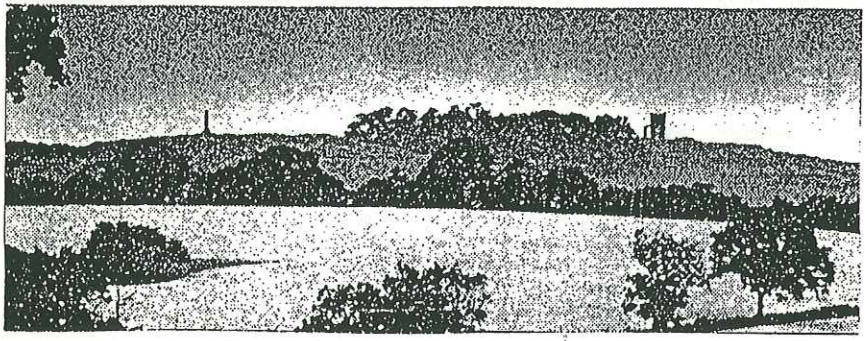
CHARNIA



LEICESTER

LITERARY AND PHILOSOPHICAL

SOCIETY

THE NEWSLETTER OF

SECTION C (GEOLOGY)

CHRISTMAS 1993 EDITION

The 'Lit & Phil': Part Two - Adult Education

The Leicester Literary & Philosophical Society had urged the City council to establish both a town museum and a free library. In 1849 the Proprietary School buildings were opened as a Museum and the Society presented its own collection of some ten thousand objects. This Nonconformist School had been opened in 1836. In 1871 a free library was established in the former premises of the Mechanics' Institute. The Mechanics' Institute flourished from 1834 to 1870. This was the main agency in the city through which adults could receive education in their spare time. Another agency for adult education was the founding of a college by Canon James Vaughan in 1862. Vaughan was vicar of St.Martin's, which became the cathedral when Leicester was raised to city status in 1919 by King George V. The college was the Vaughan Working Mens' College.

Another member of the Vaughan family, the Reverend Edward Vaughan, founded the Collegiate School for boys in College Street, in 1836. This school ran into financial trouble thirty years later and closed down in 1866. Its most famous master was Alfred Russel Wallace and its most famous pupil was Henry Walter Bates. It was because of the emphasis on an Anglican education that the Nonconformists established their premises in New Walk. That school, too, ran into financial difficulties and finally closed its doors in December, 1847.

However, there was one place in Leicester where education was not influenced by the bounds of religion or politics and that was the Literary & Philosophical Society. (Referred to as 'neutral ground' by Colin Ellis in his 'History in Leicester'). However, all was not rosy. In 1848, out of a population of some 57 000 people in Leicester, there was a total of just over 19 000 people who were not just poor but destitute. Sheep stealing from villages around the suburbs was common and many of the poor took laudanum to deaden hunger pangs. Children of the poor were given the opiate-based Dover's Powders for the same reason. It was due to the efforts of members of the medical profession who were also members of the Literary & Philosophical Society that modern sanitation came to Leicester. It was these individuals who called for pure drinking water, drainage and sewers in Leicester.

Vaughan's College had mixed fortunes; it reached its zenith at the end of the last century, having 2 225 students. Of these 1 150 were men, 750 were women and girls and the remainder was made up by 325 youths. The early years of this century saw a rapid decline in the roll of this college, which was hastened by the Great War. In 1918 the University College was founded and it was this august institution which took Vaughan College under its wing as an in-town extramural centre for adults. In 1957 Leicester's University College achieved the status of a University *per se*. The idea of a university in Leicester was first officially proposed by the Reverend Joseph Wood, in his Presidential Address to the Literary & Philosophical Society in 1862. The same sentiment was repeated in the Society's Presidential Addresses in 1885, 1895 and 1912. The 1912 Address was made by Dr. Astley Clarke, quoted in the previous edition of 'Charnia'.

What is the Society's standing in 1993? Reduced from something like twenty subject disciplines in its heyday to just two sections in the 1990s (Natural History and Geology) plus the Parent Society, does the 'Lit & Phil' have a healthy future? I sincerely hope so - there can never be an end to education, enlightenment and erudition.

Graham Stocks

SECTION C COMMITTEE 1993-4

LIFE PRESIDENT:	Dr.R.J.King, Longdon, Tewkesbury, Gloucester.
CHAIRMAN:	Dr.R.Clements, Geology Dept., University of Leicester, Leicester LE1 7RH.
VICE CHAIRMAN:	Dr.M.J.LeBas, Geology Dept., University of Leicester, Leicester LE1 7RH.
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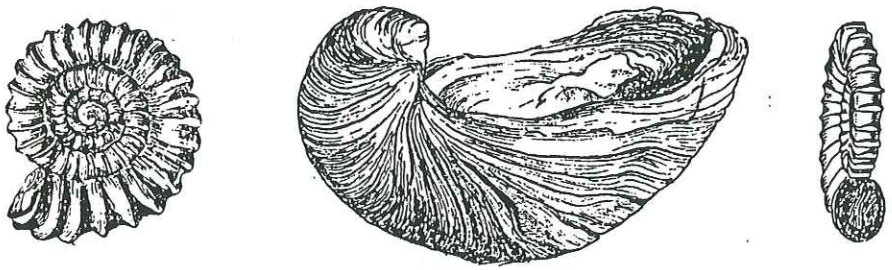
ASST. SECRETARY:	Mr.A.Hay, 33 High St., Somerby, Leics., LE14 2PZ
TREASURER:	Mr.D.Lazenbury, 39 Station Rd., Countesthorpe, Leicester, LE8 3TA.
FIELD SECRETARY:	Mr.A.Dawn, Stamford, Lincs.
COMMITTEE:	Mr.P.Blake, 35 Holbrook Rd., Long Lawford, Rugby
	Mr.C.Green, 45 Warwick Ave., Quorn, Leics.
	Mr.K.Lloyd, 9 Beacon Ave., Quorn, Leics.
	Mr.G.Stocks, 63 Barrow Rd., Quorn, Leics.,
Co-opted:	Dr.T.D.Ford, 21 Elizabeth Dr., Oadby, Leics., LE2 4RD.
	Mr.J.Martin, Leicestershire Museums, 96 New Walk, Leicester LE1 6TD.
Student Rep:	Mary Gee, Geology Dept., University of Leicester

All meetings take place on Wednesdays in the Council Room of Leicester Museum & Art Gallery at 7.15pm, unless otherwise indicated. The entrance is at the rear of the Museum, on Princess Road West. Coffee will be available from 7.00pm. Guests are most welcome. Admission is free. The Membership fee is nominal.



LIZ DOWN UNDER

The arrival of Summer saw your secretary high-tailing it, off for the down-under Winter! First stop on the way was the top end of Australia - Darwin in the Northern Territory. My 4am arrival meant it was near 6am by the time I checked into the Youth Hostel. Winter, or dry season, here meant it was cold enough for a tee-shirt. At night, even a sheet sleeping bag was unbearable, whilst daytime was spent keeping out of the sun and moving around slowly - an excellent way to unwind.

The top end is where the ***real*** Australians are and when you hear of the most important items of local history, you begin to understand:

1. WWII and the attack by the Japanese - the hotel that was left standing.
2. Cyclone Tracy and its devastation - it all but flattened Darwin.
3. Lindy Chamberlain's trial and the prison where she was kept (the dingo-baby affair).

A common sight and expression here is the 'tinny'. There are two types, both equally important in these climes. The first refers to the can of lager, more commonly known as a 'slab of tinnies' - a 24 pack. Generally, several 'slabs' are required when making use of the other 'tinnie' - more usually seen on top of or trailed behind a dilapidated car. This is the original aluminium dinghy, used to explore the rivers on the flood plains in search of barra mundi (***the*** fish) - regarded as a better prospect than standing on the bank and being considered crocodile fodder!

My real reason for this stopover was to experience the wonder of Kakadu - 'Crocodile Dundee' country! Kakadu National Park has been called a masterpiece of exotic environment, unlike anywhere else in the world. Aboriginal occupation of the area dates back more than 20 000 years, but it took nature more than 2 000 million years to create this work of art. Kakadu consists of huge escarpments and outliers and vast plains where animals roam (including buffalo which feed on the coarse grasses) rain forests, meandering rivers, lagoons and billabongs inhabited by crocodiles and millions of birds. This area is a vast flood plain in the wet season.

The main geographical highlight of the park is the Arnhemland Escarpment. It stretches for 500 kilometres, exposing vast tracts of sandstone and amazing rock formations. The escarpment features deep fissures and is dotted with interesting caves, hollows and waterfalls, some with drops of 200 metres.

This landscape is a direct reflection of the geology of the area, with differing rock types and ages determining the topography and soil characteristics. The oldest rocks, forming the plains and basement for the escarpment, are granite dating back 2 500 million years, with marine sediments on top of the granite. These sediments were metamorphosed by the 'Top End Orogeny' 1 800 million years ago into schist and gneiss.

The smooth rock faces were an ideal surface on which to paint important events, animals and spiritual figures. The paintings are often superimposed and in some areas were probably used as 'classrooms', the elders using the rock face as a blackboard in the sheltered, cool overhang. These paintings are both a record of past aboriginal culture and an important part of aboriginal life today.

/contd.

Originally several thousand metres high, the Arnhemland massif was weathered and eroded down close to sea level within 100 million years. The plain was then covered by a huge river system, depositing a quartz sandstone sheet, up to 1 000 metres in thickness. Evidence of this is seen in current bedding and ripple marks. During this time there is evidence of flash flooding, with poorly sorted conglomeratic deposits. Now known as the Kombolgie Formation, this sandstone forms the plateau escarpment and outlier country.

Mesozoic times saw seas spreading across the area and the beginning of erosion to form the present escarpment and outliers, as the sea receded. Leaching of the rocks has led to the formation of laterite.

The first humans did not appear until 20 000 years ago. These were the aboriginal people and even today they are regarded as owners and guardians of this territory. The environment of this area, with its rivers and flood plains, provided abundant natural resources, whilst the cool rock overhangs of the outliers and the escarpment provided shelter and living areas in this harsh climate. The smooth rock faces formed ideal surfaces on which to paint important events, animals and spiritual figures.

No visit to Kakadu is complete without seeing Jabiru and the pub, as featured in 'Crocodile Dundee'. Such pilgrimages and expectations only lead to disappointment. No outback-style settlement here! Instead is a neatly laid out township, roads well sealed, good street lighting, modern housing and no pub in sight, only the gigantic Crocodile Hotel. The actual 'Crocodile Dundee' pub is several miles from Jabiru. This is the purpose built township for the adjacent Ranger Uranium Mine, one of the few allowed in the Park, with significant aboriginal interest!

Liz Bellamy

Committee profile No.2: Elizabeth Bellamy

Born:	New Zealand - proud of it, though when is a secret!
UK residence:	one and a quarter score years.
Position:	Shanghai-ed as secretary a few years ago.
Occupation:	One - time housewife, market researcher, mystery shopper, now mainly teaching.
Background:	No formal interest in geology until latter years, in spite of beautiful surroundings of upbringing. Main interest in earlier years was in finding flat stones to skip across the water. Initial interest in geology was sparked in 1982 on a trip back home when I visited the Clutha Valley Hydro-electric Dam and saw gold panning. Later, I visited Emerald and Sapphire in Queensland, searching for gemstones. Following this, I picked up on an OU Course, dropped ten years earlier (maths!). I decided that it was too much like hard work studying from home and elected to embark on a Combined Studies degree. At the end of the first year I became hooked on geology and twisted TDF's arm to allow a change to single subject, namely geology. Since graduating, I have completed teacher-training and now teach science at Quorn Rawlins Community College, in between dashing off back down under.

WATCH OUT - FAKES ABOUT!

The Perfect Specimen, that holy grail of many a fossil cillector, simply doesn't exist. As I am sure many of us know to our cost, even more-or-less complete specimens of the hard parts of fossils are quite rare: most ammonites are missing the apertural margins, or the inner whorls, or the body chamber; most trilobites are missing a free cheek, or the head, or the tail, or the main part of the body. Small wonder then that the near-complete but still less-than-perfect specimen attracts our attention - and draws out our wallet! Add to this the fact that some things are so wonderfully abundant that they lose something of their attraction (who loves every Gryphaea - the Devil's Toenail?) whilst others are so rare they are invaluable (like Archaeopteryx). Every reason then, you would say, to try and improve on Nature.

Some of this improvement is standard practice and is quite acceptable. There is nothing wrong with sticking back together the pieces of a fossil that have come apart during preparation - provided this **REPAIR** is done properly. There is nothing wrong with trying to clean a specimen, or trying to remove some of the rock matrix in which it is embedded - provided this **DEVELOPMENT** does not cause excessive damage to the specimen. Sometimes even, it may be good form to replace missing parts of a specimen with plaster of Paris or the like - provided this **RESTORATION** remains quite evident. Sometimes indeed, **REPRODUCTIONS** (plaster casts and the like) or **MODELS** are right on... a good thing - provided it is perfectly clear that is what they are. **FAKES**, however, are quite a different matter.

The essence of fakes is that they cause intended or actual deception - a specimen is proffered as real, when it is not; a specimen appears to be real to a reasonably well-tutored eye, when it is not. Fakes may be crude or very subtle (indeed so subtle as to remain undetected by even an acknowledged expert). Fakes may also be of trivial importance or extremely grave. Fossil fish heads carved to look like frogs are crude and rather trivial; the moderately subtle faking involved in the Piltdown Man hoax was far from being trivial in its effect on the course of British Hominid paleaontology.

As far as fossils are concerned, there are three main classes of fakes, although any one fake may fall into more than one of these categories:

Class 1 Fakes: These consist of assembled parts from different individuals of a species (or from different species) to create an artificial whole. Trilobites and larger vertebrates are particularly likely to be faked in this way but belemnites (assembled guards and phragmocones) echinoids (spines added to tests) and ammonites (inner whorls added to outer whorls) are all possibles for this kind of treatment. Some fossil insect in amber specimens consist of real amber with a modern insect artificially introduced.

Class 2 Fakes: These consist of enhancing a specimen by artificial additions using plaster of Paris, various cements, paints and dyes. Such camouflaged additions may be used to replace missing parts, to add parts that never were present, or to conceal Class 1 faking. Trilobites are again regular candidates for this type of faking, as are flattened fish remains (painting-in eye spots, completion of outlines, etc.). Some of the amber of fossil-in-amber specimens may also be artificial.

Class 3 Fakes: These are fakes produced by deliberate removal of parts by carving, etc. This may be used to alter the ornament (to produce different 'species') or to improve or change the outline of both two- and three-dimensional fossils, and so on. In some cases, the whole of the fossil may be a carved artefact - just rock, no original fossil at all!

Minerals pose even more opportunities for falsification: artificial assemblages of real minerals; shapes altered and new faces cut; colours changed by a whole variety of methods; internal flaws in crystals concealed; synthetic minerals and replication. A veritable minefield which I am unqualified to traverse and which I shall not consider any further.

Faking of fossils is not new nor, indeed, extinct. So specimens in old collections as much as those in your favourite rock shop must be suspect. The ethics of faking is complex and I do not wish to argue pros and cons in detail here. Those who create or purvey the fakes will claim that they are in part responding to market forces, or that they are making something better than it was. Certainly as a scientist, the discovery that something is a fake destroys its scientific interest for me; as an educator of sorts, I do not like to instruct on the basis of falsehood; as a purchaser of fossils I like to know exactly what I am buying. Certainly the purpose of faking is usually to increase the value of second-rate objects by rendering something attractive that was not. If your interest in fossils is purely aesthetic, you may feel that the extra cost is worth it.

Detecting fakes is largely a matter of experience (some knowledge of the form and nature of fossils and of the rocks in which they occur is essential) and close examination of the object. There are few simple rules but the following may help when deciding whether to buy a fossil or not:

1. Always handle and closely examine the specimen - use a x10 hand lens to get a really close look.

2. Pay particular attention to discontinuities in the specimen, especially the boundaries between major parts of the organism - do adjacent parts fit?

3. Reputable vendors (particularly if it is their own material that they are selling) should readily admit if there has been any 'enhancement' of the specimen, or should otherwise be willing to guarantee that it is genuine. Beware of 'backstreet' purchases.

4. Beware of bargain prices... you normally get what you pay for.

5. Be careful when buying specimens from sources that are particularly in vogue at present: Moroccan trilobites; Green River Formation fish; Brazilian Santana Formation fish, etc.

6. Get a second, more expert, opinion, if a lot of money is involved.

...but most of all, Good Luck!

Roy G. Clements

FIELD OUTINGS '93: The concluding two events of the Field Season, reported by Alan Dawn.

September 12th.,1993.

We visited the Rugby Cement company's quarry at Long Itchington and the tour was led by Dr. Roy Clements, who described the Lower Lias exposures, which are so well exposed in this quarry, to a goodly number of people. Beds of a hard calcareous mudstone are separated by beds of shaly clays. The result is a quarry face which has a markedly layered appearance, almost horizontally bedded. Recent deeper workings in the quarry have reached downward as far as the White Lias, which forms the very base of the Jurassic System. Various fossils, in the form of brachiopods, lamellibranchs, ammonites and nautiloids were found, as well as trace fossils. Unhappily, the visit was sharply truncated soon after midday by torrential rain and everyone was thoroughly saturated by the time we returned to the car park.

September 18th.,1993.

We visited the foreshore at Frieston, near Boston, to examine modern sedimentary processes. Here, we had a setback - the leader for the day had to cancel at short notice. However, several of our number had some knowledge of what to expect and aided by notes from previous visits we managed to make an instructive and enjoyable D.I.Y. job out of it. We ended the outing by driving to East Keal to look first at a glacial outwash deposit and then on to the church, which is built of Spilsby Sandstone. The latter is a greensand which weathers rather easily, so the cornerstones of the church are reinforced with Jurassic Limestone, from further west. The sandstone forms a prominent scarp above the Kimmeridge Clays, which form the Fens below. Fine views of the Fenlands towards Boston and Skegness are obtained from the churchyard. We were also allowed to borrow the key and examine the interior of the church.

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Field excursions are a vital part of this Society's calendar of activities. If you have any ideas for future visits, or if you would like to take part in the organisation of, or you would like to lead a party, please inform the Committee. *EDITOR*

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Alan also wishes to draw your attention to Peterborough City Museum's Dinosaur Exhibition, **'Jurassic Week'**. The Museum is located at Priestgate in Peterborough and the exhibition, which coincides with half-term in the Peterborough/Lincolnshire/Cambridgeshire area, runs from Tuesday, February 15th. to Saturday, February 19th.,1994.

The central feature of the exhibition is a full-size cast of the skeleton of **Megalosaurus.** Other Mesozoic creatures will be on show, including a model of **Archaeopteryx**, the first bird, plus **dinosaur eggs. Moon rock** will also be on show and a number of activities designed especially for children will take place. There will also be display stands by Stuart Baldwin, the Geologists' Association, Stamford Geology Society, and other organisations.

Admission to the exhibition is free and the official opening will be carried out by Dr. Mike Benton of Bristol University.

STAMFORD STONE TRAIL

Stamford Museum have recently published the sixth in a series of highly informative leaflets in their Town Trail series. I refer to **Number 6: 'A Geological Stone Trail of Stamford'**, written by Alan Dawn. In fact, the illustrations are by Alan too - the draughtmanship is superb.

The trail is introduced by a general description of the Middle Jurassic limestones which underlie Stamford, a geological column and a map of local quarry sites. Twenty-eight locations are visited, illustrating not only the local building stones but also the exotics which have come from far afield (e.g.'bankfrontite'). The trail takes two hours to walk and many groups have taken part in guided tours since the trail opened in the Summer of 1993.

The following is an extract, taken from the 'Stamford Mercury':-

Trail 'a labour of love' for geologist

Stamford is a famed stone town, but perhaps you never notice it in detail. Just published is Stone Trail, the sixth in Stamford Museum's series of town trails. Prepared by local geologist Alan Dawn, the trail guides the visitor round the town pointing out various types of local stone to be seen, placing them in their geological context.

It also looks at the 'exotic' stones, imported into Stamford since the introduction of the railways 150 years ago. The illustrated trail contains a geological introduction to the town and includes a geological column placing the local stones in their context, plus a map showing the main local quarries. The illustrations have all been contributed by the author.

The trail has been a year in preparation and has been tested on a number of local and visiting groups to the town. "We are extremely pleased with the result," said museum curator John Smith, "and feel this will be an extremely successful trail. "We are extremely grateful to Alan Dawn for his labour of love."

The trail is obtainable from Stamford Museum, price 40p per copy, or 75p by post. The cost of producing the trail was met by a grant awarded by the Geologists' Asociation from their Curry Fund.

Favourable comments were received regarding the publishing of resumes of future talks. Below are guides to the content of forthcoming meetings:

January 12th.,1994.'Trilobites: evolution and origin of species.'

Does evolution tend to occur gradually and continuously, or in jumps with long periods of stasis in between? Only the fossil record can provide an answer to this question and beautifully preserved Ordovician trilobites from Central wales have yielded important evidence in this debate. The way that fossils are usually collected and described introduces biases that obscure evidence of gradual evolution where it exists. Stasis is, nevertheless, certainly a major and puzzling feature of the fossil record and a recent model suggests a counter-intuitive relationship between patterns of evolution and different environments. Dr.Peter Sheldon, Open University.

January 26th.,1994: 'Geological evolution of the area between Coventry, Atherstone and Croft.'

The rock succession of the Coventry district (Geological Sheet 169) reveals a particularly complete record of the geological events that affected the east Midlands. Exposed in quarries within the Nuneaton Inlier are Charnian volcanic and intrusive rocks which are representatives of the Pre-Cambrian basement of the Midlands. They are unconformably overlain by shallow water marine sandstones of the Hartshill sandstone Formation, laid down during the early Cambrian transgression of the Iapetus Ocean, succeeded in turn by the deeper water Stockingford Shale Group, which ranges to Lower Ordovician age.

In late Ordovician times these strata were intruded by quartz-diorites of the South Leicestershire Diorites suite near Croft and by numerous sills of lamprophyre and coarse-grained mafic and ultramafic rocks which constitute a separate Midlands Minor Intrusive Suite exposed farther west around Nuneaton. Following uplift and erosion during the Caledonian Orogeny, in mid-Silurian and mid-Devonian times, sedimentation was resumed in the Upper Devonian and is represented by the Oldbury Farm Sandstone Formation, of continental sandstones with a minor marine interval.

Carboniferous strata, laid down unconformably on the older rocks, are of Namurian age at the base. Thickness variations and unconformities between the succeeding formations are due to earth movements transmitted to this basin from the developing Variscan fold and thrust belt farther south: extensive peaty swamps were formed in Westphalian times, resulting in the commercially important seams of the Warwickshire Coalfield but continental red bed deposition became dominant as renewed uplift and basin formation took place. In late Carboniferous to early Permian times the culminating Variscan movements reactivated many old fault lines and the area was uplifted and exposed to erosion once again.

The Triassic period was characterised by extension within the east Midlands region; a segment of the crust subsided to form the Hinckley Basin which was infilled by continental sediments of the Sherwood Sandstone and Mercia Mudstone Groups. A marine transgression spread across the region late in the Triassic and persisted during the deposition of the Jurassic Lias Group, which is the youngest solid geological formation preserved in the area.

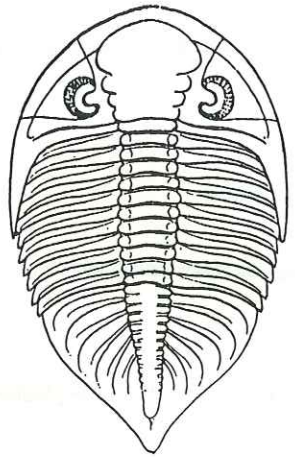
The region was glaciated during the Middle pleistocene, when a well-developed 'Wolston-type' sequence of deposits was laid down; they include tills and outwash sands and gravels with a thick bed of glaciolacustrine clay that possibly accumulated within a single, large glacial lake basin. Dr.John Carney, BGS Keyworth

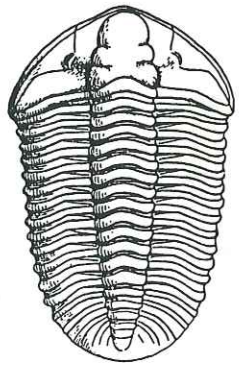
Dr.Carney completed a PhD thesis on volcanic rocks in part of the North Kenya Rift Valley before joining the IGS (now the BGS) in 1972. He subsequently spent seventeen years with the International Division of the BGS, principally mapping volcanic and metamorphic rocks in the Oman, Vanuatu and Zimbabwe and was in charge of field mapping activities in the Botswana Geological Survey. Since returning to the UK in 1989 he has been attached to the North East England and Midlands Group of the BGS and is currently leading the project to revise the Loughborough geological map sheet. Dr. Carney's talk is based on the recently completed draft of the Coventry District Memoir (Sheet 169).

February 9th.,1994: 'Where dinosaur tracks may lead.'

This talk will be given by Paul Ensom, B.Sc.,FGS,AMA, Keeper of Geology at the Yorkshire Museum, York. Paul Ensom spent eleven years as the Assistant Curator at the Dorset County Museum in Dorchester. During this time he became much involved with the Purbeck Limestone Formation and the search for dinosaur tracks in particular. Paul's illustrated talk will begin with this unusual form of sleuthing. As is often the way, the unexpected occurs and he concludes with a description of the ongoing work on the residue from three tonnes of clay, a description of which could happily be subtitled 'Mud, Mud, Glorious Mud.'

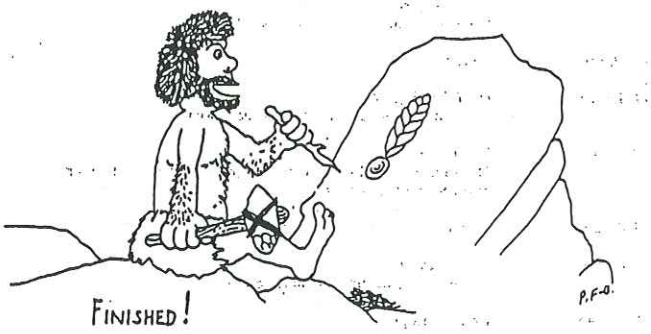
After working at the BM(NH) in the Department of Palaeontology in the early 1970s, Paul studied for his degree at Leicester. His postgraduate year gained him the Museums Certificate and in 1978 Paul was appointed Assistant Curator at Dorset County Museum. In 1989 Paul assumed his present title.





CHARNIA REVISITED

Chairman: Dr T.D. Ford



CHARNIA REVISITED
Saturday 26 February 1994

Programme

9.30 am	Assemble
10.00 am	*Dr John Moseley* The Charnian sediments.
10.35 am	*Dr Trevor Ford* The discoid fossils of Charnwood Forest.
11.10 am	Coffee
11.40 am	*Dr Helen Boynton* The frondose fossils of Charnwood Forest.
12.20 pm	*Dr Chris Peat* The unsuccessful search for microfossils in the Charnian and related sediments.
1.00 pm	Lunch
1.45 pm	*Dr Ben Bland* Trace fossils in the Swithland Slates.
2.30 pm	*Dr John Cope* Ediacaran fauna of the Llangynog inlier and how it was discovered.
3.15 pm	Tea
3.45 pm	*Dr Martin Brasier* Late Precambrian extinction and the Cambrian "explosion".
4.30 pm	*Dr Simon Conway-Morris* Ediacaran survivors and early animal evolution.
5.15 pm	Close

DEC-