean crust. Its (relatively) unaltered preservation at surface is probably due to rapid uplift from depth after its original formation. We had been lucky with the weather up to this point but rain was on its way and, sure enough, it came on as we trekked uphill to the cars and headed back to Glenelg.

### **Saturday AM (David Rae)**

The day began with a drive inland along the Old Military Road to a parking area at Bealach Ratagan, where we stopped to admire the view of the Five Sisters of Kintail. We then proceeded down to the north side of Loch Duich to examine the Ratagan Granite, which was intruded into the Moine metasediments and Eastern Unit amphibolites 425 million years ago. This eastern part of the pluton is a pinky red quartz monzonite, i.e. it has approximately equal proportions of orthoclase and plagioclase feldspar.



*Photo 8: 'Streaky' eclogite with garnet cluster garnet, Letterfearn.*



*Photo 9: Amphibolite with garnet showing retrograde feldspar rim, Totaig.*

From here we returned to the southern side of Loch Duich and headed northwest along its shore to our next localities, first Letterfearn and then Totaig, where we had our lunch. At Letterfearn we found retrogressed eclogite, which was in places visibly streaky or with garnet in clusters (Photo 8). Amphibolite grade metamorphism caused the original pyroxene (omphacite) to regress to a fine-grained mixture of amphibole, plagioclase and garnet, whilst the original pyrope garnet, being more stable, remained, with some showing a reaction rim (Photo 9). At Totaig a dolomitic 'marble' with diopside nodules was examined. The diopside may have been formed by the reaction of the dolomite with chert nodules. Also observed was the contact with the adjacent amphibolite and recumbent folding in the amphibolite.

#### **Saturday PM (Keith Torrance)**

After enjoying lunch by the boathouse at the top of the boat ramp (NG 87573 25364), we continued to examine the dolomitic diopside marble which, prior to being metamorphosed, was a sedimentary limestone within the Lewisian. The marble has a striking weathered, coarse granoblastic texture, with s-shaped, circular diopside nodules. It is strongly sheared with weathered grooves, which are the product of solution cavity weathering (Photo 11). Rims of amphibole surround some of the diopside nodules. Sightings of seals, an otter, and a sea eagle added to an enjoyable lunch break.

Approximately 100 metres further east (NG 87673 25350), the marble is bounded by amphibolitic gneiss, with pegmatite veins, which were observed by the group along the shoreline. Pods of eclogite are present within 'duplex' thrust packages, containing red garnet and green omphacite, the latter often retrograded to hornblende.



*Photo 10: Dolomitic marble showing solution cavity weathering]*

Photo 11: Fibrous actinolite (dark mineral) in schist.

Our next stop was on the A890, 0.5km north of Auchtertyre, (NG 85003 27700). Here, the road cutting exposes massive, heavily fractured, Lewisian gneiss, which is thrust over the Moine meta-sediments.

Continuing a kilometre further north on the A890, next to Lochalsh Dam Reservoir (NG 85226 28244), we stopped at a substantial road cutting exposing talc-actinolite-chlorite schist within a shear zone. The schist is lustrous green in appearance and is heavily fractured within localised zones. Large fibrous actinolite crystals are abundant, often forming clusters (Photo



11).



Our final stop was on the north shore of Loch Duich, west of the bridge to Eilean Donan Castle. (NG 88230 25945). Here we examined exposures of gneiss with dark mafic banding, locally showing evidence of partial melting. It is believed that the gneiss was originally formed under granulite facies metamorphism (the highest pressure) but subsequently retrograded to amphibolite facies. Further west, pegmatitic veins were observed crosscutting the gneiss (Photo 12), which is likely to be the result of partial melting of the amphibolite gneiss. Con explained that partial melting is not only produced by increasing temperature but can also occur during

Photo 12: Pegmatite veins in gneiss.

retrograde metamorphism with the introduction of water and volatiles.

### **Sunday (John Guerrier & Campbell Forrest)**

We left our excellent accommodation at the Glenelg Inn to drive a short distance back up Glen More to a parking spot by a Scottish Water station opposite the farm of Iomairghradain. We were once again fortunate to have a largely dry day with enough wind to keep the midges away.

This excursion was largely following excursion 1 in the Craig Storey guide and excursion 7 in the Moine geology guide and takes in the Eastern Unit of the GAI. The terrain was quite rough but not too steep and with many good exposures to explore. At our first

*Photo 13: Kyanite crystals in schist.*

locality (Locality 3 in the Storey guide) we saw blocks of dark, heavily weathered marble; indeed it was so blackened that it needed a minimal amount of hammering to reveal itself. These marbles had many protruding nodules of green-tinged diopside and dolomite and bound the eclogite at the top and bottom. A little bit further up the hill were spectacular,



*Photo 14: Close-up of eclogite on "Eclogite Ridge".*

museum quality, exposures of kyanite (Photo 13). The kyanite forms a random, platy structure, often in distinct clusters, and breaks down to andalusite.

The focus of the day's activity, however, was to find and examine the eclogites. Finding specific localities mentioned in the guides was not straightforward, despite GPS, but there were numerous good exposures. The eclogite comprises coarse-grained dark green omphacite and dark red garnet and is preserved in patches (Photo 14). Eclogites

form in high pressure and temperature estimated at around 20 bar and 750C (Storey et al., 2005). This was believed to have happened during the Grenvillian orogeny around 1082 Ma. Also, associated with this orogeny, at around 1010 Ma, the rocks experienced a decompression with the omphacite being replaced by diopside, plagioclase and quartz. The eclogite is also observed replaced by amphibole. We observed the garnets frequently had a corona of white feldspar as a first stage in the replacement process, as we saw previously at Letterfearn.

At the end of the day we took time to visit the two impressive brochs, Dun Telve and Dun Trodden. They date from around 400-200 BC and at 10m tall Dun Telve is the second largest surviving in Scotland. It is clear that the builders would have had a good knowledge of the qualities of particular types of stone and certain stones seem to be singled as being of special significance (See Cover Photos).

### **Monday AM (Bobby Alexander)**

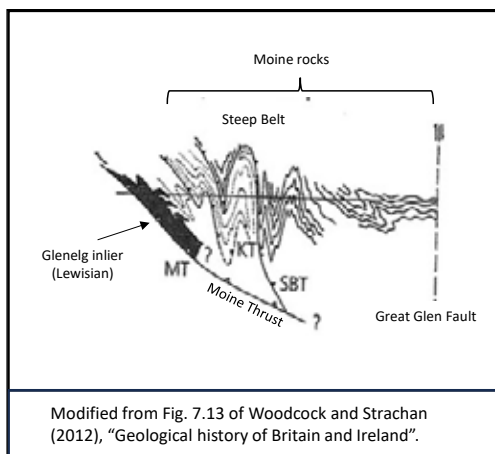
After checking out of our accommodation on the last day of the trip we set off eastward from Glenelg, with two geological stops planned before continuing our journeys homeward.

The first stop was at a roadside parking area on the A87, 10 km east of Shiel Bridge in the shadow of the Five Sisters of Kintail. Facing us across the road were crags of



Photo 15: Steeply dipping Moine rocks, Glen Shiel.

steeply dipping Moine rocks which, on some nearby summits, were expressed as sharp, jagged ridges (Photo 15). On crossing the road to examine the crags more closely, it was clear that these rocks, although metamorphosed, still retain a strong expression of their original sedimentary bedding but there was also an element of structural cleavage at a low angle to bedding or even bedding-parallel. Sharp, steeply dipping edges on the face of the crags may have been a result of the intersection of bedding and cleavage. Close inspection of the metasedimentary sequence revealed repeated fining upward units about 0.5 to 1m thick and the direction of fining indicated that the beds were slightly overturned beyond the vertical. Con explained to us that these steeply dipping Moine rocks were within the eastern part of the Northern Highlands Steep Belt, beyond which (to the east) the regional dip flattens toward the Great Glen Fault [Figure 2]. The



cross-section in Figure 2 also shows the relationship of the Glenelg Inlier within the Lewisian core of a complex major fold/thrust nappe, underlain by the Moine Thrust.

Our last stop before heading home was at the eastern end of Loch Cluanie, close to the Cluanie Dam. Parking in a convenient viewpoint layby we walked the short distance down to the shore of the loch where we found granite both as in situ outcrops and as loose beach boulders. This is the Cluanie Granite, one of the "newer granites", which has been dated at 425 Ma. It is

undeformed and therefore post-dates Caledonian deformation. The Cluanie granite is predominantly pinkish in colour, although many of the beach examples were white, possibly the result of modern day bleaching due to water washing at surface (Photo 16). The striking feature is the presence of euhedral feldspar phenocrysts, many of which display visible zoning and/or inclusions of a dark mineral, hornblende (Photo 17). As with all granites, it contains two feldspar types: a potassium-rich alkali feldspar (in this case microcline), and a sodium-rich plagioclase (in this case oligoclase). These two minerals are also present in the matrix, accompanied by quartz, hornblende and lesser biotite.

Thus ended our most enjoyable trip to Glenelg. Our heartfelt thanks go to Con Gillen for



Photo 16: Cluanie granite (?bleached white).



Photo 17: Close-up of Cluanie granite showing euhedral feldspar phenocrysts.

guiding us during our ramblings (both physical and verbal) through this iconic area of complex metamorphic geology.

## References

- Storey, C. (2008). A field guide to the Glenelg-Attadale Inlier, NW Scotland, with emphasis on the Precambrian high-pressure metamorphic history and subsequent retrogression, *Scottish Journal of Geology* **44** (1).
- Strachan R., Alsop I., Friend C. and Miller S. (eds) (2010). *An Excursion Guide to the Moine. Geology of the Northern Highlands of Scotland*, Edinburgh Geological Society, Geology Society of Glasgow, 123-128.
- Woodcock N and Strachan R (eds) (2012). *Geological History of Britain and Ireland*, Wiley-Blackwell.

# Strathclyde Geoconservation Group Report

The office bearers at present are: Margaret Greene (MG) Chair, David Hamilton, treasurer, Maggie McCallum, website and Margaret Anderson, Archives.

With the retiral of Barbara Balfour as secretary, MG has carried on with this post.

Barbara served for 11 years and was extremely efficient at her job, she is a sore miss.

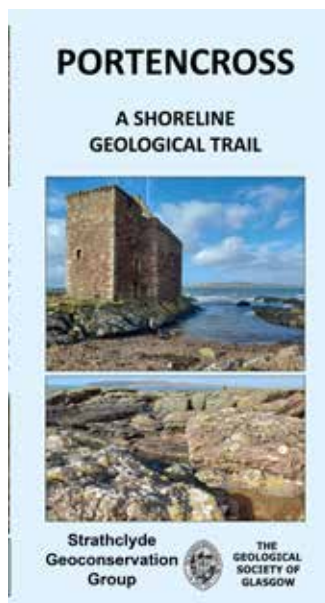
The attendance at meetings usually 6 or 7. All meetings are on zoom. There are 34 names on the SGG mailing list and we lost two good friends this year, Jim Morrison and Paul Carter, but have gained new friends to the group.

## Leaflets and walks

Two new leaflets have been finished this year, Portencross and Linn Park. Printing and distribution are in progress. It was decided to discontinue the leaflet on Gleniffer Braes due to the condition of the site.

Still in the pipeline are Mugdock Park and Kelvin Country Park; also the pavement geology around the University will be included when the Building Stones of the University booklet is reprinted.

There have been a number of walks this summer carried out by members of SGG on behalf of the Geological Society of Glasgow. On 9th April Iain Allison (IA) led a walk along the River Kelvin following the Kelvin Walkway Trail leaflet. On the 2nd May there was a joint SGG and GSG excursion to Portencross trialing the new leaflet, led by David Webster and Austin Brown. On the 11th June MG led a walk in Glasgow Necropolis on behalf of GSG following the Necropolis Leaflet, helped by IA and Katie Strang, and on 25th October MG and IA led a walk round Rouken Glen Park on behalf of the Scottish Geology Festival and GSG.



## Activities

MG and Keith Torrance ran a beach pebble hunt and indoor activities on the 29th March, for the children of the Seawilding Group at Ardfarn, Argyll; there were 17 children plus helpers, on a very wet day.

SGG was asked to respond to an appeal sent to GSG regarding destruction of the Parallel Roads of Glenroy on behalf of the residents of Achanabobane. MG wrote to Highland Council, NatureScot, the local MSP and Police Scotland in support of the appeal. A Nature Conservation Order has now been placed on this area

SGG members covered activities at the Rock Doctor event at the Hunterian on the 13th September

## Fossil Grove

Work started improving the condition of the building in May and is still on going; on the 15th June SGG was involved in activities and information at a event which had to be held out with the area of the building.

## Local Authorities

MG has attended Teams meeting with North Ayrshire Biodiversity Partnership. A meeting with the Renfrewshire Biodiversity group was cancelled but it was noted that NatureScot intended clearing vegetation at Boyleston Quarry and to carry out a Site Condition Monitoring of Rouken Glen SSSI.

## Geosites Project



Screenshot from the Geosites Database

MG has been in contact with Angus Miller of the Scottish Geology Trust who has held two 'Geoblitz's' this year - one in East Lothian and one on Arran; the proposal is to hold a training session and a 'Geoblitz' locally next year. More information at <https://geosites.scottishgeologytrust.org/>

*Margaret Greene*

# Fossil Grove Report

Glasgow City Council have accessed some £420,000 of funding to carry-out urgent repairs to the building. Commencement Date - 22 May 2025. Details at: <https://fossilgroveglasgow.org/renovation-project-2024/>

The building remained closed for the duration (originally expected to be 14 weeks - but now extended into November).

The main items are to dig new underground drainage and waterproof the underground sections of the walls to limit the amount of water getting into the building plus fix the roof leaks and gutters. Hopefully these works will reduce water damage and internal humidity. Roof leaks are being fixed.

New electrics have been installed, the redundant plant room has been removed, the front canopy roof has been replaced. Ventilation will be improved also with extra grilles being installed in the lantern.

Our usual Open Afternoons (on the third Sundays of the month) were cancelled in 2025 (apart from an outside event in June) and will re-commence in April 2026



Old lighting removed and roof structure painted



Drainage and tanking works on north elevation



Drainage and tanking works on the south elevation



Repainted reception area

## Website Report

The society's website continues to publicise the society's activities, promote the geology of the Glasgow area and report geological developments at local and international levels. During Session 167, a new set of extracts from the society's proceedings for significant anniversary years (150 years ago to 25 years ago at 25 year intervals) was added to the Archive section. Our thanks are due to the society's honorary archivist Margaret Anderson for preparing all 10 sets of anniversaries material for the sessions up to Session 167 and another set for Session 168. The Archive section and the Society Presidents page are well worth exploring for the fascinating insight they give into the society's history.

After the website was launched in January 2011, the traffic to it increased steadily until Session 162 (2019-2020), but during Session 163 (2020-2021) there was a major increase in the number of visits, probably reflecting the Covid-induced restriction of outdoor activities. In Sessions 164 and 165 there was a return to the previous trend, but Session 166 saw a slight reduction in traffic. Session 167 has seen a further reduction, with 65,660 visits, a decrease of 7.2% from the total for Session 166 (70,724). The number of users, as opposed to visits, was 54,910, a decrease of 5.9% from the total for Session 166 (58,363).

In previous reports, I have used the number of visits to indicate the relative importance of different geographic areas as sources of traffic to the website. However, the tool that produces the figures, Google Analytics, now gives information on users rather than visits and I will do likewise here. The decrease in users in Session 167 was largely the result of decreased traffic from abroad, especially from the Philippines. The number of users from the UK in Session 167 was 10,562, 19.2% of the total users and a decrease of 7.3% from Session 166 (11,351). However, there was a much greater reduction in traffic from the Philippines, which had been the most productive country in Session 166: down from 14,373 users to 5,807, a decrease of 59.6%. In Session 167, Hong Kong was the most productive country, with 14,694 users (9,696 in Session 166), the UK was second, the USA was third with 6,459 (4,630) and the Philippines was fourth. Within the UK, England accounted for 6,306 users (6,804 in Session 166), Scotland for 3,995 (4,176), Wales for 265 (282) and Northern Ireland for 197 (248). For users for whom city of origin data are available, London was the most productive city within the UK, with 2,476 users (3,054 in Session 166), followed by Glasgow with 1,313 (1,420) and Edinburgh with 663 (771). Google Analytics was unable to provide city data for 18,606 users, 33.9% of the total (12,415, 21.3% of the total, in Session 166). The most visited page on the website during Session 167 was the Home page, with 23.7% of page views (it was the third most visited page in Session 166), but the Local Rocks section accounted for more page views in total, with the Rock-forming Minerals page receiving 21.0%, the Rock Cycle page 15.0% and the Igneous Rocks page 2.0%. Other popular pages were the Arthur Holmes page (2.2%), the New Zealand's Moeraki Boulders page (1.5%) and the Scottish Fossils page (1.4%).

By far the most productive source of traffic to the website was again the Google search engine, which was responsible for 36,267 visits or 55.2% of the total number (47,547, 67.2%, in Session 166). The next most productive source was direct logons to the website, which produced 25,244 visits or 38.4% of the total (19,202, 27.2% in Session 166), while the search engine Bing produced 1299 visits or 2.0% of the total (968, 1.4%). ChatGPT made its first appearance in the annual figures, with 216 referrals, 0.3% of the total. The majority of the remaining visits resulted from referrals from social media or other websites. The most productive source of referrals was Facebook with 318 referrals or 0.5% of the total visits (444, 0.6%, in Session 166). The Arran Geopark website produced 143 referrals, 0.2% of the total visits (115, 0.2%).

In addition to the website, the society uses its Facebook page and a new Bluesky account (@GeolSocGlasgow for both) to engage with the public. It makes little use of the X (formerly Twitter) account. The Facebook page now has 358 followers, 80 more than a year ago, and the Bluesky account has 66 followers. If you have a Facebook or Bluesky account, please “like” and share any society posts that you find particularly interesting.

After 12 years as the society’s webmaster, I am now standing down, and I thank everyone who has supported me during my time in the post.

*Bill Gray*

[web@gsocg.org](mailto:web@gsocg.org)

## Library Report

The Library group (Lindsay Smith, Bobby Alexander, Ian Millar and Margaret Anderson) have had meetings with the Glasgow University Librarian and we are assured that our planned move of 197 books initially (1st phase) is still very much welcomed by the library as resources to be kept safely stored by them and catalogued on worldwide search engines to be utilized wherever the need arises.

This is a fantastic testimony to our wonderful library collection at GSG is that some books in our collection have very few copies remaining in circulation available to be used anywhere else in the world!

We have started moving some books from the Molema library room and our books will be identified in the online GUL catalogue as being from the “Geological Society of Glasgow collection” and will be searchable in the database under that heading.

*Lindsay Smith*

[library@gsocg.org](mailto:library@gsocg.org)

## Scottish Journal of Geology Report

A list was requested of currently submitted papers and their status, from Journal Manager Charlotte Sisman at the Geological Society of London.

The last board meeting was held in 2025 and discussed ideas about “Data in Brief” as well as the possible solicitation of reviews and other articles.

There are presently 8 viable contributions within the submission system. Submitted work at various stages of review and revision comprises: 1 x book review, 6 x research articles and 1 x review paper. There are 3 x original contributions on palaeontology, 2 x on ore sources or processes, 2 x on igneous geochemistry or geochronology. We will hopefully have a healthy start to the 2026 volume. Figure 1 shows a return to close to hoped-for submission rates of 20 papers/year.



Figure 1. Recent submission rates to the Scottish Journal of Geology. Source, Charlotte Sisman, Geological Society.

The acceptance rate each year in the Scottish Journal of Geology has ranged from 53-73 % and stands at 60% for 2025.

### Last year's publications:

Edition	Title	Author	Downloads via Lyell Collection
In press	The Highland Border Complex, NE Scotland	Henderson and Robertson	82 (full text not yet available)

Dec '25	Early Basin Development of the Dalradian Supergroup	Rugen et al.	541
	Gypsum pseudomorphs, subaqueous cracks, lake-bed morphology and palaeoclimate	Leather and Brown	204
	Hugh Miller the Elder and Younger	Davidson and Johnston	310
	A potential Middle Devonian example of fish Mortichnia	Eisenhauer	149
	The <i>Ureocrinus bockschii</i> bed of Trearne Quarry SSSI	Hoare and Donovan	195
Nov '24	Paleoproterozoic (late 'Laxfordian') reworking of juvenile Neoproterozoic Lewisian orthogneisses	Daly et al.	780
	Otoliths from the Lealt Shale Formation	Schwartzhans and Wakefield	134
	A new crinoid morphotaxon from the Silurian (Llandoverly) of SW Scotland	Donovan et al.	136
	New malacostracan crustaceans from the Lower Coal Measures	Clark	467
	A lectotype for the Scottish Middle Devonian (Givetian) fish <i>Osteolepis panderi</i>	Newman	100
	Mechanisms of secondary carbonate precipitation on felsic, intermediate and mafic igneous rocks	Stubbs et al.	758
	Graphitization of Neoproterozoic sedimentary marbles	Heptinstall et al.	709

Note that those papers highlighted in bold are published via Open Access agreements. There is generally higher engagement with open access papers, and it would be worth seeing or encouraging if authors have any honorary affiliations with a Read and Publish agreement that they could take advantage of.

*Iain Neill*

Scottish Journal of Geology Editor

Co-opted Member of GSG Council

## Dr. James (Jim) Morrison

1942-2025



Jim Morrison passed away on 12th August. All of you who knew Jim will remember his special knowledge of geology and his quirky humour. Our sympathy goes out to Mandy

Jim was born and brought up in Aberdeen and graduated in Biochemistry from Aberdeen University in 1964. He then moved to Glasgow University, where he did a PhD under Hamish Keir and Prof J. N. Davidson on DNA replication in herpes virus. 'JND' was a friend of 'TNG' (T. Neville George); indeed the two families holidayed together. After a spell as research fellow at Stanford University with Nobel laureate Arthur Kornberg, he spent the rest of his career at Glasgow University, teaching science, medical and vet students and continuing his herpes virus research. Latterly, he became interested in all viruses and especially their evolution, because from the mid-1980s the DNA and RNA sequences of all kinds of viruses were determined and so the genetic relationships between them could be evaluated.

He has always been interested in rocks of hill and shore in NE Scotland. About 1980, he renewed an interest in hydro-electric schemes, especially those of pre-1950 vintage; this "exposed" him to more rocks and started a strong interest in geology. In the early 1980s Graham Durant, then at the Hunterian, introduced him to the Geological Society of Glasgow, where he made steady progress with the help of "real" geologists, including Brian Bluck, Chris Burton, Jim MacDonald and Geoff Tanner, and people at BGS Edinburgh, especially the late John Mendum. Jim's initial interest was the Highland Boundary fault, but this soon extended to all Highland geology and especially the Great Glen Fault and the Moine Thrust. Starting sea kayaking in 2004 allowed him to explore some of the less accessible areas of Mull and Shetland. His interest in virus evolution has parallels with the notions of the evolution of geological structures in the Highlands, especially in the period 1200-400Ma.

Jim joined the Geological Society of Glasgow in 1986 and served on the council for three years as an ordinary member before taking on the post of meetings secretary, which he held for 25 years, from 1990 to 2015. He served as President of the Society from 2015 to 2018.

# Dr. William David Ian Rolfe

1936-2025



Ian was born in Hornchurch, Essex in 1936 and educated at the Royal Liberty Grammar school, where he was inspired there by geology teacher John “Dan” Reekie. He graduated BSc, PhD in geology (1960) from Birmingham University with a thesis on Silurian inliers of the Midland Valley of Scotland. This redescribed the large podshrimp *Ceratiocaris* which led to his Treatise on Invertebrate Paleontology (1969) on this ancestral group. Harry Whittington recruited Ian to curate non-trilobite arthropods at Harvard’s Museum of Comparative Zoology (1961–1962). Treatise funding permitted him to revise several other groups of arthropod, notably the Carboniferous *Arthropleura*.

In 1962 Ian became a curator at the Hunterian Museum of Glasgow University (deputy director, 1981–1986). He joined the 1967 joint expedition to Gogo, a Devonian locality in Western Australia, collecting 1000 fishes, mostly new, and 2000 pod-shrimps. To celebrate the 1983 bicentenary of the Hunterian’s founder, Ian published Hunter’s manuscript on the giant Irish “elk” and Stubbs’s Moose painting.

From 1986 to 1996 Ian was Keeper of Geology at the National Museum of Scotland, Edinburgh (NMS). There, he established a major project to ensure that rare fossils of the world’s earliest assemblage of fully terrestrial amphibians, then being excavated at Bathgate by Stan Wood, were recorded and purchased for NMS. Previously, he scripted a Hunterian exhibition about Stan Wood’s fossils which travelled widely in UK. He also project-managed input to the new Museum of Scotland Beginnings gallery.

Ian joined the Geological Society of Glasgow 1962, serving as Secretary (1972–1973), Editor (1967–1972) and President (1973–1976), and contributing to the society’s ‘Excursion Guide to the Glasgow and Girvan area’, published in 1992. He was president also of the Geological Society of Edinburgh (1989–1991), the Palaeontological Association (1992–1994) and the Society for the History of Natural History (1996–1999). Ian was a Fellow of the Geological Society (1960), Museums Association (1972) and the Royal Society of Edinburgh (1983). He published almost 200 papers.

He was awarded the Murchison Fund of the Geological Society of London (1978); the Coke Medal (Geological Society of London 1984); and the Clough Medal (Geological Society of Edinburgh 1997).

# Paul Carter

1943-2025



Paul Gilbert Carter MSc, MICE (Civil Engineer), MIGeo (Member of Institute of Geologists?), collapsed and died on the 30th August aged 82. He was a Chartered/Consulting Engineer. He joined the Society in 1979 (46 years membership).

He served as a Director with Babbie Geotechnical Ltd 1989-1997; Babbie International Ltd and Babbie Environmental Ltd 1994-97; and Jacobs One Ltd 1995-97 and Secretary With a Smile Ltd 2005-2007.

Paul was active in his local community, being Vice chair of the Kilsyth Community Forum; a member of the Friends of Kelvin Valley and he conducted local history talks at Kilsyth library on subjects such as flora, fauna and wildlife and the 250-year mining history of the area.

Paul was a close associate of the Strathclyde Geoconservation Group. Together with Mike Browne they carried out - in their own time - a detailed audit of geoconservation sites in North and South Lanarkshire and in the Falkirk district.

Paul took some of us round Calder Glen Country Park, which resulted in the new flier - in which he stars. Last year Paul led a group of us along Carron Glen and some went back to his house afterwards for tea and cake.

He has written leaflets on Kelvin Valley Rocks and Cumbernauld Rocks as a friend of Kelvin Valley, and also been involved with local groups and schools whenever there's has been an opportunity for Paul to talk about rocks.

Another loss to geology.

## Jim Martin



Jim Martin died on 10 August 2025, and was an active member of the society for many years, regularly attending indoor meetings and excursions along with his wife Lynne, and he served as the day excursions secretary from 2008 until 2011. Before retiring, Jim worked for IBM, and he used his professional computing expertise to oversee the specification and commissioning of the society's new website, which came into operation in January 2011. Jim and Lynne moved to Edinburgh in 2013 and they joined the Edinburgh Geological Society, but they also remained members of our society until recently. Jim was an energetic, enthusiastic, knowledgeable and generous person, who reached out to people and made many friends in the society. He will be greatly missed.

## Roy Bryce



Roy joined the society in 2014. He was a very enthusiastic member and quickly became involved in the activities of the society, in particular the excursions. He served as Day Excursions Secretary from 2014 till 2023, and carried out his duties very efficiently and conscientiously, attending virtually every excursion. (I can only remember one excursion he didn't attend, and that was because his wife was ill.) He also served as Residential Excursions Secretary from 2022 till 2023. He was a very sociable man and greatly enjoyed the social aspects of the many residential excursions that he attended.





The Fossil Grove Renovation Project kicked off in May 2025 with £450k funding from Glasgow City Council. It included drainage improvements, new ventilation and roof repairs.



# **THE GEOLOGICAL SOCIETY OF GLASGOW**

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