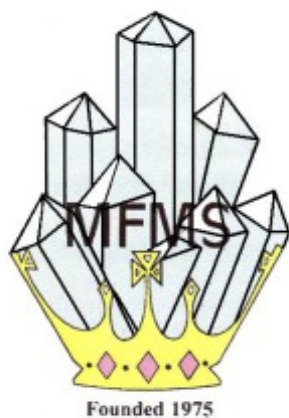


Occasional Erratics



Culand
Nick Baker 2018

Newsletter of the
MEDWAY FOSSIL AND MINERAL SOCIETY



www.mfms.org.uk

No. 10. July 201

I am obliged to add the following, to all those members of the Medway Fossil and Mineral Society, who receive this communication by direct email or by post, under the provision of the General Data Protection Regulation (2018)

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

Cover picture

The Culand Chalk Pits, Blue Bell Hill, Kent (a photo edit and drawing by the editor)

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Editor's notes.

This time round I have a report on two road shows. A focus on the Lower Culand Chalk pit. An item on Table Mountain (Gary Woodall) and memories of the 1999 solar eclipse (Ann Barrett). For reasons of file size I am delaying the 'Flint Report' until the next edition.

At the beginning of May, Carol Burr passed away. She and her husband, Ken, were members of the Society for several years. I have this message from Ken.

Carol Burr 13th June 1945 to 30th May 2018

My wife Carol died quite recently after a very tough two year battle with melanoma.

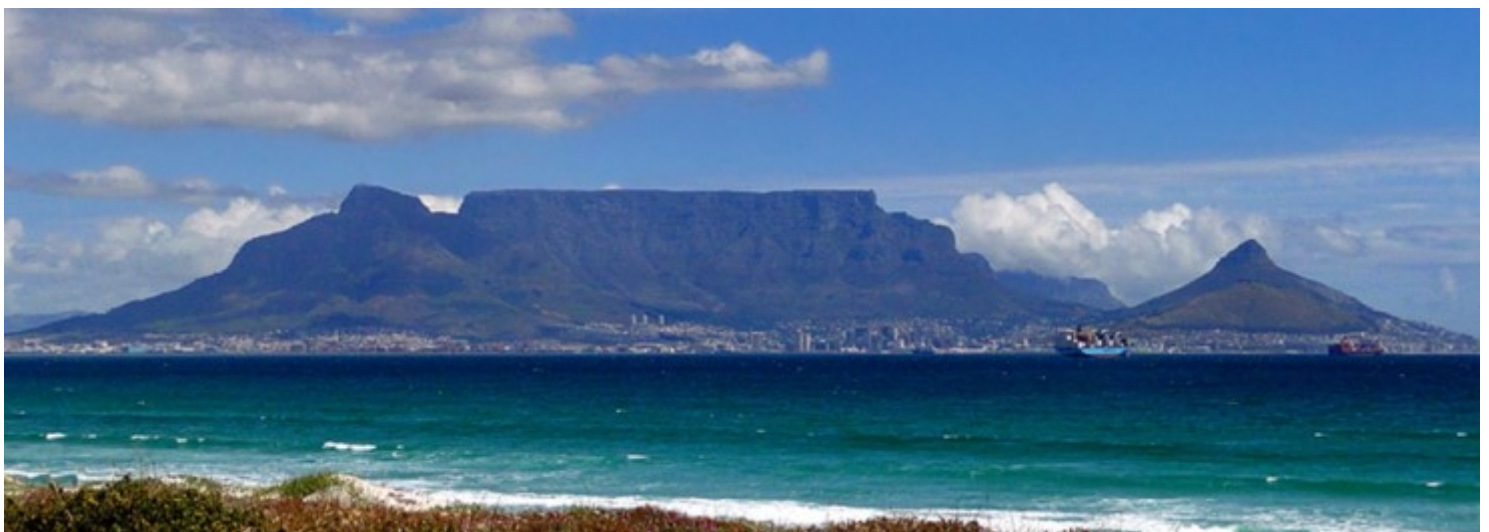
As ex-teachers and general naturalists, rather than geologists, we both joined the MFMS just a few years ago and very quickly found ourselves amongst a marvellously friendly group of 'experts', generous in answering our simple questions and fun to be with. Carol loved the meetings and the friendships. Her big moment was finding a large fossil lobster in the mud at Seasalter. She marked the find by sticking her best comb in the mud and shouting very loudly! The fossil was beautifully prepared for free by a kind member and has pride of place in the house. Thank you for the kind cards and condolences that were so much appreciated.

Ken

TABLE MOUNTAIN

Gary Woodall

As most of you know, we went on a tour of South Africa in October 2017. the tour started in Cape Town and one of the main attractions is the famous Table Mountain. It can be seen from most parts of the city and is often covered in its table-cloth of clouds, even when the rest of the city is in bright sunshine. One of the 'must do's' when on holiday there is to take the cable car up to the top which affords spectacular views and good walking opportunities. But how did Table Mountain form and why is it flat on top?



Looking at a Geological section of Table Mountain shows that the top is formed of sandstone, underlying this is a mudstone layer called the Graafwater Formation and underlying all this, and indeed most of the Cape of Good Hope peninsular is the Cape Granite.

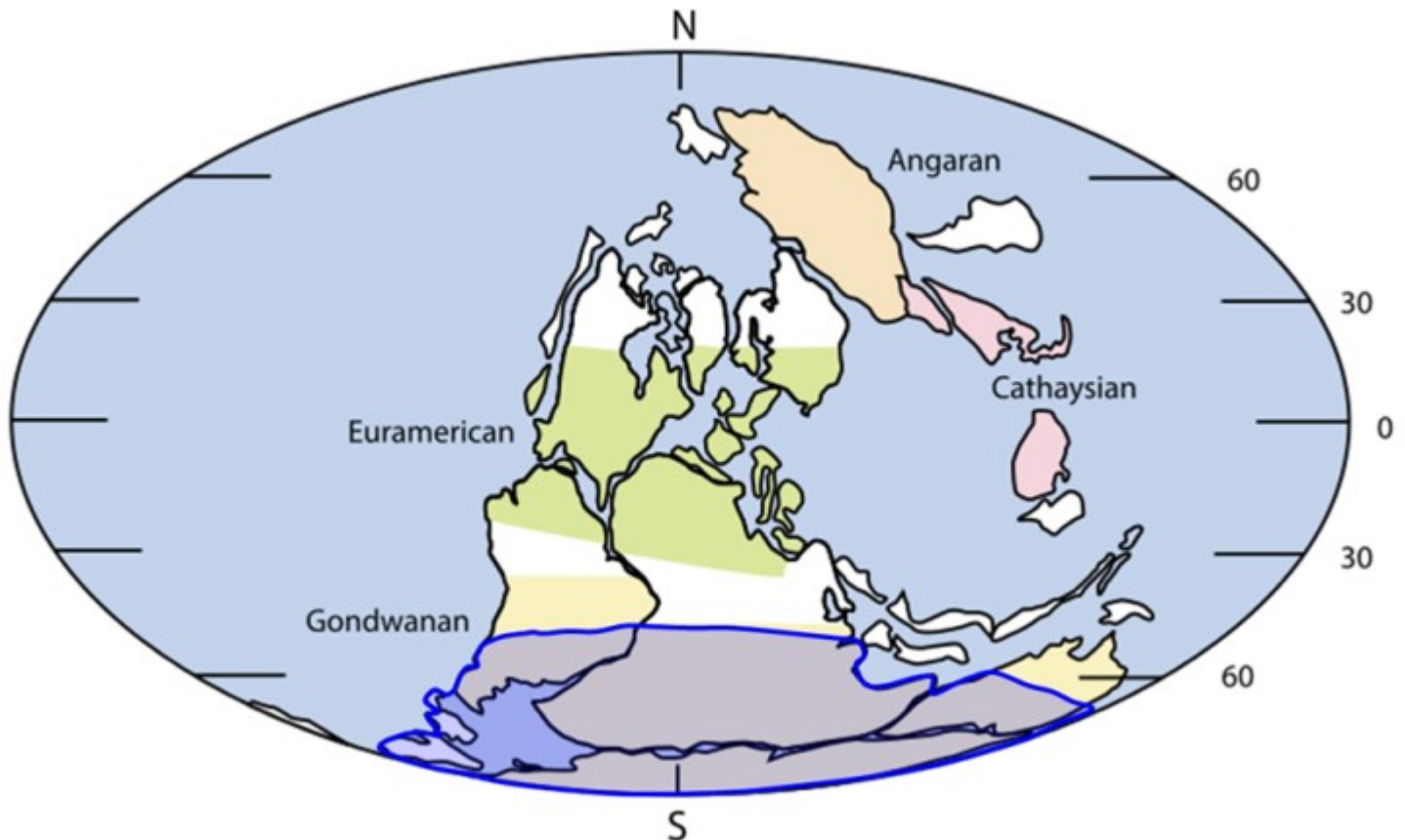
The Cape Granite was originally intruded as a huge batholith some 630 million years ago, in the southern part of Gondwana. A rift valley eventually formed between the land mass that would one day become Africa and the Falkland Plateau. The rift valley eventually became flooded and the Graafwater Formation and the Table Mountain Sandstone were laid down between 500 and 400 million years ago. By now the continents had moved toward each other and formed a super continent called Pangea. This caused the region that would become the Cape Peninsular to lift up and become land.



Geological Section of Table Mountain

EXTENT OF THE KAROO GLACIATION

Then 360 million years ago one of the major glaciations, The Karoo Ice Age started and huge glaciers covered the whole of southern Pangea. The glaciers eroded the softer sandstone into a flat 'table' that would eventually form the top of Table Mountain. The glaciations ended about 260 million years ago and coincided with the break-up of Pangea into the North American/EuroAsian continent and the new Gondwana.



This break up caused mountains to form in various places, including the area that would become Southern African and so Table Mountain came into existence. It would survive the later break up of Gondwana into South America, Australia, Antarctica, India and Africa, due to the very robust Granite underlying the region.

When visiting Cape Town a trip to the top of the 1085 metre high mountain is a must do activity. This done via a cablecar which rotates as it goes up so everyone gets a good view. The views from up there are spectacular and many walks around the area can be undertaken. However on many days the prevailing wind from the ocean can cause clouds to form the classic 'tablecloth'. When this happens the mountain is closed as you cannot see very far. During the 3 days we were there the tablecloth covered the top for 2 and a half. Luckily we managed to get up in the late afternoon of the second day.

An Eclipse Experience 11th August 1999

Ann Barrett

Almost 20 years ago, I drafted an account of the total eclipse for the 'Flint and Fossil' magazine for the Medway Lapidary and Mineral Society as MFMS was then called. I recently discovered it during a paper clear-out, so here it is albeit rather late!

Due to a rather unpromising weather forecast for Kent and being close to France, we decided to try our luck on the other side of the English Channel. After torrential rain in Saint Omer overnight, we left the hotel at 6am beneath a dull, drizzly sky and gloomy prospect. The relative darkness was due to the hour's difference between UK and France, reminding us of autumn rather than summer!

We decided to drive southwards towards Abbeville. At first, the road was surprisingly empty, but it wasn't long before the traffic increased, becoming much faster presumably due to the impatience of the longer distance drivers, particularly from Belgium, who began to overtake us. It added to the growing and tangible sense of excitement. After briefly becoming lost in Abbeville, we took a break at a café - tabac. The place was buzzing with foreigners - we had been wondering where the English were - they were obviously all in Abbeville! The poor staff were overwhelmed with the sudden influx of early morning customers and were finding it difficult to cope with the orders.

After Abbeville, we headed away from the coast towards a small town called Poix de Picardie, judging there would be a better chance of viewing the eclipse inland. Keeping a lookout for likely parking places, we finally came up onto a plateau and pulled into a roadside layby. Close by, behind us, were the remnants of a World War II airfield, although the fields of maize and corn stubble did not betray any evidence of it. As we investigated behind the hedge next to the layby a breath-taking view unfolded westwards. Below us was a valley and at its far end nestled a small village. Beyond were low, rolling hills of golden corn stubble, interspersed with dark green woodland as far as the eye could see.

Also out to the west appeared a tantalising hint of improving weather conditions - a bright band of blue sky! We then prepared for a long wait during which we shared knowledge and experiences with other travellers. All the while watching the clouds anxiously and discussing the weather.

It seemed that there were two weather systems at play or rather in collision! That original high band of blue in the west, within a fine white 'mackerel sky', was definitely gently moving towards us and slowly growing larger. Would it arrive in time?

Below it, a cool, brisk breeze was bringing thicker low, grey cloud in from the North and appearing to be winning the battle of the clouds! Decisions...should we stay put or jump in the car and drive off to the band of blue? With memories of 'swapping to the wrong queue' law we decided to stay put.

Around 11 a.m. French time, using goggles, we spotted the first contact then watched the slow progress of the partial eclipse through gaps in the lower cloud roughly every 5 minutes. Eventually, it began to feel cooler and after all the waiting, we were struck by the immediacy and inevitability of the event.

Late into partiality, we were abruptly aware that **the wind had totally dropped (1)** and the lower cloud had been somehow pushed away. The sun was now shining through the very high cloud which had become so fine, that even shadows were evident.

The combination of fine, high cloud, the weakening of the sun's rays and our position on the edge of a bright yellow corn stubble field bathed our surroundings in a glow of golden light. This was a stunningly beautiful sight and affecting all colours, including skin tones, which strangely made us all look quite ill!

We had heard that reaching the start of totality, we would see the moon's shadow rolling in at **2000 miles per hour (2)** from the west, so we spent our time between scanning the horizon and glancing at the encroaching moon. So much to look out for and not miss. All at once someone whispered, "Here it comes..." and truthfully, as I check this through almost 20 years later, the hairs on my arms are again standing on end with the memory of that spine - tingling feeling of expectation and awe.

Far away to the west, the bank of clouds, which must have been at the coast, had suddenly **darkened (3)** and it was as if a dimmer switch turned down all the light! As we looked up towards the sun, in an instant, **the corona (4)** flicked on and flared out as we all gasped in astonishment! After the morning's heavy cloud cover no one had expected to be rewarded with such a breath-taking sight. In spite of the persistent fine hazy cloud, we saw the black orb of the Moon surrounded by a thin, bright, white band of bubbling, seething light which obviously consisted of solar flares. Surrounding this, in turn, was a huge, round halo of the white glowing corona, the width of which was at least the diameter again of the moon.

The extent of that was a great surprise. Either side of the Sun, Mercury and Venus were both visible, although it was not completely dark. As the last rays of the Sun had disappeared, all had grown quiet save for the buzzing of a disorientated bumble bee flying past drunkenly at breakneck speed and the crowing of a confused cockerel from a nearby farm. From our high vantage point, we could see the whole horizon which had taken on the hue of the lowest last yellow and red vestiges of a typical sunset - yet equally all the way round. It was like being in a gigantic planetarium. Then silence, which was yet again broken by the low, plaintive warbling of some disturbed nocturnal bird.

After well over a minute, we became aware that even the high cloud was moving and just before the end of totality, we then saw the eclipse in a crystal clear sky which brought out the already fine detail of the flares into sharper focus.

The ensuing appearance of the **diamond ring effect (5)** was dramatic. Its piercing white brightness seemed to surpass the brightest firework flare or welder's torch and instinctively we looked away. Totality on our little part of the planet was over. The dimmer switch came on and everyone started chattering - astonished at how fortunate we had been - whilst gazing on the landscape as it became more visible and acquired colour once more.

As we strolled up to a small tree by the roadside, we observed, underneath it, on a piece of card, many miniature crescent suns caused by the **pinhole camera effect of the leaves(6)**.

A few hours later, as we sat on a sandy beach south of Calais watching the crowds of sunbathers, kite flyers and dog walkers, we were still talking about our experience on that quiet Picardy hillside. I remember having read about someone's experience in a magazine and how tedious they warned the build-up to totality would be. I strongly disagree! The hide and seek game those clouds played with us and the eventual way nature seemed to disperse them, like drawing curtains indoors at dusk, seemed a gift just for us. which made the whole experience yet more wondrous, exciting and magical.

Later we learnt how fortunate we had been, as that cloud we had spotted in the distant west. was obscuring the view for those watching on the Normandy coast and furthermore, skies inland had also been very overcast.

And what of future total eclipses? Well the whole of the UK will be plunged into darkness..... up to 90% eclipse in 2026 but you will have to wait till 2090 before the next total eclipse in Britain

Comments (Ed)

1

The sudden light wind will depend on the prevailing weather. On convective days the cut off of heat will kill off thermals and also the breeze between them. On the day in question, the slack pressure gradient would have made Ann's observation most likely.

2-3

Given that the earth is rotating in the same direction that the moon is orbiting, the actual speed will be moon orbit speed minus (Earth equatorial rotation (Latitude Cosine)). For 50 degrees latitude...

That is 2288 minus (1040 (.6423)) = 1620 miles per hour. Approx 730mps. Ideally, you do need that open landscape for the 'dimmer switch' effect to be fully appreciated.

4

And it is at that moment that the corona appears, which perhaps overrides the 'dimmer switch'. Only during totality is this seen.

5

And then the 'diamond ring'. It probably occurs twice - at the beginning and end of totality when the last and first arc of the sun is exposed. Again I suspect that the beginning is overridden by the sudden appearance of the corona.

6

I saw this effect on the day in London. A lot of plane trees, and the light on the pavement from between the leaves all in the form of little crescents. We are attuned to normal shadows produced by a circular light source. Any change from that and anything can happen. Photos supplied by A. N. Preston and A. Barrett (1999)



Photos supplied by A. N. Preston and A. Barrett (1999)

Focus on Lower Culand

Nick Baker

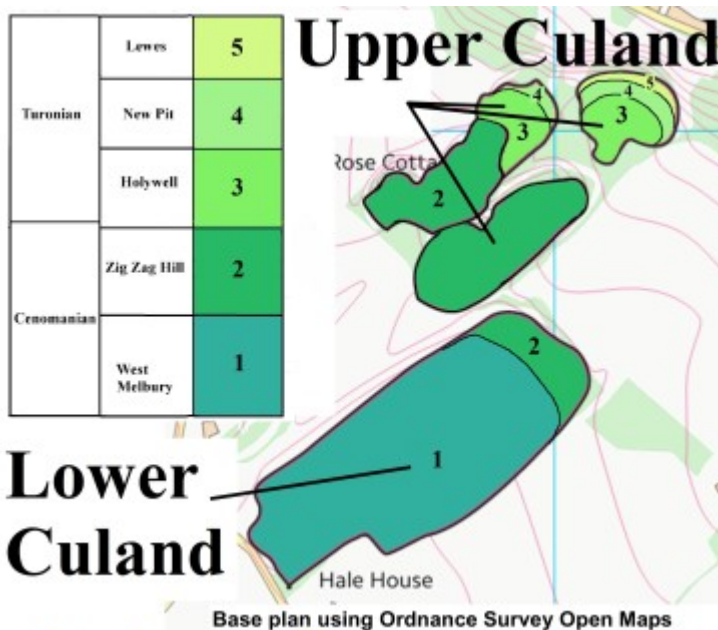


The term ‘Culand’ is the official term relating to the chalk pits on the west side of Blue Bell Hill, in Kent, although there is no name applied in the geological literature. Originally ‘Great Culand (or Kewland) was the name applied to a farm on the northeast side of the lowest pit (Lower Culand). A barn was all that remained up to 1980. A farm and cottages, a little to the southwest, are referred to as Little Culand.

So, Lower Culand refers to the large, elongate, pit just to the northeast of the Burham-Eccles road junction. The remaining pits, further up the hill comprise Upper Culand. Lower Culand was opened around 1900 to supply chalk for the Burham Brick and Cement Works, the pits at Upper Culand being worked-out. To transport the chalk a narrow gauge rail line was constructed between the pit and the works, via a short tunnel under the Burham-Eccles road.

The pit is a RIGS—Regionally Important Geological Site (now under Geoconservation—Kent), but more importantly a SSSI. This scientific status is solely in recognition of its geological content, mainly fossil fish and reptiles. The pit is also unusual in the strata that it exposes, - strata lower down in the Chalk than at any other inland site, not just in the Medway Valley, but also Kent, Sussex or Surrey. In fact, to the north of London, similar strata at Chinnor and Pitstone, have long gone under land-fill. I think that also includes the site at Barrington.

You will see from the map on the right that Lower Culand exposes a large part of the West Melbury division, not exposed in the other Medway Pits, except in the former Holborough Pit.



In 1987-88 I attempted to make a detailed survey of the Chalk sections in the Culand Pits, starting with Lower Culand. Even then the sections were becoming overgrown and degraded, which made measurement difficult. Unfortunately, this was much the situation in the West Melbury Chalk, with only a few metres visible at the top. In the log on the right, the figures indicate my estimated thickness of Chalk above the Gault Clay.

At the top of the low bluff, half way along the southeast side of the pit is a hard limestone, rich in *Entolium* and *Neithea* bivalves, often referred to as the *Pecten* Band. This band is also known as the Tenuis Limestone and its top marks the boundary of the West Melbury / ZigZag Hill Chalk, as well as the *mantelli*–*rhotomagense* zone. This approximates to the old boundary of the *varians* –*subglobosus* zones, a factor I first suspected in 1965.

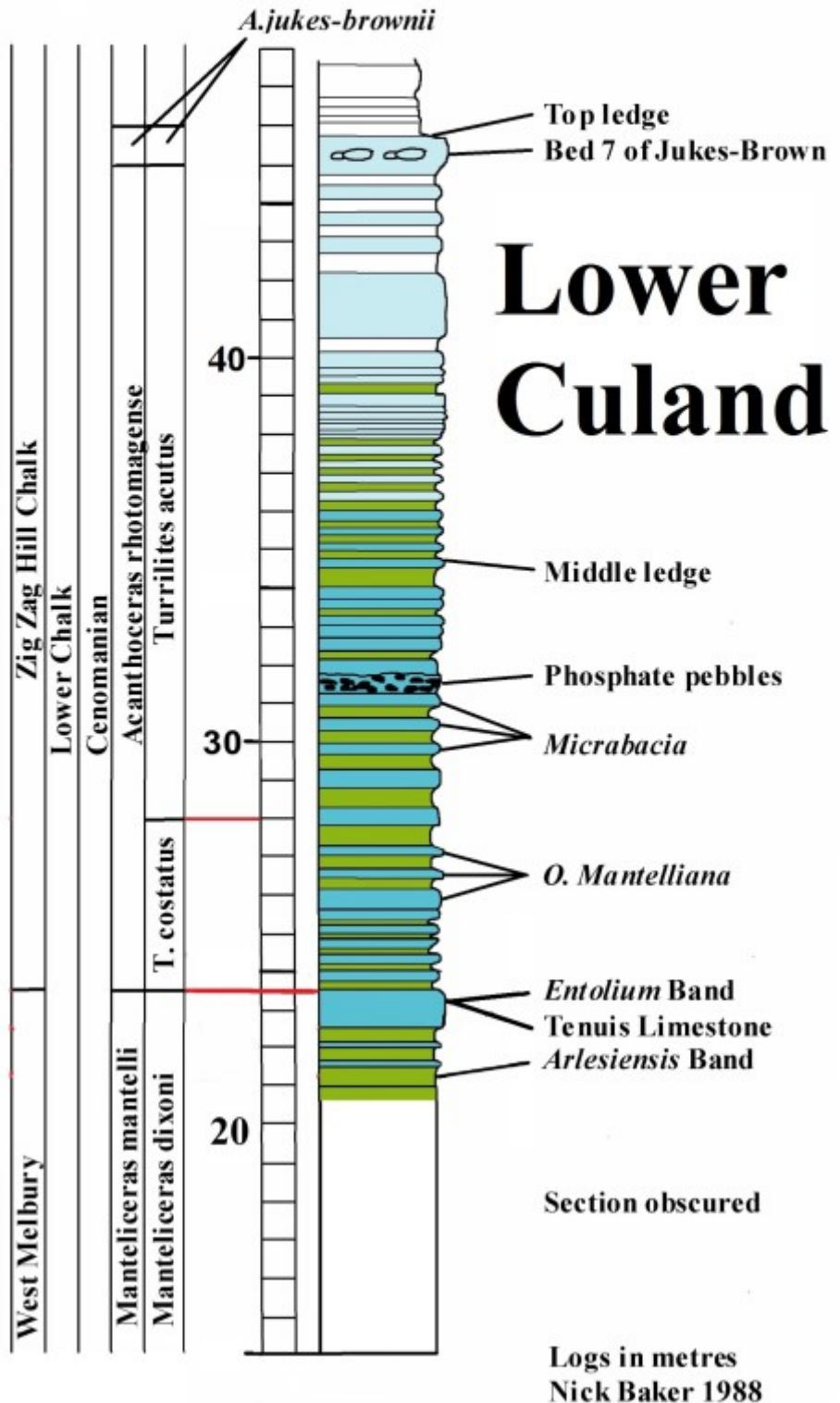
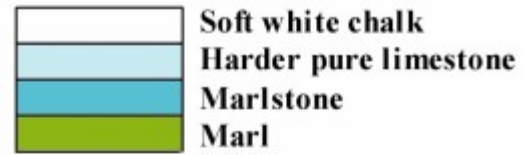
Of the West Melbury, up to 1.5m can be seen below the limestone. These consist of thin beds of marl and muddy limestone, with *Pecten arlesiensis*.

The two metres above the Tenuis Limestone is composed of alternate bands of limestone and marl, containing mostly *Inoceramus* but with occasional casts of '*Turritella*' in the lowest limestone, as well as casts of *Turritites costatus*. These beds crop out mostly in the floor of the pit close to the northeast end of the quarry

The next 1.7 metres consists of three more bands of limestone, separated by marls, the limestones filled with brachiopods, especially that of the marker bed - *Orbirhynchia mantelliana*. These beds occur in the base of the lowest cliff on the northeast end of the quarry.

The next two metres consist of two marl bands and two hard marlstones with occasional fragments of *T. acutus*. This is followed by three prominent limestone bands, occupying a further two metres, containing mainly small *Rhynchonella*, marine worms and the solitary coral—*Micrabacia coronula*. A further 70cm of limestone is filled with small phosphate pebbles. We are now 8.4 metres above the Tenuis Limestone. About another three metres of marl and limestone brings us up to the middle ledge.

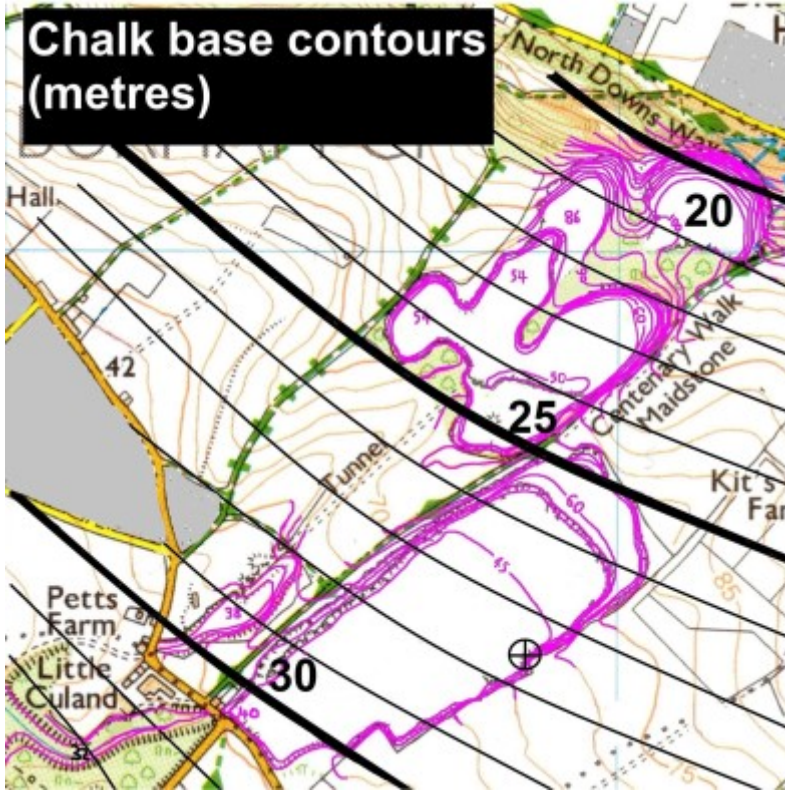
Further marl and limestone comprises the flat ledge, while the upper cliff is composed of massive hard limestones and softer chalk. Fossils are sparse—mainly fragments of *Inoceramus*, *ostrea*, *plicatula*, *Holaster* and large fragments of *Acanthoceras jukes-brownii*. We are now about 22 metres above the Tenuis Limestone.



Anomalies in bed thickness.

One of the aspects that puzzled me in the early days was the speed at which one reached the Gault Clay, when walking through the tunnel and rail cutting. It was difficult to account for the unexpected thinness of the (now) West Melbury Chalk. The Gault and Glauconite Marl was exposed on two occasions, when a trench was dug in the rail cutting in 1962 and 84, for reasons I still don't know but it was most likely some sort of survey. To the right you will see the old rail tunnel under the Burham-Eccles road. (2008)

I attempted to solve the bed thickness question by a sort of creative thinking—combined with definite observation. From local boreholes we know that the local thickness of the Lower Chalk (West Melbury and ZigZag Hill) is around 60 metres. We know that the elevation of the top of the Gault in the rail cutting is 32m OD. In Upper Culand the top of the lower chalk is at 82m, giving a Chalk base there at 22m. One needs now to get a good



idea of the direction of strike. I estimated a direction of roughly east-southeast, as shown on the map to the left. So, I arrived at a Chalk base of about 27-28m at the site of the low cliff on the southeast side of Lower Culand. With the top of the Tenuis Limestone at 52m, I arrive at a figure of 24m for the West Melbury Chalk at Lower Culand.

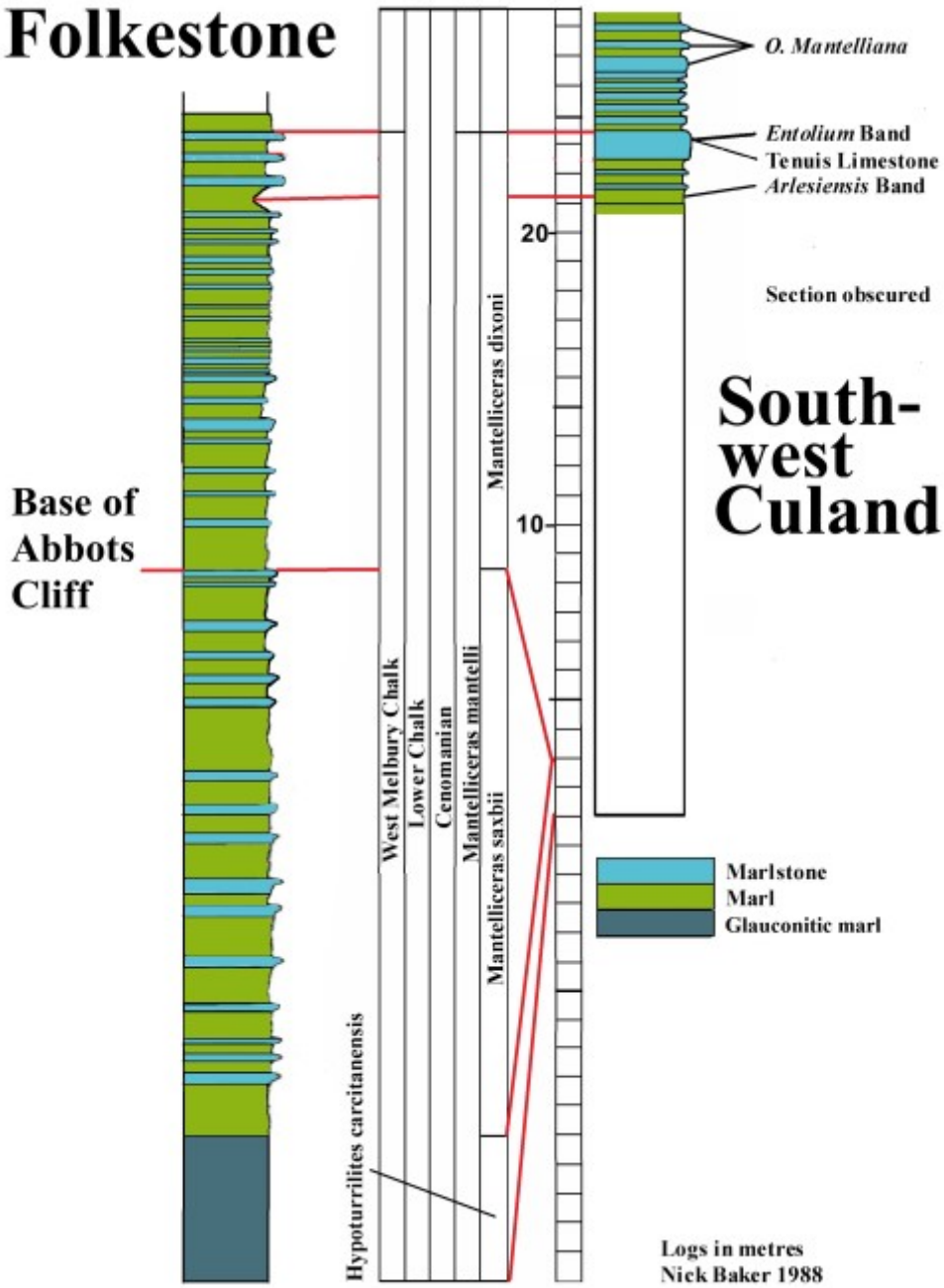


There is a low cliff on the north side of the cutting—mostly covered by downwash. We know that this is part of the main *Mantelli* zone of the West Melbury Chalk. What I did not know for sure was whether (in terms of sub-zones) it was the *dixoni* zone or the (lower) *saxbyi* zone. In a conversation with the late Jim Craig and Steve Frederick in September 1991, Jim was adamant that the *Saxbyi* division was missing at Culand, and that the 1984 excavation confirmed that the *dixoni* subzone lay unconformably on the Glauconite Marl.

Thus, Lower Culand teaches several lessons. Firstly that one cannot assume that a rock formation is entire just because it is there. It is also wrong to make judgments about thickness where one cannot extrapolate on thickness, and some have paid dearly where assumedly

that faulting was absent, simply because they could not see it. Against such odds, one can still play a hunch and win!. On the next page is a comparison of Culand and Folkestone.

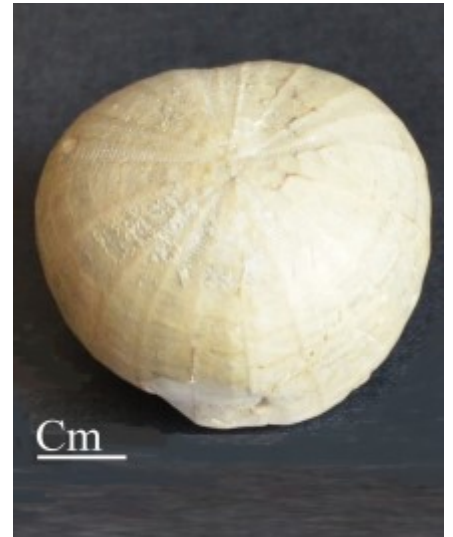
Folkestone



And here is a gallery of some aspects of the fauna found in this level of the Chalk at Lower Culand



Serpula umbonata



Holaster subglobosus



Micrabacia coronula



pycnodonte vesicularis



Neithea sexcostata



Neithea quinquecostata



Entolium membranaceum



Neithea and Pycnodonte



Inoceramus crippsi



Tetragramma sp



Mantellum elongata



Small *Rhynchonellids*

It will be seen that the fossils that you are most likely to find are small, except for less common ammonites and some echinoids. Most bivalves and brachiopods will be small and if you wish to specialize on those groups, then the Lower Chalk is for you. Exceptions are echinoids such as *Holaster subglobosus* and bivalves such as *Inoceramus*. Here follows is a gallery of ammonites.



Protoacanthoceras



"*Acanthoceras*"



"*Acanthoceras*"



Schloenbachia subtuberculata



Schloenbachia subvarians



Mantelliceras



Scaphites



Turrilites acutus

Both terms *Acanthoceras* and *Schloenbachia* are less commonly used now, but on the whole the two groups occur generally in conformity with the old style *varians* and *subglobosus* zones—the *Schloenbachia*, below the Tenuis Limestone and the *Acanthoceras* and *Turrilites* above the Tenuis Limestone.

The Culand Pits, as a whole, have a long history as a source of Upper Cretaceous vertebrates. The Palaeontological Association in their publication *Fossils of The Chalk*, list a number of fish and reptiles listed as 'Maidstone' or 'Burham' as location. I am not able to reproduce the photos here, but it is likely that many of the specimens came from the ZigZag Hill division of the Lower Chalk, and therefore from the



upper levels of Lower Culand and lowermost levels of Upper Culand.

Two photos that I do have. On the left, the fish found by Gary Woodall, is actually from Peters Pit, but the level is the same as the upper levels of Lower Culand. On the right a small tooth, found by the Editor, in 1984, from the Glauconite Marl excavation in Culand Cutting. As yet not identified but possibly reptile.



Road Show—Guild Hall Museum, Rochester, May 27th.

It was a warm and sunny Sunday, so visitors were out and about. Tony's display table was the first attraction. Where that failed Ann did a fine job of encouraging would be passers by not to pass by. The ultimate would have been a bird net with a rocket on each corner, but the need to go that far never arose—so I'm told. We had our usual attractions—Anne, with the minerals, Gary as the Expert, Dave with the big stuff from the Kent Coast. Patrick and Lilly ran the 'pic-a-straw' lucky dip.



Paul and Trevor Wright both ran a table with their recent finds for display and sale, while James ran a table on the geological activities of his U3A (University of the Third Age) local group.

And this year, we had two road shows.....

**Road Show—Maidstone Museum
Maidstone, June 30th.**



Spring Round-up

- Jan 10 Welcome back (All members)
- Jan 17 Field trip planning / display of finds from locations. (All members)
- Jan 24 Alphabetical selection –geological objects (A) (All members)
- I was not present but if you think “Acanthoceras, Actinocamax, Amazonite—then you have the picture.
- Jan 31 Vietnam – Karst and Hills (Ann Barrett)
- Ann Barrett gave a talk on ‘*The Caves and Karsts of Vietnam*’. Many of the caves were inhabited during the Vietnam War. Many are filled with fantastic growths of calcite and dolomite crystals of various colours.
- Feb 07 Insects (including fossil) (All members)
- This evening the subject was insects – modern and fossil. Fred brought in a mass of beetles and cockroaches (all dead), while Tony had the best collection of fossils. I have no fossil insects in my collection. A gent called Paul Carte came by with a large boulder of chalk (30 x 20cm) contained very big bivalve shells. We all came to the conclusion that these were ‘rudist bivalves’ – might be a species of *Durania*.
- Feb 14 Where to collect specimens (Fossil and mineral) (All members)
- The subject for the meeting this evening was ‘where to collect specimens’. I was not able to give a good example. In my past there were many localities, that are now behind high metal fences. My micro samples do not require large quarries. None the less, the folks gave a lot of information as to areas to collect.
- Feb 21 What’s the story? (behind the specimens) (All members)
- The subject was the story behind the specimen. I took along the samples of large bryozoans I had found in the Chalk at Hucking, Kent. The problem is relocating the exact horizon in that little lane section, and then locating it in other places – since I think the event was widespread. Other folks brought in minerals and fossils, with a story behind them.
- Feb 28 **Meeting cancelled (The meeting was cancelled due to very cold conditions. Subject—Global Warming.**
- Mar 07 Birds (including fossil) (All members)
- I was not present but I think the subject was ‘birds’
- Mar 14 South Africa (Gary)
- This was Gary’s talk on the subject given in the item near the beginning of this letter.
- Mar 21 Pictures on a (memory) stick (All members)
- Mar 28 End of term party / latest finds (All members)
- The Medway Soc end of term party. I took along my microscope and some micro-slides. Adrian’s Bembridge Limestone sample and sponge spicules from Steve Marshall’s flints.
- Easter break
- Apr 18 Talk (James)
- James gave his talk on Global Warming. I could have commented a lot but there was too much. The elephant in the room is that we have been measuring temperature accurately for only 80 years or so—and less accurately now !!
- Apr 25 Silica, Flint, and Rotting Sponges (Nick)
- This was to be a powerpoint talk but was converted to a tabletop demo. It was a discussion of the results from the collection of nodular flints collected by Steve Marshall. As usual it seemed to point to a need for more research
- May 02 Alphabetical selection –geological objects (B) (All members)
- The subject was specimens beginning with letter B. James—Bethersden Marble, Fred – Crabs, belemnites, bivalves from Bracklesham.
- May 09 Micro and Miniature specimens. (All members)
- the subject being Micro and Miniature. And that is what I took along, plus a microscope. It was a good evening, and everyone felt it should be repeated
- May 16 Reptiles (including fossil) (All members)
- I was not present and did not receive reports
- May 23 Road Show preparation (All members)
- Preparation for the Road Show on Sunday 27th
- May 30 Tuition night (James plus)
- James talked of geo-maps and ‘virtual’ geology etc. I gave a table-top demo of extraction and curation of microfossils.
- Anne Padfield talked on igneous rocks.
- Jun 06 Talk (Ann)
- Ann Barrett gave a further talk on Vietnam.
- Jun 13 Trace fossils (All members)
- Tony brought a whole selection of different trace fossils. Dave Rayner had a dinosaur footprint (cast). I brought a selection of stromatolites, and flint nodules (as sponge remnants)
- Jun 20 Questions and answers
- Tony gave a very informative and entertaining talk on ‘How islands form’
- Jun 27 Alphabetical selection –geological objects © (All members)
- Corals, calcite, Conulus etc. etc. etc.

Jul 04 Plants (including fossil) (All members)
 Jul 11 Historical Geologists (James)
 James gave a very good account of the geologists that were pivotal in the development of geological science
 Jul 18 End of Term party (All members)

MFMS

Autumn Term Programme 2018

19/Sep	Welcome back, Summer Finds	All members
26/Sep	Geological Alphabet specimens beginning with "D"	All members
03/Oct	TBA	Ann
10/Oct	Overseas Specimens - USA	All members
17/Oct	TBA	James
24/Oct	20 pictures on a stick	All members
31/Oct	AGM & Bring and Buy	All members
07/Nov	Geological Alphabet specimens beginning with "E"	All members
14/Nov	Q and A	Tony
21/Nov	Easter Island	Gary
28/Nov	Alternative Collections	All members
05/Dec	North Devon	Anne
12/Dec	Xmas Party	All members