

**PROCEEDINGS OF  
THE GEOLOGICAL SOCIETY  
OF GLASGOW**



photograph – *Sitting on the Tarbet Dyke ( M.Donnelly)*

**Session 154**

**2011-2012**

## **SESSION 154 (2011-2012)**

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**SESSION 154 (2011-2012)**  
**Members of Council**

President	Miss Margaret Donnelly
Vice President	Dr. Alan Owen
	Dr. Brian Bell
	Vacancy
Honorary Secretary	Dr. Simon Cuthbert
Treasurer	Mr. .Michael J. Pell
Membership Secretary	Dr. Robin A. Painter
Minutes Secretary	Mrs. Margaret L. Greene
Meetings Secretary	Dr. J.M. Morrison
Publications	Miss Muriel Alexander
Librarian	Dr. Chris J. Burton
Asst. Librarian & Hon Archivist	Mrs. Seonaid Leishman
Proceedings Editor	Mrs. .Mina Cummings
Publicity	Dr. Neil Clark (web)
	Dr. R. A. Painter (meetings etc.)
Excursion Secretaries	Dr. Emily Unsworth (days)
	Ms. Katerina Braun (Residential)
Youth Outreach Officer	Ms. Katerina Braun
Junior Members' rep	Mr. Douglas Watson
Editors of S.J.G.	Dr. Colin J.R. Braithwaite
	Dr. Brian Bell
Ordinary Members	Dr. Ben Browne
	Ms. Emma Fairley
	Mr. R. McNicol
	Dr. W Gray
	Miss Alison Drummond
Independent Examiner	Mrs. Beth Diamond

## Presidents Report October 2012

This session membership of the society has held at around 370. The eight evening meetings of the society were well attended with the exception of the December meeting when a major storm forced the closure of our venue (and many public buildings) and the AGM was postponed until January. As a result of the very late appointment of a new Day Excursion secretary we had two Saturday field trips and two evening excursions three of which were well attended while the fourth clashed with a pre-arranged field trip to Spain.

Our residential excursion to the Assynt area in September, visiting new localities described in the recently published 'A Geological Excursion Guide to the North West Highlands of Scotland', was well supported.

The Strathclyde Geoconservation Group (SGG), a subcommittee of the Society's Council, has continued to be very active in promoting geology in the wider community, investigating a number of new sites as well as continuing to work on others. Progress on the refurbishment of the building which houses the Fossil Grove has been disappointing due to lack of funds available from Glasgow City Council. The Fossil Grove Trustees meet on a regular basis with members of the Steering Group in attendance and a decision has been taken to apply, together with the Friends of Victoria Park, for Heritage Lottery funding. The two other subcommittees, Geodiversity Argyll and the Islands and Geodiversity Dumfries and Galloway, are also making progress and have investigated a selection of new sites. A representative of each group attends one Council meeting per year (in March) and all three provide a report for each Council meeting.

Our society is a member of the recently formed Scottish Geodiversity Forum which includes Geoparks, Museums, SNH, BGS, Geoconservation Groups other Geological Societies and interested groups and individuals. The aim of the Forum is to promote Scotland's Geodiversity and its value in education, community involvement and health, tourism and the wider economy. A Scottish Geodiversity Charter has been drawn up, signed by all members, and launched on 7<sup>th</sup> June 2012. Efforts to persuade all Local Authorities to also sign up to this charter are ongoing. The petition to the Scottish Parliament Petitions Committee that Scotland's Geodiversity be protected in statute has, as yet, been unsuccessful but it is hoped that continuing dialogue with the Scottish Government will take this matter forward. The Forum held their AGM on Saturday 10<sup>th</sup> March in Perth and a one day conference on Saturday 19<sup>th</sup> November in Battleby near Perth both of which were attended by many members of our Society. The Society joined with the Forum and numerous geology groups and individuals worldwide in a protest against a proposed industrial development at Siccar Point in southeast Scotland.

A 'Volcano Fun Day' was arranged in Holyrood Park, Edinburgh, in October by our Youth Outreach Officer, and a Fossil Event at Fossil Grove Glasgow in conjunction with Victoria Park's 125<sup>th</sup> anniversary celebrations in September was organized by Strathclyde Geoconservation Group. Both events were assisted by members of the Society. The Society participated in a 'Build It! Schools' event in the Glasgow Science Centre, 25<sup>th</sup> to

This year the Society allocated grants to the Scottish Geodiversity Forum and towards the publication of a paper with coloured photos and diagrams. Together with the Edinburgh Geological Society, Aberdeen Geological Society and Conoco Phillips UK, we annually present a prize to those pupils in Scotland with the highest marks in Intermediate I, Intermediate II and Higher Geology.

The two new guides to the Geology of Southern Kintyre and to the Geology of the Island of Gigha are in progress, while a revised Guide to the Geology of Arran is planned for publication by the Society.

## Margaret Donnelly

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## Membership Secretary's Report

	At end Session154 30Sep 2012	At end Session153 30---Sep---2011
Honorary Members	5	5
Ordinary Members	271	287
Associate Members	70	72
Junior Members	16	20
<b>TOTAL Members</b>	<b>362</b>	<b>384</b>
New Members	18	30
(joining in Session 154)		(joining in Session 153)
Memberships Closed	40	31

Overall membership numbers in Session154 has fallen somewhat(5.7%) from the previous Session. The new members joining rate in Session 154 was almost half what it was in the previous Session. About3 0 of the memberships that were closed in this Session were as a result of non---payment of membership fees .The remainder were as a result of resignation or death.

**R.A.Painter**  
**November 2012**

## Library Report: 2011---2012

The Society's Library has functioned normally this session after a number of years in which reorganization has been the dominant theme. The reorganisations and the many donations and acquisitions of the recent period have created an up-to-date and comprehensive geological library covering most aspects of the subject. Those members not already regular users should at least visit the Library on meetings nights and explore the stock--serendipity will certainly produce something of interest!

### *Out of date books*

There remains the problem of shelf space, which has become acute due to the steam of acquisitions. Removal of out of date books (those of no historical value and which contain some out of date knowledge) will commence in the coming session. Discarded books will be offered to members and thereafter to the Oxfam Bookshop.

### *Acquisitions*

There have been fewer book acquisitions this session, but with the usual wide range, from specialized palaeontological works to petrology. However, courtesy of our link with the British Geological Survey our map collection has grown rapidly. The latest additions include:

1:50000 Scotland Shear 102W Oykel Bridge. Bedrock  
1:5 000 England/Wales Sheet 75 Preston. Bedrock and Superficial  
1:50000 England/Wales Sheet 75 Preston. Bedrock  
1:50000 England/Wales Sheet 86 Glossop. Bedrock and Superficial  
1:50000 England/Wales Sheet 150 Dinas Mawddwy. Bedrock and Superficial  
1:50000 England/Wales Sheet 283 Andover. Bedrock and Superficial  
1:50000 England/Wales Sheet 310 Tiverton. Bedrock and Superficial  
1:50000 England/Wales Sheet 346 Newquay. Bedrock and Superficial

These and other maps in the collection can all be borrowed on application to the Librarian or the Assistant Librarian.

### *Library Use:*

Our dedicated band of borrowers-- this session 19 strong (and about the average long---term borrower number)--borrowed a total of 146 items, including the ever popular excursion guides (17 items) to a world- wide range of countries, including Italy, Spain, Canada and Australia. However, the remaining items revealed the huge range of geological interests that our members encompass-- everything from landforms to ophiolites, including calcareous sediments in the Bahamas, how to organize an expedition to Svalbard (in Norwegian!), Quaternary studies, the Alps and much more.

*All this points up the fact that our Library is a great resource and one that still outdoes the internet in its range. Come and use it!*

**C.J.Burton: Librarian**  
**S.Leishman: Assistant Librarian**

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## **Scottish Journal of Geology Editors Report December 2012**

The usual two full issues were published during the year. Volume 48 comprised 9 papers, And 7 book reviews. Papers again covered a range of topics; deformation, metamorphism, mineralogy and petrology, and palaeontology; geographical spread, from NW Highlands to the Borders and offshore; and ages of rocks, including the Moine, Dalradian, Devonian, Jurassic and Tertiary. However, notwithstanding the length of some of these, the relatively Small number of papers submitted to the journal remains a constant concern to the Editorial Board. The SJG went online in January 2010 when all issues dating back to the Journal's inception in 1965 became available through the London Geological Society's Lyell Collection. As indicated earlier, this now also includes the entire archive of the Transactions of both the Edinburgh and Glasgow societies. Negotiations by the London Society, on our behalf, have been underway, to have the SJG included in the largest North American database, Geoscience World (GSW), and in the last month this has been approved. Our initial online presence had an immediate effect, with over 77,000 abstracts and 11,000 full texts being viewed during that year. A brief web search indicates that we are already available through the Smithsonian Institution library in Washington and via HighWire Press in Stanford University, California. The hope is that our inclusion in GSW Will further increase citations and encourage more potential authors to submit papers. The increasing use of colour in the Journal, currently financed by authors, has also had An important impact, with complementary remarks reaching the Board regarding the attractiveness of the Journal and the high standard of publication. The Board is seeking support from the two Societies to extend the use of colour and thereby attract more submissions. Current concerns include potential difficulties arising from proposed Government legislation on the availability of research results. The intention is that the Results of publicly financed research should be accessible immediately without charge, and this will have important consequences for the ways in which all Journals are financed. There is also an increasing trend towards publication of Journals online, either without a Paper copy at all or with copies printed only (and expensively) 'on demand'. Both of these are likely to impact on the SJG in the near future.

**Dr.Colin Braithwaite  
Dr.Brian Bell**

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### **Publications Report Session 2011--12**

The Bookshop is, as always, proving to be a successful resource within the Geological Society of Glasgow and of value and interest to members, adult classes and students. Requests have been received for books, geological maps and specialist publications and several new titles have been added to the stock throughout the year. The link with

National Museums of Scotland and the Edinburgh Geological Society in the publication of the Moine Guide had proved to be advantageous as has the inclusion of our booklist on the GSG website which has resulted in regular e---mail requests from the UK and abroad for our own publication “*A Field Guide to the Geology of Madiera*”. However, we are now facing some competition from the internet but I am happy to say that our sales are still satisfactory.

This year we have received several donations of geological books and maps from members who were happy to pass on unwanted materials that they felt would be of interest and use to others in the Society. These have been on offer to members on Society nights and I thank the donors.

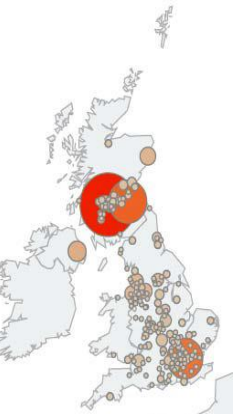
Finally, I would like to thank all those who have helped me so much in many ways throughout the year especially with the internet, the financial transactions and the bookshop on meeting nights.

**M. Alexander**

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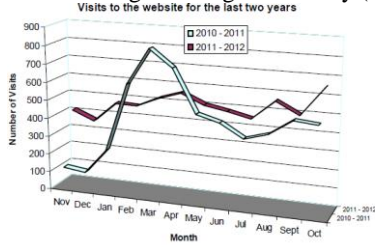
**Report on the Geological Society of Glasgow’s website<http://www.geologyglasgow.org.uk/> 2012**

The website is up and running and has been now for nearly two years. Since last November there have been 6,064 (November 2th 2011-November 5<sup>th</sup> 2012) visits to the website. During the same period in the previous year we had only 4,227 visits. This is a substantial increase in traffic to our website which has grown substantially since we converted to the new website in 2010. As in previous years, most of the visitors come from the UK with 4,675 visits-an increase of 3.3% ( Scotland (2625) , England(1,872), Northern Ireland (136), and Wales ( 39). In terms of the cities our visitors came from, the majority came from Glasgow (1,046), Edinburgh (679), and London(552). We also welcome the 2 visits from Norfolk Island in Oceania ,between Australia and New Zealand. These were the first visits from the island!



this year, [scottishgeology.com](http://scottishgeology.com) (89), the Geological Society (London) (61), and the Huntarian Museum’s curators pages (49). Although the website seems to be running adequately it was useful to review the pages this year to determine whether improvements could be made. Emma Fairley and Bill Gray were invited to become the Website Coordinator and the Website Technical

The most popular pages on the website other than the homepage are the bookshop ( in particular the Madiera Guide) and the day excursion reports for 2011. It appears that quite a few visitors are referred to our site via the Edinburgh Geological Society (115)



Coordinator respectively. Bill produced a wish list of changes that may be implemented to improve the website-some of which have already been undertaken by the newly formed Website Group. The previous team of Jim Martin and Seonaid Leishman are thanked for their hard work in setting up the website in 2010.

Although the figures are greater than last year we seem to have leveled off at about 500 visits a month with slightly less in the winter and more in the spring and summer. There was not the March spike of the previous year which followed the launch of the new website. As more information and news is added to the website we will probably see small increases in the volume of visits but we are already attracting a lot more individual visitors (4,277) than there are members of the Society. The officers of the Society are thanked for continuing to update pages relevant to their duties so that members can have information available as soon as possible. The website will continue to improve and inform but we rely very much on the members of the Society for content

**Officers: Dr. Neil D. L Clark, Emma Fairley, Bill Gray**

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### **Report from Strathclyde Geoconservation Group**

The Strathclyde Geoconservation Group has had another busy year:-

**Glasgow City Council**- we commented on the Local Plan Main Issues report and were asked to suggest a list of sites within Glasgow; BGS are now being asked to carry out a geodiversity audit using these sites; plans are going ahead to write a trail leaflet on the building stones of the City Centre, GCC have agreed to help with design etc. Barbara Balfour and Alison Drummond have revised the booklet on the Building Stones of Glasgow University originally written by Chris Burton, they are now in the process of trying to obtain funds for printing. Members have attended meetings of the Fossil Grove Trustees and Steering Committee; SGG held a very successful event at The FG in conjunction with Victoria Park's 125<sup>th</sup> anniversary celebration. SGG commented on the Victoria Park management plan.

**East Dumbarton Council**-Local Plan MIR- a pre report workshop was attended but the Local Plan is on hold at the present; SGG will comment on the MIR when it comes out; discussions with ED Tourism Officer regarding possible reprint of Campsie Glen leaflet. Meetings and discussions with Gillian Telfer , Neighbourhood Services Officer-Seonaid Leishman went round sites which were to be 'greened' to determine their geological potential; Gillian managed to obtain a grant for information boards- these will be put at strategic sites incorporating geology, the interpretation of which will be supplied by SGG. Muriel Alexander and Seonaid Leishman have reviewed all 34 sites identified in the BGS audit and rated them for promotion potential. At a meeting with ED planners agreed that sites be identified in the Local Plan as 'geo' LNCS.

**West Dumbarton Council**-Barbara Balfour and Alison Drummond have produced and printed a leaflet on Dumbarton Rock; they were involved in a meeting on the potential development of the access path next to Dumbarton Rock and took part in a guided walk to the area in conjunction with Outdoor Festival. A response was made to the Local Plan MIR; Margaret Greene and Seonaid Leishman met with Alistair Gemmell, Planning Office, with regard to assessing and registering a number of geomorphological sites in

WD as they have no funds to carry out a proper audit; a number of sites have been assessed in the WD planning area and these will be presented at a meeting between the planning dept. and MG and BB.

**Loch Lomond and Trossachs National Park-**After a meeting to discuss the geological interpretation when the Balmaha Visitor Centre was to be revamped the matter of a reprint of the Balmaha leaflet was raised. With the help of David McCulloch and funding from LLNTP this was achieved. SGG was asked for rock samples for the visitor centre and Campbell Fleming supplied these.

**Renfrewshire-**SGG commented on the Local Plan MIR and MG attended meetings of the Glennifer Braes Green Network Group.

**Site Visits-**SGG visited Hyndford Quarry, Lanark, on 3<sup>rd</sup> March and Culzean Country Park on 4<sup>th</sup> August. CF is monitoring Douglasmuir Quarry in the long term.

**Scottish Geodiversity Forum-** Members of SGG attended the Forum AGM and the launch of the Scottish Geodiversity Charter and are now promoting it to local councils and organisations.

**Publicity-**SGG has produced postcards to promote and explain the group's activities.

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### **Report from Geodiversity: Argyll and the Islands**

The group made a formal response to the Argyll and Bute Council MIR that will lead to the next Local Plan. In this response we made clear our desire to have meaningful contact with the Council in the recording of geosites. An earlier letter to the Council Planning Department was never answered and no formal response was received to this formal submission.

The Bute columnar sandstone site was brought up by Glyn Collis of Bute Museum, in the light of my response to him, he took it up with his museum trust chairman, an ABC councilor, who then took it up with the Argyll MSP Michael Russell, also a senior SG minister. As a result a meeting with Michael Russell was held in late September at which the issue of geodiversity and its official acknowledgement was discussed, mainly in the context of the Bute site. He sent a letter, informed by points supplied by GAI, to Argyll & Bute Council in which the wealth of geodiversity in Argyll and Bute was emphasized and the need for formal process by which this could be kept on record with the Council. The letter concluded by requesting that the Council hold exploratory talks with Glyn Collis ( Bute Museum) and GAI using the Bute site as an example to establish how to take this forward on a cooperative basis. I have heard informally that the matter has been passed down the line to the Council's Biodiversity Officer.

On the Isle of Luing the disused slate quarries have been identified as a potential geosite. A meeting with Historic Scotland was held in September 2011 from which emerged ideas for potential small scale quarrying, mainly for heritage use, and also an appreciation of the historic importance of the site, including its geological value. Matters are unlikely to move fast but there is immense geodiversity potential in the site.

At the AGM on 28<sup>th</sup> October 2011 the committee and officers were re-elected for another year.

In December the group held a field meeting to assess the geodiversity potential of the Dogstone , a remarkable sea-stack now high and dry on the raised beach below the MacDonald stronghold of Dunollie Castle, a location where Mendelssohn is said to have worked on his ‘Hebridean Overture’. The site ticks just about every possible box for a Local Geodiversity Site-education, scientific study, historical significance and aesthetic qualities. It is composed of a spectacular ORS conglomerate, rich in clasts from the Lorne Lavas, some with archaeological interest. It is hoped further progress with this site will be made in 2012.Following the field meeting the group adjourned for a Christmas lunch together!

The group was sent details, and responded by questionnaire, for a new project to be launched soon for consultation by a partnership of Argyll & Bute Social Enterprise Network, Argyll & Bute Local Services Initiative, Argyll & Bute Council, Scottish Natural Heritage and Forestry Commission Scotland entitled the Argyll & the Isles Coast and Countryside Trust ( AICCT ) . The proposed aim of the Trust would be to’ *work together to sustainably maintain, enhance and promote the coast and countryside of Argyll and the Isles for the benefit of communities and visitors*’. Among the objectives are:-

- Encourage , facilitate and promote responsible outdoor access to the coast and countryside.
- Maintain manage, promote and enhance our biodiversity and historic environment.
- Deliver a coordinated advisory service and education for the benefit of all existing community trusts and other organisations with an interest in the environment.
- Maximize external funding opportunities for the benefit of the natural and historic environment and its enjoyment
- Encourage participation and partnership working of existing groups and sharing of best practice with local communities and partners on all matters relating to the objectives.

It is clear that geodiversity would fit well into such a structure and this gives an opportunity for GAI to push for inclusion of geodiversity on even terms to biodiversity. GAI was represented at the first of five consultation meetings held around Argyll in the summer of 2012.

In early June GIA and Oban U3A members were invited to a combined talk and field excursion to the island of Ulva where we visited a lesser known, but spectacular, exposure of columnar basalt on the south coast. This is the type of geodiversity site which, while never likely to be under any threat of development, nevertheless needs to be assessed and recorded.

In July the Scottish Geodiversity Forum was contacted by Cllr John Semple, the Deputy Leader of Argyll & Bute Council, concerning sites in Kintyre. As a result an entirely positive meeting was held on 13<sup>th</sup> August with a particular focus on geotourism in Kintyre, but with an appreciation that the whole of Argyll & Bute needed to be addressed. Argyll & Bute Council are in the progress of signing up to the Scottish Geodiversity Charter.

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## Proceedings Editors Reports

1. The Proceedings for Session 152 (2009–10) were finally published in October 2012 by Pandaprint of Rosyth in Fife, who continues to provide a very competitive price. About 100 were distributed by hand at the October meeting and the rest (~260) by post.

**Margaret Donnelly**

2. The Proceedings for Session153 (2010-2011) were completed in good time and distributed in early 2012.many were distributed by hand at geology classes and at a GSG lecture meeting. Many thanks go to all who contributed reports especially trip reports with some excellent photos. The company who had been printing the proceedings in previous years, PandaPrint, have now moved to Fife but after I had made contact by 'phone and followed their instructions it proved very easy to continue to use their expertise by conducting the whole process electronically. The finished booklets were delivered to me very efficiently and we shall continue to use PandPrint for the coming session.

**Mina Cummings**

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### THE GEOLOGICAL SOCIETY OF GLASGOW

#### Income and Expenditure Account for year ending30th September 2012

Income	Session 153 2010-2011		Session154 2011-2012	
1. Subscriptions	£		£	
Received by Bankers Order	3977		4902	
Received by payment to Mem. Sec.	1625		1140	
Deduct paid in advance this year	-40		-40	
Add received in advance last year	40		40	
Add back Moine Guide advance	<u>68</u>	5670	<u>0</u>	6042
last year.				
2. Investment Income				
Dividends	461		495	
National Savings	<u>285</u>	746	<u>184</u>	679
3.Tax refund ( gift aid payment accrual)	850		900	
Under accrual on 2011 gift aid	87		160	
4.Conoco-Philips prizes 2011	133		<u>133</u>	1193
5a)Publications net profit (Note 1)	441		473	
5b)Moine Guide net profit (Note 2)	<u>481</u>	1992	<u>50</u>	523
6.Saturday excursion income	1588		496	
Expenditure	<u>-1444</u>	144	<u>-277</u>	219
7. Weekend excursion income	5256		1850	
Accrual	72		430	

Expenditure	<u>-5302</u>	26	<u>-2310</u>	-30
8. Donations (coffee collections)		242		264
9. Fossil Fun day income	1404			0
Expenditure	<u>-1343</u>	61		0
10. Miscellaneous income ( Note 3)				55
<b>Total Income</b>		<b>8881</b>		<b>8945</b>
<b>Expenditure</b>				
1. Meetings incl. speakers expenses etc.		321		515
Meeting Secretary's expenses		627		446
Room hire session 152/153		2441		0
Room hire session 154 (Note 4)		0		2200
2. Publications of Proceedings		0		420
3. Dumbarton Rock leaflet sponsorship( Note 5)	300			150
3A. Sponsorship ( Note 5 )	0			850
4. Library and Down to Earth	150			104
5. Insurance (accrual)	180			180
6. Conoco-Phillips prizes 2011(accrual)	300			400
7. Website	2517			552
8. Affiliation fees	340			416
9. Admin costs-postage, stationery etc				
Hon. Secretary expenses	481			245
Membership Secretary	500			707
President & VP	80			46
Treasurer	30			88
10. Miscellaneous expenditure	0			143
<b>Total expenditure</b>		<b>8267</b>		<b>7462</b>
<b>Profit/Loss</b>		<b>614</b>		<b>1483</b>

## Balance Sheet as at 30<sup>th</sup> September 2012

### Members' Funds

Balance as at 30/09/2011	59171	60974
Add back Room hire accrual not invoiced	1189	0
Surplus ( deficit) for the year	614	1483

Revised valuation fund for investments	0		0	
<b>Balance as at 30<sup>th</sup> September 2012</b>	60974		62457	
<b>Restricted Funds</b> TN George Fund	380		380	
<b>Total Funds</b>	<b>61354</b>		<b>62837</b>	
<b>Represented by</b>				
<b>Current assets</b>				
Cash at Bank				
Royal Bank of Scotland	1827		2959	
National Savings	32478	34305	32662	35621
Cash in hand				
Publications sales officer	64		35	
Membership Secretary	0		200	
Hon. Secretary	90		95	
Meetings Secretary	0		0	
President	98	252	98	428
National Savings Income Bond	12000		12000	
Current Valuation of ( Note 6)	8355		8355	
- Charifund Investment				
Debtors- Aberdeen GS				
-EGSConico-Phillips	133		0	
- Gift Aid	850		900	
W/e excursions	72		430	
Moine Sales	76		0	
Paypal bookstall	0	21486	42	21727
Stock of Publications –in house	4012		3988	
-Moine Guide	1819	5831	1293	5281    63057
<b>Less Liabilities</b>				
Subscriptions paid in advance	-40		-40	
Conoco-Phillips prizes 2011	-300		0	
Insurance	-180	-520	-180	-220

These financial statements are prepared in accordance with the special provisions of part VII of the Companies Act 1985 relating to small companies.

The financial statements were approved on 8<sup>th</sup> December 2011 by the Trustees and signed on their behalf by

President

M. Donnelly(Ms)

Independent examiner

Beth Diamond(Mrs)

## Notes to the Financial Statements for the year ending 30<sup>th</sup> September 2012.

### Accounting Policies

#### Accounting convention

The financial statements have been prepared under the historical cost convention, and in accordance with applicable accounting standards. The accounts are also set out to comply with guidance from OSCR.

The principal accounting policies adopted in the preparation of the financial statements are as follows:-

All income from membership subscriptions, excursions, publications, bank interest and donations is accounted for on an accruals basis.

Resources expended are accounted for on an accruals basis and are recognized when there is a legal or constructive obligation to pay for expenditure.

All costs have been directly attributable to one of the functional categories of resources defined in the Statement of Financial Activities.

Expenditure on equipment is charged to Revenue in the year of purchase.

#### 2. Notes on entries:-

##### 1. Calculation of surplus on Publication sales

Opening stock value	4012
Purchases	<u>839</u>
Available for sale	4851
Closing stock	<u>3988</u>
Stock sold	<u><b>863</b></u>
Income received	1363
Less cost of sold stock	<u>863</u>
Surplus	500
Donations	12
Less postage expenses	<u>(59)</u>
Final surplus	<u><b>473</b></u>

2. Moine Guide. The publishing costs for the Moine Guide were shared between the national Museums of Scotland, Edinburgh geological Society and the Geological Society of Glasgow on a 50%/25%/25% basis and any profits are shared accordingly. GSG have no control over the majority of sales nor stock management so accurate reporting of sales activity is difficult. Income received this year is £576 but we are advised by EGS that sales are effectively being made at around cost level. A conservative estimate of the profit level at £50 has been made and the GSG share of the closing stock recorded accordingly in these accounts.

Opening stock value	1819
Cost of stock sold	<u>526</u>
Closing stock	<u>1293</u>

3. Miscellaneous income of £52 has been received as a commission on sales made on Amazon through the Society's website
4. Room hire for lectures this year totalled £2514 but one meeting was cancelled as a result of bad weather in the City and a full refund was obtained from the University reducing the cost to £2200

5. Sponsorship was in two areas this year:-

Dumbarton Rock leaflet publishing-	Printing costs		<u>£551</u>
	District Council grant	£271	
	Historic Scotland	£130	
	Society sponsorship	<u>£150</u>	£551
Scottish Journal of Geology	Dr. Brian Bell's paper	£500	
Geodiversity Forum	Start up costs	£ 50	
Strathclyde Geoconservation Group	Funding	<u>£300</u>	£850

6. The Stock Market has remained fairly volatile this year but the value of investments is slightly higher than in 2011. The Balance Sheet has been retained and is still a cautious assessment.

**Michael Pell**

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### Meeting Secretary's Report

This session opened with Phil Stone of BGS Edinburgh presenting a comprehensive account of Geology in the Falklands. In November Professor Dorrick Stow came from Herriot Watt University to give a highly entertaining account of the vanished Tethys Ocean and how it shaped the world.

On the evening of the AGM, when David Chew from Dublin was due to talk, the first of three gales in December and January closed the University and prevented our meeting from happening. Dave will return next session-hopefully to more clement conditions.

The AGM was moved to January and two short talks were resented by Dave Jarman on landslips and the heights of Munros while Jim Morrison spoke about Shetland and its part in the Caledonian Orogeny.

February 2012 saw popular local figure David Brown telling us about the Paleogene pyroclastic rocks of Scotland while fossil fans were delighted in March by Mike Romano from Sheffield University and his account of tracking Jurassic dinosaurs.

We were very lucky to have recently appointed Professor of Geology at St. Andrew's University give the Joint Celebrity Lecture on what the drivers are for making mountains and the consequences of their actions.

Member's night closed the session with the usual interesting and varied programme of talks and demonstrations.

**J.M.Morrison**

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## **Meetings**

**October meeting**

**Thursday 13<sup>th</sup> October 2011**

**Dr. Phil,Stone**

Of the British Geological Society, Edinburgh  
talked on

**The Geology of the Falkland Islands**

The Falkland Islands present a geological paradox: though they are contiguous with the South American continental shelf their rocks and fossils have African affinities. The Falklands succession comprises Proterozoic metamorphic rocks ( Cape Meredith Complex) overlain by Silurian to Devonian shallow marine clastic strata (West Falkland Group), followed by Carboniferous to Permian glacial marine and lacustrine rocks ( Lafonia Group ). These have South African correlatives in the Natal basement, Cape Fold Belt and Karoo Basin respectively. Mesozoic dyke swarms relate firstly to the early Jurassic breakup of the Gondwana supercontinent, wherein the Falklands and South Africa were neighbours, and secondly to the early Cretaceous rifting that initiated the Atlantic Ocean. The present-day landscape of the islands has developed from the interaction of their geology with climatic variations, most notably during the last ice age when large -scale, spectacular periglacial features formed. Early geological work in these remote islands was piecemeal and opportunistic but has had significant consequences, influencing, amongst others, Charles Darwin during the 1833 and 1834 visits by HMS Beagle and Alexander Du Toit in his prescient 1927 championing of continental drift. More recent work has commonly had economic motivation, culminating in the current offshore exploration for hydrocarbons.

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**November meeting**  
**Thursday 10<sup>th</sup> November 2011**

**Professor Dorrick Stow**  
Herriot-Watt University  
Talked on

**A Vanished Ocean; How Tethys shaped the world.**

The Tethys Ocean once dominated the Earth. Between 260 and 6 million years ago its vast waters bore witness to some of the most significant and dramatic episodes in the history of our planet. Two mass extinctions- the end Permian and the end Cretaceous- rocked the world during this long period of time. Global environmental stress and changes in the ocean chemistry are more correctly implicated in the cause of these events, rather than the bolide impact.

The warm shallow waters of Tethys then nurtured the ensuing rebirth of new organisms; exuberant Jurassic marine life; the development of sponge reefs, coral reefs, rudistid bioherms, nummulitic shell banks and the myriad fishes that adapted to each new ecosystem; the evolution of feathered birds from Tethys lagoons and cetaceans from the strandline to the deep sea. Repeated black-shale episodes ( 180-80 Ma) when the ocean was close to its maximum extent have given the world the majority of its oil resources. Progressive closure of the Tethys led to uplift of the Alpine-Himalayan mountain ranges and their dramatic erosion fed the world's largest deepwater fans. Many of these play host to important oil and gas reservoirs. Ocean circulation patterns also changed and so impacted global climate, the resultant changes causing the world to plunge into its current icehouse climatic phase. Opening of the Gibraltar gateway after final closure of the Tethys reign ( 5.2 Ma) resulted in the outpouring of warm salty water into the North Atlantic Ocean. This is likely to help keep the Atlantic Overturn in operation and so, at least initially, stem the worst effects of global warming.

From this remarkable history of environmental change through the geological past we can learn much about our global environment today. What is robust and what is precarious? How does life respond to changing stress? How does the ocean-climate nexus affect climate? Where are the tipping points towards irreversible change?

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**December meeting**  
**Thursday 8<sup>th</sup> December 2011**

**Unfortunately this meeting was cancelled due to extreme weather conditions.**

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**January Meeting**  
**Thursday 12<sup>th</sup> January 2012**

**AGM**

Reports of the officers were received and election of new officer bearers and ordinary Council members took place before the presentation of two short talks.

**David Jarman**  
Mountain landform researcher  
Glasgow & Ross-shire  
Talked on

**Collapsing Munros; shaping of the Highlands by large paraglacial rock slope failures.**

Large landslips and rockslides have often done as much as glacial erosion to shape the mountains yet are barely recognized in school and university courses. Their causes are enigmatic; their distribution is baffling. They cluster along main watersheds, especially around some breaches, and hint at locations of 'ice piracy'

**Jim Morrison**  
Meetings secretary  
Talked on

**Geology of the Shetland Islands.**

The Shetland Islands provide a microcosm of Scottish geology. This will be a land-based exploration of its diversity and complex relationships.

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**February meeting**  
**Thursday 10<sup>th</sup> February 2012**

**Dr. David Brown**  
University of Glasgow  
Talked on

**Paleogene pyroclastic rocks of Scotland.**

The Paleogene igneous rocks of NW Scotland form part of the North Atlantic Igneous Province and are related to rifting associated with the opening of the North Atlantic Ocean. This magmatism is preserved onshore in NW Scotland as fissure-fed lava fields, and as intrusive complexes interpreted as the eroded roots of large volcanoes. Little is known of the form of these volcanic edifices (caldera, stratovolcano, shield?), their composition, and their products. Although small scattered remnants of pyroclastic rocks associated with these volcanoes are preserved they are poorly studied and much maligned! This talk documents an ongoing programme of fieldwork to study these

pyroclastic rocks, including a range of newly discovered and re-interpreted localities, within a modern volcanological framework.

Examples from Ardnamurchan, Mull and Skye, document a variety of intra- and extra-caldera deposits. The eruptions were typically explosive, producing large atmospheric eruption columns that collapsed and generated pyroclastic density currents. These currents deposited a wide range of ignimbrites that record changes in eruption steadiness and the material supplied from the vent. Fine ash generated from these density currents and atmospheric plumes was adhered by electrostatic and hydrostatic attractions to form ash aggregates (accretionary lapilli and pellets). Some of the density currents entered shallow lakes and mixed with the water column depositing ash that was subject to gentle reworking. Periodically, sustained, low-fountain “boil-over” eruptions occurred, generating extremely hot pyroclasts that agglutinated to each other and deformed as a ductile fluid, preserving rheomorphic ignimbrites. Some of these eruptions formed voluminous ignimbrites tens of kilometres from source.

These rocks provide a tantalizing glimpse into the history of volcanism at ancient continental rift volcanoes. They merit further study and will provide valuable data to understanding volcanism in similar modern tectonic settings.

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### **March meeting**

**Thursday 8<sup>th</sup> March 2012**

**Dr. Mike Romano**

University of Sheffield

Talked on

### **Tracking Jurassic Dinosaurs**

Dinosaur tracks are abundant in the Middle Jurassic rocks of Yorkshire and indeed characterise the non-marine sequences developed within the Cleveland Basin. These tracks and associated trackways provide valuable evidence of the possible diversity of the dinosaur communities, their potential makers and their behavior. The historical development of research into Yorkshire dinosaur tracks was reviewed, and the litho-, bio- and chronostratigraphic framework outlined. The probable palaeoenvironment of the Middle Jurassic Cleveland Basin in which these animals lived was summarized. An introduction to terminology and preservational types illustrated some of the problems in dealing with dinosaur ichnotaxonomy, including print simulations in the laboratory. The morphological diversity of the Yorkshire tracks and what this may mean in terms of ichnospecies and animal diversity was illustrated. Finally some case studies were presented ranging from ‘swimming dinosaurs’, the ‘*Deltapodus*’ story (so far) and ‘sauropod speculations’.

The Yorkshire sequence may well qualify as a ‘megatracksite’ of global importance since both dinosaur skeletons and trace fossils are particularly scarce during the Middle Jurassic.

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**April meeting**  
**Thursday 12<sup>th</sup> April 2012**

**Joint Celebrity Lecture**  
**Of the Geological Societies of Glasgow and Edinburgh**

The speakers will be  
**Dr. Peter Cawood**  
St. Andrews University

Talked on

**Making mountains-drivers and consequences**

Mountains are one of the key manifestations that we live on a dynamic planet. They are driven by the movement of surface plates that are in turn a response to the Earth's heat engine. Classic models of mountain building involve the collision of buoyant surface plates (e.g. Himalayas, Caledonides). Such models fail however, to explain those mountains that form in an environment of ongoing subduction of oceanic plates beneath continental plates (e.g. American cordilleras). The history of these two types of mountain ranges is linked: phases of mountain building along the periphery of continents are synchronous with, and driven by, phases of global supercontinent assembly. Such a temporal link may reflect the termination of subduction zones within the interior of the supercontinent during phases of continental assembly, which are compensated for by increased mountain building along the exterior of the supercontinent.

Recent work has discovered a previously unrecognized mountain belt that extends around North Atlantic that is particularly well preserved in Scotland. It developed on the margin of the supercontinent of Rodinia some 1000 to 700 million years ago and is termed the Valhalla Mountains. The belt formed through major clockwise rotation of the whole of Europe with respect to North America (which included Scotland). This motion created an ocean basin and subsequent plate movements along the edge of the basin resulted in the formation and deformation of the preserved rock units. The early history of the belt overlapped, and probably interacted with, the Grenville collisional belt, which was responsible for assembly of the Rodinian supercontinent. The Valhalla belt predates, but formed the basement to, the well-known Caledonian belt.

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**May meeting**  
**Thursday 10<sup>th</sup> May 2012**

**Members Night**

The final meeting of session 154 included an interesting and varied programme of talks which were very well received by the members. These talks were given by

**Neil Smith**-*British Schools Expeditionary Society Expedition to Ladakh, India*

**Julian Jocelyn** – *Dryhead Agate*

**Ben Browne**-*A Mid-Atlantic Walk, Iceland*

**Jim Blair**-*Lochaber Geopark*

**Norman Butcher** – *Arthur Holmes and the Communication of Geology*

Having enjoyed these highly informative and enjoyable talks, members repaired to the laboratory to examine excellent the displays set out by Bill Gray and Simon Cuthbert

**Bill Gray** - *Highlights of last summer's field excursions* (photo-montage)

**Anne Gray**-*Craven Fault and the Northern erratic* ( bench slideshow )

**Robert McNicol**-*Further extracts from my field sketchbooks*

**Julian Jocelyn**-*Dryhead Agate* ( specimens)

**Simon Cuthbert** – *Eclogites and garnet peridotites; messengers from the deep Earth* (specimens)

**Margaret Greene** – *The Scottish Geodiversity Forum*

**Norman Butcher**-*Arthur Holmes and the Communication of Geology* ( book display )

Thanks go to all who contributed to a very enjoyable end to the indoor lecture season.

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### **Excursions Secretaries Reports**

#### **Day and Evenings excursions**

This year the day and evening excursions were organised by Emily Unsworth. The sites were visited during the session.

Lower carboniferous limestones and their fossils at Barns Ness ( E. Lothian ) and Charlestown ( Fife ) . This was the annual joint excursion with Edinburgh Geological Society. *Led by Al. McGowan*

Carboniferous and Quaternary geology and modern geomorphic processes in Linn Park ( Glasgow ). *Led by Simon Cuthbert.*

The Old Red Sandstone and raised beaches at Ardmore Point and the Carboniferous volcanic plug of Dumbarton Rock (W. Dunbartonshire ). *Led by Mike Ke*

The building stones of Glasgow (Glasgow City Centre). *Led by Judith Lawson.*

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#### **Residential Excursions**

On Friday 7<sup>th</sup> September 15 members of the Society headed north to Rhiconich on the North West Highlands for a weekend extravaganza of Lewisian foreland geology. Our leader ,Dr. Iain Allison , started the weekend off with an evening lecture introducing the group to the local geology. This was followed by two full days in the field on the Saturday and Sunday and half a day on Monday. The hotel was very comfortable and the hotel staff looked after us extremely well, a little too well in fact considering the three course evening meals and portion sizes! Luckily both of the Saturday and Sunday field days involved

substantial walks to burn off the excess calories .Thankfully the weather in the North West Highlands was far better than last year's rather wet adventure to Ardnamurchan. Thanks to all those who attended this year's weekend excursion, especially those who volunteered to write the field day reports. In particular ,I would like to say a special thanks to our excursion leader ,Dr. Iain Allison. Unfortunately we were only able to offer one weekend residential field excursion this year due to timing conflicts with field trips organised by other geological societies or groups. Next session ,however, we will be offering two weekend residential excursions, an international excursion to Norway in June 2013 and a second U.K. based excursion to Anglesey in North Wales. Further details will follow in the New Year.

**Katerina Braun.**

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### **Day excursion reports**

#### **Barns Ness and the Scottish Lime Centre**

Joint field trip arranged by the Geological Society of Edinburgh

Leader : Al McGowan 9 June 2012

Report : *S Leishman*

The stretch of coastline east of Dunbar between White Sands and Skateraw Harbour is not only an SSSI, but a Local Geological Site (LGS) designated by Lothian and Borders Geoconservation.

Al McGowan is an enthusiastic promoter of geoconservation and this site gave him an opportunity to introduce us to excellent examples of

- **cyclothem**s. This extensive outcrop of Carboniferous limestone, sandstone, mudstone and coal indicates a long period of changing sea levels.
- **faulting and folding**, including lithified slickenfibres formed by precipitation of calcite along the plane of movement during contemporaneous seismic activity.
- **body and trace fossils** such as corals, crinoids and burrows of *zoophytes*, the latter being called “coal miner worm” as it was often seen in adits and galleries.

There are ruins of a 19<sup>th</sup> century limekiln and in the background, the Dunbar Cement Works.



Cyclothem on White Sand



limestone Infilled hollows

We then discussed the unusual regularly-spaced basin-shaped hollows in the exposed limestone, one metre in diameter and infilled by sea-earth. Al's current theory is that this represents a weathered karstic surface where hollows were infilled then colonised by plants. Or could it represent the root traces of a very tidy forest  
At this point I dropped my camera into one of salt-water pools so no more photos from me that day!

But all is not lost, you can download the Lothian and Borders Geoconservation leaflet on [www.edinburghgeolsoc.org](http://www.edinburghgeolsoc.org), go to geoconservation then Lothian & Borders publications.

The story of Scotland's limestone continued in the planned village of Charlestown at the Scottish Lime Centre in the appropriately named Rocks Road. Very few GSG members were able to take part in this visit (many being on the DACE trip to the Pyrenees ) and I do hope it will be possible to arrange another opportunity. The highlights were

- an explanation of the importance of the work of the Centre to Scotland's historic buildings

- a tour by members of the local Gellet Society of the village, including the harbour and well-preserved limekilns

- a walk up to the Gellet Stone which stands alone in the middle of the massive old limestone quarries, full of fossils

The day was completed by an excellent high tea at the Elgin Arms, named for the original Lord Elgin who developed the limestone industry in this area. Al McGowan and the Edinburgh Society members were thanked for organising such an interesting day and for their company.

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## **White Cart and Linn Park (26th July 2012)**

Leader Simon Cuthbert

Report by *Emily Unsworth*

A very pleasant summer's evening walk along the White Cart in Linn Park was well attended by a large group of society members.



The park takes its name from the 'linn' where the White Cart tumbles over a hard band of rock, a dolerite sill, producing a waterfall. The chilled margins seen at the top and bottom of the band confirm that this is an intrusion (permian) into the surrounding middle carboniferous rocks. This sort of sill can form a distinctive part of the landscape and Cathcart Castle was built on a different part of the same sill further down the river.

The White Cart flows down from Cource Hill to the south and through what was originally an estate owned by a sugar magnate, who left it to the public to be used as a park after his death. Apart from the dolerite sill the surrounding rocks are middle and lower carboniferous mudstones with some organic carbon deposits. Coal beds would have been above the current level of the park with the index limestone at the level of the park. These form part of a series of Clackmannan cyclotherms where limestone would form in shallow waters which would then be inundated by mud brought down by rivers which would then give way to forests which would in turn be drowned by sea rise and then fall down to produce a layer of what would later become coal. This cycle would be repeated a number of times giving rise to the different layers of rock.

The industrial past of the park can be seen in the lime pit and lime kiln near the park office. The river was also used to drive hammers used at the print and dye works, a far cry from the now tranquil surroundings.



Following the path along the river the next stop was at a gravel bar in a bend of the river below the linn. Here the gravel had been deposited on the inner bend of the river where the flow rate slowed down allowing the river to deposit its load. Standing on the gravel bar and looking across to the other side of the river, where the cliff was being eroded by the faster flowing water on the outside of the bend, it could be seen that the rock had been deposited as sand bars and gravel beds (all be it much older than the one we were standing on). In the cliffs the layers of sandstone and shale showed crossbedding and lens shaped layers indicating that the depositional environment had been sand and gravel bars possibly in a delta or across the mouth of a river. The vertical jointing in the rock is what had facilitated

the formation of a cliff face on that side of the river.

As the bedding could be seen to dip to the south our walk following the river (northward) was a trip back in time.

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## **Dumbarton and Ardmore Point**

Leader Mike Keen

Report by Emily Unsworth

Our trip to Dumbarton and Ardmore Point started off at the Gregory Building with a virtually full minibus. We drove along the Clyde, through Dumbarton and Cardross to our first location at Ardmore Point. The rocks which we were about to study are Devonian, Old Red Sandstone. Setting off along the path round the point, with comments on how much better the weather was than some field trips we could remember, we reached our first location. Here we could see relatively thin (15 to 30cm) layers of conglomerate and bedded sandstone. The clasts in the conglomerate were poorly sorted ranging from 0.5 to 10cm. In some places on the beach clasts were up to 30cm in size. No matter how many interesting/different looking rocks we tried to break open they all turned out to be quartzite. The small scale cross bedding and poor sorting of the clasts indicated that the paleoenvironment in which these were formed was shallow fast flowing rivers with high sediment loads forming sandbars and a braided path. The size of the large clasts would indicate that they were not transported far and the quartzite would require metamorphic conditions for its formation. Aluvial fans from mountains would produce this sediment but what mountains? The Caledonian mountains wouldn't have produced the quartzite clasts.

Moving further along the shoreline we came to an area where, within tens of meters, the dip of the beds could be seen to change direction, dipping west, south and east

curving round. This was a plunging syncline, eroded down and on a convenient scale to be seen in one view.

Our next stop was where a strike-slip fault had left evidence of its movement in the form of slick-n-slide marks. Those with sensitive fingertips can, apparently, tell which direction is smoother than the other when running their fingers along the slick-n-slide.

After making our way through undergrowth, rock pools and some unstable boggy areas we finally arrived at the unconformity between the Lower Old Red Sandstone, which we had been looking at, and the Upper Old Red Sandstone (the Middle Old Red Sandstone being missing). Half the group stood on each side of the unconformity to see the difference in strike direction on each side.

Our final location at Ardmore Point was to see a small (but perfectly formed) example of a fault where small pebbles were actually embedded in the fault plane, indicating that there were earth movements causing the fault at the same time as the rock was lithifying. At this point we had our picnic lunch sitting on the rocks by the sea.

Getting back to the minibus we headed off for our next location. Unfortunately an earlier reconnaissance had found that Auchensail quarry is now completely overgrown and inaccessible, so we therefore headed straight for the much more accessible Havoc Hole, taking note of the raised beaches and inland sea cliffs on the landward side of the road. Havoc Hole (West Dumbarton) has a fantastic example of red, aeolian, dune bedded sandstone. The scale of the cross bedding (aprox. 2m) is much larger than that seen at our first location at Ardmore Point and the rounded sandstone grains indicate that the depositional environment was desert sand dunes. This Upper Old Red Sandstone rock is red in colour which is due to a coating of ferric oxide (rust) on the sand grains.

Our next stop on the trip was Dumbarton Rock, a volcanic plug from the Carboniferous age. As the basaltic lave left in the volcano cooled it contracted forming columnar jointing. As these columns form perpendicular to the cooling surface it was possible to see that this had not been completely horizontal. Taking the path between the rock face and football ground we came to the shore of the Clyde. Here we could see fallen blocks of basalt and the underlying Upper Old Red Sandstone. WE also saw tuff and agglomerate formed from the volcanic ash.

After our final journey back to Glasgow we then thanked Mike Keen for leading us on a trip to a range of diverse geological environments.

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## **The Building Stones of Glasgow**

**23rd August 2012**

Leader: Dr Judith Lawson

Participants: 30

Report by Anne Gray

We met at 6.30 pm at St George's Tron Church, at the corner of Buchanan Street and Nelson Mandela Place, from where Judith led us on a small circuit of the city centre. We studied 10 buildings and several statues, which varied considerably in style and in the history of their construction.

The Tron Church of St George is an elegant early 19<sup>th</sup> century building in cream sandstone. It was an appropriate starting point as it is one of the few extant buildings in the city that is constructed of the local sandstone. The whole area around Queen Street to the north east of the church, including the site of Queen Street station, was one large quarry at the beginning of the 19<sup>th</sup> century. Several quarries were opened to meet the demand for new buildings at a time when the city was rapidly expanding. The local cream Carboniferous sandstone was worked out by the 1890s.



*Early building stone of Glasgow  
fine laminated cream sandstone with ripple marks  
and dark organic layers*

Judith pointed out that, unlike many towns in England which are dominated by brick buildings, Glasgow is overwhelmingly a city of stone buildings because of the lack of a local source of good brick clay.

Before the development of the canals and later the railways, local stone was much in demand, as transport costs were high. Later, large quarries were developed further out of the city, and the advent of the railway made possible the importation from Ayrshire of the red sandstone which characterises the city's buildings dating from the later part of the 19<sup>th</sup> century. The stone used in the Tron Church displays many narrow bedding planes which are interspersed with brown organic layers and contain traces of fossil ripple marks formed when water flowed over the bed of sand. These sandstones were from the Limestone Coal Group. In contrast, the white sandstone from which the former Stock Exchange, on the South-west side of Nelson Mandela Place, is built is a cream Carboniferous freestone with no clear bedding and can be cut in any direction. This is a very large imposing building, in ornate Venetian style, symbolising the traditional expertise of the Venetians in money matters. The stone was quarried at Overwood, near Stonehouse in the late 19<sup>th</sup> century. On the north side of Nelson Mandela Place sits the former Royal Scottish Academy of Music and Drama, now a restaurant called Chaophraya. It is constructed from New Red Sandstone, of Permian age, quarried at Locharbriggs in Dumfriesshire, which is the only such quarry still in operation. This sandstone has well-rounded grains and exhibits large scale cross-bedding, with some good examples of truncated upper surfaces. The carved entrance way was constructed of large blocks that were halved to give symmetry on either side of the door. But several of these blocks were inverted! Judith explained that this New Red Sandstone, as well as being easily carved, was much more porous than the earlier sandstone, and this allowed for expansion and therefore made it more durable.

We then moved a little westwards, to the neo-classical building at 92-98 West George Street, formerly owned by the Royal Bank of Scotland and now occupied by Horton's restaurant, to examine a very different building stone: Portland limestone. This is a dazzling fossiliferous, oolitic limestone of upper Jurassic age.



Opposite this, No 91, another former bank was designed in a very characteristic way for banks in Glasgow, with a base of pink Peterhead Granite and upper storeys of red sandstone. The granite contains pink feldspars, clear quartz and dark mica, and many small patches of black and white xenoliths.

*A frequently seen combination of pink granite base and Permian red sandstone upper storeys in Glasgow banks.*

We then went round the corner into Buchanan Street to look at a modern 1970s building, the Clydesdale Bank headquarters. This concrete framed structure is clad with slabs of granite from Argentina. Judith described how these granites were sent to Italy to be cut and were then transported to Aberdeen to be polished before reaching their final destination, involving an expense that reflected the wealth of the institution. It is a coarse-grained granite, composed of grey quartz, red feldspar, hornblende and biotite.

Opposite Queen Street Station, around the corner, stands a former Bank of England building. It had several features of note. It is mainly clad in cream-brown Carboniferous sandstone, but the ground floor levels are fronted with striking large panels of a polished brown and cream gneiss which is “on the way to becoming a granite”. It has long hydrothermal streaks and large cream feldspar crystals. This rock, called Juperano, is from Brazil. The entrance is clad in dark brown travertine from Siena, and has cream limestone floors. Judith commented that Rome is built of travertine, a Tertiary lake deposit.

Moving into George Square, we had a brief look at the bases of several statues, which are constructed mainly of Peterhead Granite, but the James Watt statue in the SW corner has a plinth fashioned from the less common grey Cornish granite, which has large white feldspar phenocrysts. We did not have time to study the famous buildings in the square, such as the City Chambers and the former Post Office, but Judith described how they were mainly built in the 19<sup>th</sup> century in cream sandstone from a number of quarries, including Dunmore, Giffnock and Hermand.

Our last leg of the circuit was St Vincent Place, Numbers 12 to 24. The entrance pillars to the first building are of a green serpentinite marble. Next to this is the former Citizen newspaper headquarters. Constructed from bright red Permian sandstone, it has lost much of its former glory and now looks quite derelict. The balustrade of the next building, the Clydesdale Bank, is of unpolished granite, which we wetted under Judith’s instruction, to reveal large pink feldspar phenocrysts in the pink and grey granite ground mass; this is the famous Shap granite.

In Glasgow, it was often used for kerbstones rather than buildings, and many of these can still be found lining the pavements today.

*A granite kerbstone with feldspar phenocrysts in the city centre)*



We finished our tour in the pillared entrance to the Gallery of Modern Art at around 8.30, as it started to rain and the light quality plummeted. We just had time to admire the Aberdeen granite plinth of the Wellington statue before Emily Unsworth formally thanked Judith, reflecting everyone's sentiment that it had been a most worthwhile tour, and that we would all now be looking at the buildings of Glasgow in a new light.

By the end of our tour, we were all aware of the march of time, not deep geological, but more recent time. The quarries that had dominated the city in the 19<sup>th</sup> century have vanished without trace, and many of the prestigious buildings have now fallen into decay. Banks and building societies, a college and a newspaper, and even the Stock Exchange have been converted to restaurants – if they are lucky. All are enveloped in the roar of modern traffic. However the spectacular stone which proclaimed their wealth remains.

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**Residential excursion reports**  
**NORTH WEST HIGHLANDS EXCURSION:**

Leader: Dr Iain Allison

Report by *M. Donnelly*

Participants: 14

Fri 7/9/12

We drove north in small groups (bumping into each other at various coffee stops on the way!) and arrived in late afternoon at the well-appointed Rhiconich Hotel sitting at the head of Loch Inchard. After a 'refreshment' and an excellent meal, our leader gave us an outline of the geology and the plan for the weekend.

Sat 8/9/12      Tarbet

On a very damp and misty morning we set off in cars, south on the A838 and then A894, and turned northwest on a minor road to Tarbet where we parked above the pier. We were greeted enthusiastically by a 'local' – a friendly black and white collie, who, encouraged by the 'doggie treats' that one on our group just happened to have in her pocket, joined us as we set off across the field behind the Shorehouse Restaurant and climbed to a rocky knoll on the north side of the bay (NC 162490). Here we found mafic and felsic gneisses with bands of rusty-weathering, medium to coarse-grained garnet-

biotite-plagioclase-quartz schist – so-called ‘brown schists’ which are interpreted as metasediments. These lie to the south of the Laxford Shear Zone and so are in the Assynt ‘Terrane’ or ‘Block’. Originally of granulite facies they were retrogressed to amphibolite during the Laxfordian event, and are associated with large meta-mafic bodies in the southeast. They are cut by, and are therefore older than, the Scourie dykes; their foliation dips steeply to the southwest and they are strongly lineated. There were also occasional outcrops of foliated pink-weathering rock with quartz, K-feldspar and biotite – these may be fragments of a deformed granite sheet within the metasediments.

The weather was gradually improving, and we continued (up and down!) to the northeast and a second gully (NC 162492) where the metasedimentary gneisses are separated from the quartzofeldspathic gneisses of the Assynt Block. The latter have a strong steeply dipping foliation and an intense lineation, thought to be of Inverian age; Laxfordian deformation is concentrated in discrete shear zones.

Then we came upon a stunning outcrop – amphibole-rich gneisses cut by thin pink-weathering, medium-grained, strongly foliated granitoid sheets with elongated ribbons of quartz. Both gneisses and granitoid sheets are folded into tight upright folds that are axial planar to the main Inverian foliation. One of our party observed that the front face of the cliff had obviously collapsed to reveal the relatively fresh surface within – we all took a pace back!! A photo of this face appears in the Guide.....we started referring to it as ‘Figure 87’!! (NC164492)



The collie had by now disappeared – presumably satisfied that he had seen us safely off his territory, he had headed back home. We resumed our way towards the northeast – up small hills and down into small glens, struggling through the knee-high heather. We made a particularly arduous climb, which was not eased by our leader’s later confession that it was a mistake – we had not *had* to climb the hill, we could have contoured around instead!

But it was worth all our efforts for, reaching the last ridge on the summit, there spread below us was the land of crags and lochans, with Cnoc Gorm (the blue hill) across the valley. To the northeast beyond the open water of Loch Laxford, the mainland lay in the distance, beneath a rich blue sky dotted with clouds – it was simply awe-inspiring. We made our way down (again!) and across to Cnoc Gorm – so named because of its dark amphibolitic rocks (NC 168499) which are composed of a coarse-grained, dark grey-weathering, garnet bearing metagabbro. The hill is part of a huge belt of Archaean meta-mafic bodies, locally associated with metasedimentary rocks and extending along the southern side of the Laxford Shear Zone. Cnoc Gorm typically contains abundant dark areas with red garnet crystals up to 5 cm across, commonly surrounded by albitic rims which formed during decompression. The rocks are of Badcallian granulite facies, some retrogressed to amphibolite, and are penetrated by several thin tonalite sheets. There are a

number of narrow curving shear zones of Laxfordian deformation. We spent some time examining the outcrops and taking photos.

Then we were off again, with more ups and downs, across tightly folded gneisses cut by scattered pegmatitic granite sheets, and a Scourie dyke which cut the folds thus showing the latter to be Inverian. We arrived at Rubha Ruadh (Red Point), an enormous exposure of coarse-grained, foliated, pink Laxfordian granite about 1 km wide, and settled down for lunch. It was by now a beautiful day and from our high vantage point the panorama was spectacular. After lunch we spent some time looking for blue-green alkali amphibole and grass-green aegirine-augite within the granite before heading off for the next locality. After a few minutes our leader asked us if there was any difference between these rocks and those we had just left – but we had all been too busy talking to notice. Personally, I thought ‘What rocks?’ as it seemed to me that we were on a grassy slope. But then, there were *indeed* small outcrops and, yes, they *were* different!!

It transpired that we had just crossed what some authors consider to be the boundary between the Assynt and Rhiconich ‘Blocks’ or ‘Terranes’, a *very* significant boundary!!



After several photos we continued along and down this shear zone and some few hundred yards later we stopped and looked back. From this viewpoint the boundary was much more obvious

We continued over and through the heathery knolls towards the southwest until we came to the coast at Poll an Turrabain and a huge black cliff face of gigantic columnar jointing. After a ‘viewing’ pause, we walked round to the other side of it..... what a dyke



– the Tarbet Dyke!!



*Sitting on the Tarbet Dyke*

It is simply enormous and really impressive!! (NC 161495). We settled down to take it all in before more detailed examination. This is a composite dyke of the Scourie suite, comprising felsic, mafic and ‘normal’ dolerite, and xenoliths of the ‘country’ gneisses with which it has a discordant contact. It contains variable Laxfordian deformation, and also areas which retain the igneous texture.



### The Scourie Dyke

which is the gap in the hill, the shore, and the notch in the distance!!

Finally, we again set off up *another* big slope from the coast and made our way back towards the cars, having had a most satisfying and exciting day.

Report by: *Ben Browne*  
Sunday 9<sup>th</sup> September 2012

This second day of our excursion was devoted to Excursion 12 of The North West Highland Guide reorganised so as to reduce the driving and marginally increase the walking. Sites were visited either side of Scourie Bay all within the Lewisian of the Assynt terrane including classic Scourie dykes.

Parking just short of the pier at the head of Scourie Bay (NC155449) we followed a vegetated path northward to the left of a stone barn, through a gate and along to the left of a well made stone wall then west along a drain to First Inlet (Locality 12.3, NC15204524).

Here a layered mafic-ultramafic body trending NE/SW forms a distinct ridge in the middle of the inlet. A magnet on a string showed attraction to the rock indicating a high content of magnetite. Loose boulders contained garnets with aureoles of retrogression from the original granulite facies of these rocks. There was not time enough to examine the southern side of this inlet in detail where a pyroxene+quartz+magnetite rock is interpreted as an ironstone of sedimentary origin.

Walking north then north-west to NC15134554 we obtained a view along a major Scourie dyke trending at  $300^{\circ}$  to form first the bay of Poll Eòrna (Locality 12.4) then a notch in the headland 500m further WNW. The dyke forms much of the exposed rocky shore of the bay and revealed a complex pattern of deformation, and garnets predominantly in the margins

A short walk uphill to the ENE brought us to a rocky outcrop at NC15064605 to the NE of a lochan where we were lead to expect shear zones in metasediments with small blades of kyanite but the guide refers to these as “having been described” and the map therein shows the metasediments to the SE of the lochan, so this deserves a second look, for certainly we found no such features.

Returning to the cars we drove the short distance to the cemetery car park (NC148447) on the south-west side of the bay. Passing to the right of the cemetery we reached the headland of Meallan an Tiodhlacaidh (Locality 12.1) of layered granulite facies gneiss. Boudins of hornblende could be seen in various stages of break-up during their presumed derivation from a larger mafic-ultramafic body. Further west are two distinct relatively undeformed scourie dykes with a trend of  $310^{\circ}$ . The first and thinner of the two is 1m thick and 50m north of the larger which is 55m thick. The former shows garnets mainly in the margins. The latter forms a gully and is very accessible and much studied. Variable laxfordian retrogression is described as decreasing towards the centre.

Following the faint shore path westwards then crossing the headland we came to Locality 12.2 at NC14374469. Here a small hill is composed of big pod of pyroxene-olivine ultrabasic rock with garnet porphyroblasts some over 5cm in diameter and with decompression coronas. Boulders of this decompression symplectite lay in the bay below. These rocks have been used to constrain a pressure-temperature pathway for the evolution of these rocks.

On the south side of the bay at NC14234420 the sea has made a three dimensional dissection of a spectacular pegmatite with a graphitic texture and of a complex geometry. It is said that a Scourie dyke can be found to cut the pegmatite indicating the latter to be of Inverian age but the geometry was too complex for me to be convinced of this. This also deserves a second look

Starting south on our walk back to the car park we passed in the right hand wall of a gully at NC14254428 a beautifully developed ductile shear zone.

References:

Dr Allison's Excursion Notes

Eds. Kathryn M. Goodenough & Maarten Krabbendam, *A Geological Excursion Guide to the North-West Highlands of Scotland*, Excursion 13. BGS, 2011.

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## General Information

### **CONOCO-PHILLIPS PRIZES 2010 and 2011**

There were three winners for the 2010 session and 4 for the 2011 session as two students had equal Higher results.

### **GLASGOW SCIENCE CENTRE EVENT JANUARY 2012**

The Society contributed to the three day event with a stand featuring ‘Road Building ‘ K.Braun and R.McNicol created a very impressive display with diagrams and samples depicting and explaining the various geological problems to be overcome when planning the building of a major road. A series of graphics showing the various problems were displayed together with answer cards (visitors were invited to think about the problems themselves before checking their ideas with the card) sand some sample rocks. School parties attending the event found the presentation very interesting( especially some of the accompanying staff)

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## Intimations

With regret we record the passing of

**Mr John B Sellar** member since session 95 (1952-1953 ) who died in October 2011

**Mr John Calder** member since session151 ( 2008-2009) who died on March 2012

**Mr Stephen J. Mills** member through sessions 120 -145 (1977-2002) who died in January 2012

**Mr N. M. (Nigel) Orr (Member from 135 until end 151) and Mrs B.K.E. (Sally) Orr (Member from 133 until end 151),**

The following appeared in the Glasgow herald, August 2012:

Nigel beloved husband of Sally passed away peacefully and suddenly in his sleep at home in Milngavie Glasgow on Thursday 23rd August 2012. Sally (Kistruck) his beloved wife passed away peacefully at Canniesburn Care Home Bearsden on the same date, after progressive deterioration from Alzheimer's disease.

**Mr. Stanley Wood**, member since session 125(1982-1983) who died on 9<sup>th</sup>.September 2012

## **Stan Wood** **Fossil hunter**

December 23, 1939 – September 9, 2012.

Stanley Wood achieved major renown as a fossil hunter, discovering literally thousands of fossils, including several previously unknown species. He was born in Edinburgh and after leaving school in his mid-teens, completed a shipyard apprenticeship, served in the Merchant Navy as an engineer officer and worked for Brown Brothers engineering company, before changing career to sell insurance for the Prudential. Over the years he had many different hobbies, and hunting fossils began as just another in the early 1970s. However, he quickly became fascinated, and an expert in both the methodology and in palaeontology. He was self-taught, but was enormously respected by academics, acquiring a reputation as "the Indiana Jones of the fossil world". His significant discoveries included fossil fish on the shore at Wardie in Edinburgh and the head of a scorpion that must have been about 10ft long. At 2ft wide it was the largest invertebrate head ever found. He speculated that these animals ate giant spiders and grew so large because of the absence of avian predators at the time. His reputation grew with each success; he established a commercial business selling fossils from a base in Livingston in 1983 and began to make more money selling fossils than selling insurance. He sold material to the Royal Museum of Scotland, and opened his shop in the Grassmarket area of Edinburgh City Centre in 1987. From here he sold fossils to tourists, schoolboys and big international clients; 'Mr Wood's Fossils' is still there, now run by Matt Dale, who formerly worked for him.

Perhaps his most famous find, in 1984, was that of the fossilised remains of what many have surmised may be the world's earliest reptile, revolutionising thinking about prehistoric animals. This was in the Early Carboniferous Lower Limestone Formation of East Kirkton Quarry near Bathgate in West Lothian, where a lava capping had preserved rocks and early organisms eroded away elsewhere in the world. The National Museums of Scotland subsequently initiated a major systematic study here from 1985 to 1992. Nicknamed Lizzie the Lizard, the fossil was formally named *Westlothiana lizziae*, though debate continues over whether it is reptile or amphibian. It was acquired by the Royal Museum in Edinburgh for £190,000, after fears that it might be sold to Germany. Another exciting find was a 330-million-year-old shark, popularly known as the Bearsden shark, which Stan came across while walking his dog on the outskirts of Glasgow.

He was the subject of a BBC documentary '*Stan, Stan, the Fossil Man*', he featured in David Attenborough's 'Lost Worlds and Vanished Lives' series, discovered numerous unknown species and had several named after him, including one shark called *Diplodoselache woodi*.

Latterly he lived in the Borders; here there had been a huge break in the fossil record of the Silurian Period known as Romer's gap, after the palaeontologist who first recognised it. Although many had searched unsuccessfully, in recent years Stan unearthed hundreds of fauna and flora fossils that might now help fill that gap. They may indeed shed new light on the period when life first emerged from the sea. Attenborough hailed these finds as "sensational" and a consortium of academics and museums has secured a £3 million grant to investigate further.

Mr Wood was a truly amazing, focussed, and successful fossil hunter. His discoveries have totally altered the way we understand the colonisation of the land, the development of four-legged creatures, and the very evolution of life. His loss is a great loss to Science and he will be sadly missed by many. He is survived by his second wife Maggie and his daughter Emma.

Margaret Donnelly

Reference: Brian Pendreigh, 14<sup>th</sup> Sept 2012, *The Glasgow Herald*.

**Mrs Rosemary McCusker** , member since session 122 (1979-1980).

Council member and Excursion secretary sessions during 130-143 , who died on 22<sup>nd</sup> January 2012

### **Rosemary McCusker**

1932-2012

Rosemary Blake was born in Australia in 1932 the youngest daughter of Francis and Marion Blake who had emigrated from Glasgow. Nine months later the family returned to the south side of Glasgow where she grew up and went to school at Notre Dame before going on to be one of the very few women of her generation to do a degree at Glasgow University in general science which included some geology and in addition mathematics. She recounted that at that time she was an ardent nationalist and was known to repaint red pillar boxes blue.

Her first employment after graduating was at the blood bank in Ayrshire then at The Royal Infirmary Glasgow. Marriage followed in 1959 to Hugo, a vet, and she was welcomed into a large family of McCuskers centred round Lochwinnoch and Paisley. In 1963 they moved from their first home in Paisley to Bishopbriggs, then tragically in 1967 whilst contemplating emigration to Australia Hugo died very suddenly leaving Rosemary with three daughters ranging in age from 18 months to 5 years. With the unfailing support of her elder sister Dorothea and also of her extended family Rosemary regained control of her situation and soon found employment, initially on a one year project, to analyse the lung function tests for the Respiratory Unit of The Royal Infirmary. This led on to her permanent employment and her becoming involved in setting up a computer system to speed up the analysis of the lung function tests which was to occupy her through to

retirement in 1992. To hone her skills for this work she did a Diploma and an HND in Computer Studies during the early 1970's.

Throughout her daughters' childhood Rosemary, Dorothea and they would spend all available time at their caravan at Lochgoilhead where Rosemary developed her love of walking and of landscape. As the girls grew more independent in the mid 1970's Rosemary started to attend Adult Education Classes at Glasgow University at first in archaeology but then in geology which became her overriding interest.

Rosemary joined The Geological Society of Glasgow in 1979 and became at first an ordinary member of Council then in 1987 Excursion Secretary.

The society owes a deep debt of gratitude to Rosemary for the many years' devotion to the work of organising both our day and weekend excursions. She always gave the impression of being in a state of panic but everything always worked. She was great fun to be with. From her circle of friends in The Geological Society there formed a group who met regularly for ten years for Tuesday walks. She enlisted into the Society her sister Dorothea who was in turn for six years our Treasurer and thereafter Auditor for eleven years.

On 18<sup>th</sup> May 2001 two minibuses were travelling towards Durness for an excursion organised by Rosemary when that in which she was, together with seven others, was involved in a collision in which four of our members died instantly (see Proceedings, Session 142,143; 1999-2001 p50-51) . Rosemary was the most severely injured of the four survivors with very extensive leg injuries. Years of heroic work by her orthopaedic surgeon and herself saved the leg but her days with our excursions and the walking group were over. Despite her injuries she remained an active member of the Society seldom missing a lecture meeting after first getting back on her feet until her unexpected death on 22<sup>nd</sup> January 2012 shortly after what had appeared to be a fairly minor injury from a fall at home.

Rosemary was supported not only by her family but also by her church. Her funeral was conducted in St Dominic's Church Bishopbriggs built by the congregation from funds which Rosemary had in part been responsible for raising. The priest who conducted the service was her nephew who recalled his aunt with great fondness.

Rosemary is survived by her sister Dorothea Blake and by her three daughters: Dorothy-Anne in Stafford, Frances in Italy and Susanne in Norway and by ten grandchildren all of whom were present at her funeral.

It is typical of Rosemary that when she found she had Norwegian and Italian grandchildren she set out to learn their languages for herself. She will be greatly missed.

Ben Browne