The Black Country Geological Society

NEWSLETTER No. 187 FEBRUARY 2008

The Society provides limited personal accident cover for members attending meetings or field trips. Details can be obtained from the Secretary. Non-members attending society field trips are advised to take out your own personal accident insurance to the level you feel appropriate. Schools and other bodies should arrange their own insurance as a matter of course.

Leaders provide their services on a purely voluntary basis and may not be professionally qualified in this capacity.

The Society does not provide hard hats for use of members or visitors at field meetings. It is your responsibility to provide your own hard hat and other safety equipment *(such as safety boots and goggles/glasses) and to use it when you feel it is necessary or when a site owner makes it a condition of entry.

Hammering is seldom necessary. It is the responsibility of the hammerer to ensure that other people are at a safe distance before doing so.

COPY DATE FOR NEXT NEWSLETTER IS MONDAY 7TH APRIL 2008

In this edition:

FUTURE PROGRAMME

Lecture meetings are held at Dudley Museum, St James's Road, Dudley.
Phone (01384 815575)
7.30 for 8 o' clock start unless stated otherwise.

SATURDAY FEBRUARY 16TH 2008 (*Field meeting*)

Warwickshire Field Visit.
Leader: Martyn Bradley - Warwickshire Geological Conservation Group
Meet at Glebe Farm - the former Bubbenhall school loop road off the A445, grid ref. SP365724 at 10:30am. Visiting Wood Farm, a WGCG geoconservation site, and Ryton Pools geo-education site, Shotton's old and degraded Woolstonian SSSI, and the village interpretation board. In the afternoon an exploration of Lake Harrison with a good pub for lunch.

MONDAY 25th FEBRUARY 2008 (*Indoor meeting*)

Hands on Geology
Alf Cole BCGS Chairman, chemist and geologist,
Spencer Mather, expert mineralogist and geologist

Introduction from *Gordon Hensman:* What is Geology? Its importance in all our lives, supplying our basic raw materials on which our civilisation depends: fossil fuels, building materials, metals etc.

Alf Cole: ROCK, what is it? Where does it come from? Its source – the Earth's crust. Specimens e.g. granite, sandstone, clay - for members' inspection; NB. appearance, colour, feel, weight i.e. the obvious features highlighted in turn. ORIGINS: igneous, sedimentary, metamorphic.

Spencer Mather. What are rocks actually made of? Constituent minerals with specimens to be inspected.
Testing minerals:- Crystal shape; colour; streak: lustre; hardness – Moh's scale; cleavage and fracture; acid reaction; Specific Gravity/Density; taste; magnetism; and anything else appropriate.

Alf Cole: The Periodic table and some simple chemical formulae.

This meeting is designed to allow everyone to have a 'hands on' experience of as many practical demonstrations as possible – bearing in mind Health and Safety Regulations and the constraints of the venue. It is planned to have similar meetings on an annual basis, supplemented by practical Field Days. The next one is likely to be devoted entirely to one of the following: - plate tectonics, geological dating methods, stratigraphy, weathering, erosion and deposition, vulcanology and earthquakes, palaeontology, precious metals and gems.

SATURDAY 29TH MARCH 2008 (*Field meeting*)

Joint trip with the North Staffs Geological Association to the Lapworth Museum, University of Birmingham. Leader: Jon Clatworthy – Curator.
Meet at the museum for 10.30am.
Please contact Andy Harrison for further information. Jenufa8@yahoo.com

MONDAY 31st MARCH 2008 (*Indoor meeting*) NB – AGM starts at 7.45pm sharp

ANNUAL GENERAL MEETING

Followed by –
Professor Paul Smith: Head Earth and Environmental Sciences: University of Birmingham.
Charles Lapworth and the Highland Controversy - Maps, Mountains and Madness!

SATURDAY 19TH APRIL 2008 (*Field meeting*)

Field excursion to Hanter Hill. Leaders: Sue Hay and Geoff Steel.

Meet at 10.30am in the lay-by at Burlingjobb on the B4594 (SO251583).
This will be a circular walk up, around and down Hanter Hill. I estimate about 4 miles total distance much over quite rough moor land. Bring a packed lunch and drink.

MONDAY 28th APRIL 2008 (*Indoor meeting*)

Jan Zalasiewicz, University of Leicester:
Extinctions Past and Present

Gordon Hensman and Andy Harrison

OTHER SOCIETIES

NORTH STAFFORDSHIRE GROUP OF THE GEOLOGISTS' ASSOCIATION

Lectures: Diary Dates for 2008
6 Mar 2008 - AGM and Chairman's Lecture with Elizabeth Hallam.
More details are available by following the links at www.esci.keele.ac.uk/nsgga

LAPWORTH LECTURES

All lectures commence at 5.00pm in the Palaeo. Lab., Earth Sciences, University of Birmingham.

Monday 11th February 2008

Dr Tony Prave
(School of Geography & Geosciences, University of St. Andrews)
Building on Lapworth's Legacy: Uncovering new "secrets" of the geological evolution of the Scottish Highlands

Monday 25th February 2008

Dr Joanna Wright
(Dept of Geography & Environmental Sciences, University of Colorado Denver)
Terrestrial Trackways: testing assumptions & future directions

Monday 10th March 2008

Dr Peter Barker
Antarctic Glaciation - When and Why?

For further details/information contact:-
Jon Clatworthy, Curator of the Lapworth Museum of Geology.
Tel: 0121 414 7294
E-mail: J.C.Clatworthy@bham.ac.uk

EDITORIAL

We have previously mentioned the demise of the dinosaurs and many other life forms at the Cretaceous/Tertiary (K/T) boundary. The nice neat theory of a bolide impact has proved very popular, but as more research takes place it becomes evident that there are many more factors involved. This happens time and time again when new ideas in geology are suggested; those of us old enough can remember the 'granite controversy' of the sixties and the reinterpretation of sediments in the light of research into turbidites. The K/T controversy is in the same stage.

We have all sorts of other evidence, volcanic eruptions, the lack of oxygen in the sea and now some other ideas from entomologists. By studying insects preserved in amber of that age, it is found that there was a huge explosion in diversity, including disease carrying parasites. By looking at dinosaur faeces, these parasitic microbes can be found. Apart from spreading diseases, these insects were pollinating flowering plants as these were now taking over from the

earlier cyads and seed ferns. Could the herbivorous dinosaurs easily adapt to the new vegetation?

The mass extinction of the K/T boundary did not happen in an instant, it took perhaps a few million years. I believe that when all the evidence is evaluated, some time in the future, it will be a combination of various environmental factors that led to the massive changes. Our planet is a complicated system and we may know less than we like to admit.
www.guardian.co.uk/science/2008/jan/07/dinosaurs

Bill Groves

FROM OUR MEMBERS

Graham Hickman visits the Sedgwick Museum in Cambridge. At the beginning of October 2007, I had the opportunity to visit the Sedgwick Museum in Cambridge. I had visited the museum as a student in around 1980 and remember being very impressed by the large number of fossils and dusty Victorian display cabinets. My return visit was just as impressive and I happily spent an afternoon viewing the collection. One section of the museum has been recently renovated with more interpretive displays but still maintaining the look and feel of the Victorian architecture and hardwood cabinets. The Sedgwick Museum is predominantly a palaeontology collection numbering around 3.5 million specimens

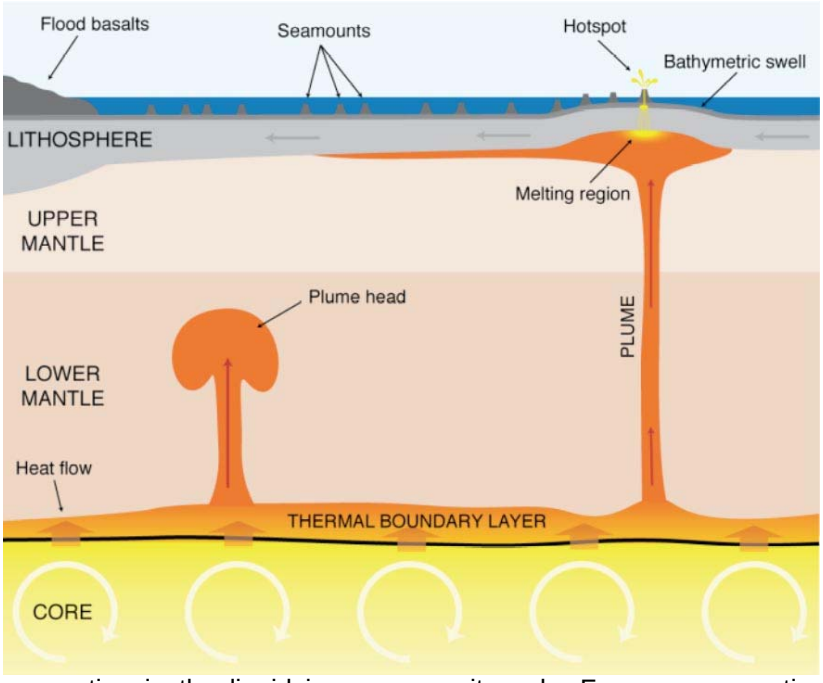
The collection originated in 1728 when a Dr. John Woodward (1665 - 1728) left his life time collection of nearly 10,000 specimens in his will to Cambridge University, and in addition funds to establish a lectureship in geology. The Museum now has a small room where this original collection can be view along with its original fine walnut cases. In 1818 Professor Adam Sedgwick (1785 - 1873) [left] was appointed as the Woodwardian Professor and curator. He had a passion for education and gave popular public lectures. Sedgwick was self taught in geology. He added greatly to the collection through his acquaintances with a number of collectors of the period, including Mary Anning. The museum also contains a number of Darwin's field note books and several thousand rock specimens from his voyage.

The current museum building [see picture] was purpose built for the collection and department of geology. It opened its doors in 1904 and at the time was the most expensive building in Cambridge. During my recent visit I was particularly impressed to learn about the work of Mr "Bertie" Brighton (1901 - 1988) who became the Museum's first professional curator in 1931, and worked until 1968. Many of the labels that you see on specimens displayed in the Museum today were handwritten by Bertie Brighton. During his lifetime he catalogued around 350,000 specimens. By my calculation that would have involved cataloguing on average 40 specimens a day for around 36 years!

The museum has a great website and good search engine. http://www.sedgwickmuseum.org Of particular interest is the section on the Silurian fossils, many of which came from Dudley and Wenlock Edge. "Explore the Wenlock Reef" is an excellent educational resource with high quality images of fossils: http://www.sedgwickmuseum.org/wenlock/index.html If you get the chance to visit Cambridge it is well worth spending some time here.
Graham Hickman (hickmang@bp.com)

David Miller considers The Great Plume Debate

The current debate as to the existence of mantle plumes is probably the greatest since plate tectonics was proposed. Plume theory was developed in 1971 and was relatively unopposed as it was seen as an extension of the plate tectonic theory.



Hotspots – classic evidence:

Hotspot volcanism is persistent volcanism in a location that is relatively independent of plate motion. Hotspots are the surface manifestations of mantle plumes, hot, narrow upwellings from deep with the Earth's mantle. They are often associated with broad topographic swelling, indicating direct uplift due to buoyant material rising from beneath. But do they actually exist?

The Plume Hypothesis:

The Earth's magnetic field is a result of rapid convection in the liquid iron core as it cools. For core convection to continue heat must be dissipated away from core-mantle boundary. The most efficient method of heat transport is convection and thus would form buoyant thermal plumes with the classic mushroom cloud shape. The most striking evidence for the classic plume theory are hotspot tracts, the most famous being Iceland and the progressive volcanic islands of Hawaii. But can we prove they exist?

Resolving the question:

The heart of mantle plume theory lies in the lower mantle, fundamental proof is deep within the Earth, but how do we observe the evidence? Answer: Seismology and Geochemistry.

Seismology – the fast track answer:

Surely with the development of advanced seismological surveying we could prove the theory once and for all. However, no evidence for mantle plumes was found under Iceland. Is that the death of the theory?…no, the plumes may be below the resolution of the seismic tomography. They are simply too small to see. Recent advances in tomography sensitivity have found narrow low velocity anomalies extending from the surface to the core-mantle boundary. However, these results are hotly debated as architectures of the models and not proof of plumes. So seismology cannot give us the answer can geochemistry?

Geochemistry – a mantle source:

The chemical signature of hotspot basalts is often very different from ocean ridge basalts and from each other. However, if plumes are derived from the core-mantle boundary there must be a chemical contribution from the core, an isotopic tracer. The Earth's core is liquid iron and thus the core will be enriched in siderophile, or iron-loving elements. If the hotspot magma contains even a small amount of core material, they should show elevated siderophile ratios. Significantly enriched ratios of the siderophile osmium have been found indicating a core contribution to hotspot magma. Surely all siderophile elements should show this enrichment. Tungsten is extremely sensitive to core contribution and is therefore an excellent test for osmium. Unfortunately, tungsten ratios give no evidence for a core contribution within Hawaiian lava thus casting doubts over the osmium results. However, this does not disprove the existence of mantle plumes as they are not required to have a chemical contribution from the core.

The Hawaiian hotspot – other theories:

- Shallow recycling of subduction material
- Melt focussing

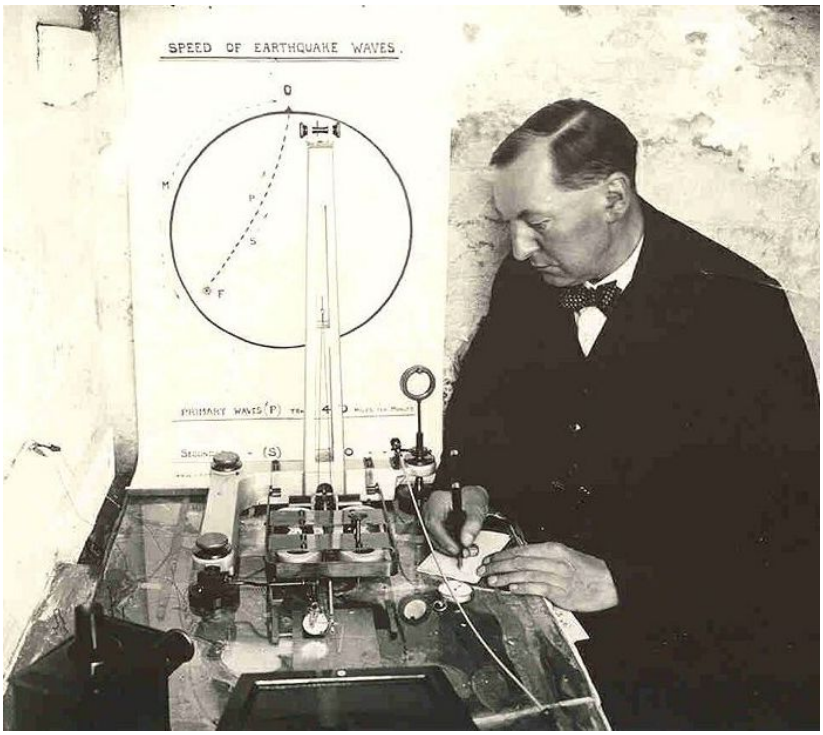
- Propagating lithospheric cracking

Conclusion:
The geochemical and seismic evidence is still ambiguous and/or controversial. Or, putting it in another way, not good enough to persuade the sceptics or dissuade the faithful, but more importantly what do you think, do mantle plumes exist?

David Miller MSci.(Hons) F.G.S.

Glossary:
Seismic tomography – a method of measuring variations in seismic velocity by comparisons of arrival times.
Osmium – Os – a transition metal and one of the densest natural elements

Gordon Hensman introduces us to the West Bromwich Seismologist: J.J.SHAW
John Johnson Shaw was born on 27th December 1873, at 11, Church Street in Lower Gornal. His father was a pawnbroker and a grocer. He eventually went to King Edward V1 Five Ways, in Birmingham. He left at 16 and was apprenticed to an engineering company. Around 1900 he gave up this career and entered the family pawnbroker business. In 1905 he took over the pawnbroker at 166, Hill Top, West Bromwich. He was very successful – eventually owning four pawnbrokers.



However, science was his passion – especially the scientific study of earthquakes. After meeting the world's leading authority on earthquakes whilst on holiday on the Isle of Wight, Professor John Milne, who explained how his instrument worked, Shaw built a similar one in the cellar of his house in West Bromwich. It was made of all sorts of things from a knitting needle to an alarm clock. Despite this he was able to detect and announce the occurrence an earthquake in Mexico on 13th October 1908, before any press reports reached Britain, and later the same year he recorded the disastrous earthquake that hit Messina in Italy killing 77,000 people.

In 1910 Shaw carried out a series of experiments at Jubilee Pit and Baggeridge Colliery to see if the moon affected the earth in the same way as it affected the tides of the sea. The results turned out to be inconclusive as the tiny movements which he had predicted were swamped by the continuous series of small tremors – microseisms - that affect the earth all the time, especially in an unstable place such as a mine with the strata under constant strain. In the course of time he did a lot of work in the study of microseisms, this time conducting experiments in Millpool Colliery.

He soon became recognised as an expert in seismology, especially with the popular press who always consulted him for earthquake details. In 1910 the press were curious to know why Jamaica had been cut off from the outside world – was it an earthquake? Eventually they found out that it was due to a hurricane. By 1913 his seismograph had been perfected, and he called it the Milne-Shaw Seismograph, but unfortunately Professor Milne died before he could see how successful the machine was. This machine became the standard equipment for measuring earthquake activity and for the next 50 years Milne-Shaw machines were set up in observatories across the globe. The components were made by a number of Black Country firms, and Shaw

would assemble them in his greenhouse before sending them of to places such as Canada, China, Hawaii, New Zealand, South Africa and Egypt. Some of these are still in existence today. There is a working example in the Science Museum in London while the Lapworth Museum of Birmingham University has the one that Shaw used at his home in West Bromwich.

Despite being an amateur he became the leading authority on earthquakes. In 1914 he joined the Seismological committee of the British Association for the Advancement of Science., founded in 1831, and the following year he became its secretary. Besides his newspaper reports and articles he wrote papers for various scientific societies, such as the Royal Astronomical Society. All this time he was running his pawnbroker business and he opened a third shop in West Bromwich. He then moved to Sunnyside, Birmingham Road, West Bromwich where he lived until he died.

So precise was his equipment that he claimed to be able to tell how many people were in the room above, and precisely where they were standing, as well as being able to measure the tilt of his house when the sun was shining on it! Shaw had other scientific interests as well. He was interested in clock making and time keeping, accurate time being essential to the recording of earthquakes. It is said that he kept the clock in his home accurate to one eight hundredth of a second. He was a member of the Birmingham and Midland Institute, and in 1921 he became President of its Scientific Society, giving an address on Greenwich Mean Time. As well as demonstrating his seismographs at the BMI, he also demonstrated experiments using liquid air. He produced sticks of frozen whisky, powdered butter and a hammer made of frozen mercury. He experimented with parabolic mirrors, Chladni plates (showing modes of vibration), and an "emotional recorder" that he had invented!

He was also very interested in radio, and built his own receivers to hear time signals transmitted from the Eiffel Tower in Paris. In 1920 he founded the Birmingham Wireless Association. When an earthquake occurred he would broadcast a signal to his friends to tell them to start their own equipment, or come to Sunnyside to watch his own seismograph. He met John Logie Baird, the television inventor, and there is a photograph of them watching a demonstration of Baird's television system which probably took place in Birmingham, or possibly the old Birmingham and Midland Institute in Paradise Street. Shaw travelled to Rome in 1922 for a conference of the International Union for Geodesy and Geophysics as the representative of the British Association, and while there had an audience with the Pope. The following year he made a series of broadcasts for the BBC about seismography and about the great Kwanto earthquake in Japan which occurred on 1st September 1923. In 1924 he displayed on of his seismographs at the British Empire Exhibition and in 1926 one of his instruments was installed at Oxford University Observatory.

Shaw was awarded a CBE in 1931 in recognition of his scientific services and his achievements in earthquake research. In the same year Birmingham University awarded him an honorary Master of Science degree. He continued with his radio broadcasts and in 1937 made vice-president of the BMI. He went to the USA in 1939, shortly after his wife died, to give a series of lectures and attend conferences. In 1940 an earthquake was mistaken for an enemy air raid but Shaw proved that it was local 'quake. He recorded the Fauld (near Hanbury, Staffordshire) explosion in 1944, which was the largest explosion in British history when an ammunition dump containing 3,670 tons of bombs in an old gypsum mine, blew up. He was disappointed not to detect the American Bikini Atoll nuclear explosion in 1946, and he was similarly disappointed not to detect the British attempt to blow up the German island of Heligoland with 6,800 tonnes of surplus WW2 ammunition.

Increasing bad health forced his retirement in 1946 and he died in West Bromwich and District Hospital on 23rd May 1948 at the age of 73. He was a marvellous example of a devoted amateur scientist who rose to be the foremost authority in his field using the instrument he invented and used in the cellar of his home.

Photograph of Shaw with one of his instruments is from:
www.lapworth.bham.ac.uk/collections/historical

Gordon Hensman

ARTY-CRAFTY GEOLOGY

Some time ago a relative of mine who is a very keen needlewoman asked me for some ideas for a competition. She had to make something with a geological connection. We browsed the glossy picture books of faults, folds, ripples and other structures, but inevitably strayed into pictures of fossils. On seeing an ammonite she decided on a circular cushion and ran away with the picture. I was not optimistic, the evolute specimen had ribs on the inner whorls, but the outer whorl had lost its shell case to reveal superb, but very intricate suture lines. The result was remarkable from someone who has no geological knowledge, and after the competition she gave me the cushion, and I still have it several years later.

If you have any examples of geology cropping up in 'arty-crafty' contexts, please let me know.

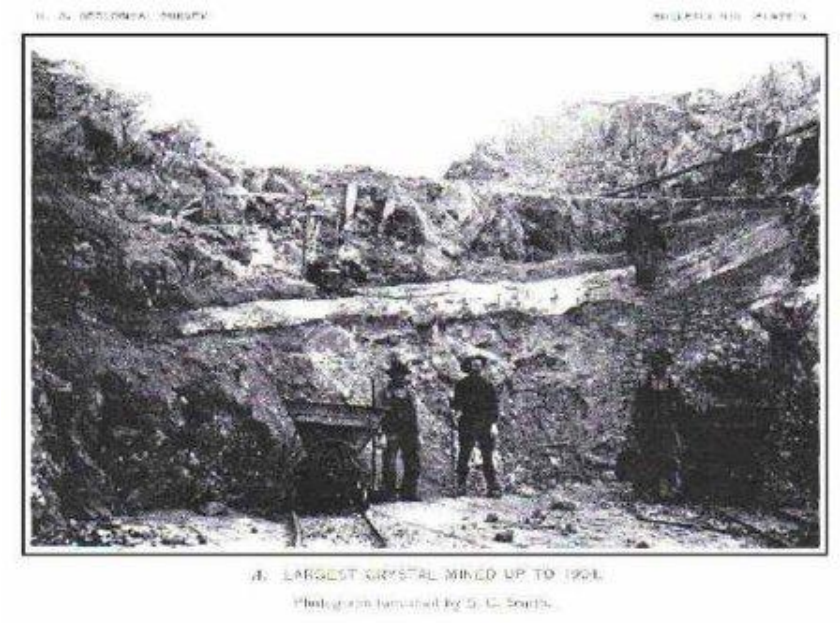
Bill Groves

GEOBABBLE

The Guardian recently (www.guardian.co.uk/science) printed an illustration of a giant fossil rodent, or rat. The skull, 50cm long was found in Uruguay and is 4m years old, and these rodents were common from the Oligocene, 20ma. When projected to the whole animal it would give a beast 3m long and 1.5m tall. At the end of last year another huge fossil was given space in the popular press. This time it was a monster Arthropod, called a 'sea scorpion' or *Jaekelopterus rhenania* to give it its proper name. From the Devonian, they found a fossil claw 46cm long which projects up to a 2.5m (8ft) creepy crawly, rather like a giant prawn.

We are always fascinated by the biggest, tallest, longest, strongest, heaviest etc in all things, and geologists are no different. If you search for the biggest dinosaur you find several claims and countries seem to be quite proud to have found a huge specimen. The main contender is *Sauroposeidon* representing the United States (where else) weighing in at 60m tonnes and 18m tall in bare feet, challenged by the mighty *Argentinosaurus* from Argentina. In the longest category the veteran *Diplodocus* is 27m, and we have a complete skeleton, but the fragmental *Supersaurus* could be 40m long.

I am more interested in the lesser known big creatures, like the ammonite *Parapuzosia seppenradensis* from the Cretaceous of Germany which is 2.5m in diameter, or the Ordovician trilobite *Isotelus* from the Hudson Bay are at 70cm long. It need not be fossils, what is the biggest crystal you have seen? There are huge crystals in the pegmatites of the Black Hills of South Dakota. *Spodumene,* exploited as a source of Lithium grows with crystals up to 14 m long. In 1904 they found one 42ft long with a cross section of 3ft x 6ft. They took a grainy photograph, I hope it is clear enough, on the next page.



However, for my very favourite you must imagine that you are in Dudley during the Silurian. Swimming in the balmy coral reefs, you drift out into the deeper water and there you see the giant *Monograptus flemingi.* Unromantic, planktonic graptolites even get into the record books, and stipes of this species have been found 39cm long.

Bill Groves

CONTACT US

As ever we would love to hear your news and views, for any part of the Newsletter, so please put pen to paper or fingers to keyboard and give us your thoughts. We are often able to print photographs that are sent by email or colour print. However, if you are sending photographs, can you please reduce them as suitable for documents. We try to keep the Newsletter below 1MB for the convenience of members who do not have sophisticated computers. Notices that appear in this Newsletter will remain in future editions until the date of the related meeting or event has passed. In order to include material in the April Newsletter, please send or give it to one of the Editorial Team by ***Monday 7th April 2008***

EDITORIAL TEAM	
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Why not have a look at our excellent website at:

www.bcgs.info

Reminder: – if you haven't paid your 2008 subs yet please forward to Mike Williams asap (details in December Newsletter)