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The Friends visited the Western Alps of France in June this year. The group explored the structure and geology of this classic mountain range over six days. Beginning in the city of Grenoble, fifteen Friends travelled across the whole range of the Western Alps from Chartreuse in France to St. Veran within a few yards of the Italian border.

Read more about the trip on page 12.

Sedgwick Museum of Earth Sciences, Downing Street, Cambridge CB2 3EQ

Opening hours: Monday to Friday 10am–1pm & 2pm–5pm Saturday 10am–4pm

☎ (01223) 333456 ✉ sedgwickmuseum@esc.cam.ac.uk 🏠 www.sedgwickmuseum.org

✉ Friends of the Sedgwick Museum friendsofsedgwickmuseum@gmail.com

Registered Charity (No. 1091393)

Friends forthcoming events

Unless otherwise clear, Friends talk events and committee meetings will be held in the Department of Earth Sciences, Downing Site, Cambridge CB2 3EQ. The doors to the department will be opened at 6.15pm for tea/coffee, and the talk will start promptly at 7pm. Please try not to be late, in spite of Cambridge traffic congestion, because our doors have to be locked at 7pm. Members attending a Friends talk are asked for a donation of £3 each (or £4 for non-members). Cars may be parked on the Downing Site during these events. The entrance for cars is from Tennis Court Road, opposite the back entrance to Pembroke College, through the “Visitor’s” barrier gate. Identify yourself as attending a “Friends of the Sedgwick Museum” event, if requested by security. After the talk, cars must leave using the exit barrier at the other (Downing College) end of the site. The barrier will open automatically as the front of your car approaches the bar.

Talks are usually held in the Tilley Lecture theatre in the Dept of Earth Sciences. Please contact the Friends in advance if you require assistance with access.

October – December 2019

Tuesday 19th November

Talk by Owen Weller, University of Cambridge
‘Tales from the Arctic: a chronology of Baffin island’
Doors open at 6.15pm for 7pm

Saturday 23 Nov 2019,

Jurassic East Conference*

9:30 am to 4:30 pm

A day of talks on the Jurassic of the East of England at BAS Aurora Centre, Madingley, Cambridge

On behalf of:

Geo-East, GA, and CGS (not organised by the Friends)

To book please visit www.geo-eastevents.org.uk for more information and registration form

Presenters include:

Dr Liz Hide (Director, Sedgwick Museum)

Dr Simon Kelly (Sedgwick Museum)

Dr David Norman (Sedgwick Museum & University of Cambridge)

Tuesday 3rd December

Friends Christmas Party *

Members can look forward to entertaining talks by students of the Sedgwick Club about their adventures round the world, and to the Christmas refreshment and raffle arranged by the Committee

Please help our planning by registering your attendance and send a cheque for £9/head (made out to ‘Friends of the Sedgwick Museum’) by 22nd November to Carol Franklin, 273 Wellbrook Way, Girton, Cambridge CB3 0GL.

Any financial surplus after costs will go to Museum support funds. The more members and their guests who attend, the more enjoyable the party will be and the more we will support the Museum.

Please note that events with a star * need to be pre-booked. Please use the standard booking form which is found on Pg.11 of this Newsletter

January – March 2020

Tuesday 28th January

Talk by Emily Mason, University of Cambridge

‘Volcanic ‘polluters’ – gas and particulate emissions from volcanoes’

Tuesday 11th February

Experimental class by Dr Mike Tuke*

‘Experiments on the permeability of sediments’

Mike’s practical lab classes have proved to be a popular annual feature of our programme. Please book with Mike Tuke (01480 457068) or miketuke@btinternet.com. Places in this practical class are limited in number.

Tuesday 25th February

Talk by Dr Anthony Shillito, University of Oxford

Organism-sediment interactions (title tba)

Tuesday 10th March

Talk by Dr Neil Davies, University of Cambridge

‘Life and environment in a vegetated polar region: is the Pliocene of High Arctic Canada a prediction of future Earth?’

April – July 2020

Monday 4th May

Talk by Dr Olie Shorttle, University of Cambridge

‘Geology beyond the Solar System’

Doors open 6.15pm for 7pm

Tuesday 19th May

Talk by Dr Emily Stevenson, University of Cambridge

‘Adventures in Arctic rivers: Understanding the impacts of rock dissolution in high Arctic landscapes on our modern carbon cycle’

Tuesday 9th June

Annual General Meeting, 6pm, Department of Earth Sciences.

All welcome. Local friends are particularly asked to attend because this is the best opportunity to consider future activities.

Sunday 14th June – Sunday 21st June

Excursion to the Shetland Islands, Scotland *

** Please note This event is now full. Please contact Mike Tuke if you wish to be added to the waiting list.**

This is being arranged by Dr Mike Tuke, and details have been sent to all friends. The group will be limited to 20 in number. Registration is being carried out by Mike Tuke, miketuke@btinternet.com, Old Farm House, Waterloo Farm, Great Stukeley, Cambs, PE28 4HQ

Sedgwick Museum upcoming events

Friends are always very welcome at public events in the Museum

Saturday 30th November

11am - 3pm

'Explore your Archive' at the Sedgwick Museum

Seasons' Greetings! Treasures in the Archives - University Cambridge Museums

Come and explore festive archives from the Polar Museum, Kettles Yard and the Sedgwick Museum of Earth Sciences. This is also a chance to speak with a Professional Archivist about how to care for your family archives.

All welcome free drop in.

Friday 6th December 2019

14.00-15.00 and 15.30 – 16.30

Bookings for this event are via Eventbrite https://feminist_takeover_tour.eventbrite.co.uk

A Feminist Guide to Dinosaurs – in Introduction

As part of the Sedgwick Museum's Feminist Takeover Weekend, join artist and geologist Emma Theresa Jude for an incredible introduction to the history of women in the fields of palaeontology and geology. Introducing wide-ranging themes through a guided tour of the incredible Sedgwick Museum (a national treasure and an early seat of women in palaeontology), from hidden stories of female scientists whose work has been relegated to the footnotes of history, to the current challenges facing women in the field today. From the first female geologists like Martine Bertereau, through the Sedgwick's own Mary McKenny Hughes, to modern scientific rebels like Gerta Keller, we'll be asking the difficult questions along the way.

What role did the intersection of class and gender play in Mary Anning's story? What can Marguerite Thomas Williams tell us about the history of geologists of colour? Should gender be irrelevant in science, or can women's perspectives accelerate scientific progress?

This one-hour class covers the key points of the immensely popular A Feminist's Guide to Dinosaurs workshop, without the drawing. Ideal for non-artists, or a perfect primer for the evening's Drawing Fossils Like A Feminist art class!

Friday December 6th

6.30 – 8.30 pm

Bookings for this event are via Eventbrite <https://www.eventbrite.co.uk/e/drawing-fossils-like-a-feminist-the-sedgwick-museum-illustrated-tickets-79960827989>

Drawing fossils like a Feminist – The Sedgwick Museum Illustrated

As part of the Sedgwick Museum of Earth Sciences' Feminist Takeover Weekend, join artist and geologist Emma Theresa Jude to explore the Sedgwick's fossil collection through drawing, with an eye to famous female scientific illustrators of the past! The 2-hour class is suitable for complete beginners and non-artists as well as experienced sketchers.

We will begin with an exploration of the crucial role women as multidisciplinary scientists and artists played in the development of palaeontology, focusing particularly on historic women of the Sedgwick. Emma will then

lead the class through three exercises in charcoal designed to loosen up and improve confidence in beginner artists, resulting in a final piece in multi-tonal charcoal to take home.

Saturday 7th December 2019

10.30 – 15.30

Booking for this event is via Eventbrite <https://www.eventbrite.com/e/a-feminists-guide-to-dinosaurs-tickets-80431411517>

A Feminist guide to dinosaurs

Join Emma Theresa Jude and The Big Art Herstory Project for an incredible introduction to the history of women in the fields of palaeontology and geology. Introducing a wide variety of themes through a guided tour of the incredible Sedgwick Museum (a national treasure and an early seat of women in palaeontology), from hidden stories of female scientists whose work has been relegated to the footnotes of history, to the current challenges facing women in the field today. Expect incredible fossils, stunning rock formations, meteorites, volcanoes and, of course, plenty of DINOSAURS! From the first female geologists like Martine Bertereau, through the Sedgwick's own Mary McKenny Hughes, to modern scientific rebels like Gerta Keller, we'll be asking the difficult questions along the way.

This class is an LDG/Big Art Herstory Project honorary class with the morning's tour of the museum led by our resident geologist Emma Jude, a Fellow of the Geological Society, with an MEarthSci in Earth Sciences (with Palaeontology) from the University of Oxford as well as an MSc from Imperial College London. She is also a landscape artist whose work focuses on multilayered paintings and drawings with geological themes, as well as how we interact with museum collections - we are very excited to have her!

The afternoon's drawing session will be led by our resident Feminist Drawing Tutor Luisa-Maria MacCormack, with exercises concentrating on drawing from the incredible textures, layers, fossils and leaps of imagination that the museum has to offer!

Wednesday 19th February

4.30pm – 7.30pm

Twilight at the Museums - The Sedgwick Shadows

Explore the Sedgwick Museum after dark and search amongst the shadows to uncover fabulous fossils and marvelous minerals. With your torch, hunt for secrets in the shadowy showcases and see if you can spot something new.

All welcome free drop in.

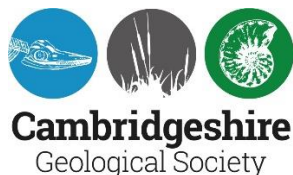
(Please note there will be no toilets or baby changing available in the Museum. Buggies and pushchairs will not be allowed into the Museum during the evening but a supervised undercover area will be available outside the Museum. We regret we have very limited disabled access, please call in advance for details. The shop will close at 7.15pm)

News from the Museum Director, Dr Liz Hide

This summer has been a busy and exciting time in the Sedgwick Museum. We've had record visitor numbers to the Museum, with more than 900 people taking part in our Summer at the Museums events, up 60% on last year. To mark 50 years since the Apollo XI Moon landing, we displayed the lab notebook where Stuart Agrell recorded his analyses of the moon rocks, and received some excellent media coverage for this and also recent Departmental research on lunar samples. You can read more about it later in this newsletter. We lent a number of items, including Adam Sedgwick's collecting bag, to the University Library for *'Discovery: 200 years of the Cambridge Philosophical Society'* which proved to be their most popular exhibition ever, and we also lent items from our founding collection to Kettle's Yard for *Artist Unknown'*. We've also been out and about: Our public engagement team Nic Skipper and Helen Devereux ran craft activities on Parkers Piece as part of the city's Big Weekend event in July, while Exhibition Coordinator Rob Theodore took part in holiday activities run by the City Council on recreation grounds around the City, identifying young people's own fossil and rock collections. Some of these finds will be going on display in our Community Cabinet during October.

Meanwhile, behind the scenes, we have started moving into our brand new Collections Research Centre, the Forbes Building on Madingley Rise, adjacent to the Brighton Building store and conservation lab. This is a state-of-the-art environmentally controlled collections centre, built with support from both the University and CASP. Over the next 15 months or so we will be moving around 150 tonnes of rocks and fossils from a variety of locations across Cambridge into this new facility, bringing our rock and fossil collections together to create a focus for research that will be truly international in its reach. To assist with this mammoth (sorry!) task, we are delighted to welcome a new member of staff, Catherine Craston. Over the coming months, Catherine will be recruiting and training a team of volunteers to help label, clean and photograph the drawers of rocks, and to move them into their new homes. If you're interested in being part of this amazing project, do look out for the adverts or get in touch with the Museum directly.





Cambridgeshire Geological Society
Monthly Talks Programme
October – December 2019

The Society meets at The Friends Meeting House, 91-93 Hartington Grove, Cambridge CB1 7UB

Talks start at 7.30pm and doors open at 7.00pm

Visitors (£3 per person) and Members (free) are welcome

Contact: Franziska Norman, Programme Secretary info@cambsgeology.org

www.cambsgeology.org Affiliated Group of the Geologists' Association

Saturday 23rd November

Conference: 'Jurassic East'

Venue: Aurora Innovation Centre, British Antarctic Survey, Madingley Road, Cambridge

Subjects covered during the day will include our regions' fascinating Jurassic geology and palaeontology, our legacy landscapes and the Jurassic collections of the Sedgwick Museum.

Booking Required. Full details <http://www.geo-eastevents.org.uk/>

Monday 9th December 2019

"The effect of mass extinctions on Cephalopods" Prof Paul Rodhouse, British Antarctic Survey

The Great Meteorite of July 1860 - When stars fell to Earth



159 years ago, on July 14th 1860, the people of the remote Himalayan hill station of Dharmsala in Himalchal Pradesh, north-western India were treated to the awesome sight of 'shooting stars' burning up as they plunged through the atmosphere into the surrounding landscape. The locals reported seeing 'flames of fire, nine feet in length and clouds of dust as the incandescent fragments landed'. Awed they may have been but surprisingly not too frightened to try and retrieve some of the heavenly bodies. They were of course in for a surprise when they picked them up but not in the way you might expect.

The long reach of the Empire

1860 was just three years after the Indian Rebellion and Earl Canning was still the British Governor General. The local population of Dharmsala had increased in number with the newly garrisoned Gurkha Light Infantry and with the seasonal influx of colonial administrators and their families escaping the heat of Delhi. The British presence and their observation of the celestial drama drew the phenomenon to the attention of the Geological Survey of India, which was then directed by an Irish geologist Thomas Oldham. An investigation was ordered.

Hot news!

The investigating officer reported that eye-witnesses 'ran to the spot to pick up the pieces. Before they had held them in their hands half a minute they had to drop them..'. However, the reason was not what was expected. The report continued – it was '...owing to the intensity of the cold which quite benumbed their fingers...'. As surprised and puzzled as the locals, the officer continued '..considering the fact that they were apparently but a moment before in a state of ignition, is very remarkable, each stone that fell bore unmistakable marks of partial fusion'. The reported facts were thought to be sufficiently remarkable for the meteorites to be dispatched to the Woodwardian (now Sedgwick) Museum of the University of Cambridge, where they are today on display.

It's cold out there

What the people of Dharmsala had in fact experienced was the intense coldness of deep space from where the meteorites had originated. Despite their surface fusion, the low thermal conductivity and size of each rocky meteorite before it fragmented, preserved their low temperature.

Douglas Palmer
Sedgwick Museum

Image <https://apod.nasa.gov/apod/ap100722.html>

50 years on, the Moon still rocks

Fifty years ago, Cambridge mineralogist, Dr Stuart Agrell was given VIP treatment and a police escort after flying into Heathrow from the USA because he was carrying a bag full of very precious rock material. The samples were amongst the most expensive ever collected as they had been retrieved from the moon by two of the American Apollo 11 mission astronauts. The programme of their investigation was a remarkable and unprecedented example of international scientific collaboration, which still continues....read on

Apollo 11

Launched from Cape Kennedy on July 16th 1969, the Apollo 11 mission opened a new era in the exploration of Earth's moon. Four days later the lunar module Eagle landed with astronauts Neil Armstrong and Buzz Aldrin on board. An estimated 350 million people watched the televised images. One of their main aims was to sample as wide a range of rock and surface material as possible to help determine the moon's composition and formation. They were also looking for any signs of past life or water on the moon.

On July 21, 1969, Armstrong and Aldrin spent some two hours collecting 50 rocks and surface dust from around the landing site. Although armed with a geological hammer, there was no available bedrock to sample. Eagle rejoined the orbiting command module Columbia, piloted by Michael Collins and they returned to Earth on July 24th. It was one of humankind's most remarkable technological achievements.

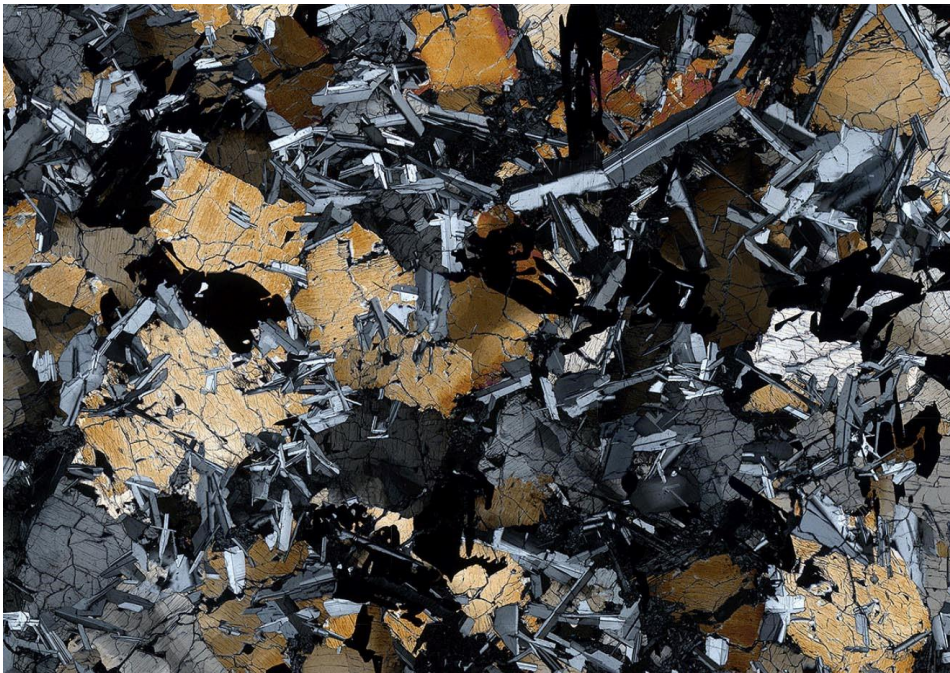


Fig 1.

• A basalt lava collected by Apollo 11, seen in microscope thin section with polarized light. Numerous criss-crossing laths of feldspar, coloured white to black, intersect large pale brown pyroxene crystals. (copyright NASA/OU, imaged by Andy Tindle)

Altogether the Apollo 11 mission recovered 21.5 kg of rock material from the Mare Tranquillitatis (Sea of Tranquillity). This vast region is in fact a very ancient impact basin between 3.5 and 3.8 billion years old and filled with basalt rock formed from molten lava. Its dust-covered surface is pockmarked by younger and smaller impact craters and rock debris, which created difficulties in landing Eagle.

Back on Earth, the samples had to be quarantined for 50 days to ensure that they contained no pathogens. Only then were they parcelled out to experts around the world for investigation. It is likely that no other set of rocks has been investigated so extensively or intensively.

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Apollo XI Lunar Sample

Wt. filter	57	30.2956 - 29.5298 = 0.7658	
Wt. after drying H ₂ O		30.2958	
Residue SiO ₂		29.8855 - 29.5288	
		29.8851	
		29.8851	
Wt. after HF		- 29.5641	
SiO ₂		29.8851 - 29.5641 = 0.3210	11.92 92.16
R ₂ O ₃		29.8334 - 29.5288	
		29.8332	
		29.8332	
		= 0.3044	39.75 30.51
CaO	35	29.4976 - 29.4058	
		29.4975	
		29.4972	
		29.4972	
		0.0914	11.94
Mg ₂ SiO ₄	55	28.9026 - 28.7360	
		28.9020	
		28.9017	
		28.9012	
		28.9008	
		28.9003	
		28.9002	
		0.1648	7.76
Fe ₂ O ₃		23.20 - 0.00	
		23.20 × 0.007984 × $\frac{350}{100} \times 0.7658 \times 0.09755$	17.56

Fig 2
Caption: •A laboratory notebook showing the results of a wet chemical analysis of some lunar samples that was made within days of arriving in Cambridge, probably by J.H. Scoon who was a chemist who worked with Stuart Agrell in the Department of Mineralogy and Petrology. (Sedgwick Museum archives)

The moon comes to Cambridge
The Cambridge Department of Mineralogy and Petrology was one of the 150 recipient laboratories,

thanks largely to the presence of mineralogist Stuart Agrell (1913-1996). He had spent much of the 1960s in America and became well known there for his precise chemical analyses of mineral samples and his work on meteorites. As a result Agrell along with Geoffrey Eglington (1927-2016), a Bristol University biogeochemist, were the only non-American geoscientists involved in planning the moon-sampling program, which required frequent trips to Houston.

There are various anecdotes, some of them contradictory, about Agrell’s seemingly nonchalant approach to this remarkable material. Apparently the security-conscious American team in Houston, were somewhat non-plussed by Stuart Agrell’s sole concession to the safe keeping of the samples. For the return trip to London, he just tucked them into his spare clothes in a large holdall. On arrival, the samples went on display for the press at the SRC (Science Research Council) headquarters in High Holborn before being collected by the principal investigators of the 15 UK research teams. Again, there was an emphasis on the need for sample security in transport and within laboratories along with an urgency in investigation. Initial results were to be reported within three months for publication in the international journal Science and at a conference in Houston.

Whilst many of the research teams had put in place all sorts of elaborate decoy plans to avoid hijacks of the priceless material, the Daily Mirror splashed a photo of Stuart on the London tube with the holdall on his knee. But by the time it was published Agrell and his samples were safely back in Cambridge. One puzzling aspect is that, according to the accompanying Daily Mirror caption, on 19th of September, 1969, Stuart was accompanied on the tube by Dr P. E. Clegg of Queen Mary College, London University. However, the lady sitting next to Agrell is definitely not the physicist Dr Peter Clegg. She may have been someone from the SRC.

Stuart Agrell and the Cambridge team

For over 30 years before the Apollo 11 mission, Agrell had been using optical microscopes and ‘wet chemical’ analysis to study fine-grained minerals. He was especially interested and knowledgeable about those minerals, which had undergone high temperature processing both industrially and naturally. Initially, this work was done during the decade from 1939, which he spent as a staff member at Manchester University. He continued this work when, in 1949, he moved back to Cambridge, where he had been both an undergraduate and PhD student. Here, Agrell benefitted from the technological expertise of Jim Long who was working on a pioneering and ‘home made’ scanning X-ray micro-analyser in the Cavendish Laboratory. It had the advantage of being the first to provide in situ transmitted light viewing of polished and uncovered thin sections of the moon rocks. Agrell’s investigation of the Moon rocks was greatly aided by this newly emerging technology.

What are the moon rocks?

The Apollo 11 lunar rock material ranged from fragments of igneous rock and microbreccia to the lunar surface dust. Agrell worked with other members of the Department, the mineralogist I.D. Muir, the 'wet chemist' J.H. Scoon and the crystallographers P. Gay and M.G. Bown on the analysis of the larger dust fragments. This revealed the presence of basaltic igneous rocks derived from the underlying bedrock lavas. But there are also fragments of other moon rocks, especially a feldspar –rich igneous rock called anorthosite from the lunar highlands. In addition, the mixture of crystalline and glassy fragments in the dust records successive episodes of impact and melting. Agrell's expertise and striking personality led to him being in constant demand for television interviews during the Apollo programmes.

The Soviets join in

Just four months later in November 1969 Apollo 12 also made the trip and recovered another 34 kg of samples, mostly ancient basaltic rocks from the moon's Oceanus Procellarum (Ocean of Storms)' region. Dated to between 3.1 and 3.3 billion years old, these basalts are some 500 million years younger than the Apollo 11 basalts. And then in September the following year (1970), the Russians finally succeeded in landing an unmanned robotic Russian Luna 16 probe on the moon. They drilled 35 cm into the surface deposits and recovered a 101 gm core sample from the Mare Fecunditatis.

The next four years saw successive Apollo and Luna missions recovering a total of several hundred kilos of moon rocks and dust. Some of this material found its way to Cambridge and other British laboratories. Overall, the geological samples provided many new insights into the processes that formed the moon and its surface but did not resolve the problems of its origin. No signs of life were found nor initially any indication of water. However, subsequent lunar probes have detected patches of crystalline water-ice at the moon's poles.

The Cambridge team expands and contracts

In 1976, Agrell invited Colin Pillinger, who was a member of a Bristol University lunar research team working on the carbon chemistry of the lunar samples, to join him in Cambridge. Pillinger brought the 'carbon' team with him and so there were two independent lunar research teams in the Cambridge Department of Earth Sciences. Then in 1985, Colin Pillinger and the 'carbon' team moved to the Open University at Milton Keynes. There, Pillinger formed the Planetary and Space Sciences Research Institute and later conceived and the 2003 Beagle 2 spacecraft which landed on Mars in 2003.



Fig 3.
Jean and Stuart Agrell (first and second from the left) and Colin Pillinger (third from the left) with some of Colin's group picnicking in the Pillinger's garden in Cambridge, 1982. Credit: with thanks to Judith Pillinger

Stuart Agrell retired from formal academic duties in 1980 and was elected President of the Mineralogical Society of Great Britain in 1983. He continued publishing his research work into the 1990s.

The Moon still rocks: An ongoing story

Research continues on the lunar samples including the basalts. Eleanor Jennings' Cambridge PhD looked at large-scale eruptions of basalts and the relation to their source in the underlying mantle. Currently a lecturer at Birkbeck, University of London she is extending this work to the very ancient and primitive lunar basalts collected in the Apollo 12 mission (See Fig 5 & 6) to see what they can tell us about their mantle source rocks. She is collaborating with Iris Buisman in the Cambridge Department of Earth Sciences where the microprobe technology allows them to measure trace elements at high precision in individual crystals. This provides clues as to the original temperature of crystallization of the basalts.

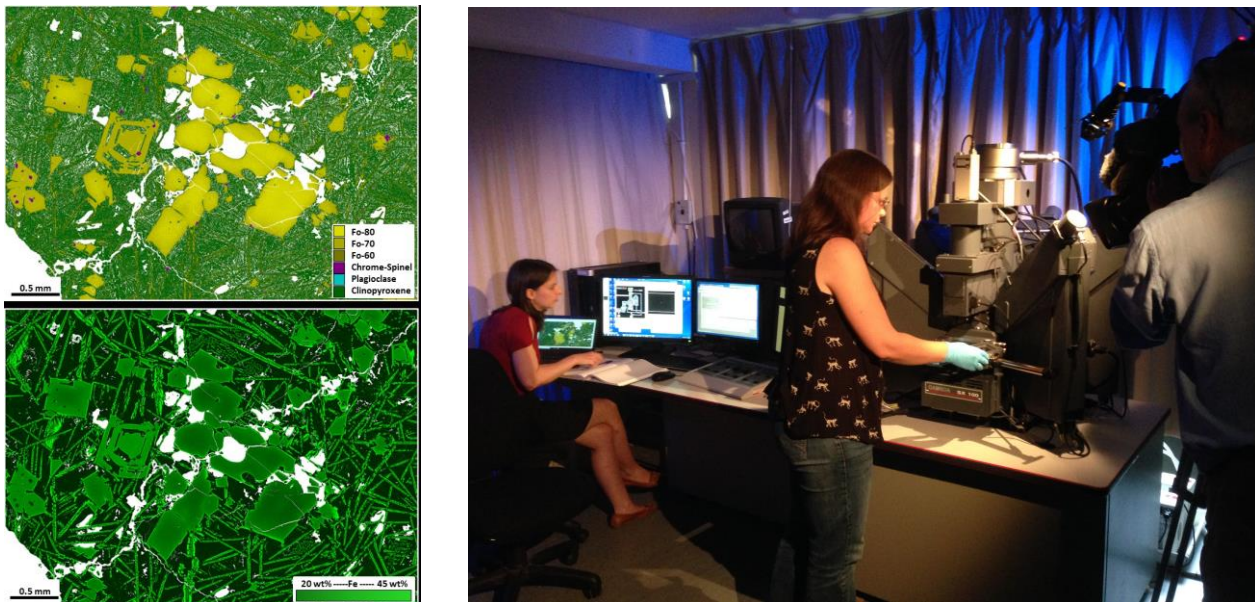


Fig 5 & 6

•An Apollo 12 basalt sample (on loan from NASA), is being investigated using a Quanta 650-F Scanning Electron Microscope (SEM) at the University of Cambridge, Earth Sciences Department. As the rock crystallised from a primitive lunar magma, it gets us a close as possible to the lunar mantle from which it was derived.

Upper: Called a phase map, this image shows olivine crystals (pale green) with a variety of forms – skeletal, dendritic and equant. The resulting texture probably reflects fast cooling of a low viscosity ‘fluid’ magma. The phase map shows the magma’s high iron content (see lower hand image) which is derived from the lunar interior.

Lower: An Fe-map shows iron concentrations in the olivine crystals, with the dendritic forms being the most Fe-rich whilst the equant olivines show increasing Fe from core to rim. (image NASA, courtesy Dr. I. Buisman)

Friends' Field Trip to the Western Alps – June 2019

Fifteen Friends gathered in the city of Grenoble on Sunday 16th June at the start of a six day field trip across the whole range of the Western Alps from Chartreuse in France to St. Veran within a few yards of the Italian border.

The excitement began even before we arrived at the train station in Grenoble in the form of a magnificent anticline. Then as we trundled our cases to our hotel in the pretty centre of Grenoble, we glimpsed the jagged snowy peaks of the Alps between the rooves of grand C19th town houses. There was yet another thrill as we reached the foyer of our hotel and dumped our suitcases on a shiny floor of polished gneiss. The fun had begun.

Parts of the Western Alps are as old as Gondwana itself and highly complex. This complexity is due to the northward movement and twisting of the African plate, resulting in the present day shape of the Alps. This trip was one of the most intellectually and physically challenging of all the trips the Friends have undertaken. But of course, there is nothing a Friend loves more than a challenge. So off we set. We marvelled at the scale, the beauty, the drama of the Alps. We gazed in wonder at the rugged peaks of the crystalline basement, the tortured folding of the Jurassic and the great panoramas of mountains, range upon range, as old as 320 million years. We grappled with the technical terms; thrust belts, nappe stacking, oceanic subduction and much else.

Our lovely guides from the Centre de Geologie de L'Oisans were Dr. Thibaud Simon-Labric and Dr. Jonathan Mercier. They challenged us in every way. They encouraged and cajoled us up the steepest and highest of mountain tracks to elevations of nearly 3000 metres. Ever thorough and determined, they instructed us in the complexities of alpine morphology with impromptu and frequent felt tip and white board field sketches. We bombarded them with questions, alternative theses. We began to get an inkling of the tortured history of the Alps. We began to realise the story is yet unfinished. We began to share the enthusiasm of Thibaud and Jonathan for this area.

But as always with the Friends, there are diversions, observations and insights. We cooed over the pretty alpine cattle with the wooden bells about their necks which rang discordant monotonous over pretty alpine meadows rich with wild flowers. We watched frisky sheep herded up steep mountain passes to summer grazing. We considered the deserted and dilapidated copper mine near Saint Veran and pondered on the sad stories of suffocation, explosion and economic failure that had led to the final closure of the mine in the mid C20th. We scanned the fabulous ridges of the Vallon du Fournel for the Italian border just over the way. Then there was the visit to the church of Notre-Dame des Neiges with its windows of modern stained glass depicting scenes from the life of Jesus in a style that was dynamic, impelling and vivid. All the main players were there; unfortunate John the Baptist, shifty, perfidious Judas, sad bereft Mary, Mother of Jesus. We felt their pain. We shared with Peter, most beloved of Jesus, and all the other disciples, the foreboding of the Last Supper. We couldn't help but be moved by this glorious work of art.

Then it was back out into the sunshine and a bright sparkling alpine sky. And there was lunch, baguettes, quiche, pizza, invariably eaten on a grassy slope looking out on millions of years of contorted, shifted, folded morphology. The air was clear and ringing. Sometimes there was a cuckoo, a raven cawing, a mountain stream babbling.

Dinner was always a chatty, lively affair. Aperitifs on a sun kissed terrace or in a local bar, to loosen tongues just enough. The Friends are never short of well-informed opinions. The conversation always flows. We reminisced. We recommended, books to read, films to see, places to visit. We recollected, a cruise round

Africa, another up Norway, a flea circus in Denmark. The food was good. There was wine, a lager, a beer, maybe a nip of the local spirit, Chartreuse. There were the geologists from Paris who shared our hotel and exhorted us to remain in the EU. Did we detect irony? Good humour all round. And so it went on until the warm French night would draw in.

Then there was our last supper. An event when we dress just a little smarter. A bitter sweet affair when we get together at the end of a trip to reflect on what a good time we have had. This year it was in a hotel in the village of St Veran. St Veran, at an elevation of 2000 metres, is the highest village in France. We looked through the window at mist rolling up the alpine valleys. There was a big thank you to Thibaud and to Jonathan, for making our trip so enjoyable and informative. Then there was a big thank you to Christine for making this trip possible, for all the work she had done in France, booking hotels, guides, mini buses and myriad other things. We remembered her hero, the celebrated English alpinist Edward Whymper and the detour she insisted we make to L'Argentiere-La-Bessee to see the statute, constructed from steel sheets, erected in his honour by fellow alpinists. Then it was time for the latest version of our own special Friends' Grace:

We thank you Lord for stones and bones
and bringing us together.
For rocks within the Alpine zones
and all the lovely weather.

We loved it. We giggled at the doggrel; we chuckled at our inventiveness and remembered all the other versions, all the other lovely times. The original grace was written especially for us by Bishop Peter Sainsbury, an early Friend. Each trip we edit it to reflect our latest adventures
Then there were the au revours, a bientots; all the sadness of departure, all the anticipation of we'll meet again.

By Jean Tuke



In Memoriam Michael Dorling

Michael George Dorling was a member of the Sedgwick Museum staff for some 36 years. He died in early June 2019, at the age of 76.

Mike had a remarkable memory, many interests and a sarcastic sense of humour. Much of his work in the Museum involved management of the Sedgwick's rock and fossil materials. A vital part of the job involves the location, selection, receipt and cataloguing of new material destined for the Museum's collection. The other vital part involves contact with specialist researchers from the international world of geological sciences. Both parts require continuous work from Museum staff and Mike played an important role in this.

Mike was born in Newmarket, the son of a key member of the Cycling Club, and Mike himself became a central figure in the Club. Indeed, Mike helped to build it into a Club of national importance, with the help and support of his wife Norma, and eventually with the help also of their two daughters Gemma and Abi. Ultimately Mike became involved also with the Newmarket Town Football Club and one of its Vice chairmen.

Douglas Palmer
Sedgwick Museum

**Friends of the Sedgwick Museum
BOOKING FORM**

Date/Event
Contact details – please print
Name(s)
Email
Telephone
Address
Additional Information
Parking required?
Special diet?

Please enclose cheque for the appropriate amount made payable to ‘The Friends of the Sedgwick Museum’ and send to the person indicated on the programme.

Enclosed cheque for _____

Signed _____

Details will be emailed to you unless you indicate otherwise

The initial Deposit, made as an expression of interest, will be non-refundable if the event goes ahead. In the event of a later cancellation after further payments have been received, unless the place can be refilled an additional sum may be retained to cover the apportioned outlaid costs. Participants are therefore advised to arrange appropriate holiday insurance cover.

Please rest assured that your data will be used solely by the Committee and its Officers for the management of the Friends' activities and will not be passed to any third parties unless you have given permission for this to happen. Your consent to receive matter by email can be withdrawn at any time.



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Membership is open to
anyone!

Contact details

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01223 333400

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Key websites:

SEDGWICK MUSEUM

<http://www.sedgwickmuseum.org/>

DEPARTMENT OF EARTH SCIENCES BLOG

<https://blog.esc.cam.ac.uk>

CAMBRIDGESHIRE GEOLOGICAL SOCIETY

<http://www.cambsgeology.org/>

FACEBOOK - SEDGWICK MUSEUM

<https://www.facebook.com/sedgwickmuseum>

APPLICATION FORM

Please use block capitals and return the form, with your cheque, to the membership secretary.

Name (Dr, Mr, Mrs, Miss, Ms) *(delete as applicable)*

.....

Address.....

.....Postcode.....

Telephone.....

Email.....

Age (if under 18).....

Subscriptions (please tick)

- Individual: £12 per annum (Over 18 years)
- Family: £18 per annum (Two or more members living at the same address)
- Young £6 per annum (Members under the person: age of 18)
- Concession: £8 per annum (Full time students, unemployed or over 60s)

Membership is for one year and expires on 31st March. Members joining after 31st December will have the last quarter's membership included in the following year.

- I attach a cheque for £..... made payable to The Friends of the Sedgwick Museum

Signed.....Date.....

Gift Aid Scheme. Because the Friends is a registered Charity (No. 1091393) we can claim an additional amount on any subscription or donation, provided that you are a UK tax payer. Your signature below will allow us to increase the value of each payment you make for the benefit of the Friends.

Gift Aid Declaration. I am a UK tax payer. I would like the Friends of the Sedgwick Museum to treat all membership fees and donations as Gift aid donations from the date of this declaration until I notify otherwise.

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- Tick if you consent to the Friends contacting you by email to send you their Newsletter and keep you informed about their activities.

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