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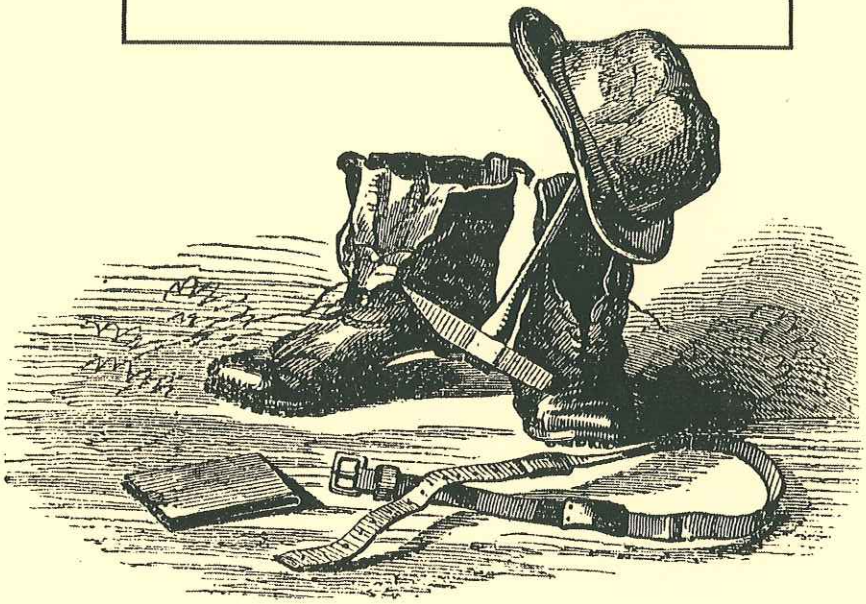


LEICESTER LITERARY & PHILOSOPHICAL SOCIETY : THE NEWSLETTER OF SECTION C (GEOLOGY)

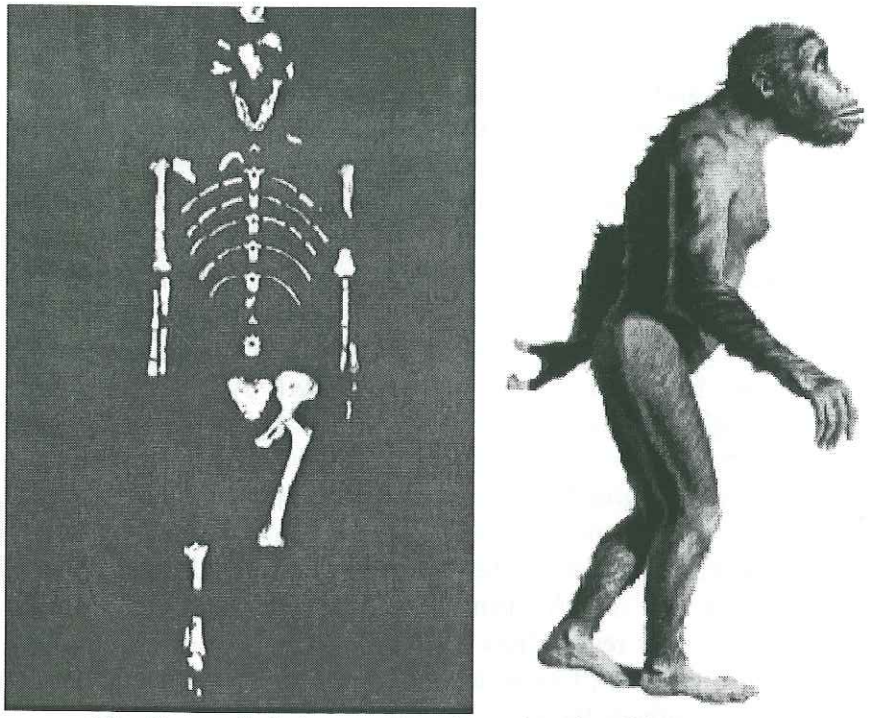
SUMMER 2003 EDITION

EDITORIAL

Saturday, March 1st., 2003 was quite a day - especially if you happened to attend Section C's annual Saturday School at Vaughan College (see the report on the day's proceedings later in this Charnia). The theme this year was 'Hominid Evolution and Climate', a popular topic evidenced by over-subscription. The sub-title for the day's discussions was 'The climatic constraints on the success or failure of hominid lineages' and one of the critical times for our evolution took place around 20 million years ago, during the formation of the Rift Valley. The initial doming and uplift brought about the fragmentation of the forest cover, the favoured environment of the Miocene apes. It may well have been this breaking up of tree cover which brought about 'get up and go' among apes, encouraging bipedalism. The first evidence for bipedalism so far discovered is in *Australopithecus anamensis*, though whether this creature was 'human' is debatable, since it had a very ape-like jaw. There is no proof of bipedalism in earlier models, for example, *Sahelanthropus* at 6.5 million years or *Orrorin tugenensis* at 6 to 7MY. *A. anamensis* 'walked' 4.1MY ago and *O. tugenensis* is now interpreted as Hominoid (i.e. ape) and not Hominid (human). It is not until we look at evidence provided by the Laetoli footprints that we have no doubt about bipedalism - these tracks were left 3.8 MY ago by *Australopithecus afarensis*. Interestingly, *A. afarensis* has a divergent big toe, which suggests that these proto-people were still adept tree-climbers. Associated with these footprints are the tracks of giraffes, from which it is presumed that there were probably islands of trees set in savannah grasslands, hence bipedalism. The earliest undoubted skeletal evidence for bipedalism so far discovered is that of 'Lucy', who is 3.1 MY old. A fortnight after the Saturday School it was announced in 'Nature', by researchers from the University of Padua, that a set of 325 000 year-old human footprints had been found in volcanic deposits at Roccamonfina, in Southern Italy.

Why did humans spread out of Africa? Were they driven, or was it just a result of passive adaptive radiation? Climatic change may well have been a forcing event. If you've ever looked at distribution maps of animal species recorded in the UK on ten kilometre grid-square maps, the thought that the density of certain species may have more to do with the distribution of the experts who recognise and record them than their actual density may have occurred to you. The same might apply to East Africa; preservation and the relative ease in exposing hominid remains in the Rift Valley might be giving a somewhat skewed picture... A spanner recently thrown into the works

which challenges the 'out of Africa' origin of *modern* humans is the discovery of the 60 000 year-old 'Mungo Man' in New South Wales; there now exists the possibility that *Homo sapiens sapiens* arose simultaneously in Africa, Asia and Australasia. The Section C Saturday School was another huge success and gratitude is owed to the Chairman and his team for organising the symposium. For readers wishing to find out more I recommend the website http://www.modernhumanorigins.com/ There is, of course, a wealth of information on Hominid evolution on the web, though beware, there is a lot of Creationist contamination and obfuscation out there!



The Lucy skeleton and an imaginative life reconstruction

Dating evidence and events in Earth Science is perhaps taken for granted these days. The story of the discovery of the means behind both relative and absolute dating is eloquently told in a book, titled 'Architects of Eternity' by Richard Corfield (Headline Press, 2001, ISBN 0 7472 7179 8). The author is a research associate in the Dept. of Earth Sciences at Oxford University. The book is written in an interesting way; for example, no chapter headings as such but points in time and place, such as page 34 'Rock rage in the age of Victoria. Trewern Brook, Shropshire, England. 52.44N, 03.05W. 12 January 1989.' This is the setting for the monumentally important work carried out by Gerty Elles and Ethel Wood on graptolite zonation. Corfield writes, 'I first came across Elles and Wood when I was prospecting for carbonate sediments with my colleague Derek Siveter on the banks of the Irfon River at Builth Wells, the self-proclaimed sheep capital of Wales…' The book is full of biographical details of geological 'names', including the sometimes pretty awful clashes of personalities and dirty competitive dealings. In the 'chapter' headed 'Como station, Wyoming Territory, 41.50N, 106.10W, 19 March, 1877' the fight for fossil bones between William Reed and Bill Carlin and another pair of dinosaur hunters - Othniel Charles Marsh and Edward Drinker Cope makes very interesting reading indeed. Real thinking persons' Wild West stuff! Without telling you too much, the author describes the fascinating events behind the K-T boundary story, isotopic dating and much, much more. This book is a riveting read for any geologist and should be included as an essential background reader for every undergraduate earth-science student.

I was pleasantly surprised when a second-year geology student recognised the provenance of the front-cover illustration and without giving away too much, it was taken from the end-paper of a book on historical geology. On the subject of historical geology we have a talk this coming winter dealing with the work of Sir Roderick Murchison (brief notes later on in this 'Charnia'). It is notable that a descendant of this great Victorian geologist is presently studying geology at Leicester University.

If you haven't already asked for a free subscription to 'Earth Heritage' and 'Earthwise' you need to contact David Evans on 01733 455207 (or e-mail: david.evans@english-nature.org.uk) and Tracey Heard on 0115 936 3100 (e-mail: earthwise@bgs.ac.uk) respectively. The former magazine deals with all aspects of geodiversity and geological/landscape conservation, while the latter reports on the work of the British Geological Survey. Two first-class sources of information for the lay geologist and professional alike. It is worth asking for backnumbers - all available free of charge. (Chairman's note: we get 25 copies of each issue of Earth Heritage, which are available at indoor meetings until they disappear)

Geology in the daily press sometimes raises a smile; the 'Independent ' of April 4th carried this title on one of its pages, 'Faultline under Los Angeles could cause huge earthquake'. Yesss… The article was actually about the Puente Hills Fault, which is a thrust fault discovered in 1999 and isn't quite as daft as the headline suggests. The last major earthquake in LA was a

Richter 6.7 event in 1994. This caused $40bn of damage and killed 57 people. Nearer home, our countryside is under threat from planning applications to extract coalbed methane. You might think this is a good idea until you consider that each licensed boring site could have as many as 200 well-heads, with as little as a hundred metres between each borehole. This will have a major landscape impact and possibly other effects too as the process involves pumping out groundwater from around the coal seams. Coalbed methane has the potential to meet 8% of the UK's gas demand up to the year 2020. However, this is a non-renewable resource which will contribute to global warming. Keep your eyes open for planning applications in coalfield areas.

The next items all concern water. First, the Mars Express space vehicle will begin its mission to carry out radar probing of the Martian crust for water. It will sense down to a depth of five kilometres. Secondly, Leeds University is microprobing crystal fluid inclusions formed during the Archaean. Analysis of quartz crystal inclusions formed in underwater lava flows four billion years ago may indicate what Earth's ancient oceans were like. Thirdly, scientists in Paris are examining dinosaur egg shells from two distinct palaeohabitats in Aix-en-Provence. Isotopic signatures indicate that one population of dinosaurs drank from floodplain rivers and streams while another drank water from forest streams. One of our forthcoming winter talks concerns this forensic method of analysing fossil material. Fourth and last item on water are explorations in African lakes. Lake Bosumtwi in Ghana was formed when a 2km-wide asteriod struck the surface. Water and sediments flow into this depression from tropical rainstorms, from which there is no outflow. Boreholes 1km deep should reveal the nature of the tropical heat-pump at the time when humans were evolving in Africa. A like project is scheduled for next year when sediments in Lake Malawi in East Africa will be similarly analysed.

In the best tradition of the evening news... 'And finally, a dinosaur cannibal...' A Cretaceous theropod dinosaur, *Majungatholus atopus*, normally predated Madagascan titanosaurs. When this food source was unavailable it apparently turned to cannibalism as a feeding strategy. The evidence? Toothmarks on a leg-bone of *M. atopus* exactly match the dentition of this species, so it either chewed its own leg off or, more likely, had cannibalistic tendencies.

GS

Programme of Summer Excursions

Saturday May 17th. The Sedgwick Museum, Cambridge. Meet at Museum at 10.30. Host: Mike Dorling

Friday June 20th - Sunday June 22nd. Weekend field trip to Suffolk to see Plio-Pleistocene sequences. Based at Bull Hotel, Woodbridge. Leaders: Peter Long and Roger Dixon. FULLY BOOKED.

Sunday July 13th. Geology in Nottingham. Triassic exposures in and around the city, including the Hemlock Stone. Meet at 1.30 in car park near Portland Building, Nottingham University. Leader: Keith Ambrose

Sunday August 17th. Bradley Fen Quarry, Whittlesea. Oxford Clay. Meet at 10.30 at entrance to access road to quarry. Leader: Alan Dawn.

Sunday September 14th. Tilton Cutting and Holwell quarries. Lower Jurassic. Leader: Roy Clements. Meet at the cutting at 10.30.

At your service – a committee meeting in the Geology Department

Programme of indoor meetings 2003/2004

All held at 7.30pm in Lecture Theatre 10 (LT10) in the Geology Department, Leicester University, except where stated
Details: Chairman Andrew Swift, 0116 2523646, as48@le.ac.uk

Wednesday October 8th
Dr Neville Hollingworth (NERC, Swindon) - 'Hunting mammoths in a Co-op creamery'

Wednesday October 22nd
Dr Mark Maslin (Department of Geography, University College, London) - 'Tectonics, ice ages and human evolution'

Wednesday November 5th
Professor Michael Collie (Barkestone, Nottingham) - 'Geology by canoe: Roderick Murchison's mapping of the Ural Mountains'

Wednesday November 19th
Dr Jane Francis (Department of Earth Sciences, University of Leeds) - 'From greenhouse to icehouse, from forests to frost. Using fossil plants to track climate change in Antarctica'

Wednesday December 3rd
Dr Jan Zalasiewitz (Department of Geology, University of Leicester) - 'Sliding into the deep freeze: the Plio-Pleistocene geology of East Anglia'

Wednesday December 17th
Christmas meeting, to be held at the **New Walk Museum, Leicester**

2004

Monday January 12th
Parent Body Lecture, to be held at **New Walk Museum, Leicester**. Dr Jane A Evans (NERC Isotope Geosciences Lab., British Geological Survey, Keyworth) - 'You are what you eat: isotope studies and migration'

Wednesday January 14th
Dr Graham Weedon (Department of Environment, Geography and Geology, University of Luton) - 'From climate change to time scales: examples from the Jurassic in England'

Wednesday January 28th
Dr Diana Sutherland (Mears Ashby, Northampton). Title TBA. Theme - The building stones of Northamptonshire

Wednesday February 11th
Members evening, to be held at the **New Walk Museum, Leicester**

A typical audience for a Section C lecture. Are you in it?

Wednesday February 25th
To be arranged.

Saturday February 28th (whole day). Provisional.
Saturday School, **Vaughan College, Leicester**. 9.30 am - 5.00 pm. Theme - The marine and flying reptiles of the Mesozoic

Wednesday March 10th
Professor Simon Conway-Morris (Department of Earth Sciences, University of Cambridge) - 'Meeting the extra-terrestrials: clues from evolution on Planet Earth'

Wednesday March 24th
AGM and Chairman's address - Andrew Swift (Department of Geology, Leicester University) - Title TBA

And after the lecture .....

AGM Report

Those of you who did not attend the AGM on March 26th and are not on the e-mail circulation list may be unaware of the decisions taken at that meeting, so I've taken this opportunity to bring you up to speed.

Subscriptions:
New rates as from March 26th – individual members, **£7**; joint/same address **£10**; student **£5**, Parent Body member **£5**
Please note that subscriptions are **now due**. Please send your monies to Acting Treasurer Doug Lazenbury, 39 Station Road, Countesthorpe. Leicester LE8 5TA

Chairman/Vice-Chairman:
Rule 6 was changed to allow a maximum term in office for the Chairman and Vice-Chairman of **4 years**, subject to annual re-election.
Also – the Student Representative can now serve for more than 1 year

Officers/Committee for 2003-2004:
Keith Smithson was elected to the post of Treasurer, but due to illness has been unable to take up his post. We all wish Keith a speedy recovery and restoration to full health, but in the meantime we are very fortunate that Doug Lazenbury has agreed to carry on as Acting Treasurer. We express our grateful thanks to Doug for stepping into the breach. All treasurer's business to him please.

LEICESTER LIT & PHIL SOCIETY SECT C GEOLOGY

STATEMENT OF ACCOUNTS 25TH MARCH 2003

Receipts		2002-03	2001-02	Expenditure	2002-03	2001-02
Cash in hand	113.82					
B.S. Balance	482.74	596.56	650.45	Photocopies		31.15
Subscriptions		532.70	513.00	Insurance	57.75	104.12
B.S> Interest		4.34	8.53	Geog. Ass.Membership	22.00	
Donation		10.00	70.00	Web Site	52.69	
Payment for Field Trip			40.00	Stationery	19.07	3.35
Sale of coffee		33.42	37.55	Postage	128.10	23.82
				Repayment for Field Trip		40.00
				Speakers' expenses	151.40	226.07
				Charnia Printing	93.19	194.46
				w/e Leaders' exp.		100.00
				B.S. Balance 630.19		
				Cash in hand 22.63	652.82	596.56
		1177.02	1319.53		1177.02	1319.53

Examined : M. Taylor 24.3.03

Chairman's Report for the Session 2002-2003

2002–2003 was another very successful year for the Section which, encouragingly, saw a steady increase in membership numbers, which now stand at 137. The officers and committee showed their commitment to the cause by regular attendance at committee meetings and by willingly undertaking duties which have kept the wheels turning smoothly. Both winter and summer programmes ran very successfully, and the standards we are

Molluscs in the Oxford Clay sea

David Baines 2003

setting must be the envy of many other groups. We are proving that you don't need a big bank balance or high subscriptions to manage an effective geological society. One of our greatest strengths is our friendliness and closeness, and that can take you a long way.

The summer programme saw us ranging the country as usual. In a departure from normal procedure, we began the season in mid-May with the weekend field trip, which was based in Lyme Regis for excursions to the Dorset Coast, led by myself. It was a marvellous weekend, and we saw more excellent geology in our other trips. The next one on June 23rd saw us re-visiting one of our favourite haunts at Blockley Quarry, led by Mike Howe and Pete Blake. The evening excursion of July 24th was rather unusual, and involved a geological ramble around Welford Road cemetery led by Helen Boynton, looking at the geology of the monumental masonry. This one attracted a large turnout and no-one was disappointed. On August 3rd we visited another of our old haunts, Southam (Long Itchington) Quarry near Rugby, a locality which never disappoints, and on this occasion the visit attracted a recent record one day attendance of 27. I again led that one. In early September we had a special treat, when Roger Mason, who first reported Charnian fossils from Charnwood as a schoolboy in 1957, returned to Leicester from China to lead (with Helen Boynton) a commemorative field trip to the scenes of his world famous finds of 45 years earlier. This one was run in conjunction with the British Association Festival of Science week based at the University; the Section was fully involved and received much favourable comment. And finally, our last visit of the season was to Warwick Museum and Edge Hill Quarry with Jon Radley from the Warwickshire Museum, on a beautiful late September day.

The winter programme ran without a hitch although we had to do a double shuffle to get a speaker for the Parent Body talk on February 24th, when we lost not one, but two, previously arranged speakers. In the end we were fortunate to get the services of Julian Andrews from the University of East Anglia, who gave us an excellent talk. Attendances at indoor meetings were very encouraging, and up yet again on previous years. The Saturday School made a very welcome return to the programme this year on March 1st at Vaughan College, and the topic of hominids and climate proved extremely popular, with applicants for tickets being turned away after we'd sold the permitted 80+ tickets. The Christmas meeting was enjoyed by all, but perhaps the most satisfying event of the winter programme was a very popular Member's Evening on February 12th, when we got our best attendance for many years.

Other important landmarks during the year were the long-anticipated launch of the Section C website, Charnia, in December. Great credit must go to Dennis McVey for his exhaustive efforts in putting together a very impressive site. The e-mail circulation list continued to grow in size and importance and has now assumed a major role in the dissemination of information and reminders to members. My usual plea here – please let me know if you go online and then I can add you to the list. These days our newsletter Charnia is almost unrecognisable from its earlier photocopied incarnation, and is a credit to the Section – keep those articles coming!

Finally, I cannot close without mentioning two special occasions for the Section which occurred in this session. First, a happy one, which was the 80th birthday on March 18th of Bob King, our Life President, who was so influential in laying the foundations of the successful Section we have today. We wish Bob many more birthdays. The other was rather sadder for the Section, and that was the retirement of Doug Lazenbury from the Treasurer's post he has occupied with distinction for over 10 years, a retirement which took effect at the AGM. Many thanks Doug!

Andrew Swift

Leicestershire's geology takes centre stage

In an important new initiative, several institutions and organisations have put their names to a plan to promote the geology of Leicestershire in the public forum. No more will information about the county's geology be hidden away and inaccessible in dusty cabinets and forgotten archives. The British Geological Survey, who are major movers in the project, have drawn up a press release which gives full details, and we're pleased to include it below.

Cash boost for nature lovers

Local geologists are reaching out to the next generation with the help of a £235,000 grant from the Aggregates Levy* Sustainability Fund through the Minerals Industry Research Organisation (MIRO). The British Geological Survey (BGS), together with Leicester City Museums, Leicestershire County Council Heritage Services, the National Forest Company, Leicester University and others, plans to create a website of geological information relating to Leicestershire and Rutland, education packs for children, improve access to collections and organise geological trails with interpretation boards

at key sites throughout the counties. A major part of the project is to provide viewing areas with seating at two of the county's geologically interesting quarries, Breedon Hill and Cloud Hill. It is also planned to make a video of these two quarries, describing the geology.

'This is very good news,' says BGS's Executive Director Dr David Falvey. 'The aggregate levy was introduced just a year ago and part of its purpose is to increase understanding of the true meaning of sustainable development. Using the money to help people understand more about this precious world we live in is a perfect use of the funds.' A company spokesman for Ennstone Breedon PLC said, 'We are very keen on this project and we feel it will be of great benefit in further integrating ourselves with the local community.'

The public face of Leicestershire geology – Bradgate Park

The East Midlands is home to the nation's own earth science advisors, the British Geological Survey who, with Leicestershire County Council Heritage Services, are committed to disseminating information in the community and promoting the public understanding of science. The National Forest aims to enhance public enjoyment of the Forest and its facilities, including its natural heritage assets. This project fulfills all of these objectives and will provide relevant information for anybody planning to do geological research in the counties of Leicestershire and Rutland.

The BGS Project Leader, Keith Ambrose, noted that the region has a complex and fascinating geological identity, including some of the oldest fossils to be found anywhere in the country, a landscape sculptured over millions of years and valuable resources of minerals and aggregates. Leicestershire is one of the major producers of aggregate in the UK, producing around 16.8 million tonnes of crushed rock and 1.2 million tonnes of sand and gravel in 2001 and is one of the major suppliers of crushed rock to south-east England.

*The Aggregates Levy is a tax on the commercial exploitation of aggregates (sand, gravel and rock) in the United Kingdom. It was introduced to address the environmental costs associated with quarrying that are not already covered by regulation, including noise, dust, visual intrusion, loss of amenity and damage to biodiversity.

Anyone who is responsible for commercially exploiting aggregate in the United Kingdom has to pay the levy, usually the operator, owner or occupier of the site. The levy came into effect on 1 April 2002.

Further information is available from Keith Ambrose (British Geological Survey) on 0115 9363203, Gill Weightman (Leicestershire Heritage Services) on 01509 891222 or Richard Kell (Ennstone-Breedon PLC) on 01332 862254

SIR RODERICK IMPEY MURCHISON (1792 - 1871)

Reference to the National Dictionary of Biography tells us that Murchison was a Scottish geologist who left the army in 1816 to devote himself to geology. We are told that he established the Silurian system in 1835 and with ADAM SEDGWICK defined the Devonian system. The Murchison Falls in Uganda and the Murchison River in Western Australia are named after him. The dictionary lists his principal publications, The Silurian System (1839) and The Geology of Russia in Europe and the Urals (1845) and that he was made Director General of the Geological Survey and Director of The Royal School of Mines. That's it in a nutshell, though I'm sure there are many interesting tales to relate about this man. I'll give a few tasters without stealing the thunder from a forthcoming Winter talk….

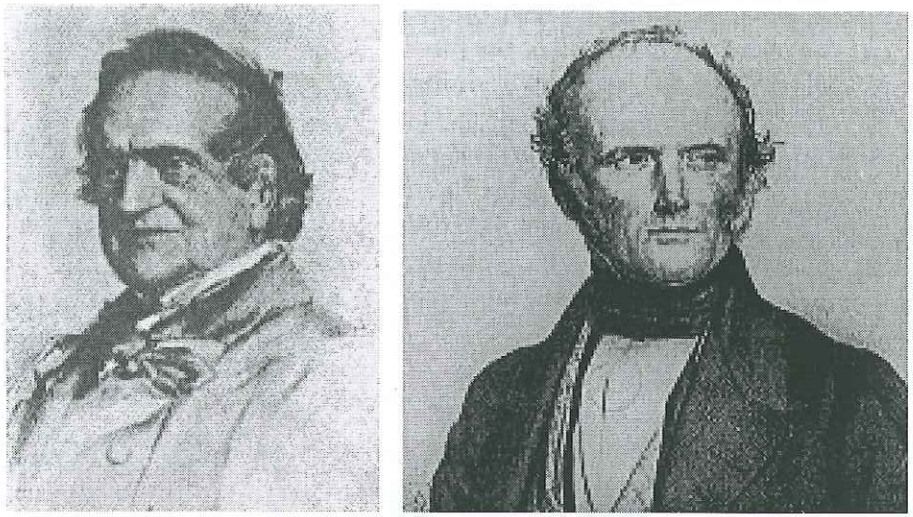
Murchison in 1836

Murchison was a wealthy man of independent means who became the stereotypical Victorian gentleman scientist. He had a reputation for aloofness and snobbery, though this perception fails in that he championed the working man's geologist, William Smith. Being a baronet he was well connected with aristocracy not just in Britain but on the continent too. He was invited by Czar Nicholas to carry out a geological survey of Russia, which Murchison undertook in 1840-45, defining the Permian.

Geologists in the mid-1830s were alarmed to think that most of the world would be classified as Silurian, which earned Murchison the nick-name of 'Count Siluria'. One wonders what triggered Murchison's passion for geology; after serving with Wellington in the Peninsular War he became obsessed with fox-hunting, which he largely gave up in 1821. At around this time Murchison met and was encouraged by Buckland. He also had informal tutoring from Adam Sedgwick, who seems to have infected Murchison with an anti-Darwin stance.

Murchison was among the first to recognise the importance of fossils in zoning. He allied himself with Charles Lyell in support of Uniformitarianism, opposing Buckland's concept of a Noachian Flood. A founder member of the Geological Society of London and publisher of more than 120 papers and books on geology, Murchison found it difficult to accept the idea of an Ice Age, even though he corresponded with Agassiz, albeit mainly about fish fossils. I recommend the following website if you wish to delve deeper; it has transcriptions of many letters to leading geological lights of the day and can be found at:-

http://www.nahste.ac.uk/isaar/GB_0237_NAHSTE_P0179.html



Adam Sedgwick and Charles Lyell

GS

Hominid evolution and climate

The climatic constraints on the success or failure of hominid lineages

On March 1st 2003 the latest in the long running series of collaborations between the Geology Section and the Department of Lifelong Learning took place at Vaughan College, in the shape of a Saturday School symposium which focused on the impact of climate and climate change on the evolution of human lineages. Surely there are few more fascinating and fundamental questions as those which we humans ask ourselves about our past - what factors influenced our evolution? How did our prehistoric ancestors and other

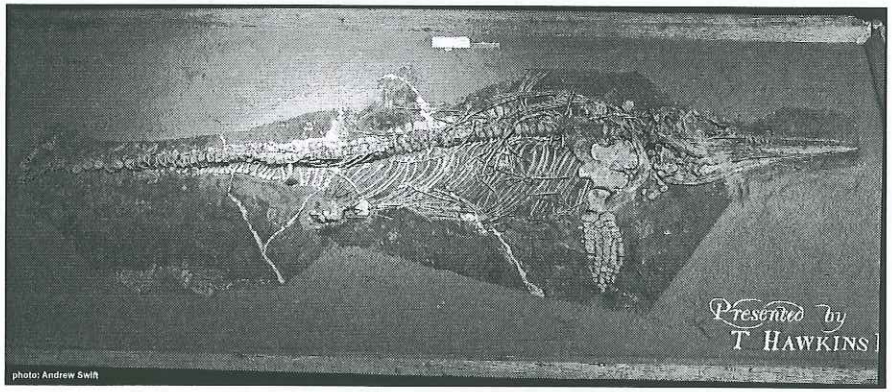
hominid species respond to the world in which they found themselves? What happened in the early stages of our evolution to make the human being what it is today? Perhaps we also ask such questions about our neanderthal cousins. Such mysteries seem to be at the core of our humanity and this meeting addressed many of these questions. Five of the leading experts in the field of hominid studies, Professor Chris Stringer, Professor Leslie Aiello, Professor Peter Andrews, Dr Mark Maslin and Dr Douglas Brandon-Jones, were assembled together in Leicester for the symposium, which I was privileged to convene and organise. The logistics at Vaughan College were capably undertaken by Diane May and her team. The meeting proved very popular and attracted a sell out audience of around 90, which was drawn not just from the members of the Section but also from academia, the people of Leicester and many experts and interested students from other parts of the country.

The five speakers and the Chairman during a break from proceedings, with the Jewry Wall as backdrop

The expert speakers, who were drawn from several UK institutions, did not disappoint the audience (despite a pathological fear of the lapel microphone!) and topics discussed ranged from the role of earth movements and mountain building in changing local climate to drive evolution, to the influence of glaciation on human migration, via the reasons for Neanderthal decline and extinction in Europe. Other speakers considered how we can use the composition of the other mammal remains found with hominid fossils to interpret the environment favoured by our distant relatives. The debate went on amongst the delegates during breaks for refreshments and lunch, and the discussion which concluded the day could probably have gone on for much longer.

Andrew Swift

The revamped, yet still traditional, gallery at the Sedgwick Museum



And a famous exhibit

The original gallery, soon to be revamped, at the Sedgwick Museum

Some of the party that visited the Sedgwick Museum on May 17th 2003

Leicester Literary and Philosophical Society
Geology Section (C)
Officers and Committee 2003-2004

Life President: Bob King,
The Oak,
Longdon.
TEWKESBURY
Glos GL20 5SE

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

Chairman: Andrew Swift,
208 Milligan Road,
Aylestone.
LEICESTER LE2 8FD
0116 2523646 or 0116 2833127
e-mail: as48@le.ac.uk

Vice-Chairman: Mark Evans,
Leicester Museum & Art Gallery,
New Walk,
LEICESTER LE1 6TD
0116 2254904
e-mail: evanm003@leicester.gov.uk

Secretary: Joanne E. Norris,
208 Milligan Road,
Aylestone.
LEICESTER LE2 8FD
0116 2833127 (after 6pm)
e-mail: joanne.norris@ntu.ac.uk

Acting Treasurer: Doug Lazenbury,
39 Station Road,
Countesthorpe.
LEICESTER LE8 5TA
0116 2776407

Field Secretary: Dennis Gamble,
43 Somerset Avenue,
LEICESTER
LE4 0JY
0794 7725361

'Charnia' Editor: Graham Stocks,
63 Barrow Road,
QUORN
Leics LE12 8DH
01509 415186
e-mail: graham.stocks@lineone.net

Publicity Officer: Paul Monk,
2 Rennes Close,
ASHBY-DE-LA-ZOUCH
Leics LE65 2YD
01530 411563
e-mail: paul.monk@virgin.net

Student Representative: Kay Hawkins,
Department of Geology,
University of Leicester,
University Road,
LEICESTER LE1 7RH
e-mail: kh62@le.ac.uk

Committee: Mark Purnell (0116 2523645, e-mail: map2@le.ac.uk), Andy Saunders (0116 2523923, e-mail: ads@le.ac.uk), Roy Clements (0116 2523800, e-mail: rgc@le.ac.uk) (all Department of Geology, University of Leicester, University Road, LEICESTER LE1 7RH), and Doug Lazenbury (address above).

Co-opted: Margaret East,
36 Brambling Way,
Oadby
LEICESTER LE2 5PA
0116 2716252

Dennis McVey,
130 Carisbrooke Road,
Knighton
LEICESTER
LE2 3PE