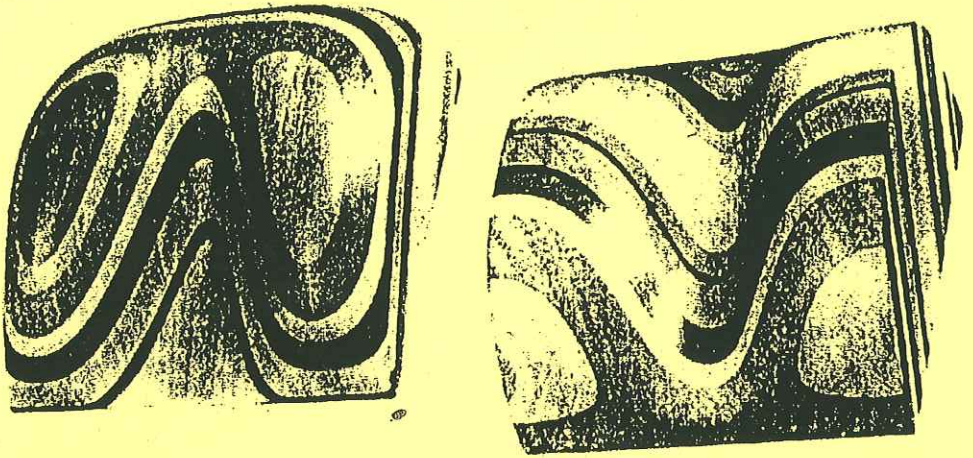


# CHARNIA



LEICESTER  
LITERARY AND PHILOSOPHICAL  
SOCIETY

*THE NEWSLETTER OF  
SECTION C (GEOLOGY)*

**AUTUMN 2001 EDITION**

## Editorial

My father told me that I would be busier post-retirement than I would be when in full-time employment. He was right, though at least I have the choice of doing things to suit my immediate family and myself. After giving a lot to the needs of inner-city schoolchildren for nearly three decades this is a welcome change. One of the benefits is that I can now read the literature of my choosing and not the drab and uninspiring bumf emanating from what was the Department of Education & Science (latterly known as DfEE and now the DfES).

One good read for me at the beginning of the year was Roger Osborne's 'The Floating Egg' (Jonathan Cape, ISBN 0-224-05028-1). The text is a most interesting and motley collection of material relating to the geology of the Yorkshire coast and of the alum industry in particular. Naturally, there is much on the subject of palaeontology. Why did ships bring urine from Sunderland and Newcastle to the Whitby area? Did you know that Louis Hunton, a native of Lofthouse, laid down the principles of biostratigraphy? What did Buckland find in the Kirkdale Cavern that so revolutionised the study of earth science? Naturally, I'm not going to tell you! The reason for reviewing this and the following titles is that, like it or not, we're on the run-up to Christmas and you might appreciate some ideas for gifts, given or received.

In recent years several authors have produced what might be termed 'popular geology/science' titles. Naturally, most (if not all) of these books are biographical, which gives an added dimension to the text-book geology we may have acquired. One example is Pat Shipman's 'Taking Wing', published four years ago (Weidenfield & Nicolson, ISBN 0-297-84156-4). As you might suspect from the title, the book centres on the Bavarian *Archaeopteryx* discoveries and then digresses into the evolution of flight in other animal forms. The book begins, 'There are seven specimens, and a feather ....' Pat Shipman has also published 'Life History of a fossil' and (with Erik Trinkhaus) 'The Neanderthals'.

Messrs Jones, Gould and Dawkins have been mentioned before in past issues of *Charnia* and are the leading lights of popular evolutionary science publishing. It is therefore refreshing to read authors such as Shipman and Osborne. Another book reviewed in a previous *Charnia* is Fortey's 'Trilobite', which is extremely well-written. Another of Richard Fortey's superb titles is 'Life - an unauthorised biography'; both titles are unputdownable. Some popular palaeo books can be a little heavyweight and text-bookish. An example is Simon Conway-Morris' 'The Crucible of Creation'. This is an interpretation of the Burgess Shale fauna and the assumed beginnings of chordates and hence, mammals. 'The Dinosaur

Hunters' is another excellent read, subtitled 'A True Story of Scientific Rivalry and the Discovery of the Prehistoric World' (Deborah Cadbury, published by Fourth Estate, ISBN 1-85702-959-3). Here we learn of the goings-on between Mantell, Buckland and Owen - with, of course, Cuvier and Darwin plus other notables thrown in for good measure.

I'm now going to return to Pat Shipman and Roger Osborne. Both have published titles concerning the discoveries of fossil hominids in the Far East and the personalities behind the discoveries. Osborne's book, 'The Deprat Affair - Ambition, Revenge and Deceit in French Indo-China' (Jonathan Cape, ISBN 0-224-05295-0), is intriguing. Jaques Deprat had a promising career until he was accused of supplementing far-eastern fossil material with European finds. The jury is still out and the reader is left to make up their own mind on the balance of probabilities presented in this excellent (almost forensic) investigation. Deprat's career took-off in the early 1900s with his excellent research into Mediterranean Permo-Carboniferous fusulinids, though what followed is a secret Deprat took to his grave. In 1920 Deprat simply disappeared from the world of geology and was not heard from again .... Pat Shipman's book, 'The Man Who Found the Missing Link - the extraordinary life of Eugene Dubois' (Weidenfield & Nicolson, ISBN 0-297-84290-0) explores the hunt for 'the missing link' in 1890s Java. This book focuses mainly of Dubois' life and is therefore a biography in the main. He threw away a promising career but this was more than compensated for by his later discovery of *Pithecanthropus erectus* (= *Homo erectus*).

Coincidentally, another title concerning the above, 'Java Man' (Curtis, Swisher and Lewin, published by Little, Brown & Company, ISBN 0-316-64860-4) focuses on radiochemical dating (Garniss Curtis was a student of Jack Evernden, who pioneered the application of radiochemical dating to anthropology in the 1950s). This focus, however, is not to the exclusion of headhunters, DNA, the Leakey's work in East Africa and the whole field of contemporary anthropology.

There is another book I would like to mention, though after Christmas might be more appropriate (if you have a book token and don't know what to do with it). This is the story of William Smith, the 'father of English Geology' and the title of the book is 'The Map That Changed the World - the Tale of William Smith and the Birth of a Science' (Simon Winchester, published by Viking, ISBN 0-670-88407-3) Some readers of *Charnia* may have heard BBC Radio 4's serialisation of extracts from this book earlier this Summer. Elsewhere in this issue of *Charnia* is an account of another individual associated with not just geological map-making but the production of geological models, only a few years after William Smith's groundbreaking efforts.

Changing tack dramatically now, I report on the announcement of a planning application to prospect for oil just to the west of Quorn. This is interesting both economically and geologically. The former refers to the fact that the Energy Minister, Brian Wilson, has just announced that undeveloped blocks and their licences to explore and exploit hydrocarbon resources in the UK are a luxury we cannot afford. Not unnaturally, local people are incensed that the prospect of a drilling rig and all that is associated with this could invade the margins of Charnwood Forest - an areas designated in the Borough Plan as an 'APAC' - an 'area of particularly attractive countryside'. The root of the problem is that we all like to drive to the supermarket, use plastics, medicines, anaesthetics, dyestuffs, paints fuels, solvents, detergents, etc., just as long as they are not won, refined or processed in our immediate backyards. Remove reliance fossil hydrocarbons and society would have to cope largely as it did in pre-Industrial Revolution times. Add to this the popular perception of what getting oil means (Torrey Canyon, Amoco Cadiz, Exxon Valdez, pipeline breakages in national parks, human rights abuses in on-shore oilfields, the Iraqi destruction of the Kuwait oilfield, etc.) which surely must make onshore oil and gas exploration an extremely delicate planning matter. We all tend to have that famous scene from the 1956 Warner Brothers film 'Giant', with Liz Taylor and James Dean dancing around in light crude as it gushed out of the ground. Present day onshore oil and gas production couldn't be further from this. There are 'nodding donkeys' painted drab green and driven by electric motors to the east of Loughborough quietly operating behind hedges, unnoticed by the majority of people passing by. It could be argued that a nodding donkey producing fifty barrels a week causes less environmental impact than the daily visits of the milk lorry to nearby farms.

Geologically, the application site at Quorn (though it actually lies in the Parish of Woodhouse) is quite interesting. It seems that the presence of reserves has been detected by Russian space satellite technology. Every physical object radiates sub-atomic particles belonging to the lepton family and the lepton signature is what has been detected at Quorn. It is known that hydrocarbons are present in Namurian Sandstones. The depth of the sandstones is known too, though the actual quantities of hydrocarbons is not known, hence the application for exploratory drilling. It would seem that there is a mini-Widmerpool Gulf, with the sandstones at an angle against the Palaeozoics of Charnwood, trapped by the overlying Merciless Mudstones.

Perhaps we'll be hearing more about the leptons in the near future - it must have the seismic people a bit worried .....

## Castle Cement Quarry, Ketton July 8th 2001

Another year, another trip to Ketton, and why not? Nowhere else in the East Midlands is there quite such an array of splendid geology on show. Whether your taste is for sedimentology, fossils, structure or stratigraphy, Ketton offers it all - bar a bit of volcanic or metamorphic stuff for those so minded. However, our visit this year was not originally programmed as such. In fact, it wasn't initially a Section C trip at all. The story is that I was approached by the Head of the Geology Department, Section member Dick Aldridge, who in turn had been approached by the Geologists' Association - with me so far? The idea was to set up a weekend excursion for them, based in our area. Dick asked me to become involved and, as these things often turn out, I found myself as local secretary. Thus it was that we arranged a field trip to Charnwood on Saturday July 7th for the heavy metallers, sorry, hard rockers, and a visit for more refined people to Ketton on Sunday 8th. Unfortunately, the foot and mouth epidemic hit Bradgate Park, and bang went the Saturday trip. However, by the time that happened, I had received almost no interest from GA members, so it was probably best that the weekend excursion shrank to a day trip. In the back of my mind I knew of course that the members of Section C, a discerning lot, would have no problem in forming a party to go to Ketton, and so it proved, with around 24 participants in the end. A token two came along from the GA - thanks Rosemary and Charlie.

And a splendid day was had by all. The big change from last year was that the small sump in the bottom of the quarry had now grown into a substantial excavation, revealing in all its glory the basal portion of the Lincolnshire Limestone ('Collyweston Slate'), the Grantham Formation (née Lower Estuarine Series) and the Northampton Ironstone. The Basal LL was especially interesting, with a number of rare fossil finds like colour banded snails, drifted wood and belemnites. Roy Clements was in his element here, and while on this subject, thanks Roy for help with explanations. Also, thanks to Peter Delstrother from Castle Cement, who gave some useful remarks, particularly about the ironstone. For myself, I had a good look at the oft-mooted Oxford Clay in the highest visible levels, and I think this year just about convinced myself that it really was basal Oxford Clay. Probably the nodules were the deciding factor.

Next year of course we won't be visiting Ketton - or will we?

## 90 years ago

90 years ago, Section C had 17 members, plus 44 sectional associates and two honorary members. It is interesting to note that the Chairman, Dr. F. W. Bennett, wrote in his annual report that 'The financial position of the section is fairly satisfactory, a very small balance remaining in hand, but it would be a very great relief to the Secretary if all members paid their subscriptions more promptly'.

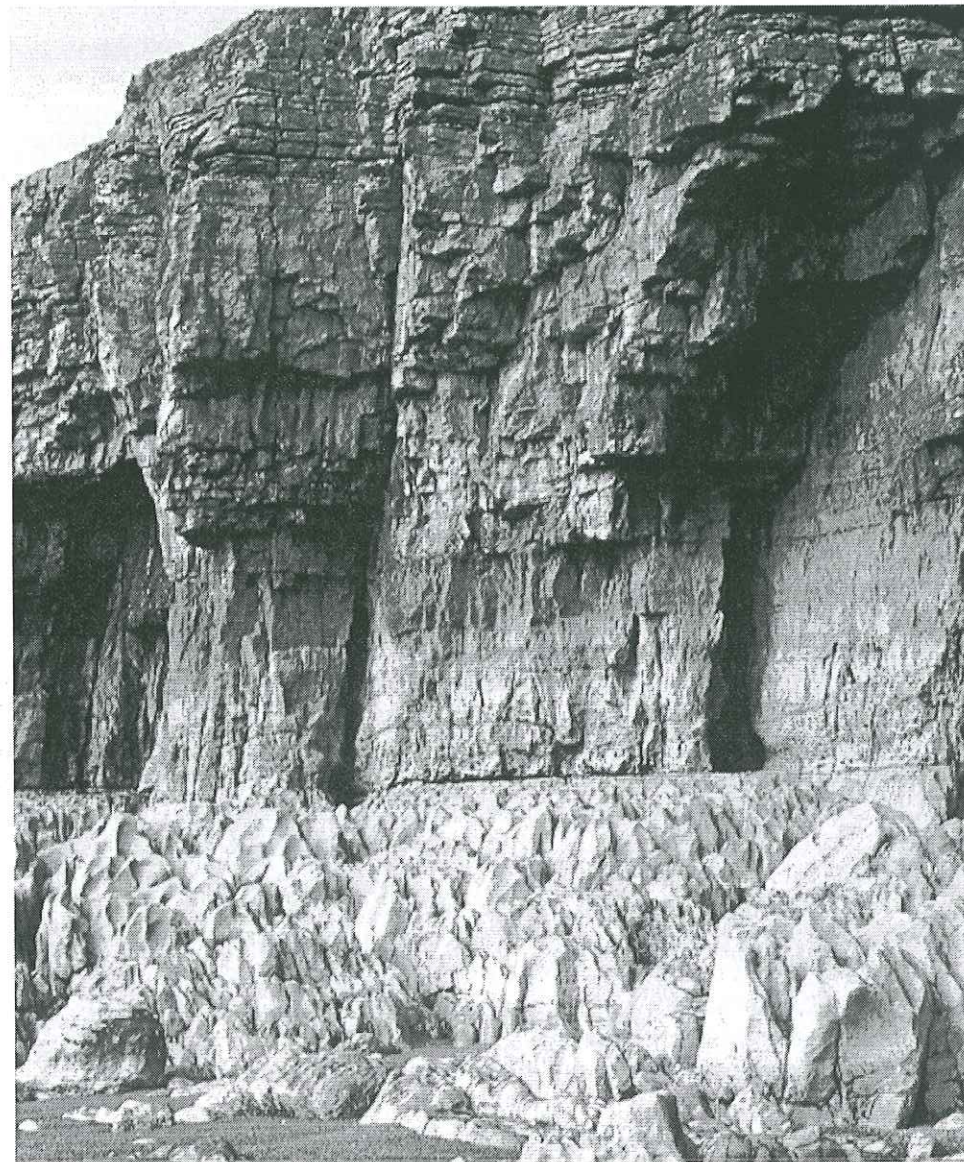
Field excursions in the previous Summer season were to: Charnwood Forest - led by Dr. Stracey; the Permian, Bunter, Waterstones and Keuper at Nottingham - led by Dr. Swinnerton; the Carboniferous Limestone of Crich Hill and Ambergate, plus Millstone Grit and Lower Coal Measures - led by Mr. H. E. Sargent; Mountsorrel, Buddon and Brazil Wood - led by Mr. E. E. Lowe, and an end-of-season excursion to the Stamford District - led by Mr. F. Gater. The Chairman noted that, 'with the exception of the first two, the summer excursions were rather poorly attended'.

The winter programme of talks for 1911-12, as written, was as follows:

- Oct. 20th, 1911 Exhibition of Rocks, Fossils, etc. A pleasant and instructive evening.
- Nov. 17th, 1911 Lecture on "The Principles of Petroleum Geology", by Mr. T. O. Bosworth, B.A., B.Sc. A very fine paper by an expert on the Trinidad oil fields.
- Dec. 15th, 1911 Lecture on "Dynamical Geology", by the Secretary.
- Jan. 19th, 1912 Lecture on the Rhaetics, by Mr. A. J. S. Cannon, which it is hoped will be amplified with additional research and printed in the Transactions next year.
- Feb. 16th, 1912 Lecture, "Palmistry of the Rocks", by Dr. H. H. Swinnerton. A very highly interesting lecture on the footprints of extinct animals.
- March 15th, 1912 The Annual Meeting.  
Lecture on "The North-West District of the Charnwood Forest", by Dr. Stracey, F.G.S, embodying the author's work in this District, and preliminary to future excursions.  
Lecture by Mr. E. E. Lowe, B.Sc., F.L.S., on the Mountsorrel area, expressing his ideas on the evidence for the igneous rocks of this District, being a case of "differentiation in place", and upon the probable existence of a fault along the north-west boundary of the area.

This information was taken from the 'Transactions of the Leicester Literary & Philosophical Society', Volume XVI, 1912, published by W. Thornley & Son, Bowling Green Street, Leicester, price two shillings and sixpence. The copy was 'withdrawn from stock' by the County Library Service for which I paid £1. I hope that treasures like this are not being disposed of and that this was a duplicate copy .....

G.S.



The magnificent unconformity between the Carboniferous and Lower Jurassic near Ogmores-on-sea, South Wales

## Another successful Saturday School at Vaughan College

For well over 20 years the partnership between Section C and the Department of Adult Education at the University has worked to good effect to produce a series of excellent geologically-themed Saturday Schools. Each year a 'cutting edge' topic is decided upon by Section C, and we appoint a senior figure from the geological world to oversee the provision of speakers and drawing-up of a programme. The staff of Vaughan College, marshalled by Diane May, provide the venue, look after bookings and the logistics of the day. This year's meeting, held on March 3rd, was probably one of the best ever, due in large part to the pivotal role played by this year's convenor, Professor Andy Saunders from the University's Geology Department. The theme of the meeting, catastrophic natural events, was extremely topical, and Professor Saunders brought together many of the leading figures in this field. The title of 'Dangerous Earth: warning - Planet Earth can seriously damage your health' was most apposite and the full house of 80-odd participants enjoyed a compelling series of lectures.

After Chairman John Martin had opened proceedings and Professor Saunders set the scene, the main body of talks commenced with Dr Allan Mills from the University's Geology Department, who talked about 'Our bombarded Earth', an entertaining discourse upon the infrequent, but often catastrophic, meteorite impacts on our planet. Dr Mills explained that while the Earth's natural weathering processes usually obscure impact sites over time, there are still many to be seen, especially from the air. The evidence is very strong that the impact of a huge meteorite in the Gulf of Mexico played a major role in the demise of the dinosaurs and many other groups, 65,000,000 years ago. Dr Mills was followed by Dr Tony Waltham, a gifted and widely travelled speaker familiar to many East Midlands geology enthusiasts, who made the short journey from Trent University, Nottingham, to deliver a typically enthusiastic summary of certain enormous and destructive landslides caused by both natural and man-made agencies. Dr Simon Day of University College, London, fresh from television exploits, was featured next, explaining how naturally-generated volcano collapse in island situations can create, and has created in the past, gigantic waves (tsunamis) with enormous destructive power. Worryingly, Dr Day argued convincingly for a potentially disastrous major volcano collapse which could possibly occur in the short to medium term in the Canary Islands.

After lunch, another 'local' speaker, Dr Rosalind White from the University's Geology Department, took us back 250 million years to a time of great geological upheaval at the Permian-Triassic boundary

interval, which many geologists believe was the time of the greatest mass extinction of all, exceeding that at the Cretaceous-Tertiary boundary. Dr White examined all the theories which might explain this catastrophe, both well-known and obscure, but wisely gave none of them precedence and indicated that many complex interactions occurred in concert to create the catastrophe. The day concluded with talks from two of the leading figures in the study of catastrophic geological events, Professor Steve Self from The Open University and Professor Bill Maguire of University College, London. Professor Self gave an erudite summary of the highly destructive effects of the eruption of vast sheets of basaltic magma ('flood basalts'), volcanic phenomena which are relatively rare but have occurred periodically throughout earth history. Such enormous eruptions of highly volatile magma are capable of releasing staggering amounts of sulphur dioxide into the atmosphere, sufficient to have profound effects on climate and the viability of life. Finally, Professor Maguire, a familiar figure on television whenever natural disasters occur, took us into the world of 'super-volcanoes', which, like the eruption of flood basalt, are rare, but phenomenally destructive and capable of producing lethal atmospheric poisoning. One of the most fascinating of the many aspects introduced to the audience by Professor Maguire was the proposition that a major super-volcano 74000 years ago nearly eliminated the human race and led to a shrinking of the gene pool which is reflected in the relative lack of genetic diversity in human populations today.

Lively discussion took place at appropriate moments throughout the day, and doubtless could have been continued for some time after the last talk, but Professor Saunders was obliged to bring the meeting to a close, and it was left to John Martin to express thanks to all involved in making the day such a success.

Andrew Swift



A quiet day at Mt St Helens, Washington (photo courtesy of the USGS)

Abstract of Parent Body talk scheduled for Monday December 3rd 2001

### **Extinctions ancient and modern**

**Professor Michael D. Benton**  
**Department of Geology, University of Bristol**

Palaeontologists and geologists have established a great deal about extinctions in the past. Events range in magnitude from the 'big five' mass extinctions to much smaller events, such as the loss of large mammals from northern continents following the retreat of the ice. Attempts to find a common cause, or single model that links all extinctions or all mass extinctions, have failed; each event seems to have been unique. Present rates of extinction match those of any of the events of the past, but there are some differences. I will concentrate on the end-Permian and the KT events, and what the latest research is showing.

Abstract of talk scheduled for January 16th 2002

### **Walking on eggshells - evidence for reptiles breeding during the deposition of the Purbeck strata of Dorset**

**Paul D. Ensom**  
**Palaeontology Department, Natural History Museum, London**

The Purbeck Limestone Group of the type area in Dorset lies at the Jurassic - Cretaceous boundary, and is composed of a varied series of clays, shales and limestones representing terrestrial to marginal marine environments. These follow on from the deposition of the fully marine Portland Limestone Group. These sediments have long been known for their rich flora and fauna, especially the vertebrates, which have received considerable attention since the 1850's. More recently the tetrapod fauna has been described as one of the richest mid-Mesozoic assemblages known.

Fieldwork on these strata since 1981 has yielded an increasing variety of vertebrate trace fossils and in 1986 a footprint site produced the tracks of quadrupedal dinosaurs. Subsequent sieving of the lake clays in which these animals walked has led to the discovery of a wide range of microvertebrate remains. Amongst the residues are fragments of reptile eggshell. These have been identified as belonging to at least 7 distinct types which I will describe. Continuing fieldwork has led to the discovery of further eggshell producing horizons at new localities.

What might the fauna (ichno- and body-fossil) of these strata tell us about the identity of the egg-layers? The recovery of very small reptile teeth in addition to fragments of globular calcified cartilage from the same horizon as the eggshell has led to speculation about their origin. Could these be from embryo or hatchling reptiles? What can eggshell tell us about the Purbeck Limestone Group and the conditions which existed when it was deposited?

Abstract of talk scheduled for January 30th 2002

### **Zeolites - or how an inorganic chemist discovered the Highlands and Islands**

**Professor Alan Dyer**  
**School of Sciences, University of Salford.**

Zeolites have a fascination to many mineral collectors because of their attractive crystal habits. Their modes of occurrence, with the ways in which they can be formed, will be discussed and related to their localities in Great Britain. The significance in the understanding of their formation in nature will be related to the current industrial importance of synthetic zeolites as bulk chemicals for detergent use, as well as their more specialised employment as molecular sieves, drying agents and catalysts. Finally the expanding use of natural zeolites in the nuclear industry, as agents for waste water treatment, and as animal food supplements, building materials and in horticulture will be reviewed.

### **Sad news**

We have had two sad events befall the Section since your last Charnia, and I know you will join with me in expressing our deep regrets at the sudden passing of Bob Bowers, a long time member of the Section from Skeffington. Bob didn't get to many meetings but, as in all these cases, we are always distressed to hear such tidings. I relayed our collective sympathy to his family.

The second unfortunate happening was the serious illness which befell our old friend Helma Tasker. I don't need to explain who Helma is to any of you regulars out there, she is one of our most prominent members who hardly missed a lecture for many years. She was also a regular on field trips until her health intervened. Her questions were always probing and sometimes couldn't be held back until the end of a lecture, but her genuine enthusiasm affected all who know her. Helma was taken ill in Somerset, and detained in Taunton hospital. From there she was moved to a nursing home in Minehead, and has subsequently moved permanently to that locality. I have written to her with good wishes and urged her to retain her membership, and will certainly visit her when I am working in my field area, which is very close to Minehead.



**May 19th 2001, BGS, the party on the steps of the Reception building**



**September 30th 2000, Natural History Museum, London**



**By gum! That were a big 'un. Possible sauropod footprint, near Whitby**



**These may be the claw marks of swimming dinosaurs, also near Whitby**

## Weekend Excursion to the Yorkshire Coast June 22nd - 24th 2001

Having travelled south for our weekend excursion for the past three years we headed north for the Yorkshire coast in 2001, and in particular to the area around Whitby and Scarborough. This was the excursion that nearly wasn't, as the original leader had to drop out because of other commitments. At that point we approached Dr. Mike Romano of Sheffield University and he kindly agreed to lead the trip with his co-worker Dr. Martin Whyte. Soon after confirming the leaders, the foot and mouth outbreak intervened and all arrangements were put on hold. When some of the restrictions were lifted in May the trip was reinstated, with the proviso that access to field areas should be made only from certain metalled localities.

The party met up on the evening of Friday 22nd at our base in Scarborough and were given a short illustrated talk on the geology of that part of the Yorkshire coast. The two leaders are long-time researchers working on the dinosaur footprints which occur commonly along the coastline, and they showed some very interesting slides. On Saturday we travelled to the cliff top car park at Whitby Abbey and walked down, through part of the town, to the shoreline and cliffs. At this point on the coast the Upper Lias forms the foreshore whilst the cliffs are Middle Jurassic in age. Many times as we traversed the shoreline the leaders were able to point out footprints, some of which were large and possibly made by sauropod dinosaurs. To the untrained eye, these depressions looked like pools that had weathered out of the rock naturally. Most people walking past them every day would not realise what they are. The Upper Lias on the foreshore produced some very nice examples of the bivalve *Nuculana ovum* and ammonites *Dactyloceras*, *Hildoceras* and *Peronoceras*. Two species of belemnite could also be collected from the innumerable specimens that lay exposed on the Lias Group surfaces.

On the Sunday we drove in convoy to Scalby Bay, just north of Scarborough. We had to descend a very steep path to reach the shore. Here the rocks are all Middle Jurassic in age and at a number of points along the shoreline many dinosaur footprints could be found. We also saw actual trackways, some long famous in the literature, one of which was made by a large theropod. At least six of its footprints could be discerned. When measured it was estimated that the animal was probably six feet tall at the hips. Some prints were found in the cliff and these vertical sections illustrated nicely how downward pressure from the animals had deformed the underlying horizons. We were also given a glimpse of some actuopalaeontology as the leaders explained what could be learnt from the tracks left by modern animals such as dogs (and humans). The key factor

appears to be the firmness and consistency of the substrate. Some of the cliff exposures in the north part of the bay contained a large amount of fossilised plant material and fine specimens of *Ginkgo* leaves were collected from here.

A very, shall we say, interesting, conclusion to our weekend came with a rather undignified scramble up a cliff 'where no foot had trod', in order to regain the cliff top path homeward to the cars. It would be wrong to say that the 'path' was vertical, but it certainly felt like it!

Dennis Gamble

### Safety and the Section

We can never put too much emphasis on safety, and it is often forgotten that we frequently find ourselves in some of the more hazardous spots in the country, especially quarries. If you've never been hit by a lump of falling rock, or fallen into a sump, then you think it will never happen. But it does, and people are seriously hurt or even killed. Touching every piece of wood to hand, I have to say we've not experienced anything serious in my time with the Section, but one day something will happen, do what we may. So this is an appeal to every one of you to take every precaution when we enter hazardous localities. Do wear a hard hat, do wear stout boots, do wear a fluorescent jacket. Don't enter private or restricted areas without permission, don't approach dangerous faces, don't climb cliffs and don't hammer when there are people below or near you. That's just a selection of do's and don't's, much of the rest is common sense. Remember that you are representing the Section wherever we go, if we lose the good will of landowners and quarry owners, we will rapidly have nowhere left open to us.

The Section has only third party insurance, fully comprehensive cover is completely beyond our resources. Young people under the age of 14 are not covered at all. Thus, if you are concerned about being insured, you must take out personal insurance cover for yourselves and your children.

Andrew Swift



## Thomas Sopwith

To any middle-aged 'anorak' this name will conjure up images of flimsy biplanes and the character who founded the Sopwith Aviation Company at Kingston-on-Thames just prior to the Great War. True, this Tommy Sopwith went on to become chairman of the Hawker Siddeley Group. So what has this to do with geology?

Have you noticed how, in some families, certain traits persist for several generations? I'm thinking of the Darwins and Huxleys in particular. How much is nature and how much is nurture? So it is with the particular family of Sopwiths under discussion here. Sir Thomas Sopwith's (i.e. of aircraft fame) father was also called Thomas (1838-98), as was his grandfather (1803-79). All had a talent in engineering and it was the latter who was famed for his contribution to the understanding of the infant science of geology. Thomas Sopwith senior's father, Jacob, was a cabinet-maker and craftsman builder in Newcastle-on-Tyne, and it was no doubt skills handed down to the young Thomas Snr which enabled him to build his own telescope and microscope. Young Thomas also developed an interest in local history, antiquities and cartography. Like his father, Thomas was also a talented architect-builder, aided by his talent for observation and accurate sketching.

The geological part begins with the meeting of Sopwith and William Smith during the surveying of the proposed Newcastle-Carlisle Railway in 1837. Thomas Sopwith had designed an improved levelling staff for the surveying of mines and cuttings. These mahogany staves were in widespread use for more than a hundred years, being referred to as 'Sopwiths'. Thomas also designed a combined desk and cabinet which required only a single key to access all compartments via a single central lock. These desks were known as 'monocleids' (Greek: kleisto = secret, closed, cloistered), the name being suggested by Sopwith's friend, the Reverend Dr. William Buckland. Another project undertaken by Sopwith was the production of wooden, three-dimensional geological models of strata. A picture of two of these models graces the front cover of this edition of *Charnia*.

Sopwith's greatest contribution to geology was made as a result of the work he was commissioned to undertake in the Forest Of Dean in 1833, namely to survey the mines. By 1835 the mapping was complete and Sopwith decided to construct a 3-D model of the Forest which could be dismantled and so reveal the coal seams and other strata. This was constructed in 1837. By this time, Sopwith was an established member of the Geological Society, his main sponsor having been the Dean of Westminster, Dr. Buckland, others including Sedgwick and Murchison. Coincidentally, it was in 1835 that the government began the Geological

Survey, under Henry de la Beche, with whom Sopwith was acquainted.

Sopwith's models were engraved for the Second Edition (1841) of Lyell's 'Elements of Geology'. Up until around ten years ago you could have seen Sopwith's Forest of Dean model at the Sedgwick Museum in Cambridge. However, it has been on long-term loan to the Dean Heritage Centre at Cinderford since then. It was only very recently that a dusty presentation set of Sopwith's 'instructional models' was discovered in a cupboard at the Sedgwick Museum. Those readers who went on Section C's 'behind the scenes' visit to this museum will understand how easily something could have lain neglected for so long!

Being a polymath, it was no surprise when Sopwith took up employment as chief agent for the WB Leadmines in Allendale in 1845. This marked his departure from celebrity into relative obscurity. However, he was distinguished geologically by FGS (1835), FRS (1845), Life Fellow of the Geological Society of France (from 1844) and was awarded the Telford silver medal by the Institution of Civil Engineers in 1846 for his geological models. Those cardboard models which were part of the O.U.'s Second Level S23 Geology Course had a fine pedigree!

GS

### THE SCIENCE AND ITS OBJECTS.

**GEOLOGY**, though it has become a popular science, may be difficult to define. If we ask what is Geology? We are told it is the "Doctrine of the Earth." No one can venture upon such a science as this, in its most comprehensive sense, nor was it ever undertaken but by speculators in theory; it has remained for this age to apply the principles of experimental Philosophy to a knowledge of the earth's surface.

The principles of Geology, like those of Geometry must begin at a point, through two or more of which the Geometrician draws a line, and by thus proceeding from point to point, and from line to line, he constructs a map, and so proceeding from local to general maps, and finally to a map of the world: Geometricians founded the science of Geography, on which is based that of Geology. But it may be asked, what gives it such general interest? We answer, the interest which every man naturally feels in the soil on which he treads, and from which he derives his food.

Part of the first page of *Abstract views of Geology*, a work in press at the time of William Smith's death in 1839

## Fun with Sticklebacks!

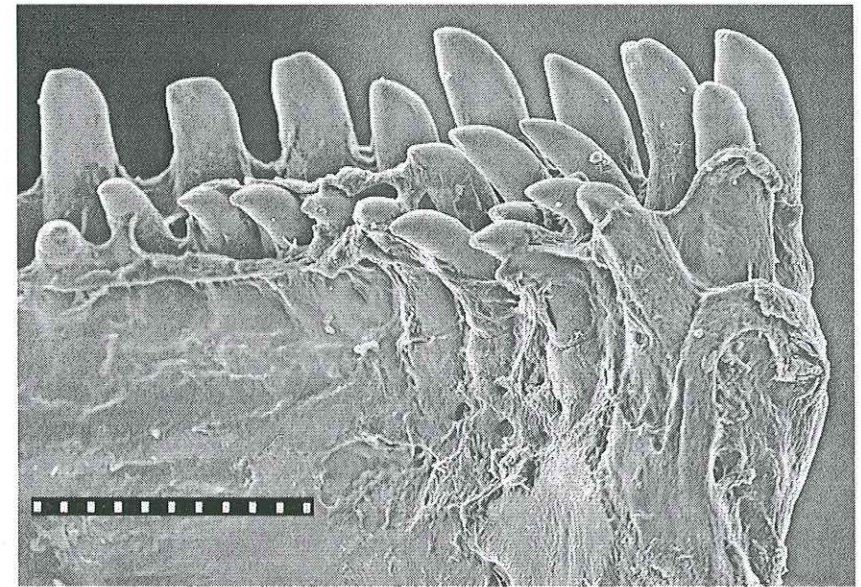
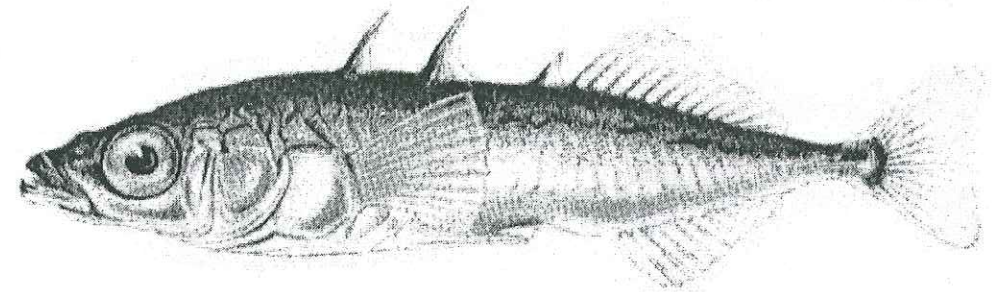
As a new member of Section C and also a recent recruit to the Geology Department at Leicester University, this is my first article to appear in *Charnia* and hopefully not my last. Perhaps it is not that surprising I am contributing, because I share an office with our Chairman, who suggested that my project might make an interesting article. I am not trying to deflect the blame, as I think it is a fascinating topic too. So here goes.

Why study the humble three-spine stickleback, *Gasterosteus aculeatus*, and also what is its connection with geology? Well firstly it has a modest but important fossil record which stretches back 16 million years to the mid Miocene. Mere soil! I hear you cry, but I don't think it's too bad for a little fish, and the number of fossil specimens is not inconsiderable. A more important answer to my first question lies in what this animal can tell us about evolution. Many people would regard the whole fossil record as evidence for evolution but to pin down the actual mechanisms of evolution at work on individual populations or species is very difficult. There is very rarely enough evidence to be able to infer such things as the effects of competition for a specific resource, the possible divergence and speciation that may ensue. This is where our hero comes in, because there is evidence from post-glacial lakes in British Columbia that speciation has been occurring rapidly within the stickleback populations. What you have there at the moment are two populations of stickleback exploiting one of two niches, with little interbreeding coupled with development of morphological differences. Effectively two species have evolved. Now how could evidence of an evolutionary event such as this be investigated using the fossil record, as one cannot observe the ecology of the living animal directly? The answer is that the activities of an animal over time leave their mark and the team, (i.e. Dr Mark Purnell of the Geology Department, Dr Paul Hart of the Biology department and myself), have focused on the varying wear patterns left on teeth by feeding activities.

Teeth, as hard, resistant structures, are readily preserved in the fossil record and by examining them with the aid of a scanning electron microscope it is hoped that we can infer feeding behaviour. By comparing these results with the wear patterns on the teeth of living sticklebacks it would not be unreasonable to suggest that they both occupied a similar ecological niche. Using this comparative methodology it may be possible to chart evolutionary events and change regarding resource exploitation in a population - if one has enough fossil material. Our research material is from North America and consists of fossil teeth extracted from whole fish which are common fossils in rocks laid down in a mid Miocene lake. It is possible that similar events to

those that occurred in the lakes of British Columbia could also have happened here in the Miocene. The extracted teeth are being analysed for wear patterns and then compared with teeth extracted from fish that we have raised ourselves in the laboratory. These latter animals have been subjected to a variety of feeding regimes and conditions, similar to those found in the wild. The modern teeth will act as a baseline of data with which to compare the fossil teeth and make interpretations regarding the evolutionary ecology of the fossil specimens. In theory this should be a way of positively identifying evolutionary events occurring over short time-scales and could possibly be used for other species or groups, providing there is a reasonable number of specimens at any particular locality.

David Baines MSc



Scanning electron microscope photo of part of a stickleback dental array  
The scale bar is 300 microns long

## Indoor meetings 2000/2001 - programme

All meetings begin at 7.30 in room LT10 in the Geology Department, Leicester University, **except where stated**

2001

### Wednesday October 10th

Dr Michael H. Stephenson (British Geological Survey, Keyworth) - 'The Permian of the Arabian Peninsula: tracking climate change after the great Permo-Carboniferous glaciation of Gondwana'

### Wednesday October 24th

Dr Keith J. Duff (English Nature, Peterborough) - 'Geological conservation - why bother?'

### Wednesday November 7th

Dr David T. Wright (Department of Geology, Leicester University) - 'Dolomite - a major geological enigma'

### Wednesday November 21st

Professor Peter Andrews (Department of Palaeontology, Natural History Museum) - Title TBA. Theme - Hominids

### Monday December 3rd

Joint Meeting with the Parent Body (held at **New Walk Museum**). Professor Michael J. Benton (Department of Geology, University of Bristol) - 'Extinctions ancient and modern'

### Wednesday December 5th

Professor David J. Siveter (Department of Geology, University of Leicester) - 'Ostracod ecology and palaeobiology: sex through time'

### Wednesday December 19th

Christmas meeting, to be held at the **New Walk Museum**

2002

### Wednesday January 16th

Paul C. Ensom (Department of Palaeontology, Natural History Museum) - 'Walking on eggshells: evidence for reptiles breeding during the deposition of the Purbeck strata of Dorset'

### Wednesday January 30th

Professor Alan Dyer (Department of Chemistry, Salford University) - 'Zeolites - or how an inorganic chemist discovered the Highlands and Islands'

### Wednesday February 13th

Members evening, to be held at the **New Walk Museum**

### Wednesday February 27th

Professor Bob A. Spicer (Open University) - 'Fossil leaves: nature's ancient meteorologists'

### Saturday March 2nd (whole day)

Provisional. Saturday School, **Vaughan College**. 9.30 am - 5.00 pm. Title TBA. Theme: Geology of the terrestrial planets and the Moon

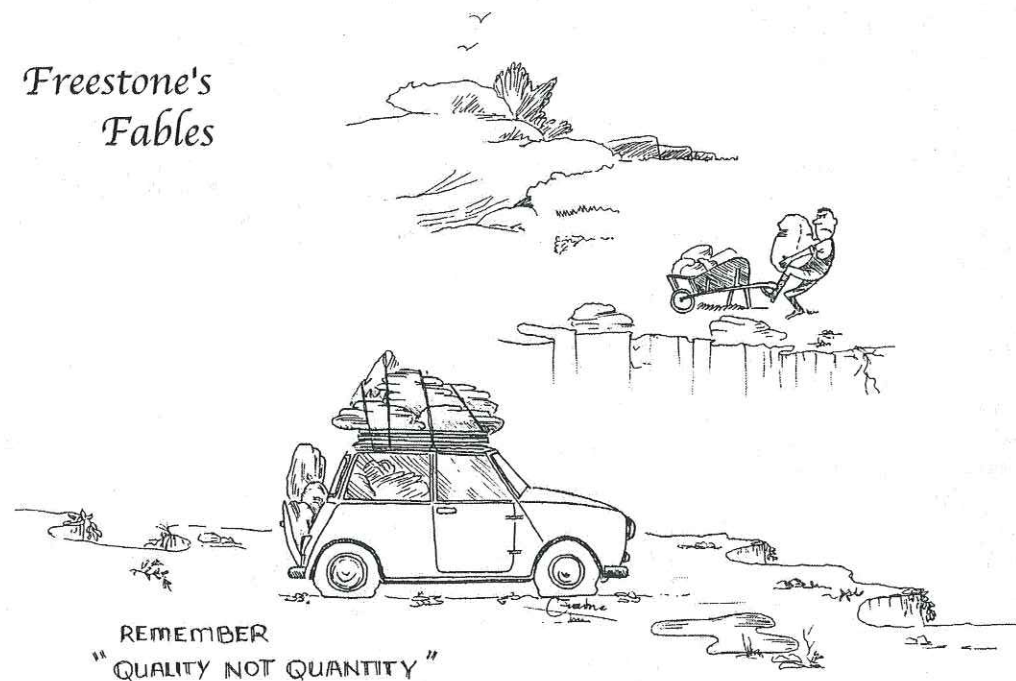
### Wednesday March 13th

Dr Mike Searle (Department of Earth Sciences, Oxford University) - 'Crustal evolution of the Himalaya, Karakoram and Tibet during and after the India-Asia collision'  
*Confirmation pending.*

### Wednesday March 27th

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

## Freestone's Fables



## Report for the year 2000/2001

Because only a few Section C members are members of the Parent Body, most of you do not see the Transactions, so I thought it would be of interest to reproduce the report I wrote for that publication for the year 2000/2001. It ran as follows.

The Section C year from March 2000 was another successful one and maintained the progressive trend of the last few years. Membership stood at around 130, including joint members, a figure which compared well with high points in the past. The popularity of the programmes was reflected by a steady flow of membership enquiries, while on the other hand we brought the membership details up to date and 'weeded out' a few members who hadn't paid for years! Treasurer Doug Lazenbury continued to manage the finances with his customary care, as well as keeping the drinks and biscuits coming on winter meeting evenings. Communications with the membership were maintained not only through our thrice-yearly newsletter 'Charnia', masterminded by editor Graham Stocks, but also via regular field trip circulars, which took on the form of 'mini newsletters'.

The summer programme went off very well, and the localities proved popular. Attendances continued to grow for these excursions, and the weekend trip, re-introduced two seasons ago, is now an established highlight of the programme. We were also very lucky with the weather. Field Secretary Dennis Gamble did his usual conscientious job to keep things rolling smoothly.

The quality of the winter programme was maintained, and we continued to attract excellent speakers. Much of this was due to our having use of the excellent facilities in the Geology Department at Leicester University, and we are indeed fortunate to have such a first class base for our activities. We remain very grateful both to the department and the university for this privilege. We are also grateful to several speakers for stepping in at late notice when booked speakers withdrew for various reasons, and to others who consented to late changes of date. In fact, the final programme as it ran, bore little resemblance to the original one we put together! However, the quality never wavered as a result of these changes. Two highlights were an excellent Parent Body talk on December 4th by Sandy Knapp from the Natural History Museum, London, and a very popular and successful Saturday School on March 3rd convened by Andy Saunders from the Leicester Geology Department, where people had to be turned away. Attendances during the winter season averaged about 38.

The committee met at regular intervals of around two months through the year and kept things ticking over efficiently, and thanks are due to Chairman John Martin and Secretary Joanne Norris for their hard work in this regard.

Andrew Swift

## Visit to the British Geological Survey, Keyworth

The section's first summer excursion of 2001 was on Saturday May 19th to the British Geological Survey at Keyworth in Nottinghamshire. This trip should have been made in October but was brought forward when our scheduled trip to the Cotswolds had to be postponed due to the foot and mouth crisis. Dr. Mike Howe, Chief Curator of the B.G.S. collections, kindly agreed to the change. Mike is a member of Section C and has only recently been appointed to his position. He met the group in the car park and led us through the maze of corridors to the museum area. Here the party were introduced to two BGS colleagues, Pauline and David, and Mike then gave a very interesting potted history of the BGS. from its early days in 1835 as a department of the Board of Ordinance, part of the original War Office. The Survey grew out of the work of Sir Henry De La Beche, who spent three years surveying and compiling geological maps of Devon. Many leading geologists have worked for the Survey over the years and as it's portfolio has grown, it has employed more and more people. It now has eight hundred employees throughout the United Kingdom. For many years the Survey had it's HQ in London but during the last twenty five years it has moved to its present site at Keyworth.

The Section C party was split into three groups, with each group taking turns to view the collections situated in the ground floor and first floor museum. Some two million fossil specimens are housed at Keyworth, with about two hundred and fifty thousand of the most important being held in the museum. A large proportion of the museum items are type specimens. We were also shown the BGS web site which came 'on line' recently. The address is <http://www.bgs.ac.uk> for those of you who are part of the wired generation.

After lunch Mike took the members for a look at the Core Store, a vast warehouse with row after row of shelving for pallets, some thirty to forty feet high. The store holds one hundred and fifty thousand miles of continuous cores, plus one million specimens and samples from other boreholes. Fifty-two thousand trays, six feet long, are needed to hold the cores from the six thousand five hundred boreholes they have. The oldest borehole held by the BGS is one drilled at Portsmouth Dock in 1825.

Some members could clearly have lingered for a while, but others were feeling the effects of lots of corridor walking, so after the obligatory 'family group' photo on the steps of the reception building and the expression of sincere thanks to Mike for a splendid tour, the party dispersed.

Dennis Gamble

Leicester Literary and Philosophical Society

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