

THE GEOLOGICAL SOCIETY OF GLASGOW

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President: Dr. Neil Clark

www.geologyglasgow.org.uk

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162/3



An artist's impression of the Dover Strait region shortly before the chalk ridge failed and the lake was released as a catastrophic flood!. Come to Prof. Jenny Collier's lecture on the 9th April to hear more about this!

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Lecture Meetings

All lectures are held in the *Gregory Building, University of Glasgow, Lilybank Gardens, Glasgow G12 8QQ* (unless otherwise noted). Meetings commence at 7.30 pm. For more information please contact the Meetings Secretary: <u>meetings@gsocg.org</u>

Thursday 12th March 2020

Professor Andrew Scott, Royal Holloway, University of London.

Burning Planet - the story of fire through time

This talk will cover the past, present and future of wildfires and their environmental effects and especially the role of fire in Earth systems processes. In particular I will concentrate on modern and ancient fires, their products (charcoal) and effects, including the rise of fire in the Devonian, the evolution of late Palaeozoic fire systems and evidence for fire at the Paleocene-Eocene Thermal Maximum (PETM).

Charcoal preserves the anatomy of the plants that have been burnt. Scanning electron microscopy is routinely used to study their morphology and anatomy and new methods of obtaining temperature of charcoal formation using reflected light microscopy have been developed. This has implications for both studies of natural wildfires as well as for our understanding of the human use of wood and charcoal as a fuel.

Biogeochemical modelling suggests significant variation of atmospheric oxygen in deep time. Using a charcoal proxy for atmospheric oxygen over the past 350 million years there is evidence for significantly high levels of oxygen in the late Palaeozoic and in the Cretaceous suggesting high levels of fire at that time. This resulted in the rapid spread of weedy flowering plants in the Cretaceous.

Studies of palaeocharcoal can also delineate changes in fire over the past 20,000 years. There is a strong link between fire and climate with increased fire during periods of rapid climate change.



Andrew graduated with a B.Sc. in Geology from Bedford College, University of London in 1973. He then undertook his doctoral research in the Botany Department at Birkbeck College. and was awarded his PhD in 1976 for his thesis "Environmental Control of Westphalian Plant Assemblages from Northern Britain". Following post-doctoral research in the Department of Geology at Trinity College Dublin he was appointed as Lecturer in Geology in the

Department of Geology at Chelsea College, University of London in 1978 which in 1985 became part of the new Geology Department at Royal Holloway, University of London. Andrew was promoted to Senior Lecturer in 1989, Reader in 1993 and to Professor of Applied Palaeobotany in 1996. He was appointed Emeritus Professor of Geology in 2012. In 2019 he was appointed a Distinguished Research Professor in Ancient and Modern Fire Systems.

Background reading:

Scott, A.C., Bowman, D.J.M.S., Bond, W.J., Pyne, S.J. and Alexander M. 2014. *Fire on Earth: An Introduction.* J. Wiley and Sons. 413 pp.

Scott, A.C., Chaloner, W.G., Belcher, C.M., Roos, C.I. (eds). 2016. The interaction of fire and mankind. *Phil. Trans. R. Soc.* **371**, Issue 1696 252 pp.

Scott, A.C. 2018. *Burning Planet. The story of fire through time*. Oxford University Press, 224 pp.

Scott, A.C., Hilton, J., Galtier, J. & Stampanoni, M. 2019, A Charcoalified Ovule Adapted for Wind Dispersal and Deterring Herbivory from the Late Viséan (Carboniferous) of Scotland, *International Journal of Plant Sciences*, **180**, pp. 1059-1074.

Scott, A.C. 2020. *Fire. A very short introduction.* Oxford University Press. 144 pp.



[Note Andrew will have copies of his books for sale and signing after the lecture]

Thursday 9th April 2020

Professor Jenny Collier, Imperial College, London

The breaching of the Dover Strait and the creation of "Island Britain"

For much of our pre-history, a permanent land bridge existed between Britain and France at the Dover Strait. How and when it was removed, however, was previously unknown. We analysed a new regional bathymetric map of part of the English Channel derived from a compilation of both single- and multi-beam sonar data, which shows the morphology of the seabed in unprecedented detail.

We observed a large bedrock-floored valley that contains a distinct assemblage of landforms, including streamlined islands and longitudinal erosional grooves, which are indicative of large-scale subaerial erosion by high-magnitude water discharges. Our observations support the megaflood model, in which breaching of a rock dam at the Dover Strait (see artist's impression on front cover) instigated catastrophic drainage of a large pro-glacial lake in the southern North Sea basin. This flow was one of the largest recorded megafloods in history and could have occurred 450,000 to 200,000 years ago.

We suggest that megaflooding provides an explanation for the permanent isolation of Britain from mainland Europe during interglacial high-sea-level stands. The breaching likely affected patterns of early human occupation in Britain by creating a barrier to migration which possibly explains the complete absence of humans in Britain 100,000 years ago. The breach of the ridge, and subsequent flooding, also may have initiated the large-scale reorganisation of the river drainages in north-west Europe by re-routing the combined Rhine-Thames River through the English Channel to form the Channel River.



Following her PhD at Cambridge Jenny undertook postdoctoral studies and lecturing duties at Oxford, Leeds, Cambridge and Imperial college. She was appointed a senior lecturer in marine geophysics at Imperial in 2002, and became a professor in 2018. She is a former President of the British Geophysical Society

Background reading:

Gupta, S., Collier, J.S. *et al.* 2007. Catastrophic flooding origin of the shelf valley systems in the English Channel, *Nature*, **448**, pp. 342-345.

Collier, JS, *et al.* 2015. Streamlined islands and the English Channel megaflood hypothesis, *Global & Planetary Change*, **135**, pp. 190-206.

Gupta S., Collier J.S., *et al.* 2017. Two-stage opening of the Dover Strait and the origin of island Britain, *Nature Communications*, **8**.

Collier, J.S. 2017: A megaflood in the English Channel. *Astronomy & Geophysics*, **58** 2.38-2.42.

Thursday, 14th May 2020

Members' Night

Short presentations by members of the Society. Members' Night is an opportunity for Society members to give short presentations or displays about their own interests and adventures in geology. If you are interested in presenting then please contact the Hon Secretary, Walter Semple, either by email at <u>sec@gsocg.org</u> or by using the form at the end of this newsletter.

Residential Field Excursions 2020

Booking Forms for the Islay and Ardnamurchan excursions can be found at the end of this newsletter. For further information please contact Maggie Donnelly - email restrips@gsocg.org

<u>Islay</u>

April 24th – April 27th 2019

Leader: David Webster

Due to over-subscription of the 2019 trip we are running it again for those who couldn't make it - and for those who loved it so much they want to come again! The whisky selection is good too! The geology of Islay is amazingly varied – 1800 Ma gneiss, Precambrian metasediments and fossil stromatolites, the famous Port Askaig Tillite (possible 'Snowball Earth'?), low grade metamorphic Dalradian rocks retaining original sedimentary structures, reactivated and reversed extensional faults, substantial mineralisation, 60 Ma igneous intrusions (related to the opening of the Atlantic Ocean)



and a large selection of Quaternary Ice Age features.

We plan to visit key localities with the aid of "A Guide to the Geology of Islay" by David Webster, Roger Anderton & Alasdair Skelton, available from the publisher <u>www.</u> <u>ringwoodpublishing.com</u> or from Amazon. Copies will be available on the trip.

Accommodation will be B & B in Bowmore; transport will be in shared cars.

There are still places available on this trip so if you are interested please contact the Residential Excursions Secretary, Maggie Donnelly asap, at <u>restrips@gsocg.org</u> because accommodation is not plentiful and gets booked up quickly.

<u>Ardnamurchan</u> 8 - 11 May 2020 Leader: Con Gillen

The Ardnamurchan peninsula, which includes the most westerly point of the Scottish mainland, is composed mainly of the remains of an early Palaeogene volcano with three centres of activity. Part of the North Atlantic Igneous Province which includes Mull, Rum and Skye, it was erupted into Moine metasedimentary rocks and overlain by a sequence of



thin sedimentary rocks. Ardnamurchan displays classic geology on a colossal scale, with features such as mixed magma, ash flows, ring dykes, cone sheets and examples of "airfall" rocks formed from lava ejected from the heart of the volcano – it is regarded as almost a "textbook volcano". A drive across the peninsula is a journey through its magma chamber. Its overall structure is difficult to perceive on the ground but from space the picture is much clearer – rings of once molten magma can be seen to define a series of almost perfect circles. These are the lower parts of the volcano after the superstructure has been planed off by erosion, in this case, effectively, by the last Ice Age. We plan to visit significant localities of igneous, sedimentary and metamorphic rocks and there may also be the opportunity to sail to Tobermory (whales!) for those who wish to do less climbing!

Accommodation will be B & B in Kilchoan etc.; transport will be in shared cars.

There are still places available on this trip so if you are interested please contact the Residential Excursions Secretary, Maggie Donnelly asap, at <u>restrips@gsocg.org</u> because accommodation is not plentiful and gets booked up quickly.

<u>Snowdonia</u>

Leader Simon Cuthbert

Fri 11th to Mon 14th Sept 2020.

Further details forthcoming.

Accommodation will be B & B; transport will be in shared cars.

If you are interested please contact the Residential Excursions Secretary, Maggie Donnelly at <u>restrips@gsocg.org</u>.



Day Excursions 2020

All excursions leave by coach from the Gregory Building, Lilybank Gardens at the times stated – please check the synopsis for details.

Please note that a deposit is required for each excursion. The deposit is set at a level to recover the anticipated costs of the trip. In addition, please be aware that any balance of costs will be recovered / refunded on the day of the excursion. Excursion 3 will conclude with an evening meal with our fellow enthusiasts from the Edinburgh Geological Society.

Members who choose to take their own vehicles will be still be asked to pay the full deposit as a contribution towards the overall cost of the excursion to the society.

Please complete the attached form, including details of who you would like us to contact in the event of an emergency. Applications will be acknowledged to the email address you supply. The form should be returned to: Roy Bryce, email: <u>daytrips@gsocg.org</u>

<u>Saturday 6th June: Onich Shore</u> - Leaving Gregory Building 09:00 Leaders: Dr Iain Allison and Jim Blair

The Onich Shore is a classic east-west crosssection through folded Dalradian metasediments, part of the Appin Syncline, including Appin Phyllite, Limestone and Quartzite, and with Ballachulish Slates, plus some minor basic dykes and intrusive bodies. With easy parking and access at the petrol station in North Ballachulish, it is claimed to be the most visited section of the Grampian Terrane. The shore is mainly of shingle,



with some short rocky sections hence walking boots or wellies are recommended. The Dubh Ghlac (Onich Dry Gorge) lies a further 1,000 metres to the west of the section and a series of other localities are scattered around Loch Leven to the east (some of these localities are of quick and easy access, others less so).

A key reference is 'The Dalradian rocks of the central Grampian Highlands of Scotland',

J.E. Treagus, P.W. Tanner, P.R. Thomas, R.A. Scott and D. Stephenson, P.G.A., 124, 2013 (page 167).

Iain and Jim look forward to your visit and seeing the rocks through your eyes!

<u>Saturday 13th June: Great Cumbrae</u> - Leaving Gregory Building 09:00 Leader: Dr Con Gillen

A great opportunity to view the wonderfully varied geology of this small island. Full details of the excursion are available at <u>http://earthwise.bgs.ac.uk/index.php/Great_Cumbrae_-an_excursion</u>

Saturday 27th June: Queensferry - Leaving Gregory Building at 09:00, followed by afternoon tea with our EGS colleagues.

Leader: Richard Smith

This will be our annual joint excursion with the Edinburgh Geological Society and starts on the promenade to set the scene and view the 3 bridges now spanning the Firth of Forth. Then we examine the accessible exposures along the shore to the east of South Queensferry which include the Lower Carboniferous West Lothian Oil-Shale Formation dipping generally westwards above the older Gullane Formation (both Strathclyde Group). The West Lothian oil-shales comprise cycles of thin marine or freshwater limestones followed by lagoonal oil-shales then mudstones, siltstones and sandstones where deltaic systems fed into a wide lagoon (Lake Cadell) which existed in this area about 335 Ma, open to the north-east but bounded to the south-east by the Southern Uplands. To the east the Gullane Formation, comprising sandstone and mudstone but generally lacking oil-shale, was intruded during Upper Carboniferous times by two prominent sills, the Mons Hill teschenitic sill and the Hound Point quartz-dolerite sill. These rocks were folded and faulted during the subsequent Variscan Orogeny. The surface bedrock has gradually been eroded by the elements, including within the last two million years, the Pleistocene glaciations. Subsequent late glacial and postglacial deposits cover much of the bedrock away from the shoreline.

Saturday 11th July: Hessilhead - Leaving Gregory Building 09:00 Leader: Gary Hoare

An excursion to see the fossils and rocks of the lower limestone group of Ayrshire. This quarry is disused and the main quarry is now flooded, but a good spot to see some of the geological features of the lower limestone group. And an excellent opportunity to look through the waste rock tips for fossils. Very little walking required and easy parking. The site is also abundant in wildlife and plants.

<u>Saturday 1st Aug: Charlestown Lime Centre</u> - Leaving Gregory Building at 9:00 Leaders: Dr Katie Strang & Gary Hoare

There will be a one-hour presentation on the history of the lime industry in Charlestown and the geology and palaeontology of the Blackhall Limestone, and a chance to look at a collection of fossils which have been found locally. We will then have an excursion to





Shark tooth from Charlestown Quarry

look at outcrops of the Blackhall limestone and disused quarries. The quarries on the Elgin Estate are no longer operational, but provide an excellent opportunity to look at outcrops of the Early Carboniferous Visean Limestone. There will also be a chance to look for fossils in some of the old spoil heaps. The walk is about 10 minutes from the Charlestown Workshops and is mostly flat, although can become quite waterlogged – Wellies or walking boots advised!

Thursday 20th August: Behind the Behind the Scenes at the Hunterian museum at Kelvin Hall - Meet at 14:00 in the Kelvin Hall Reception Leader: Dr Neil Clark

Every year I try to organise an excursion that does not involve climbing over fences and is therefore suitable for all members. This year we are privileged to get a chance to see part of the Hunterian Collection that is not usually on public display in the company of both Dr John Faithfull (Curator of Mineralogy/Petrology) and Dr Neil Clark (Curator of Palaeontology).

Saturday 12th September: Arthur's Seat - Leaving Gregory Building at 9:00 Leader: Dr Colin MacFadyen.

Arthur's Seat and Salisbury Crags, as part of the Royal Park of Holyrood, provides a rugged and spectacular backdrop to Scotland's capital offering one of the best views of the city. Visible for miles around, and offering views over the Lothians and across the Forth to Fife and beyond, Arthur's Seat is a classic site of international significance and is one of the gems of Scottish geology.

Representing the eroded remains of a 340 million-year old volcano Arthur's Seat provides one of the best examples of its kind anywhere offering the opportunity to experience lava flows, ashes, volcanic bombs, intrusions, and agglomerate-filled craters. The rocky crags and slopes of the Park also provide evidence of the environment into which the volcano erupted, how it would have appeared in that environment and the geological events that took place following cessation of eruptive activity.

The excursion will include a locality at Salisbury Crags in the heart of Holyrood Park that has an important and special place in the history of geology for it was here that the late 18th century that James Hutton found evidence to support his theories that have become pivotal in understanding the Earth.

Report on Annual General Meeting

The AGM was held on Thursday 14th Dec 2019. Thanks were expressed to all Council Officers for their work during the recent session, and particularly to those who had come to the end of their term of office. A summary of the results of the membership survey were presented and discussed. The customary officers' reports were presented. Following the election / re-election of Council Officers, Council now comprises the following:

President	Neil Clark
Hon. Secretary	Walter Semple
Vice President	Brian Bell
Vice President	vacant
Vice President	vacant
Treasurer	lan Veitch
Meetings Secretary	David Webster
Membership Secretary	Campbell Forrest
Excursions Secretary (day)	Roy Bryce
Excursions Secretary (residential)	Maggie Donnelly
Librarian	vacant
Asst Librarian and Hon. Archivist	Margaret Anderson
Proceedings Editor	vacant (see note below)
Publications Officer	vacant
Webmaster	Bill Gray
Web Consultant	Neil Clark
Newsletter Editor	David Webster
Junior Representative	Matthew Staitis
Editor of SJG	Brian Bell
Editor of SJG	Colin Braithwaite
Ordinary Member	Mina Cummings
Ordinary Member	Ann Ainsworth
Ordinary Member	Simon Cuthbert
Ordinary Member	lan Millar
Ordinary Member	Elaine Shaw

Ian Anderson was re-appointed as Independent Examiner.

Note: David Webster subsequently offered to take on the role of Proceedings Editor and integrate it with his existing role as Newsletter Editor.

Obituary: Benjamin Harding Browne

1946-2019



Dr Ben Browne joined the Geological Society of Glasgow in Session 129 (1986-1987). Over a period of almost thirty-three years he provided an enormous contribution and became a highly respected and valued member. His knowledge and understanding of geology were immense and he continually enhanced these by attending the University of Glasgow's Open Studies classes on many aspects of geology and by his own personal investigations and extensive reading.

Ben was born in Hereford and grew up in Worcester where he received his first taste of geology. His mother had her own collection of minerals and Ben spent much of his youth walking and climbing among the varied and fascinating rocks of the Malvern Hills. He attended University College London where he gained a degree and doctorate in mathematics, and where he subsequently took up a post teaching maths. He would meet Sudi, later his wife, while teaching maths with the OU. He also started teaching judo, eventually forming a small close group of enthusiasts.

After some years Ben decided to study medicine and moved to Sheffield where he gained his medical doctorate and specialised in ophthalmology. As a result, his friends thereafter referred to him as "Big Ben the Double Doctor"!

After Sheffield, the family lived in Summertown, Oxford while later, in 1986, they moved to Glasgow where Ben had acquired a position at the Royal Infirmary and where, in the course of time, he became a Consultant in Ophthalmology. Ben was renowned for his

caring and conscientious manner: his great strength was that he always saw his patients as "people" first and "patients" second, and took a very personal interest in them. Part of his remit was the training of new doctors. In this he was his usual meticulous and patient self, such that his trainees became very well qualified and proficient.

Ben joined the Oban Mountaineering Club in 1987 and he accumulated a detailed knowledge of Scotland and of its topography, and developed a deep love for the Scottish mountains. He became club treasurer and deservedly one of only two honorary members of Oban MC. Ben had a very enquiring mind, constantly observing and asking questions about all the plants, trees and environment. This inquisitive nature attracted him to a wide variety of interests. No matter what was the new subject, Ben was soon deeply involved, always with extra input freely given, and all part of a very generous character. Lately he successfully combined two of these interests, water-colour painting and wild flowers, by attending classes in the latter at Edinburgh Botanic Gardens; his finished paintings are simply exquisite. Ben's hand-writing was also exquisite, beautifully crafted and instantly recognisable. He was truly a polymath, and the finest of companions.

On joining the Geological Society of Glasgow in 1986 Ben, as ever, quickly became totally involved and gave his own talks and provided displays. Ben took his geology very seriously and was always well organised with maps, compass, torch and, most usefully, his Swiss army knife, without which it would have been sometimes difficult to finish the day properly ... with a glass of wine. He was extremely observant and often noticed the significant features of an exposure long before anyone else. On more than one occasion he would continue his geological musings in strong winds and heavy rain when most of the others had found shelter.

Ben was treasurer of the society for six years in the 1990s, co-auditor from 1999 until 2007, a vice president from 2012 until 2014, and then treasurer again from 2013 until 2018. He was also recently elected an honorary member of the society in recognition of his contribution to its objectives and his distinction in service. Last but not least, he took charge of organising the tea and biscuits at the end of the monthly meetings! Ben was a

very thoughtful and considerate person, with always a helping hand for others. He cared very much for the members of the society, having been involved in all its aspects for so many years. Ben passed away peacefully on 25th May 2019 after a short illness. He will be greatly missed by us all. Ben is survived by his wife Sudi, son Tristram, daughter Claire and grandchildren.

Maggie Donnelly

(Editor's Note: A longer version of this obituary is included in the Proceedings for Session 161).



News and Topical Articles

The Proceedings

The Session 161 Proceedings booklet is now being collated and edited by David Webster, and it will be published at the end of the month along with this newsletter. If you get the newsletter by download link then you'll also get a link to a pdf of the Proceedings. If you get the newsletter by post then you should also get a Proceedings booklet in the same envelope.

Newsletter/Proceedings by post or email?

Members who have not given the society an email address will automatically get a printed copy of the newsletter/proceedings by post. Everyone who has an email address gets an email with download links to them as pdfs. We would, nevertheless, like to keep reducing our printing/postage costs as well as



the time spent stuffing envelopes. So if you've traditionally had printed copies by post and now would be happy with an download link (or conversely get an email link but now also want a printed copy) then please let me know at <u>meetings@gsocg.org</u>

Volcanic Experiences

A company called Volcanic Experiences has asked us if we would publicise a couple of trips (Iceland in May and Sicily in June) that they are running this year. Details at: <u>www.</u> <u>volcanicexperiences.co.uk</u>

Fossil Grove

A number of key repairs have been carried out by the Fossil Grove Trust. These include new lights, a roof and gutter clean, new roof vents and repairs to the underground drainage. SNH recently rated the SSSI condition as 'unfavourable/partly destroyed' - and we are in discussions with the Council on how best to remedy the situation and are engaging with the Heritage Lottery to access some funding to continue with these emergency repairs and get professional help in assessing and costing future options.



The building will be open 11 April to 18th October on Saturday & Sunday afternoons 12-4. More information at <u>www.fossilgroveglasgow.org</u>

Elgin Museum Fossil Finders' Trail Event Sunday 26th April 10.00 am – 4.00 pm



This bookable event gives you a unique opportunity to explore the Moray Coastal Trail around Clashach Quarry with visiting palaeontologists. A free return coach trip from the Museum to the quarry access road is provided. The Museum will be open in the afternoon (12.00 pm – 4.00 pm) so that you can see the temporary exhibition "At the Water's Edge" alongside our displays of fossil fish and reptiles from the local area. To book

your place on either the morning or afternoon excursions please email: <u>EMfossilfinders@</u><u>gmail.com</u>

Scottish Geology Festival 2020

The Scottish Geology Trust is coordinating the Scottish Geology Festival in September & October 2020. They're inviting organisations across the country to plan events with a geological theme – talks, walks, family activities, exhibitions. Anything goes, as long as it is in Scotland and open to the general public. So watch this space or propose something to the Society.

The Trust hope that events will tie in with the Year of Coasts and Waters, the 51 Best Places to see Scotland's Geology, or Earth Science Week (11-17 October).

Geopoetry 2020

Thursday 1 October 2020 Scottish Poetry Library, Edinburgh

Are you interested in poetry and geology? Are you a geologist who writes poetry? Geopoetry 2020 will bring together poets and geoscientists to celebrate poetry drawn from where the Earth, rocks and society meet.

Following on from the Geological Society's first Geopoetry day in 2011, this meeting will be held on National Poetry Day, hosted by the Geological



Society (in conjunction with the Central Scotland Group), the Scottish Poetry Library and the Edinburgh Geological Society.

The organisers of GeoPoetry2020 are seeking contributions which will form the basis of a programme of talks, walks, readings and workshops, and ultimately a publication, in the following areas:

- •Geo-themes: poetry about rocks, geologists, geological sites
- •Geo-images: poetry that uses earth and ocean images
- •Geology and society: poetry drawn from earth and society interaction

•Geoscience and the poetic form: Geopoets' influences, inspirations, histories Please email any contributions to <u>michael.mckimm@geolsoc.org.uk</u> by Sunday 1 March

Arran Mountain Festival 2020

Ard Bheinn geology walk Sunday 17th May This walk is run in conjunction with Arran Geopark Project. We tackle the highest summit south of the String in territory that deserves to be more visited given its



wonderful panoramic views of the northern hills and across Kilbrannan Sound. We will learn more about its fascinating geology with a geologist on hand to help us visualise this volcano formed some 60 million years ago, and to unravel the complexities following its collapse.

For more information and booking go to: <u>www.arranmountainfestival.co.uk/walks/ard-bheinn-geology-walk</u>

'Snowball Earth' Research Conference

The Cryogenian glaciation: the extraordinary Port Askaig record and its comparators Tony Spencer - who gave us a talk recently on the Port Askaig Formation - is organising a 2-day research conference in St Andrews on 12/13 May 2020. More details and registration on the website at <u>www.portaskaig.org</u>. Cost £60.

Geological carbon offsetting

Worried about your carbon footprint? Thinking about 'offsetting' but not sure your money actually goes into CO_2 reduction projects? How about offsetting by contributing directly to a developing technology that is geologically based?





The Carbfix technology captures CO_2 from air. The process mixes the CO_2 with water used by a geothermal energy plant in Iceland and pumps it deep underground.

The CO₂ is dissolved in water prior to or during injection into basalts which are reactive and contain high amounts of divalent cations such as Ca, Mg and Fe. Chemical reactions between surrounding host rock

and injected CO_2 loaded fluids result in the formation of carbonate minerals such as calcite, dolomite and siderite within pore space and amygdales in the basalts for permanent storage of the injected CO_2 . This process is called 'carbonation'.

At the test site in Iceland the basalts flows are interbedded with hyaloclastites which separate various aquifers. The aqueous CO_2 solution is injected at a depth of around 800 m where temperatures are about 60°C. The most feasible formations are young basalts, where faults and fractures are still



open, and pore space is not yet filled with secondary minerals.



Pilot injection at the geothermal site in Iceland began in 2012 followed by industrialscale injection in 2014. Further expansion of the project followed in 2016 and in 2019 a second site was commissioned. The results so far suggest that the project can be upscaled significantly into other areas with suitable host rock formations.

You can help finance this project by offsetting your personal CO_2 footprint by subscribing to Climeworks and paying a monthly subscription which equates to a specific carbon removal target. Gift cards are also available.

- **Explorer subscription:** 7 euro/month equates to the removal of 15% (85 kg/ yr) of the global average travel footprint
- **Discoverer subscription:** 21 euro/month equates to the removal of 45% (255 kg/yr) of the global average travel footprint
- **Expedition subscription:** 49 euro/month equates to the removal of 100% (600 kg/yr) of the global average travel footprint

For more information go to <u>www.carbfix.com</u> and to subscribe go to: <u>www.climeworks.</u> <u>shop</u>. We hope to get a talk on this project in a future lecture session but in the meantime here is a link to a video of a recent lecture on carbfix <u>https://livestream.com/</u> <u>accounts/15654755/events/5610704/videos/127598480</u>

Scottish Geology Trust

The Scottish Geology Trust was registered as a SCIO (Scottish Charitable Incorporated Organisation) by the Scottish Charity Regulator (OSCR) on 26th November 2019. It has eight trustees or directors from Edinburgh, Glasgow, Aberdeen, Stirling, Fort William and Ullapool. The Chairman is Melvyn Giles from Lochaber, a retired professional geologist who formerly worked for Shell. Angus Miller, who has done a huge amount of work for of the Scottish Geodiversity Forum and Scotland's Geodiversity Charter, is the Secretary. The plan is to merge the Forum into to the new Trust. Your secretary is currently the Treasurer. It has strong support from the Edinburgh Geological Society

which has donated £5,000 towards start-up costs.

The initiative is attracting much interest in geological circles. The directors are confident that it will be supported by all those who have the best interests of geology in Scotland at heart. The aim of the Trust will include improving the conservation of and access to geological sites and education and information about geology. This is an opportunity to respond to increasing public interest in learning how the world works.

The Trust is a membership organisation and will rely on its members for support and providing directors to manage it. You can join the Scottish Geology Trust mailing list at http://www.scottishgeologytrust.org/

The new Trust will need paid help to organise and run its activities. The directors are working on plans to generate funds to achieve this. There will be a Special General Meeting of the Scottish Geodiversity Forum on Friday 27 March to formally dissolve the Forum and transfer unspent funds to the new Trust. The meeting will also review and celebrate the work of the Forum, and look to the future of the Trust and the Geodiversity Charter by mapping out Scotland's geological organisations and resources.

The first major project will be a Launch and a Scottish Geology Festival focused on a conference in Edinburgh on 16th to 18th October, but with a wider geographical scope to include events wherever they can be organised.

The Library of the Geological Society of Glasgow

Did you know we had a Library? Have you ever been to it? The Society's library is located in Room 320 of the Gregory building - one floor up from the foyer area.

It is open from 6:40 to 7:20 on lecture nights. A series of four arrowed signs will take you there from the foyer. A wide



range of geological books are available and there are excursion guides and other material which geological travellers may find useful. There's also a large number of folded maps for loan in the basement.



You are welcome to come and browse! The Society's Assistant Librarian (Margaret Anderson - above right) will be on hand to help you discover all its hidden treasures!

Subscriptions

The membership fees for the Society are as follows:

- Ordinary Membership (including Scottish Journal of Geology): £25
- · Associate Membership (available to those over 60, or spouses of Ordinary

Members, or members of the Edinburgh Geological Society but does not include the Scottish Journal of Geology): £12.50

• Junior Membership (available to those under 25, or full-time undergraduates, or recent (4years) graduates: £6.25. (Junior members who pay a £ 6.25 supplement will also receive the Scottish Journal of Geology.)

Any queries regarding the above can be addressed to: The Membership Secretary: Campbell Forrest, Strathview, Fintry Road, Kippen, Stirlingshire, FK8 3HL email: <u>memsec@gsocg.org</u>

Welcome to new Members: Yvonne Lewin, Oliver Strimpel, Andrew Wyllie, Stephen Brown, Janet Pooran, Chris Daniel and Alan Painter.

Courses at the Glasgow University Centre for Open Studies

Geology in the Field

Field studies and examining rocks in the field are the basis of all geology. We will examine the geology and geomorphology of a series of areas within easy reach of Glasgow. There will be five full-day excursions by private car. Walking will generally be easy and no prior knowledge of geology needed.

Dates: May 6 - Jun 1, 2020

Tutor: Michael Keen

For more information and to book: <u>www.gla.ac.uk/study/short/book/category/167.</u>

Events from other Geological Societies

Edinburgh Geological Society <u>www.edinburghgeolsoc.org</u>

4th March - David Jarmin. Rock slope failure in the Scottish mountains

20th March - Dave McCarthy. The geological controversies of the Falklands Plateau

Aberdeen Geological Society <u>www.aberdeengeolsoc.org.uk</u>

5th March - John Millett. Exploring the worlds ancient buried volcanos: from hydrocarbons to climate change and back again

19th March - Dr Adam Zaniewski. Macro to micro-scale insights into granite petrogenesis, Ross of Mull Granite

16th April- Tom Sharpe - Henry De La Beche – 1816 tour of Scotland

Highland Geological Society www.spanglefish.com/highlandgeologicalsociety

18th March - Dr Adam Zaniewski, Macro to micro-scale insights into granite petrogenesis, Ross of Mull Granite

Hon. Secretary: Walter Semple email: <u>sec@gsocg.org</u> Newsletter Editor: David Webster email: <u>meetings@gsocg.org</u>

Members' Night: Request to contribute

Thursday 14th May 2020

Please use this form or email the following information to the Hon. Secretary

Title of contribut	tion:
Name	
Address	
Telephone/Fax/e	email

Please complete the details below:

I wish to make a presentation as follows (please tick box as appropriate):

- □ Oral presentation with Powerpoint slideshow or overhead projector
- □ Bench-top display
- □ Wall-mounted poster
- □ Lap-top computer "kiosk"-style slideshow (member's own laptop)

<u>Please Note:</u> Oral presentation speakers are requested to keep their talks to a **maximum** of 15 minutes *including* question time. In the event that more than four requests are received for oral presentations GSG Council will select those to be included in the programme; successful requests will be informed by e-mail or post by 1st May.

Please return this form to:

Walter Semple, Honorary Secretary,

The Geological Society of Glasgow,

c/o School of Geographical & Earth Sciences, Gregory Building, University of Glasgow, Lilybank Gardens, Glasgow, G12 8QQ,

or email: <a>sec@gsocg.org

Booking Form for Residential Field Excursion to Islay Fri 24th – Mon 27th April 2020.							
Name(s):							
Address:							
Landline Tel. No(s). Mobile No(s).							
Email(s): Accommodation: Please tick one box.	Shared double room with your partner/ spouse B&B Shared twin room B&B Single room B&B						
Travel : <i>Please tick</i> <i>one box</i>	I will make my own arrangements for accommodation. I would be happy to take my car to Islay and give a lift to passengers to/from Islay . State No. Passengers: I would be happy to take my car to Islay and give a lift to passengers on the field days. State No. Passengers: I would prefer not to take my car, but will do so if required. Ideally I would prefer to take a lift from someone else. I would like a lift in someone else's car. I will make other travel arrangements. (Please specify)						
Do you have any sp	Do you have any special dietary requirements for breakfast? Please specify.						
Emergency Contact Details: If an emergency arises whilst I am on the excursion the Society may contact the following person(s): Name:							
Telephone:							
Name: Telephone:							
Membership I/we am/are a member/s of the Geological Society of Glasgow Please tick							

X

Declaration:						
I/we confirm that I/we have read and will comply with the Society's guide to field safety (provided with this booking form).						
 I enclose the completed form and a cheque (payable to Geological Society of Glasgow) for the deposit of £30.00 per person. Please tick box. 						
Or						
 Please email to me the GSG bank details as I want to make a bank transfer. My place on the trip will be confirmed only when this has been received by GSG. Please tick box and email the form back to the Res Sec (Maggie Donnelly). 						
Signed						
Print name						
Date						
Please note that the later you cancel the less likely it is that you will get all or part of your deposit back. Once the society has passed on your deposit to the hotel it is very unlikely that it will be refundable. If two people are sharing a room and one person cancels, it may in fact be necessary for that person to pay the full balance. You are strongly advised to buy travel insurance to cover you for any such losses.						
Please return the form and the deposit to Maggie Donnelly, <u>restrips@gsocg.org</u> .						

Booking	Booking Form for Residential Field Excursion to Ardnamurchan Fri 8 th to Mon 11 th May 2020			
Name(s):				
Address:				
Landline Tel. No(s).				
Mobile No(s).				
Email(s):				
Accommodation: Please tick one box.		Shared double room with your partner/spouse B&B		
	Γ	Shared twin room B&B	To share with (if known):	
		Single room B&B		
		I will make my own arrangem	ents for accommodation.	
Travel : Please tick one box		I would be happy to take my car and give a lift to passengers to/from Ardnamurchan. State No. Passengers:		
		I would be happy to take my car to Ardnamurchan and give a lift to passengers on the field days. State No. Passengers:		
		I would prefer not to take my car, but will do so if required. Ideally I would prefer to take a lift from someone else.		
		I would like a lift in someone else's car.		
		I will make other travel arran	gements. (Please specify)	
Do you have any special dietary requirements for breakfast? Please specify.				
Emergency Contact Details: If an emergency arises whilst I am on the excursion the Society may contact the following person(s): Name:				
Membership Please tick		I/we am/are a member/s of th Glasgow	ne Geological Society of	

I/we confirm that I/we have read and will comply with the Society's guide to field safety (provided with this booking form).

1. I enclose the completed form and a cheque (payable to Geological Society of Glasgow)

for the deposit of £30.00 per person. Please tick box. Or

2.	Please email to me the GSG bank details as I want to make a bank transfer.
	My place on the trip will be confirmed only when this has been received by GSG.
	Please tick box and email the form back to the Res Sec (Maggie Donnelly).

Signed
Print name
Date

Please note that the later you cancel the less likely it is that you will get all or part of your deposit back. Once the society has passed on your deposit to the hotel it is very unlikely that it will be refundable. If two people are sharing a room and one person cancels, it may in fact be necessary for that person to pay the full balance. You are strongly advised to buy travel insurance to cover you for any such losses.

Please return the form and the deposit to Maggie Donnelly, <u>restrips@gsocg.org</u>.

Booking Form for Day Excursions 2020

A non-returnable deposit is requested for each chargeable booking - even for those taking their own cars. **No bookings will be accepted without the deposit.** A financial adjustment may be collected/refunded on the bus on the day. All cheques should be made payable to: **The Geological Society of Glasgow**. Please return your form with payment to: **Roy Bryce - email daytrips@gsocg.org**

Date	Excursion	Leader	Tick to apply	Deposit amount	Deposit enclosed
Saturday 6 th	Onich Shore	lain Allison &		£40	
June		Jim Blair			
Saturday 13 th	Great Cumbrae	Con Gillen		£40	
June					
Saturday 27 th	Queensferry	Richard		£30	
June		Smith			
Saturday 11 th	Hessilhead Quarry	Gary Hoare		£30	
July					
Saturday 1 st	Charlestown Lime	Katie Strang		£30	
August	Centre	& Gary Hoare			
Thursday 20th	Hunterian at the	Neil Clark &		Free	İ
August	Kelvin Hall	John Faithfull			
Saturday 12 th	Arthur's Seat	Colin		£30	
September		MacFadyen			
Total number of trips				Total	

Your Name (please print).....

Email

Address

Phone number

Emergency Contacts

In case of an emergency we may need to contact someone on your behalf, while you are on the excursion. Please provide details below.

Name of contact

Relationship

Phone numbers

Please complete this declaration:

I confirm that I have read and will comply with the Society's recommendations on field safety

Signed

Dated

Safety in the Field

Although geological fieldwork is a pleasurable activity, by its nature it may involve some risks. These can be minimized by observing sensible precautions. It is important that everyone undertaking fieldwork is alert to both the general and specific risks and can take responsibility for their own safety and for the impact this may have on the safety of others.

A general *Code for Geological Fieldwork* is published by the Geologists' Association.

Field Excursions organized by the Society are conducted on the understanding that members and guests are aware of their general responsibilities. For its part, the Society, through excursion leaders, will issue specific warnings where conditions differ from those likely to be encountered by an active person of normal health during a weekend ramble in the hills. Participants are specifically asked to:

(a) Inform the party leader in advance of the field excursion, in confidence, of any medical condition which may have a bearing on their own safety or on that of other party members.

(b) Observe all safety instructions given by the party leader. Inform the leader if they wish to leave the party and inform him/her immediately of any illness or injury.

(c) Provide themselves with warm and waterproof clothing (brightly coloured if possible), strong waterproof boots that provide some grip, and carry a small personal first-aid kit.

(d) Carry a survival bag, whistle, spare clothing, and survival rations when working in remote or mountainous regions.

(e) Wear a hard hat whenever there is a risk from falling objects. This is obligatory when visiting quarries, mines, building sites or road sections under construction and, in the interests of safety, members may wish to obtain their own.

(f) Always wear impact resistant safety goggles or spectacles when hammering tough or splintery rocks, or using chisels. Never use a second hammer as a chisel. Beware of standing too close to others using either.

(g) Take special care on steep slopes (e.g. scree slopes, cliffs and quarries); on muddy slopes and slippery shore-sections, and when working on roadside cuttings or exposures, particularly when construction is in progress. Be alert when crossing roads and railways, it is easy to get distracted. Check the times of tides, remembering that high winds may make them higher than you expect, and ensure that you are familiar with the exit points from coastal sections.

(g) Obtain the permission of landowners or factors before entering property. Permission to collect samples may be required and special permits are necessary on Sites of Special Scientific Interest (SSSIs).

(h) Avoid overhanging or unstable rock faces, especially during thaw conditions after a cold spell or after heavy rain. This is particularly important in quarries but also on some coastal cliffs where large sections may fall without warning.