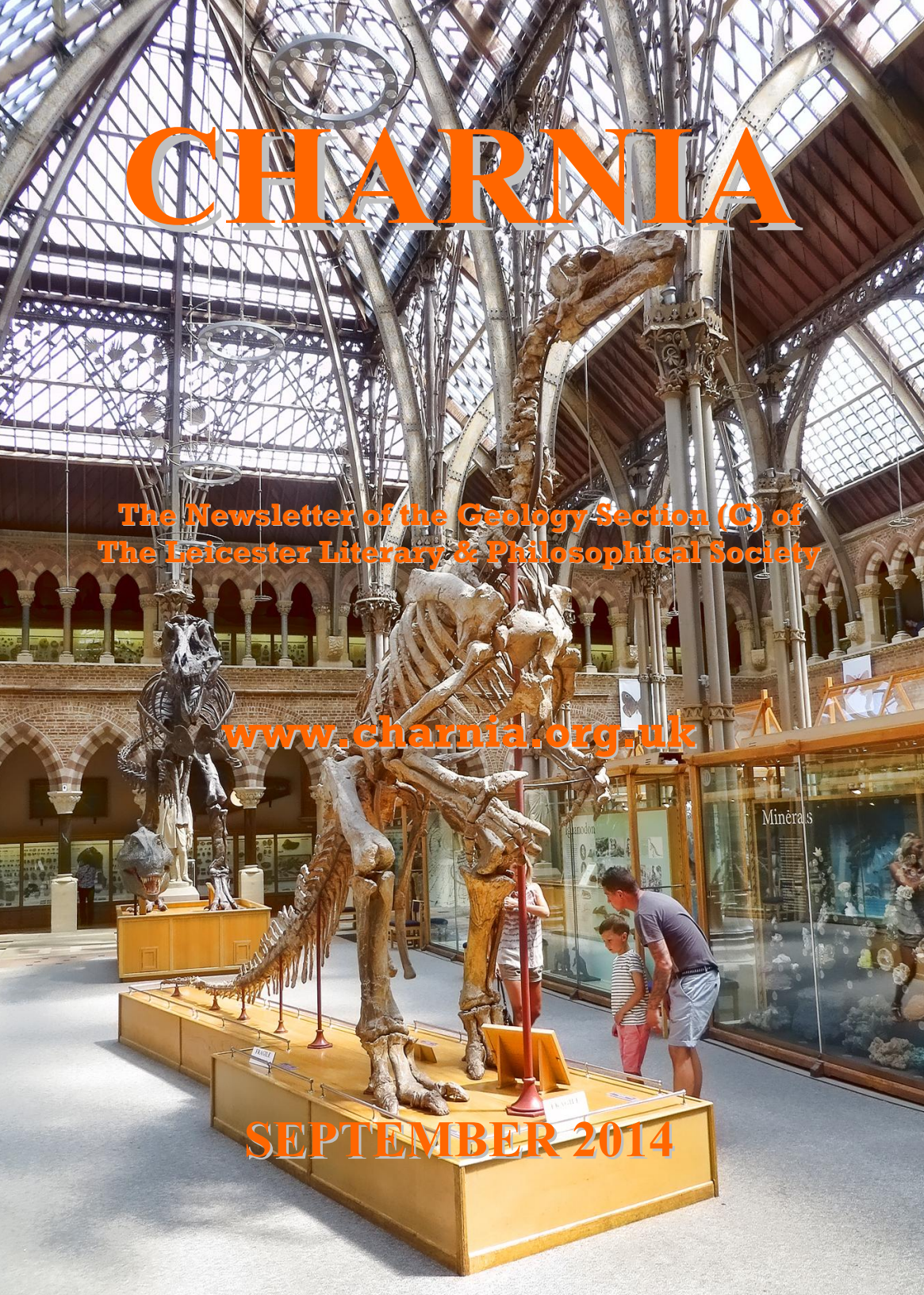
CHARNIA

The Newsletter of the Geology Section (C) of
The Leicester Literary & Philosophical Society

www.charnia.org.uk



SEPTEMBER 2014

Editorial September 2014

Its always a pleasure to see the work of our members appearing in print, and I'm happy to be able to tell you that Dr Diana Sutherland has once again published on the splendid Anglo-Saxon church at Brixworth in Northamptonshire. This time it's a publication for the Friends of Brixworth Church and the title is 'The building of Brixworth Church'. It will be on sale in Brixworth church or from Diana, at £5, which, frankly, is a bargain for a work of excellent scholarship. The book focuses not only on the myriad of different stone types found in the fabric, which is where our interest as geologists comes in, but the history of the construction of the building and the features to be seen inside are also discussed. A most comprehensive guide to a justifiably famous building, and highly recommended.

Mountsorrel railway: weathered surface (l); drift sequence (r) photos Graham Stocks

News of temporary exposures or other new exposures in the county is also most welcome, and Graham Stocks has sent me notification of an interesting excavation on an old mineral railway near Mountsorrel, which is being renovated by the Mountsorrel Railway Project. During works for the provision of a car parking area near Rothley Common, an area of Mountsorrel granodiorite was revealed. This is heavily weathered and

smoothed due to glacial action and/or exposure in Triassic times, allowing a fascinating glimpse of rarely seen phenomena. A nice section of glacial drift was also exposed, consisting of three distinct sequences, the lower one rich in reworked Mercia Mudstone material. Graham sent some photos of the site and I have included two of these above.

Ex-chairman Joanne Norris, having my ear as you might say, complained that I misrepresented her in my last editorial. She tells me that she did not resign at the last AGM, but declined to stand for re-election. A subtle distinction, but clearly worth pointing out. I might get some peace now!

Andrew Swift

Cover photo, Oxford University Museum of Natural History

Winter Programme 2014/15

All talks are held at 7.30pm in Lecture Theatre 3, Ken Edwards Building, on the main University of Leicester campus, except where stated. Refreshments served from 7.00pm.
Details: Chairman Mark Evans, mark.evans@leicester.gov.uk, 0116 2254904

Wednesday October 15th
Professor Chris Stringer (Dept of Earth Sciences, Natural History Museum, London). **The origin of our species**

Monday October 29th
Professor Gideon Henderson (Dept of Earth Sciences, Oxford University). **Caving in to past climates**

Wednesday November 12th
Dr Roger Suthren (University of Derby). **Geology and wine in southern France**

Wednesday November 26th
Professor Patrick Boylan (City University, London). **The geological significance of Darwin's four weeks in the High Andes in March – April 1835**

Wednesday December 10th
Christmas Meeting, New Walk Museum

2015

Monday January 12th
Parent Body Lecture
Dr Phil Wilby (British Geological Survey). **Theme: Precambrian fossils of Leicestershire and exceptional fossil preservation**

Wednesday January 14th
Dr Tom Harvey (Department of Geology, University of Leicester), **Theme: early Phanerozoic fossils and the radiation of major groups**

Wednesday January 28th
Professor Sarah Davies, Dept of Geology, Leicester University). **Shining a light into the dark corners of the sedimentary record**

Wednesday February 11th
Member's Evening, New Walk Museum

Wednesday February 25th
Dr Richard Butler (University of Birmingham**). Dawn of the giants: how dinosaurs rose to dominate the Triassic world**

Saturday March 7th
Annual Saturday Seminar
Seven steps to becoming human.

Wednesday March 11th
Professor Rory Mortimore (University of Brighton). **Stonehenge - recent unique discoveries in the Chalk**

Wednesday March 25th
AGM & Chairman's Address. Dr Mark Evans (New Walk Museum). **The Mesozoic marine reptile renaissance**

Winter Programme abstracts

Wednesday October 15th

The origin of our species

Professor Chris Stringer, Natural History Museum, London

Human Evolution can be divided into two main phases. A pre-human phase in Africa prior to 2 million years ago, where walking upright had evolved but many other characteristics were still essentially ape-like. And a human phase, with an increase in both brain size and behavioural complexity, and an expansion from Africa. Evidence points strongly to Africa as the major centre for the genetic, physical and behavioural origins of both ancient and modern humans, but new discoveries are prompting a rethink of some aspects of our evolutionary origins, including the likelihood of interbreeding between archaic humans (for example the Neanderthals) and modern humans.

Wednesday November 26th

The geological significance of Darwin's four weeks in the High Andes in March - April 1835

Professor Patrick Boylan, City University London, President of the Yorkshire Geological Society

Though now known mainly for his pioneering work on evolution, Charles Darwin was primarily a geologist in the earlier years of his scientific career. Among other things after Cambridge he assisted Adam Sedgwick in his work unravelling the complex Lower Palaeozoics of North Wales, and on his return from the almost five years of the second round the world voyage of the naval survey ship HMS Beagle he was from 1837 to 1841 Secretary of the Geological Society of London.

Following a long period of severe seasickness round the coast of South America Darwin went ashore in the Chilean port of Valparaiso for just one month in March - April 1835 while the Beagle carried out some detailed surveying of the coastline. He quickly engaged a local guide and 10 mules in Santiago, and set off to cross the high Andes and back in the deteriorating weather of the southern hemisphere's Autumn. He crossed first via the 7,000 ft. high Portillo Pass to the city of Mendoza in Argentina, and then back to Valparaiso through the 13,000 ft. high

Uspallata Pass through the foothills of Aconcagua, the highest mountain in the world outside the Himalayas, where Darwin wrote in his *Journal* the geology was of: 'every shade of colour.... It was the first itme I ever saw which really resembled those pretty sections which geologists make of the inside of the earth'.

Armed with copies of Darwin's journals and notebooks, and in the equivalent season of the year, Patrick and Pam Boylan flew to Mendoza and then set out to track down on the ground the footsteps of "Carlos Darwin", as he is celebrated there. This took them through some of the world's most spectacular geology and scenery - though with the aid of a Renault Clio with a high altitude engine management computer adjustment, rather than Darwin's mule train!

Field Excursion Reports

Glebe Fluorspar Mine and Longstone Edge, Derbyshire, Tuesday 18th March 2014

The location of British Fluorspar Ltd at Cavendish Mill, Stoney Middleton, put one in mind of the large limestone quarries there, which hold the reference section for the reef facies of the Eyam Limestone Formation. However, no fluorspar is there! The Mill is where the fluorspar is processed, and is approximately equidistant between the fault at Longstone Edge, which is quarried, and the Eyam fault, which is mined at the Glebe Mine.

At Cavendish Mill we were met on a rather cold, and what became a rather wetting day, by John McGough, the very friendly Quarry Manager. When all ten of us had gathered, John took us into the admin block, and introduced us to his assistant, James, the geologist, and to Rob, the Mine Manager, who would be our driver into the mine. We were treated to a review of the operation over the years, to the interesting personal histories of our hosts, and to an account of the providence of the flourspar. Fluorspar is the commercial term for fluorite, CaF2, which is the starting mineral used in the chemical industry for the manufacture of hydrofluoric acid. The brines of the Zechstein Sea percolated westwards through the folded and faulted Carboniferous limestone, and deposited gangue minerals in veins which run westward from the eastern edge of the limestone. The mineralogy grades from fluorite in the east, through barite with fluorite, to calcite in the west.

The Section group were split into halves: one went into the mine, the other, taken in Company Rovers, driven by John and James, to Longstone Edge, where they were treated to hail showers! The fault at the Edge is around 100 metres wide and filled with fluorspar. It has been quarried for over 60 years. The parties then changed venue, with the second group into the mine experiencing the shock waves from the blasting at the face. That was an experience! The downside for that group was that the fumes resulting precluded approaching the working face; however recompense was in specimens collected from side drives. Photographs of the day were included in the Charnia published in May.

The mine manager suggested that we should visit again around about April next year.... Watch the web page.

Rob Tripp

Ketton Cement Production Plant and Quarry Monday, 28th April 2014

The operators, Hanson, have restricted access to their facility, as have many quarry operators recently, in response to the safety elfin. Visitors are closely chaperoned, and access is often only possible during the normal working week, to reduce overtime hours. We were given to John Taylor, a retired employee, who volunteered his service to guide us through the Plant, and into the quarry. Weekend visits are consigned to history, and not expected to return next year. For our visit the Company hired a minibus to take us around the facility, and it was with great embarrassment that 5 of the Society boarded this vehicle that was to take the 13 that there should have been. Regrettably those who had bid for either the previous Thursday, or Friday, were denied. We began the visit touring the Production Plant.

The quarry provides both the Jurassic, Bajocian, Upper Lincolnshire Limestone Member, which is a high energy ooidal grainstone, and the overlying clays from the Rutland Formation and the Blisworth clay. The intervening Blisworth Limestone is unsuited to cement manufacture, and is stockpiled for occasional inclusion, for supplemental minerals, but also provided for our later fossicking - oysters such as *Praeexogyra*; bivalves e.g. *Pholadomy*a; and echinoids such as *Clypeus*, as well as many terebratulids.

The quarried product is dumped into the conveyor system, which feeds overland into the mill and homogeniser, and here begins the chemical

analysis. The Lincolnshire Limestone porosity is low, and the water content is low, therefore the preferred method is for dry kilning - the raw material is pre-heated by flue gas. The clay and mudstone provide the silica, alumina and iron oxides, but not always in the correct chemical balance. Supplements are often required, and these come from strange sources. The coals used as kiln fuel are sourced from many countries, and so too are blended in an homogeniser before delivery to the furnace. The supplemental constituents that may be required, come from the burning of alternative fuels, which reduce the total carbon dioxide emission, and waste to landfill. Such fuels used at Ketton are M&BM, meat and bone meal; Profuel, e.g. end-of-life tyres, which is otherwise landfill; Cemfuel, waste from the chemical industry; SRS, which is also otherwise landfill, and is packaging, and cardboard type; and Petcoke, from the petroleum industry. The ash from the furnace may also go into the kiln.

Ketton Quarry - John Taylor is 2nd from right **photo via Rob Tripp**

The kiln temperature is 1425-1450ºC, which is rather different to the 145ºC of the Gypsum kiln at Barrow. The powdered feed material is calcined, to partial fusion, and flows down the rotating kiln, over several hours, to be then fed into a ball mill, to be finely ground, and mixed with about 5% gypsum or anhydrite to produce Portland cement. The cement passes to the holding silos from where most of the product from Ketton

leaves the facility by rail. From the production area, we entered the control room, where the chemistry of cement was explained to us.

Our thanks go to Mr Colin Daly, the Plant Manager for permitting our visit, to Tracie Mitchell for organising it, and to John Taylor for being our guide on a most informative and enjoyable visit. Paul in the quarry control room was our photographer, without a hint of a shake - thank you.

Rob Tripp

Great Tew Quarry & Church, Oxfordshire, 10th May 2014

The excursion party (10 out of 14 anyway)

We certainly had some bad luck with weather during this summer, which was doubly unfortunate because most of the rest of summer (we'll pass over August) was good. Our visit to Great Tew was not quite blighted by it, as we got a break in the rain and high force winds while down in the bowels of the quarry, but it was not the best of days, especially as our leader (i.e. me) was suffering with the chest cold from hell. It was also extremely muddy in the quarry. However, despite all that, Great Tew is an excellent quarry for the geologist, because as well as lots of fossils (on a good day), it has an intriguing sequence, developed in the Marlstone Rock Bed (ironstone here) and overlying Whitby Formation (dark mudstones and shales). The ironstone is exploited here for building purposes, not so much for primary building i.e. houses, but more for walling and rough outdoor use. Interestingly, the Romans were busy iron smelting around

here and there is slag to be found in the quarry. The party of 14 had a fine time hunting for fossils, especially ammonites, several of which were quite large. Most came from a highly condensed layer at the top of the Marlstone.

Overview of Great Tew Quarry

After the rigours of the quarry the village pub promised compensation, but in the event was too overcrowded for real relaxation. We had much better luck in Great Tew church, which we had more or less to ourselves, and a super church it was, with much of geological, historical and architectural interest.

Andrew Swift

Volcanics in south Derbyshire, Saturday 7th June 2014

Mike Allen has a flair for organising field forays that provide for *ones' comfort* - no bushes required! The volcanics that we were to witness are late Dinantian, within-plate, tholeiitic, interbedded lavas, tuffs and agglomerates, with sills, that were extruded into a shallow carbonate platform, and account for about half of the Dinantian deposits.

We met at the Shothouse spring, where a hidden volcanic bed is believed to be the impervious stratum that prevents water percolating downwards. The same phenomenon was apparent in Grattondale, from above the Matlock Lava, as we later observed the spring in the pathway there.

The Derbyshire volcanics party, extremely wet, Miner's Standard, Winster

A short walk from Shothouse towards Grangemill enabled our group of 13 to view the hills of the volcanic vents to the east of the road. The location of the vents is deduced from the trend of thicknesses of the volcaniclastic material ejected. We drove to Grattondale, to walk up-dale seeking the Matlock lavas, and the evidence of the old mine adit, before returning to the Miners Standard for lunch, to dry out, and wait for the rain to pass. The ore house at the road junction was then a photographic subject.

In Grangemill, the quarry gave insight into the brecciation of vent agglomerate. This was also the clue to the location of the Hoptonwood vent, which was the last location visited before we repaired to the Miners Arms, also in Carsington, for excellent refreshment. Between these two

locations we had visited the quarry that worked the Ible sill for aggregate. The loading bins for this are near the roadside in the Via Gellia.

Rob Tripp

The Matlock Lava in Grattondale **photo Rob Tripp**

PS Rob barely mentions the rain in the morning, which was simply SHOCKING! Ed.

Charnwood Forest Saturday, 28th June 2014

Joint field trip in association with the Yorkshire Geological Society

Dr Mike Howe lead a superb outing, for 13 Members and seven YGS visitors, to study the Ediacaran, Late Neoproterozoic strata in the Charnwood area north of Leicester.

The group met in the car park of the Mount Saint Bernard Abbey, where Mike gave an introductory outline of the setting in which the Charnian rocks were deposited. Our experience was highlighted by the selection of specimens, that Mike had brought from the BGS store, of the rock types, and casts of the Ediacaran fossils found to date. (More are coming to light, but arrangements for casts to be taken are not yet in place. May I refer you to the Note in the May 2014 Charnia.) The locale of the Charnwood area at the time of deposition would have been an island arc (resembling Montserrat), under pressure from approaching continental masses. The Charnian rocks are volcaniclastic sediments, from two volcanic complexes, and two sets of diorite intrusions.

Our first location was the Abbey wall, where Mike indicated, and described, the rocks of the Whitwick Volcanic Group, following which we climbed the outcrop summit, noting the strata exposed.

We moved to the Warren Hills, contrasting the rocks exposed on each of the three hills, and then to the brecciated 'bomb rocks' to the side of the road into the National Nature Reserve of Charnwood Lodge. These rocks are part of the Charnwood Lodge Volcanic Formation: we then went on to view the Blackbrook Group rocks exposed in Morley quarry. Here the safety barriers preclude close scrutiny of the rhythms that have been logged in the quarry wall, but the Triassic wadi infill was noted.

The Charnwood party gathers for a briefing at Mount St Bernard's Abbey

The next location was Bradgate Country Park, and the Beacon Hill Formation, to start with, by St Johns Tower. The turbiditic siltstone dip and strike were observed; and then the Bradgate Formation to the east showed the slumped turbiditic rocks brought down by earthquakes during eruption phases. Further east, overlooking Cropston reservoir, we found, guided in by Mike Allen, amongst the bracken, the conglomerate of the deeper water Hanging Rocks Formation.

The final rock formation of the day was westwards to Lady Jane's House, where the South Charnwood Diorite, an intrusive, mottled, granophyric diorite makes its most northeasterly appearance. It was here that the YGS thanked Mike Howe for such an excellent field outing, and the members agreed. The final rock of the day was searched for, briefly, as Mike led us surely to a headstone in Newton Linford churchyard. The *Teichichnus* trace fossil on this stone proved the later Cambrian age of the Swithland Formation.

Rob Tripp

Oxford University Museum of Natural History, 12th July 2014

We'd visited this august and distinguished museum before, but when Professor Paul Smith, the Director of the Museum, let it be known that he would be pleased to take us around personally for another visit, we were always going to go for it. Thus it was on a lovely July day that 11 of us convened outside the Museum for our tour. We were entertained to tea/coffee and decent biscuits before setting off into the wonderful Gothic extravaganza that constitutes this famous establishment, opened in 1860. Being the Director, Paul was able to take us into many infrequently visited corners and dusty rooms, where we were amazed by the fabulous treasures stored therein. We also visited many other, much more active areas and saw wonderful works by William Smith, William Strickland and Charles Darwin, and many other giants of geology.

The OUMNH party

We also saw at close quarters many arcane but historically and systematically vital collections. This was time travel on an impressive scale, but it was also clear that the Museum is still at the forefront of geological research and still enjoys an enviable worldwide reputation.

Andrew Swift

There will be more field excursion photos in the next Charnia

Subscription reminder

Subscriptions are due at the beginning of October. Can all members please make sure that they pay these promptly. You will find a form in this Charnia, fill it in and return it to the secretary Fiona Barnaby (contacts on the Officers/Committee list). You can also pay Fiona at the forthcoming indoor meetings or if she's not there, another nominated officer. Please don't leave renewing your membership until next year, we may be obliged to cancel your membership.

Mystery photo!

Photo Helen Boynton

Can anyone identify this mystery photo and tell us where the coat of arms can be found? Answers in the next Charnia.

All photos in Charnia are by Andrew Swift unless otherwise stated

Officers and Committee 2014 - 2015

President: Dr Trevor Ford OBE, 21 Elizabeth Drive, Oadby.
LEICESTER LE2 4RD 0116 2715265

Life Vice-President: Dr Roy Clements, 5 Ringwood Close, Wigstom Magna,
LEICESTER LE18 2JL 0116 2888838
royandjanc@gmail.com

Chairman: Dr Mark Evans, Leicester Museum & Art Gallery, New Walk,
LEICESTER LE! 6TD 0116 2254904
mark.evans@leicester.gov.uk

Vice-Chairman: Dr Albert Benghiat, West View Farm, Alstonefield.
ASHBOURNE. Derbyshire DE6 2FS 01335 310230
albert@ajb12.plus.**com**

Secretary: Fiona Barnaby, Cuckoo Cottage, 22 Church Lane, Dingley.
MARKET HARBOROUGH. Leics LE16 8PG 01858 535404
fiona.barnaby@hotmail.co.uk

Treasurer: Roger Latham, 25 Potters Lane, EAST LEAKE. Loughborough.
Leics LE12 6NQ 01509 856562 roger.latham@lineone.net

Field Secretary: Robert Tripp, 6 Haymes Close, KIBWORTH HARCOURT.
Leics LE8 0SS 0116 2790094 rob.n@newford.u-net.com

'Charnia' Editor: Andrew Swift, 208 Milligan Road, Aylestone. LEICESTER
LE2 8FD 0116 2833127 swifta@digit-image.co.uk

Publicity Officer: Dr Albert Benghiat. Contact details above

Webmaster: David Hayward, 12 St Helen's Close, LEICESTER LE4 0GR
0116 2622350 david.hayward8@btopenworld.com

Student Representative: **Sam Taylor st277**@student.le.ac.uk

Committee: Dr Carys Bennett, Dennis Gamble, Gillian Graham, John Martin

Co-opted: Dr Joanne Norris