

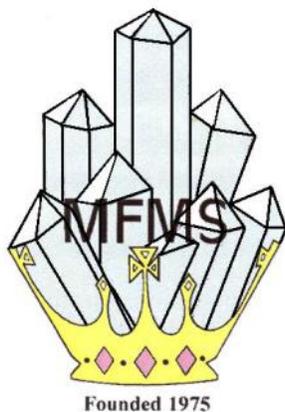
# Occasional Erratics



Newsletter of the

**MEDWAY FOSSIL AND MINERAL SOCIETY**

[www.mfms.org.uk](http://www.mfms.org.uk)



No. 04. July 2015

The editor of this edition of the MFMS Newsletter was Nick Baker

**Cover picture**

The Medway Valley, viewed from Upper Halling. June 2013

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## Editor's Notes

Nick Baker

Yet again, the quest to stop *Nick's Geological Journal* is on again, and this time it came closest to happening. That's how it looked at the start of May, but then the firm of Rayner and Talbot showed up and provided quite a few pages. Dave R has given a report on the history of the Medway Society, under the title of Was it all worth it? Well, I think it was and I know Dave knows it was, so, read the article. Dave T. has given a report (including photos) on the visit to the Brightling Gypsum Mine. I did not attend, but I have been down a few mines (coal, lead, tin, copper, slate) but I think this would have been the most dusty. Gary Woodall commented that he didn't know Dave was there. Well, it was dark and very dusty and I believe people were wearing facemasks etc, so you could miss someone!

But getting back to Dave R's account of our history, led me to thinking about the future. We are all getting older and some of us could be described as old. So the on-going problem is how to get not just new members but also younger ones. One local geological society recently folded because there weren't enough people to serve on the committee. But it's not just a problem for geology. It seems to be a problem for most amateur scientific societies, which raises the question, are we witnessing the passing of a social phase, which began in the 18th Century? We may well be, but the question is why? And if we know why, can we stop it?

In a recent letter I commented on the ease of gaining information in these days of the Internet, as compared with former times. Question, does that ease of information erode curiosity and perhaps even interest? No, I will not go down a luddite road and deny the Internet as being a good and an 'earth-shifting' invention. And its effect on society is manifest and thus its effect on scientific societies. A recent survey of words used by children showed an increasing use of words relating to computing and fewer and fewer words relating to the natural world.

Computing and the Internet are in danger of becoming, if not have become, an end in themselves, rather than an extra tool in knowledge investigations. So the problem is that those who would provide new blood, cannot get away from their screens. Even if we do get out more, we now take the screen with us. So if the world outside the scientific societies is changing, we have to adapt. But how we do that involves more than just a one or two word answer. One challenge in particular is that a proportion of the visitors to the recent fossil show had little knowledge of science in general or geology in particular.

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### Joyce and Harry Day

Joyce (1929-2015) and Harry (1930-2015) both passed away last April, within a fortnight of each other. The memorial service took place at Medway Crematorium on May 6th. Harry was a founder member of the Medway Society in 1975. As an engineer he was very useful to have around in the society's lapidary and rock cutting activities. He joined with Dave Talbot and Dr Robert Stout in the research into *The Rock Types and Geology of the Lower Cretaceous Wealden District*.

Here are a few words from Anne, our secretary

I started collecting minerals in the late 80's when my son was a toddler. After seeing an advert, I went to the Medway Lapidary and Mineral Society show at Hempstead Valley and then started going to the weekly meetings in Gillingham, where I met Harry and Joyce. From the start they

were so friendly and helpful and great mentors and teachers. I was lucky enough to view their wonderful mineral collection on several occasions.

Harry and Joyce used to take me to the British Micromount Society and Russell Society meetings, in their car, which was always an enjoyable outing. Sometimes I would also accompany them to Sidcup Mineral and Lapidary Society. Harry and Joyce used to help man a stall at the Dickens festival in Rochester, where they would sell the clubs minerals and fossils. Many times I was there with them, dressed up in one of Joyce's 'vintage' Dickens dresses, she had 'handed me down'.

Harry had made a study of crystallography and helped me with the subject when I was doing my geology degree. He loved microscopes and loved to improve them by customising them. Well, of course, he was an engineer and loved making things, especially his model steam engines. He used to display them at shows, including the Kent County Show, where I used to see him with Joyce and family. They were always up for a social event and enjoyed the various garden party's members and other societies laid on. More recently it was me driving them to the Sidcup 'Do'. For many years Harry was club secretary, but really the two of them shared the job, until I took over. They had been members from the start of the club and seen many changes, including changes of venue and club name. I watched this lovely couple grow old, but still retain their wit, humour and dignity and know that they shared a long, satisfying, interesting and happy life together.

Anne Padfield

# Was It All Worth It

David Rayner

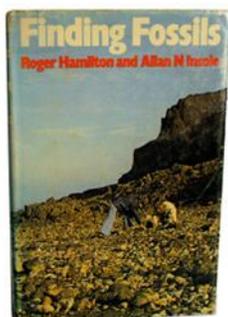
I am not going to explain just yet what the title of this article means as I am sure you will guess this as you read further but I will explain and answer my own question at the end.

Sometime around 1977 while I was at work in Gravesend, supervising an excavation for a foundation, I found something in the chalk spoil which came from the excavation. I knew that it was possibly a fossil of some kind but that was all I knew at the time. Finding this made me want to know more about it so after looking in the local museum, which was located in the public library I found that the object was a fossil sea urchin from the local chalk deposits. I then decided that I would like to find more examples and as the Gravesend and Northfleet area is littered with old chalk quarries (the chalk being used for production in cement making) I thought the quarries were a good place to start from. After scrabbling about in one or two of the local quarries I found a few bits and pieces, mostly broken sea urchins and shells but nothing of any significance. Also around this time, having hired several camper vans on different occasions for holidays, I decided to purchase a secondhand van and have a go myself at converting it into a camper van.

Then one day when we had taken Martin to Maidstone library, in the children's section I found a fossil collecting guide book. It was quite a good book for the beginner and listed and described a number of sites to visit for collecting fossils. Sites in the South East were; Botany Bay Margate, Beltinge, Sheppey and Folkestone. Also there were sites shown in, Dorset, Isle of Wight, Bristol & Gloucester region and the Yorkshire coast. I made enquiries at the local book shop and managed to purchase a copy of the book - which I still have today.



*The first van before conversion*



*Our first fossil guide book*

Our fossil collecting days had started. Martin was about 4-5 by this time and some of our first trips were to the Palm Bay area where we collected chalk fossils. We also managed trips to Folkestone and Beltinge but at Beltinge we only looked in the cliffs at Bishops Stone Glen. If only we had realized what could be found by looking in the right place on the foreshore at Beltinge, then I am sure that we would have paid a visit to Sheppey much sooner than we did. By now I had virtually



*Palm/Josh Bay area near Broadstairs*



*The first van after conversion*

finished converting the van into a camper van and we started using it to go away for holidays, mostly to areas where we could collect fossils - places in Sussex, Hampshire, Dorset, Norfolk etc. Having had our second son Aaron by this time and also having had about four or more years with the first camper van I decided to go 'up market' and so purchased an ex ambulance to convert. It was more powerful with a 2.2 litre engine, was automatic, had a fiberglass body, more room and already had the windows in it - so much

better than the first van.

From my fossil guide book I read up on the Isle of Sheppey and decided to pay it a visit. On the first few visits we parked at the top of the cliff near the old post office and then made our way down from there over the eroded cliffs to the beach. At that time we were oblivious to the dangers of cliff falls and mud runs. Incidentally when we first went there the concrete pillboxes which are



*The Sheppey pillboxes 2006*

now on the beach were located at the top of the cliffs near the road. After a few trips we then discovered the small car parking area down near the sea wall/beach at Warden Bay, which was a much safer place to be able to get to the beach. At this time the camper van was very useful for carrying all the gear, for changing your clothes, preparing and eating food and we also had the extra luxury of a porta-loo. On our frequent trips to Sheppey we only searched for fossils on the beach area from the caravan site at Warden Bay up to Barrows Brook and never went out to search on the foreshore area.



*The second van - as purchased*



*The second van after conversion*

On a couple of occasions we met a guy on the beach his name was Jim Craig, he lived at Minster and was a member of the Medway Lapidary and Mineral Society.



Jim told us about the society and suggested that we go along to one of the Wednesday evening meetings held at the Adult Education Centre at Green Street, Gillingham. We didn't take him up on his suggestion but later on Angela read in the paper about a forthcoming Mineral & Fossil Show to be held on a Saturday at the Hempstead Valley shopping centre, Gillingham – so we decided to pay it a visit. The show, which was held on a Saturday in early July each year was organized and run by the MLMS and continued up until 2006, which was the last show. We went along to the 1988 show, were very impressed with the show and while we were there we met a number of the society members – Tony Mitchell, Joyce & Harry Day, Gary Woodall, Simon Dodds and others.



*The MLMS show 1993*



*The MLMS show 1995*



*The exhibit table - MLMS show 1999*

From this we decided to go along to one of the Wednesday evening meetings in September 1988 held at Green Street, Gillingham. We were made very welcome and found everybody pleasant and friendly. After a second visit we joined as a family group and so my, or should I say our involvement with the MLMS began. I think that about the same time Teresa Watson and family also became members of the society. When we joined I think the membership was about seventy or more and the meetings were held in one of the classrooms at the rear of the main building. The room that the society was allocated was used in the daytime as a woodworking room but the society had been allowed to set up a number of grinding and polishing machines including a flat lap machine in the same room. There was also a well stocked library of reference books. Off of the main room there was a small room which had a couple of circular saws for cutting minerals and there was also a sink and the tea making facilities were located here.

Joyce Day and Emma Johnstone Brown held a rock shop where on various evening meetings they brought along rocks, minerals & jewelry for sale. There was also a thriving silversmithing section and the machinery was used by a number of people for lapidary work. I suppose at the time we joined there were more members who were interested in minerals than there were fossil collecting members. The committee organized a Wednesday evening programme of events and there was a field trip programme which included one or two mineral field trips and was organized by the Field Trip Leader. The society organized a stand at the G.A. Reunion show in London and also in June the society had a stall at the Dickens Fair. Generally there was also a Christmas meal arranged.



*1989 My 1st MLMS display at the G. A. meeting*



*1989 Field trip 'Trilobite Trail' to Shropshire*



*1990 Field trip to Watchett Somerset*



*1991 Field trip to Sheppey*



*1991 Field trip to Beltinge*



*1991 Field trip to Bracklesham*



*1991 The MLMS stand at the Dickens Festival*



*1991 The MLMS stand at the G.A. show*



*1992 Field trip to Shropshire members enjoying a meal*



*1993 Field trip to Walton-on-the-Naze*



*1993 The Christmas meal*



*1995 MLMS 20th anniversary show at Maidstone Museum*

After we had been members for about 4/5 years the siversmithing group had gradually packed up, mainly due to the fact that a tutor could not be found and also by then a number of members had left the group. Then about 1995/6 it was announced that the Adult Education management wanted to use the woodworking room (our meeting room) for a Wednesday evening woodwork class. At first it looked like the society would have to find an alternative venue but it was agreed that the society could use one of the other classrooms as a meeting place. The only problem with this was that the lapidary machines would have to be taken out of the present room and they would not be able to be used in the other classroom. In the end the management agreed that sufficient machinery could be located in the small room adjacent to the woodwork room. The library and the machine spares had to be thinned down as they had to be moved as well.



1996 Field trip to a quarry in the Cambridge area



1998 FT to Ramsholt & Baldsey Suffolk



1998 FT to Highcliffe in conjunction with Essex Society



1998 FT to St. Margaret's Bay



2000 The launch at Brighton of the 1st book on Sheppey fossils



2001 MLMS table at Kempton Park Rock & Gem Show



2002 The MLMS stand at the Kempton Park Show



2003 An evening meeting at the 2nd classroom Green Street

Leading up to the year 2000 the society committee had discussed and decided that the society should perhaps try and complete a project to celebrate the new millennium. This idea was put to the membership and two proposals were put forward. On the fossil side, myself, Martin, Tony Mitchell and Fred Clouter had been working on producing a reference book concerning fossils from the London Clay of Sheppey, so it was decided that this could be a suitable project. We set about the task of completing it and making sure that it was printed and ready for sale in 2000 – this we managed to do. On the mineral/geology side it was decided that a project to produce a reference collection of rocks from the Wealden area would be undertaken by Harry Day, Dave Talbot and Robert Stout. This project was also finished, with a collection of mineral thin slices and a CD released about the project.

The society had sort of settled into their second classroom but problems were looming. The car park at Green Street was quite small and most of the parking was supposed to be for the lecturers. Quite often peoples cars got hemmed in and eventually the management had a barrier system put in which caused problems for people attending the classes. The society's membership had fallen and also there was the problem of the society having to operate from two separate rooms. With these problems and the fact that the Adult Education Centre was possibly going to close down, the society decided to look for another meeting place.

After several venues were considered, in 2004 it was decided to rent a classroom at the Mid Kent College located on the Chatham Road opposite Rochester Airport. The biggest problem of this however was that none of the machinery could be accommodated at this venue. Although there was plenty of cupboard space for the library books and other equipment all the machinery and spares had to be disposed of, which in a way was the demise of the lapidary side of the society. Although at first the classroom appeared to be OK it did have its drawbacks. It was obviously used in the daytime and when the MLMS members turned up for the evening meetings things from the daytime meetings were left out and the tables and chairs were all over the place. This meant that before the meeting began things had to sorted out and the tables and chairs re-arranged. Another problem was that the caretaker never left the room unlocked and it always took ages before anyone could find him to unlock the room so we could start the meeting. Personally I thought that it was not the best venue for the society's meetings.



2004 MLMS evening meeting at Mid Kent Collge venue



2004 MLMS stand at Kempton Park Show



2005 MLMS stand at Kent RIGS show Leeds Castle grounds



2005 MFMS 'Mick Cuddeford' stand at Kempton Park



2006 The MFMS stand at the Canterbury Road Show



2006 Alternative Collections evening meeting at Mid Kent

In 2005 a proposal was put forward to change the name of the society to the Medway Fossil and Mineral Society. One of the main reasons for this was because the Society no longer had the ability to carry out lapidary and also I suppose the majority of members interests at that time were fossil orientated. So it was put to the members at the 2005 AGM, the motion was agreed and the society became the Medway Fossil and Mineral Society. In 2006 the College management decided that all their classes would finish by 6.30pm therefore making it impossible for the society to hold its meetings, also the hourly rate

for the rental of the classroom was to be raised by 50%. There were also indications that the whole College would be closing and the land sold off for housing purposes. So once again the society had to look for an alternative venue.

Therefore in September 2006 and mainly due to Ian Burdens suggestion the society relocated to its present venue here at St. Peters Church Hall, Delce Road, Rochester. When the hall was first used it was decided to start the evening meetings at 7.30pm and finish at 9.30pm. The reason for this being that the hall was used before us and wasn't vacated until about 7.00pm, also starting at 7.30pm made it better for some members who worked late to get there before the meetings started. After about a year the meeting times were altered back to 7.00pm to 9.00pm, which is as it is now. I personally think it's a good venue for our evening meetings, there is plenty of room, a nice kitchen, its comfortable and plenty of parking.



2007 The MFMS stand at the Canterbury Road Show



2007 The last MFMS stand at the Kempton Park Show



2008 Part of the MFMS display Maidstone Museum Road Show



2008 MFMS evening meeting at St. Peters Church Hall



2009 MFMS stand at the Canterbury Road Show



2009 The MFMS stand at the Lyme Regis show

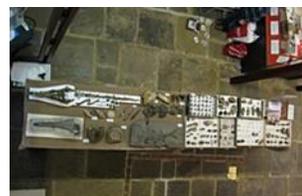


2009 View showing part of the Lyme Regis show



2009 Dinosaur exhibits evening at St. Peters Church Hall

After the society had been at the new venue for a while it seemed to start to go downhill a bit, with a decline in membership and the evening meeting attendances also declining. A number of us on the committee had noticed this happening and so decided that we had to try to find a solution to the problem. I think the causes were due to yet another change of venue, the changing interests of the members, also field trips were hardly ever arranged and the weekly evening subjects were getting stale and often much the same as usual. Most other societies only meet once a month and so only need to arrange subjects for twelve meetings. The MFMS meets about forty times a year so trying to arrange something of interest for that many meetings can sometimes prove difficult. In spite of these problems the society committee managed to come up with a better range of subjects, including more talks, for the evening meetings. Also about this time the society had a number of new members join which injected more life into it. A Field Trip Leader was appointed and a number of field trips arranged – this involved using one of the first evening meetings at the beginning of the year so that members could be involved with the choice of field trips that they wanted. With the injection of new members and the measures taken with the programme etc. the society was back on track. Today, although the membership total has dropped to about thirty five since we joined the Society it is still afloat and flourishing.



2010 The MFMS stand at the Canterbury Road Show



2010 The MFMS stand at the G.A. Show, London



2011 The MFMS stand at the Canterbury Road Show



2011 The MFMS stand at the G.A. Show, London

Sometime back in the distant past, near the beginning of us joining the MLMS, I was persuaded to become a committee member. Also later on Martin served on the committee for a number of years. I was still a serving member of the committee up until 1999 when, I don't know how or why, I was persuaded at the October AGM to become the Chairman and again the same thing happened in October 2000.

The publication and sales of our first book must have gone to my head! My successor in 2001 was (guess who) Tony Mitchell, who as you know, managed to get out of it in October 2014. Despite my numerous attempts to get out of it I am at present still on the committee. One other thing of note, in 2009 after six years of preparation myself, Martin, Tony Mitchell and Fred Clouter managed to complete and put on sale our second book, *London Clay Fossils of Kent and Essex*. To date the book has sold quite well and we are still receiving orders for it. [If anyone wants to buy a copy then please contact me or Tony]



2011 The MFMS table at an Open University meeting Ashford



2013 The MFMS stand at the G.A. Show, London



2014 Field trip to Gallaghers rag stone quarry nr. Maidstone



2014 MFMS table at an Open University meeting, Canterbury

The MLMS used to issue a newsletter, the first one was produced in March 1977 this being approximately two years after the society was formed in 1975. There have been a number of editor's over the years, these being; Miss G.Morriss, Mr. P. Rimmer, Mr. D Wharton, Mick Cuddeford, Bill Miller, David Rayner (twice) and Fred Clouter. From issue No.35 the newsletter was called 'Flint & Fossil' and this was the title up until the last issue, No.85 December 2011. From issue No.76 it was issued in A5 format. The editor of the present newsletter is Nick Baker and the title has been changed to 'Occasional Erratics' and starts from No.1. Also for the first time it is available to look at on the society's web site, [www.mfms.org.uk](http://www.mfms.org.uk).

Regarding the MLMS/MFMS part of this article this is my personal account of the society as I recall it from September 1988. If you require any details of the society prior to this then you would need to speak to Harry and Joyce Day. This is what I said in my original article which I wrote earlier this year, but as you all know and as reported in this newsletter sadly both Joyce and Harry passed away in April this year. I believe that Tony Mitchell is now the longest serving member of the society and, if needed, may be able to shed light on the earlier days of the society.

Today there are only about 6 or 7 members who were members when I joined the society, but in the past we have seen the sad loss of a number of members who I think in their time added a little bit more character to the society. Here are the names of a few that I can remember, but I am sure there are many more; Alf & Marg Woods, Bill Miller, Kath Reeves, Vi Atkins, John Watson, Jim Craig, John Best, Mick Cuddeford, Robert Stout, Bill Marshall and Joyce and Harry Day.

So here we are now, thirty eight years on from finding that fossil in Gravesend and Martin and I are still collecting fossils (amongst other things) – that is of course when we both can find the time to do so. Also it is nearly twenty seven years ago when we first began our involvement with the MLMS – MFMS. This brings me back to the title of this article – 'Was It All Worth It' – I can definitely say YES it has been well worth it. I and Martin still get a great deal of enjoyment and satisfaction out of finding, collecting, preparing, discussing, writing about and displaying fossils (sounds like 'anorak' talk). Our involvement with the Society has also given us a great deal of pleasure as we have made a lot of friends, acquaintances and contacts over the years. Let's hope that both the fossil collecting and the Society carry on for a good number of years yet.

## Visit to Brightling Gypsum Mine – March 9th 2015

Dave Talbot

Almost three years ago I visited the mine with the OU South East Geological Group, today I am returning with a small group of Medway members. The visit was arranged by Anne Padfield with the mine manager on a Monday when there are fewer operatives in the mine due to the way their shifts work out on Mondays and Fridays. There would also be no blasting.

We were pre-warned that we would be walking in, at least 2.5 kms, which was different to how we were taken in last time with the OU; that time we were transported by Land Rovers, I seem to recall there were at least ten maybe twelve of us then. So this was the main reason for me wishing to return there as, by walking, we would see so much more than we had then, with more to investigate in the way of sedimentary structures and faulting.

After preliminary safety instructions and a short DVD on mine welfare, we also had to get a short questionnaire correct; we were taken out to the dressing area where we were all given a belt with a battery pack and breathing apparatus, (Pic 1) to guard against carbon monoxide gas poisoning, and a hard hat and hi-vis vest. We were informed that it would not be cold in the mine but it may be quite dark in some places, hence the battery pack as



this had a flexible lead with head torch attached. Having got toggled up the torch clipped onto a bracket at the front of the hard hat, we were soon to see the reason for this. Just before leaving the office block we were all given two metal discs, with the same number on each, which we had to put our names against on a sheet; I shall explain further as we go.

The mine entrance is by adit, (**Pic 2**) which is usually an angled, up or down, route into a mine on the side of a hill, normally following the seam of material you are trying to extract, here however, it is to get through the clays and limestones deposited after the evaporites. Our route today takes us downward, as we enter the mine the manager stops us at a board with hooks on, this is where we place the first of our discs, this informs those who are outside the mine, the numbers of operatives and/or visitors who may be down there should an incident occur (health and safety) the other remains in our pockets.

This first part of the entrance has the roof covered by steel sheeting and is about three metres high, maybe a little less, but is away from where the gypsum conveyor exits; men, women and machines do not mix very well should there be an accident. This is also the entry for the power cable which supplies the conveyors, electrical plant and workshops down nearer the face. As we progress we are walking against an outrush of air, I ask the manager about this and am informed that they have to have blowers on all the time men are working, to spread oxygen around due to the depth of the workings from the surface. The fans draw in air from outside through ventilation ducts; this is just the excess finding its way out through the easiest opening.



Going down the ramp then we are soon in the mine proper following the course of the road used by many others before us. Hanging on the side of the tunnels are poles about a metre long with green and black bands, these are direction finders, as, if the poles are to your right, you are going in; if to your left, you are coming out. This way you should not get lost. The problem of course is getting disorientated; with nothing around you, other than walls and ceilings, there is nothing for your eyes to lock on to guide you, everything looks and is the same. After a number of route direction changes it is easy to see why this is, so knowing the position of these poles is a guide to direction.

So, having entered, and walked several hundred metres I have no idea in which direction we are now walking, we are just following the manager as he continues on; but we are keeping marker poles to our right. Other markers might be the numbers given to pillars which you would eventually learn should you work here. Also, in other recesses, spare materials and plant are stored.

Winning and removing material is on a pillar and room arrangement where pillars of gypsum and shale remain to support the roof so that very little extra steel work is needed. In some places in the mine steelwork is required, usually due to fracturing and faulting within the rock making roofs unstable. The rooms are generally extracted at 14 metre centres with 6.5 metre rooms and 8 metre pillars left behind. These pillars are adequate to support the roof without the need for other support; production is typically across a face of 15 to 20 headings wide.

Gypsum has been mined in the area for almost 140 years starting at Mountfield in 1876. A borehole drilled just before then had reached over 1900 feet, this was in the search for coal, none was found. However, seams of gypsum at 130 feet and 160 feet had and the Sub-Wealden Gypsum Co. was formed. Mining proved somewhat difficult due to its isolation from suitable road and rail networks, until a link was constructed from the London/Hastings line from Robertsbridge. Gypsum then was mined from the upper No.1 seam with output of 8000 tons/ annum, the gypsum being transported by underground rail to the mine shaft where it was hoisted to the surface by a steam powered engine.

The workforce increased as the need for more gypsum increased during the 1890's and with amalgamation with other companies and the two World Wars, demand continued. Production from No.4 seam started also; it was about 1936 that pillar and room method of extraction started. In the late 60's the mine became fully mechanised by the installation of conveyors replacing endless rope haulage which had also required an inclined drift access.

Along with the gypsum mined is a certain amount of anhydrite, which is gypsum without the water molecule, this has to be separated as it is not suitable for use in plaster production. A separation plant was installed so as to win that gypsum away from the anhydrite when demand pressures ensued. This plant operated up to the 1990's when it was closed when the Mountfield Mine also closed due to the exhaustion of reserves.

Here, I think I should say something about the geology and the formation of evaporitic sediments. Due to the age of the Tunbridge Wells Sheet BGS 303 and Memoir, 1972, I have taken information from the Hastings and Dungeness Memoir BGS 320, 1987. From this the Purbeck Group crosses the Jurassic / Cretaceous boundary; the Upper Purbeck being the

Durlston Formation, the Lower Purbeck is the Lulworth Formation, these sit conformably on the Portland Sandstone and have been proved by borehole results from Broadoak, Fairlight and Dungeness. The junction of the two Purbeck formations is taken as the junction of the Cretaceous with the Jurassic, this being the 'Cinder Bed' Member and proposed by Dr. Raymond Casey in 1963. Putting an age to this has been troubling, to say the least, for geologists – over the 'ages'. Currently the ICS (International Commission on Stratigraphy) puts this about 145.5 Ma +/- 4.0, so a span from 141.5 Ma to 149.5 Ma; a quite considerable time of 8 Ma.

The Cinder Bed was proposed due to it appearing to be the last fully marine incursion prior to the mainly freshwater deposits of the Wealden. Above the 'Cinders' the Greys Limestone was deposited prior to the Ashdown. Below the 'Cinders' the Blues Limestone formed and these Jurassic rocks are the lowest exposed in the area. Both the Blues and Greys were used for lime-burning and building-stone. The Blues lie within the Broadoak Calcareous Member, below this is the Gypsiferous Beds Member, the evaporate layers we had come to see.

Deposited in late Jurassic times, the evaporites developed in subaerial *sabkhas* in periods of low humidity, high temperatures and high salt content, where influxes of marine waters are rapidly evaporated over short periods of time. These brines deposit gypsum first followed by anhydrite and halite, depending on salinity. In between these deposits silts, limestones and algal mats may develop depending on levels of marine waters filling the basin. Both gypsum and anhydrite develop as nodules giving a 'chicken wire' or mosaic form. Gypsum takes the molecular form  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ , but as temperatures rise above 60°C the water molecule is driven off and anhydrite,  $\text{CaSO}_4$  develops.

*(In our handout from the mine the Lulworth Formation, and the age of these deposits, is given as 140 Ma; I believe this should be closer to 150 Ma given that the Jurassic/Cretaceous is 145 Ma or thereabouts and they were deposited on the Jurassic side).*

Reserves had been mined from the Netherfield inlier, as these became depleted Brightling Mine was opened up in 1963 and although Mountfield continued, it eventually had to close. As the processing plant was built on the Mountfield site, long before Brightling Mine opened, when it did a means to convey material to the plant was required. This was to take the form of an aerial ropeway bucket system, which had its own built-in problems. Thus, a different way to move the gypsum was needed; this came in the way of an enclosed conveyor which followed the same route. It was installed in 1986 and is about 4.5 kms long. Currently working the No.4 seam only, No.1 seam is not as thick, output is at 150,000 tonnes a year; it has been as much as 1 M tonnes.

At the base of No.4 seam the gypsum sits on the marine Portland Stone, on occasion this is removed for roadstone and decorative uses. Due to the marine nature of the stone many large ammonites are found within it, of which we saw as we first entered the mine and then later much further in.

As I said above, I have no idea in which direction we are going, other than downward, I also have no idea of the time it is taking, so it must be very interesting. The manager has said also we shall be stopping on the way down to look at a section which will be of much interest to us. But first he takes us into where the site electricians and fitters have their workshops and repairs area. This is just like any other working area, only it is underground, well lit with benches, plugs and sockets and a store of spares. Standing in the workshop is a large machine (**Pic 3**) for cleaning up the recesses after blasting, of loose material. This has to remove all potentially dangerous rock, especially in the roof, to make the working area safe. The machine has a reinforced cab and a long hydraulic arm with a pointed end. The end acts rather like a woodpecker's head, banging the pointed end onto the surface to remove those loose pieces. This machine, like all the plant down here, is electrically powered from a cable drum mounted on the rear of the machine; the cable on the drum is plugged in to a large socket outlet mounted away from the working area.



On our way again and every so often we have to get into the side as some vehicle or other passes by, but with our hi-vis and headlamps we are well seen, so relatively safe; best not to look directly at drivers though, as these headlamps are very bright, and may momentarily blind whoever you are looking at! Our guide now takes us to an area the mine like to show visitors where thin veins of gypsum align along fault planes and where we can see other minerals including shale, limestone, chert, anhydrite and satin spar. I have to say there is not a lot of colour in a gypsum mine, very grey, and all shades of grey. Iron staining from meteoric water does add a small amount of weak reddish-yellow to some seams.



As we proceed gradually down we now come upon the ‘Firing Booth’, (**Pic 4**) this is the cabin where wires coming from the charges set in the face, are brought up to and connected to the firing apparatus. As we get closer to the face these wires can be seen snaking along the floor and walls, remnants of a previous blast no doubt. We start to walk downhill around here where there is much faulting in the mine walls. There has obviously been movement here in the past and the roof has to have extra support in the way of steel pillars and roofing sheets. Our path gets very steep here also as seam levels change and we are steered into an area where faulting and sediments show signs of this movement.

This is a good place to see the differences in the various deposits and how they relate to each other with shale, gypsum, limestone, anhydrite – the waterless form of gypsum – and iron-staining (**Pic 5**). We spend about ten minutes here; this is the position of seams two and three in the mine and is why we have recently had to go down a

steep decent. Moving on and the atmosphere is getting rather dusty and I feel the need to place a dust mask over my face, as do a few of the others; we soon see why.

Through a tunnel two conveyors meet, where one is discharging material on to the next one, causing the dust in the air. It plays havoc with our photography as the small particles in the air reflect light from the flash of our cameras. They are like glass particles or snow flakes (**Pic 6**) and reflect all over the show.

We are now getting close to the working face of the mine and are led to another hook board. This is for the second of the discs given to us before we came in. This one tells operators we are in the vicinity and again is for safety purposes and numbers in the area. There is certainly more noise around here of mobile plant moving to and fro. We also come upon more large ammonites that are white, wavy lines on white stone and difficult to photo

because of it – do you use flash, because of the dark, or no flash and use reflected light from your headlamp? Either way it takes some practice to get good results.



Turning another corner the conveyor end is found where loose material is pushed onto a short belt which feeds lumps of rock into a crusher (**Pic 7**) where they are broken down to more manageable size for the conveying system. The crusher comprises two revolving steel drums with hardened teeth that do the breaking up as the rock meets them and is pushed in.

Some of the headings we are getting to now are the end of the line, they have been cleaned out and loose material taken; the roof has been cleared of damaged pieces so we are allowed to take a look at the face proper. Here we can see remnants of the holes the drilling machine has made prior to loading charges and lines in blue chalk are for guidance for the driller for the new ones. Looking up to the ceiling we can see how well the nibbler has done his job; no loose pieces.

In another recess (**Pic 8**) the driller is in position for drilling more charge holes. Our leader gets the operator to stop drilling and we are allowed to get in closer to see the machine ‘at the sharp end’. There is a lot of atmospheric dust and the operator needs a strong light to see what he is doing. This is the end of our visit and we walk back to the disc board and recover our discs. Our drivers are ready with the escape craft, sorry ‘land rovers’ and we make our way out.



At the mine entrance we collect our other discs and exit the mine. Disembarking from them we re-enter the office block and return our equipment and hang our discs back ready for the next group.

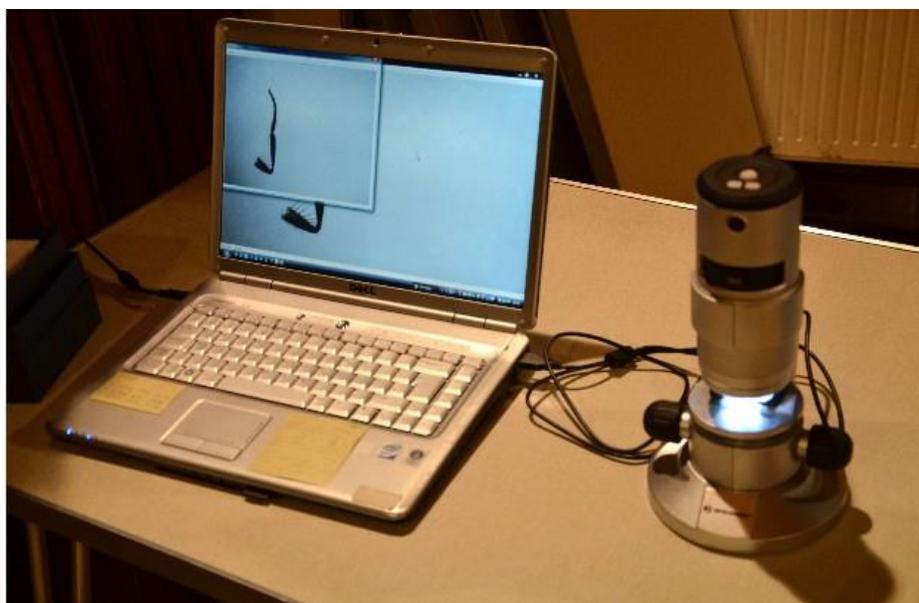
## References

- Brightling Mine, British Gypsum*, 2010, unpublished visitor notes, 14 pages.  
*Geology of the country around Hastings and Dungeness*, BGS Memoir 320, R D Lake and E R Shephard-Thorn, HMSO, 1987, 81 pages, ISBN 0 11 884411 3.  
*Geology of the country around Royal Tunbridge Wells*, BGS Memoir 303, C R Bristow and R A Bazley, HMSO, 1972, 161 pages, SBN 11 880150 3.  
*The Encyclopaedia of the Solid Earth Sciences*, ed. P Kearney, Blackwell Science, 1993, 713 pages, ISBN 0 632 03699 0.  
*The New Penguin Dictionary of Geology*, P Kearey, Penguin Books, 2001, 327 pages, ISBN 0 14 051494 5.

## Photographing fossils demonstration

March 4<sup>th</sup> 2015

On March 4th the subject of the meeting was photographing fossils. That is to say, photographing them in such a way that the viewer of the photograph can gain as much information without handling the actual fossil. Tony Mitchell and Fred Clouter gave the demonstrations. James Downer gave us some input on the micro end of the scale.



The photo (left) shows James' set-up using a Bresser microscope connected to a lap-top computer. An insect leg is shown on the screen. This static USB set up appears to be much more stable than using the, much smaller, USB microscope, where the scope is held over the object. Different models may also require different software.

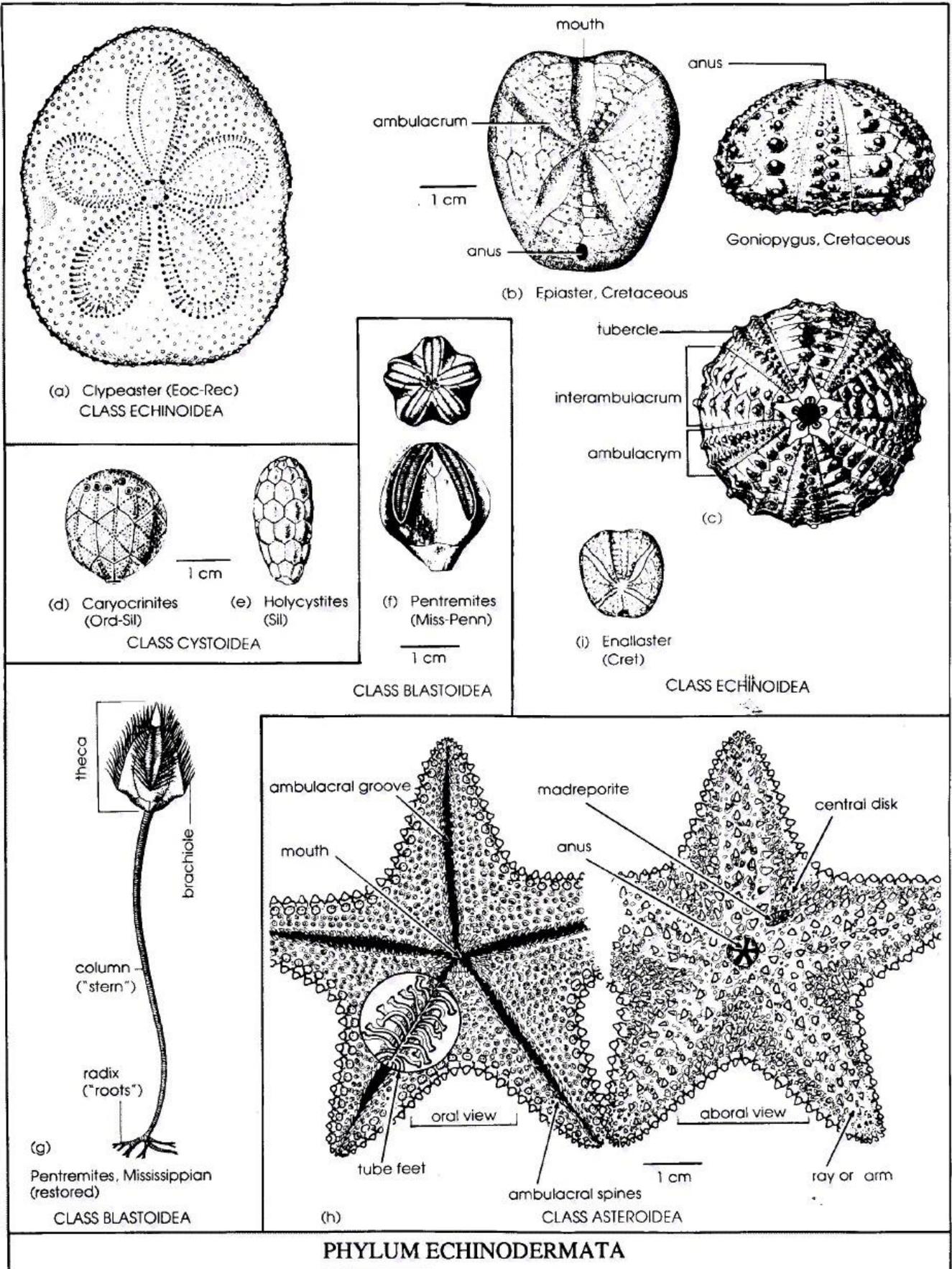
A photograph of a fossil must give some idea of the fossil size. Something (ideally a ruler) must be positioned as near to the fossil as possible, but this must be done while avoiding the 'distance distortion' that can be caused by the position of the camera in relation to the subject and the ruler.

There is, then, the Nick Baker method.  
1 Measure the fossil. 2 Photograph it. 3 put a scale bar on the photograph!

There can be problems with this as well!

# ECHINODERMATA

Fred has reminded me that it might be time to learn a few fossil parts. In this case it is the Echinodermata—sea urchins, star fish, and crinoids (sea lilies).



## Fossil Show at Rochester Guildhall Museum May 23<sup>rd</sup> 2015

It was late last year that Ann Barrett alerted us to the needs of geo-conservation, not just in terms of geological sites but also public awareness of the geological science. And so, this event had its birth. The event was jointly run by **The Medway Fossil and Mineral Society** and **Geoconservation Kent**. Several members of the two societies ran exhibits. **Gary Woodall** ran the 'ask the expert' desk, with his very aged and wise assistant! **Tony Vale** and **David and Martin Rayner** exhibited their general collections, as did **Paul wright** and **Fred Clouter**, - Fred specialising on Gault Clay and London Clay specimens, while **Yours Truly** took charge of Chalk and micro. **Ann Barrett** ran a lucky dip stall. **Dianna Franks, Ray and Wendy Cooper and Amanda Bird** helped run the Geoconservation Kent desk, explaining their work in helping to conserve geological sites, and extend geological knowledge.



According to Stephen Nye (museum conservator) 409 members of the general public visited the show. At one stage, Ann went out to the High Street to hand out some advertising bills, which did boost the numbers quite a bit. For myself it was quite an eye-opening experience from the other side of the desk. Very few of the visitors seemed to have any exposure to geology, indeed, probably little or no exposure to science in general. Some asked why chalk fossils were manly white (the colour of the preserving mineral).



When looking at the micro aspect, they were often surprised to find that fossils could also be very small!

May I take this opportunity (on behalf of Kent RIGS and MFMS) to thank Stephen Nye for helping with the publicity and providing the space at the museum, thus making the event the success that it was.



# Methods in Micropalaeontology

## a short overview of microfossil collection and storage

Nick Baker

We are in the realm of soft rocks. In geology, soft usually means sediments, while hard usually means igneous and metamorphics. In this operation I am bringing the boundary down within sediments. Soft will include unconsolidated sands, clays and soft limestones and chalks. Most chalk is workable, but hard crystalline chalk is not, and I'll explain why in a moment. What is needed is for the rock to be rendered down to a sludge so that the rock particles will pass through a sieve, while the micro fossils are held back in the sieve, which means it is time to list the equipment needed.

As far as equipment goes, you do not need an expensive **microscope**. You do need some sort of microscope. I started out trying to do this work with a hand lens, but it's not enough. The microscope I got from Geosupplies, in 1995, still serves very well. You will need a set of **sieves**. I still use some 20-year old small nylon ones, but you may want to go as far as large steel or brass versions. These will be more expensive (c£100) but it is possible to get by with just two sizes –say, 250 microns and 1mm. A **picking tray**, for examining the final dried samples, is a help in that it gives some order to your search. These can be obtained from a company called Biotech Microslides, based in Sussex. Picking out fossils is best done with a fine **sable brush**, such as those used by watercolourists. Fossils collected are best stored in **clear gelatine capsules** (a company called Davcaps, based in Monmouth, can supply these in various sizes). You may want to mount some of the fossils, and Biotech Microslides sell those very items, ranging up to 64 cells per slide, with white or black backgrounds.



So, what about the rocks? We are talking about soft sedimentary rocks, but not exclusively so. The Palaeozoic formations have the least soft rocks, but some of the softer limestones of the Silurian (such as at Wren's Nest) are as rewarding as the Tertiary. Some Palaeozoic harder limestones may be rich in teeth and bones and can be treated using techniques involving acetic acid. This also applies to the Triassic - Rhaetic Bone Bed. Many of the formations from the Jurassic onwards respond to the techniques described below.

So, what of the different rock-types? **Sands**, devoid of clay content, can be sifted directly in water, or dry sifted, but any clay content leads to challenges. The problem with **clay** is how to break it down. Drying clay at between 100-200C will cause the mineral lattice to break down and the subsequent addition of water will then cause most or all of the clay to disintegrate to a fine mud. Any that does not go through the 250-micron sieve can be reprocessed or given some chemical treatment. Most clays will (after drying)

disintegrate in a solution of Calgon, or by boiling in washing soda. Use the latter method as a last resort, since it can be hard on fragile fossils and carbonaceous ones. There is also the paraffin method. This involves soaking the dried clay in paraffin, filtering off as much of the paraffin as possible and then hitting the clay with boiling water. The method is highly efficient but messy and is not recommended for flat-dwellers! Small quantities of resistant clay can be reduced with hydrogen peroxide, but recent events have made the acquisition of this chemical somewhat troublesome. You may be questioned as to why you need it! Peroxides also tend to destroy carbonaceous fossils. I prefer the sodium sulphate method.

After drying, clay or soft **chalk** can be broken down by repeated freezing and thawing in a solution of sodium sulphate. This reagent (once sold as Glaubers Salt) is now, harder to get, but not impossible. You can make sodium sulphate by adding powdered gypsum to boiling washing soda solution. Remove the washing soda solution from the heat source before adding the gypsum – a lot of extra heat is given off in the process. You then filter off the solution and it is ready to use. The amount of sodium sulphate present is uncertain and if you can get the pure reagent, then do so. Most clays and some chalks will reduce in just one or two sessions of freezing or thawing. If nothing has happened after six sessions or so, then it's not going to break down. Sodium sulphate does not usually cause any alterations in the minerals in your sample. Washing soda will change any gypsum into calcite. You can ascertain whether chalk is suitable – Dr A. J. Rundle favours driving a chisel into wet chalk – if a fine sludge wells up either side of the chisel, then the sample is OK. If it breaks into discreet lumps, then not so. The reason why the process does not destroy the fossils is the same reason it does not work on hard, semi-crystalline chalk. The solution cannot penetrate solid calcite.

The reduced rock should be filtered from the chemical solution and the sieved samples washed thoroughly. This applies to all of the above methods. **Harder limestones**, where there are silica or phosphate fossils, as in bone beds, can be reduced with acetic acid. Distilled vinegar can be used but will take a long time, so concentrate on small samples in this case. Do not use hydrochloric acid, as this dissolves the phosphate in bones and teeth.

When sieving the sludge I find the best method, and the quickest, is to use the 250 micron sieve first of all, otherwise, if you start using the large sieves on the whole sample you will have a sludge following you down all the time. You will need only to use a small fraction of the finer sample and at the end of the process you will have a large amount of surplus fine sludge. The water should be filtered off and the sludge disposed of as 'dry' rubbish and NOT sent down the drain. Newsheet makes good rough and ready filter paper. The fossil residues should then be dried.



Small amounts of residue should then be sprinkled onto the picking tray. Picking out fossils from the residues is an acquired skill. Do not sprinkle the residue too thickly on the tray, work on a thin spread, since this makes fossils easier to see. Using the moistened fine paintbrush under the microscope is a skill of it's own but is not that much different to using a computer mouse! A steady hand is also a great help! Place the fossils on a light or dark card, ruled into sections for different fossil groups. Some fragile fossils will need strengthening by impregnation with a hardener. I favour Butvar in acetone or xylene. The larger fossils can be cleaned of any rock still adhering. This applies to the larger fossils. Don't try to clean small thin shells. Unless you are very skilled, they won't survive your intentions!

The fossils can then be stored in clear capsules, in turn stored in labelled plastic bags, or you can mount them directly on to microslides. This is, again, an acquired skill. Various adhesives can be used to mount the fossils, either spirit or

water-based. I favour the use of diluted water-based PVA craft glue. Larger fossils may require something such as bostic in acetone.

When mounting fossils on slides give attention to what you put together. For chemical reasons try not to put pyrite with calcite- unless you know that the pyrite is stable. The breakdown of the pyrite can destroy the calcite fossils. Avoid these situations and calcite, phosphate, and silica fossils will last a long time, hopefully many decades. Carbonaceous fossils

**20120919\_01\_1**  
**UPPER CHALK**  
**Cretaceous-Santonian-**  
**Coranguinum zone**

**Nick Baker colln**



**Rabbit burrow on north edge of wood, 600m and 180° from the road junct at Meresborough, Kent.**

**TQ 8203 6367**  
**20120919**

can be preserved by covering them with a drop of butvar-in-xylene.

Label the slides with as much detail as possible, such as place, strata etc. I number my slides with the date and sample number and then slide number e.g. 20120919\_01\_1. Try and identify as much as you can and make some sort of listing. If done on computer, this can be updated as your knowledge of the items increases.

In many cases you will not find all there is to find in a sample. So, it will be worthwhile to save remaining fossiliferous samples in storage tubes. 25x75mm is a useful size. Watkins and Doncaster (watdon.com) supply these. This may lead you on to a study of any micro-mineralogical aspects in the material left over from the first investigations.



## Can evolution work in reverse?

Nick Baker

This account was prompted by an article in the *KGG Newsletter* (2006). The article entitled—*Evolution: Is it working backwards?*, was by a lad named Nathan Nicholls, who was 14 in 2006. He gave a talk to the KGG in October 2005 on this subject, which I appear not to have attended. Nathan refers to the *Glitch*, - a retro environmental change that would throw evolution in reverse. He expands this as follows—*'If the planet's environment changes to one that has previously existed, then life will evolve towards a primordial stage, as a result of the ecosystem working backwards'*. The problem is that this is not how evolution works, and, surely this environmental change happened several times, and evolution, if anything, went on at a greater pace. Nathan also seems to have completely disregarded Lovelock and the Gaia Hypothesis .

He gives an example of an ice age and its effect on a tropical forest, such as the Amazon, speculating that it would be reduced to grassland. Well, ice ages have occurred in the past. In the Permian ice age, the coal forests were reduced but not eliminated. Climatic zones were squeezed but the equatorial zone did not 'drop off the edge'. The latitudinal climate controls were still in place. The evidence is strong that the atmospheric structure (in terms of pressure distribution) was the same as it is now. The inter-tropical convergence zone was still in place, and so were the forests. In the Pleistocene, the grasslands between the Kalahari and the Congo Forest would have expanded into the edge of the forest during the glaciations, making new challenges for the forest-dwelling apes. This was evolution advancing, not going into some sort of retro.

He goes on to speak of the Cretaceous, where he states that there were *no ice caps*. Now, whatever the content of the atmosphere, in terms of greenhouse gasses, six months of polar darkness would produce a seasonal ice cap of sea ice, which might be permanent in some years. Temperatures below 0C would be hard to avoid. There is certainly evidence of ice in parts of Australia, which was at 60S in the Cretaceous. He goes on to speak of *widespread volcanic activity, which poisoned the land—otherwise the dinosaurs might have had a better chance against that asteroid!* Apart from the Deccan Traps, I have always had the impression that the Cretaceous was relatively quiet.

He then says that *after the mass extinction there were tropical rain forests all over the earth—* (no doubt even where the solar angle was less than 10 degrees?) *Then a giant El Nino caused by the poles freezing over for the first time (?) due to the Earth's distance from the sun, made the climate cooler and drier.*

I will make one final quote, from para 10

*One of the main reasons for there being so little life on earth, is that over time there have been many mass extinctions. So little life on earth???? Perhaps it was because of those mass extinctions that the earth is now teeming with life—(or will continue to be if we give it a chance).*

Yes, it would be easy to criticise Nathan's ideas and assertions. For myself, I would urge Nathan to consider the claims of Lovelock. There is good evidence that the evolution of life on Earth has changed the Earth's environment. So does evolution run in reverse? Well, first I will quote from one of Nathan's opening statements.

*Charles Darwin and (Alfred Russell) Wallace, in their theory of Natural Selection, predicted that over many generations a species will change to adapt to a changing eco-system'*

At first sight the statement sounds more Lamarckian than Darwinian. The species itself is quite defenceless in the face of change. A mutation occurs, which may or may not be favoured by the environment. The species can do nothing of itself, unless, as in the case of *Homo sapiens*, evolution becomes conscious of itself. For the first time, evolution is now conscious. We are no longer *totally* at its mercy. It is a question as to whether that state was reached by Darwin's discovery, or by the evolution of ego-consciousness. I favour the latter. If evolution has a target, could ego-consciousness be that target? Such a question has religious aspects. I am not an atheist, but this cannot be my pulpit! - yet, in spite of Professor Dawkins, the teleological questions do not go away. But, what of the original question? If evolution is teleological, then the answer is no! But, lets look closer. Evolution is an emergent process. It is forever producing new life-forms out of those already existing. But it is not determinist at every stage. Any causation would have to exercise *kenosis* (Self limitation). In order to get from Higg's Boson to ego-consciousness, and result in a myriad of life-forms on the way, one would need a *free-running, all possibilities* program.

Nathan's *glitches* have occurred and each time evolution was presented with new possibilities. The survivors of those glitches were also subject to all aspects of change. Many would not survive, but many would also go forward. Evolution is still building on the past, however catastrophic the events. Evolution, proceeds forward in this respect—that it proceeds forward to greater complexity. Reversal is towards simplicity, and simplicity has a limit. Complexity has infinite possibilities. There are three options. Remain simple, increase complexity, or become extinct. But extinction is not an aspect of evolution. Whatever the environment does, a decrease in complexity is not an enticement. In the light of this, *evolution is forever forward.*

# The Knockmill Enigma

Nick Baker

First of all, where is Knockmill? Well, don't blink if you are driving because there are no road signs saying 'Knockmill City Limits'. This is a cluster of farms northwest of Wrotham and about 2km S-SW of West Kingsdown. So, we are on the top of the downs, in Clay-with-flint country, but not quite that because we are dealing largely with flint pebbles in a sand matrix. Rounded flint pebbles are not uncommon on the high downs, and are usually mapped as disturbed Blackheath Beds. It is thus to be expected that fossils are as good as unknown, but if you are interested in quartz, then the following is for you.

The Knockmill outlier is situated on the east side of the hamlet of that name at a height of about 210m. above O.D. It is the largest of the three that are situated east of the Darent, extending over 800m from north to south and 400m from west to east. The material is the usual sandy pebble bed with round pebbles of dark flint, formally seen to a depth of 6m. in a pit on the south-west side of the road between Knockmill and Crowslands (the road now called St Clere Hill Road). In a sink-away, at Hollywood House, coarse pale-yellow sand with pebbles is said to have been proved to a depth of 20m, presumably in a pipe. There are several small pits showing pebble beds scattered about the wood.

The chief peculiarity of the outlier is the disintegration of the flint pebbles seen in a part of the large pit just mentioned. The disintegrated flint forms a very compact mass which, when broken into is found to consist largely of flint pebbles, all pure white out-side, and mostly whitened throughout, embedded in a stiff gritty siliceous paste. These whitened pebbles can be cracked easily with a hammer. Many are even as white and almost as soft throughout as Chalk, and may be cut with a knife or crushed with the fingers. Some have even crumbled to powder. Those which retain their shape may show, when split open, patches or perhaps small cores of black or grey flint shading off gradually into the surrounding white cortex. The mass of disintegrated pebbles does not merge gradually into the surrounding pebbles. Its boundary is fairly sharp. But nearly all the pebbles in the pit showed some alteration and specimens may therefore be selected which range from dark almost to black flint through every shade of grey and greyish white, to the pure white pebbles and silica powder in the most highly altered mass. The compact white paste enclosing the white pebbles can be separated by levigation into (a) milk-white quartz sand, (b) pure white siliceous powder, so fine that it will remain for hours suspended in water, (c) a still finer powder, which will remain in suspension for many days. The white paste is therefore composed of powdery silica derived from the decayed flints, mixed with quartz sand (originally present with the pebbles) which has lost its usual yellow tint by the same action that has whitened and disintegrated the flint pebbles.

It is noticeable that the pebble beds in the pit show signs of downward sagging suggestive of collapse into a solution-pipe in the Chalk. The disintegration of the pebbles is probably due to percolating water. It was suggested that the water may have risen, but even if water could rise through the Chalk at this point, it is hardly conceivable that it would rise through sandy pebble beds in a pipe; against water percolating from the surface. The disintegration does not quite reach the surface, but that is a phenomenon frequently observed in connection with the percolation of surface water. In any case it is necessary to assume the presence of an alkaline water to dissolve the colloid silica of the flint, but the source of such alkali remains unknown. Alkaline waters have been found in the Chalk, but only where a thick covering of Tertiary beds is present.

To the north of the outlier blocks of conglomerate are abnormally frequent for the district. These are formed by the deposition of colloid silica in the pebble bed, the silica removed from one spot has been redeposited in the immediate neighbourhood, a result easily accounted for by the action of carbon dioxide on a solution of alkaline silicates. A somewhat similar disintegration has been noted in the pudding-stone of the Reading Beds, north-west of London, near Radlett, where both the pebbles and the siliceous cement have been bleached and disintegrated. In an old pit on the opposite side of the road an excavation showed in 1921 some 2m. of the siliceous paste with no trace of pebbles remaining, the sand and pebbles here have been dug for many years.

Most of the previous observations were made at the time of the BGS surveys, prior to 1924 (1). 90 years on I have not been able to ascertain the status of any remaining exposures. Further investigations are called for. We are all aware that silica, even as pebbles. can be worn down to grain size, but the idea of large pebbles disintegrating is difficult to account. Alkaline conditions are suggested in the forgoing account, but what about that, plus tundra or permafrost, perhaps in a frequent freeze-thaw situation? And then giving quartzose silt in clay-size particles.

The Geologists' Association had a field trip to the site on September 17th 1932 but came to no new conclusions. Under the right (alkaline) conditions, the colloidal component of flint will dissolve, leaving the crystalline component as fine silica sand. It would remain to ascertain the cause of the alkaline conditions, and why in such a localised area.

Ref (1) *The Geology of the country around Dartford*. Dewey H., Bromehead C., Chatwin C., Dines H., HMSO 1924

## Spring Roundup

- Jan 14 A members evening but nobody brought anything. None the less, everyone enjoyed the get-together after the Christmas break.
- Jan 21 Field-trip planning
- Jan 28 One of our geological period themes—Lower Jurassic. Several members brought specimens.
- Feb 4 The theme was Trilobites
- Feb 11 Ann Barrett's recent trip to Goa, on the occasion of her son's wedding—also provided material for her talk on *The Geology of Goa*
- Feb 18 A silent auction
- Feb 25 A do-it-yourself evening. The planned talk on the *Evolution of Marine Predators* did not take place.
- Mar 3 The Annual Evening Meal took place at Wetherspoons, Maidstone
- Mar 4 Photographing fossils—see photo-report on page 13
- Mar 11 Prof Matt Friedman gave us the results of the scanning performed on some of our fossils (mainly fish and crustacea) from last autumn
- Mar 18 Anne Padfield gave a talk on *The Geology of the Caribbean*.
- Mar 25 James Downer gave a talk on Devonian fish
- Apr 1 Minerals
- Apr 22 Upper Jurassic theme
- Apr 29 Cephalopods—(other than ammonites)
- May 6 Anne Padfield on Geological Maps
- May 13 Do-it-yourself evening
- May 20 Ammonites
- May 23 Fossil show at Rochester Guildhall Museum.— see photo-report on page 15
- May 24 Field Trip to Cliff End, Sussex
- May 27 James Downer gave a talk on *The Copperas industry of North Kent*
- Jun 3 James Downer gave a talk on *The Cambrian Period*
- Jun 10 Lower Cretaceous theme
- Jun 17 Nick Baker - *A British Stratigraphy in 40 Pictures*
- Jun 24 Isle of Wight fossil localities—a talk by Fred Clouter
- Jul 1 A visit to the Rochester Guildhall Museum
- Jul 8 Fred Clouter, on Gault fossils.
- Jul 15 40th Anniversary party and raffle.

## Autumn Program

- Sep 16 General activities evening
- Sep 23 Upper Cretaceous fossils - Tony Mitchell
- Sep 30 Canyonlands - Dave Talbot
- Oct 7 Canyonlands - this is in case I can't get to the previous meeting
- Oct 14 Minerals, rocks and fossils with spots or stripes - all members
- Oct 21 History of fossil collecting on Sheppey - Fred Clouter
- Oct 28 AGM
- Nov 4 MFMS 40th anniversary - cakes and stuff - all members
- Nov 11 Focus on gastropods - all members
- Nov 18 Specialist maps - Anne Padfield
- Nov 25 Photo display, any topic - all members
- Dec 2 Geology in Armenia and area - Tony Mitchell
- Dec 9 Finds of 2015 - all members
- Dec 16 End of year party - food, cake etc - all members
- 2016
- Jan 13 Restart general activities - all members
- Jan 20 Tertiary volcanics - James Downer

