

Occasional Erratics



Newsletter of the
MEDWAY FOSSIL AND MINERAL SOCIETY

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

Cover picture

Coldrum Stone Circle, Trottiscliffe, Kent

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Editor's notes.

Welcome to edition No. 13 of *Occasional Erratics*. I thank Gary for his contribution. This is the third item in his series on American Parks. Then comes a report by Dave Talbot on a trip to Burham. Although primarily a KGG trip, it was attended by some of the Medway Soc Members and so it is included here. Dave has very kindly provided me with the text and photos. Gary then writes on Columnar Basalts. Fossil Collecting Jive & Terminology, supplied by Fred Clouter, originally compiled by the late Mick Cuddiford. A field trip to Folkestone, by Trevor Wright, Autumn Roundup, Portraits of Canyon lands by Dave Talbot, and finally the spring 2020 meetings.

American Parks Part 3: Badlands

by Gary Woodall

Badlands National Park in South Dakota, is another park that is often overlooked but like Rocky Mountain is only a couple of hours off of the national park itinerary from Denver to Las Vegas. It is situated about 60 miles east of Rapid City, the most convenient stopping point for visits to Mount Rushmore and Devils Tower. The name is very descriptive as the park is composed of classic 'bad lands' landscape. That is to say softish rocks that erode into small crevices and canyons. These type of deposits occur all over the west and are preserved in several national parks. But here the outcrops are banded and very colourful and were one of the main reasons the park was established.



Badlands

Another reason the park was set up was to preserve the spectacular fossils that are found in the area. The oldest beds are of Upper Cretaceous marine deposits that have yielded a fantastic ammonite fauna. Obviously being a national park collecting is strictly forbidden and the penalties for ignoring this are severe. Not wanting to end my time in a nice orange jumpsuit even I didn't dare pick up anything! Fossils can legitimately be collected from private lands bordering the park and in the 1980's I managed to trade some Watchet ammonites for a couple of fine skulls with a dealer. There are number of trails where you can see the beds close up, and many have very good information panels and replica fossils to show the visitor what can be found. For obvious reasons all real fossils are removed to the museum.



Fossil Overlook Trail



Information Panel

Even more important pale ontologically are the Late Eocene / Oligocene 'White River' deposits that were laid down in rivers and lakes and have preserved a unique fauna of early mammals. The most common type is the Orodont a pig like animal but many other mammals are found including rabbits, three-toed horses, camels, and large predatory wolf like mammals.

Many fossil hunting expeditions took away thousands of specimens to museums back east at the end of the nineteenth century. At this time the Custer was fighting the Indians in the nearby black hills, but the native Americans left the fossil hunters alone thinking they were mad.

There is a excellent museum in the visitor centre showing the finds and allowing visitors to view the palaeontologists working preparing the specimens. Also reconstructed animals are displayed in dioramas to really show the visitor what the area was like 40 million years ago.



Hyracodon skull



Reconstructed mammals

The third reason the park was established was to provide a safe area for wildlife. Herds of Bighorn sheep roam the park as well as a large number of Pronghorn Antelope. This is the second fastest animal in the world able to run at 55mph, only the African Cheetah is faster, but the pronghorn can maintain a fast speed for a long time, the Cheetah for only a few minutes. It is the antelope in the song 'Home on the range' but ironically is not a member of the true antelope family at all!



Bighorn Sheep



Pronghorn Antelope

It is not just larger mammals there are several Prairie Dog towns in the park, each home to perhaps hundreds of individual animals. They are constantly on guard and taking a close up photo is very hard as they quickly disappear into their burrows. They are preyed upon by eagles, foxes and rattlesnakes, fortunately we did not see any of the latter as we made sure we stayed on the pavement and didn't walk in the grass.



Prairie Dog



Rattle Snake warning sign

A Walk along the Medway Valley in the Burham Area, led by Dr. Anne Padfield, 17/02/18.

Text and photos by **Dave Talbot**

Photo 01 A small group of KGG / MFMS members met at a crossroad at the end of a short tarmac road where the ancient church of St. Mary stands. This 12th Century Norman church has been variously modified over the years, but its position near to the Medway became somewhat tenuous in later years when the population moved to higher ground and nearer to new brick making and cement factories. Due to its abandonment the church has more recently been adopted by The Churches Conservation Trust and others. At the crossroad a track continued to the river at the rear of some cottages to the left and to some farm buildings to the right beyond the church. The road to the left passes the front of the cottages and continues on passing fields on either side to a fenced off area on the right, this, a Southern Water site. A track back at the junction goes off on the right to some more farm buildings; we are to look at the old church first.



We will be examining the building stones of the church later, but first is a look at the inside and various aspects of the architecture. It is rarely, if ever, used now but is open to the public due to its history. We entered by the south facing porch, through a wooden framed gate with chicken wire mesh; you could not call this a door! A notice asked us to close this before opening the main door; a bulky, wooden one of medieval age, to prevent the ingress of our feathered friends, (they can be quite messy and should they get locked in, will probably die, which would encourage other vermin). Having done this, we entered. It seemed to be a large building, but I think this was to do as much with there being no ceiling and the white emulsioned walls. Wooden pews, some painted white, others just varnished filled a part of the floor space, about sixteen of these. At the far end of the church a wooden framed altar stood partly covered by a white shroud with a wooden cross on the table top. Unfortunately, in 2013, thieves broke in stole the brass crucifix and a pair of candle holders. The upper two thirds of the walls are still plastered, the lower third has obviously suffered from rising damp as this is plaster free and the stone remaining is powdery and flakey.

Photo 02: Another item inside the church was a wooden wheel, mounted on the north wall of the tower, which was about six feet across; it had been mounted there after a previous theft, in 1982, when a medieval bell had been stolen from the upper tower. There is no age given for this wheel so I would assume a medieval age again. Entry to the tower through a door is barred; this does however have an age given as fifteenth century.

Two Norman fonts, the first just inside the door is circular of unknown origin, the second is a larger square one and has been in the church a long time. The font may be twelfth century; however, the pedestal it stands on is of a modern material and design.



Photo 03: The north and south sides have variously been altered over time as can be seen by the changes of blockwork. Aisles were added in the thirteenth century but only lasted 100 years or so, when they were again removed and re-blocked with small windows being added. The removal of plaster through rising damp has given us the opportunity to look at the types of rock used in the church's design. Much of it is ragstone from quarries at Ditton, but other rock seen is chalk, flint, tufa, very local and brick and tile as added extras to the fabric of the building, most likely from Roman villas, the ruins of which have been found local to the church. One piece could be rotten *Paludina* limestone.



Quarry tiling finishes off the floor of the building with a natural ferruginous colour, unsure of the age of this. The altar window at the east end of the building was last remodelled in the fifteenth century. Low down in the north wall the blockwork of a stairway is seen; this led to the loft atop the Rood Screen which would have divided the church into a nave and a chancel. The loft, I can only assume, may have been the area for pilgrims to sleep and rest on their way to Canterbury, as this church is on that route.

Photo 04: We had not quite finished yet with the church and Anne led us outside; this was a welcome respite from the chilly feel to the inside as today's weather was uncommonly warm for February outside. Weathering to the church's outer walls has had some time to work, this being, originally, a twelfth century building, so that any limey or calcareous rock types are showing the results of that aging, being friable and crumbly. These would be the rag, chalk and tufa, others, like the flint and sandstone not quite so bad. With the river so close there may also be exotics from ballast used in holds of the different ships trading up and down it.



From the porch we proceeded clockwise around the building taking in the tower, on the west, to the northern long wall. Here looking at the construction, we could see why the interior suffered from rising damp, as the ground came directly up to the walls, with no drainage ditch or the like; the eastern end was the same. On getting to the south facing wall however, a ditch had been dug, lined with cement with a brick wall to hold back the bank, this came right up to the porch. This has obviously been carried out in the last few years, so maybe the intention is to continue around the entire building, at some time later, given enough funds.

Photo 05: The church has been built on Head looking at the area's geological map. On the OS map for Maidstone and the Medway Towns it sits just above the five metre contour which isn't really that much above the river, certainly not when high. In more recent years river flood defences have been improved, not when the church was built though, so it is understandable that rising damp should affect it; as well as from natural groundwater from rivers and springs out of the Downs. As industry grew along the river, the brick making and cement works especially, with their attendant quarries, the local populace were gradually moved to higher up the valley. This was probably a twofold affair, in that they were moved away from flooding and closer to the works area. That was in the 19th century; they even had a new church built, which didn't last anywhere near as long as it was demolished in 1981.



NB: Even today streams still run out from the Downs in a myriad of places, flowing toward the river. Some of these are directed into culverts and ditches around the lower fields to help keep them drained and suitable as grazing land for sheep and cattle. This is also a way to keep a freshwater barrier between the tidal section of the river and habitat for wildlife in the ditches.

Photo 06: Talking of the river's water movements we have now come up to the flood wall where we are opposite a tight meander in it. The tide is on its way in so the river is running fast, easy to see with flotsam on the surface racing along. I wonder how salty or brackish it might be, but that would be down to several conditions including the amount of fresh water coming from upstream; by how much it has mixed in; the strength of the tide and these days, the amount of weirs the Environment Agency have positioned up river (for holding it back) and the extraction points Southern Water might have (for extraction to reservoirs). The material on the river includes clumps of dead reeds, straw and wood moving swiftly past our position on the bank as the river squeezes itself around the bends, (remember, faster on the outside, slower on the inside). And there are thousands of reeds in the banks of the river standing tall and straight, and dead, it being winter. With the sun streaming down on us into our eyes, makes for a quite surreal scene.



Photo 07: As we proceed downstream Anne points out several things to us including a line of plinths in the distance – we shall get to these a little later on – she tells us they are to do with the cement works built there in the 1850's. A certain Thomas Cubitt built the brickworks in 1852, at the time one of the most modern in the country. To reduce labour costs a network of tramways were built, though by 1859, 600 to 700 boys and men were employed, producing 25 to 30 million bricks a year. Drain pipes, ornamental flower and chimney pots and tiles were also made. A huge engine house driving a 520 foot lineshaft, drove the machines for brickmaking, with heat produced being used for drying sheds, where bricks were laid out prior to firing in the kilns.



Photo 08: We have continued along the bank following a straight section of the river and are heading towards another bend. To our left, on the opposite bank, Townsend-Hook papermill has just started letting off steam. As the steam rises it covers the sun which is just perfect for me to get a few shots with the camera; I am told I shouldn't look into the sun, but with steam covering it, it's what I call, 'perfect'. To the right, the tower of Snodland church rises above the trees surrounding it. It is said that the two churches both stood on the Pilgrims Way and gave succour to those travelling to Canterbury and the shrine of St. Thomas Becket. And here, where we have stopped in-line with the churches, is a memorial stone that tells of a crossing here by Roman soldiers in AD43; they defeated the army of King Caratacus in the Battle of the Medway.

We had been walking away from the Downs up to here, but we turn again as we follow the path and the Downs are now to our right, rising up to the sky with several cliff faces cut in them; these are the faces of the old quarries. As noted above, there had been a cement works built also, this had started up in 1855, just a few years before the death of Cubitt; this substantially expanded over the next 30 years, hence the chalk quarries. Clay was also required and this came from another quarry dug a little below the chalk ones, probably in the Gault Clay.



Bottle and beehive kilns were made of brick and were used to burn the slurry of clay and chalk for clinker, which then had to be ground into a powder, the cement, for packing and distribution. Most of this went to London so was loaded onto barges on the river from a quite substantial wharf, with cranes and derricks alongside for that purpose. Cubitt had the river dredged here and walls built for wharf stability and strength.

Photo 09: We take another turn now, on our journey toward the Downs and the path now takes us alongside of those plinths we had seen from distance earlier. This site is off limits due to the height of the wharf above the river and its condition; however, a gap in the hedge and between the plinths does allow some entry to it. On the floor of the wharf the old buildings footings are still visible, so there is a possibility of twisting ones ankle or tripping over. The plinths about sixteen or so, not sure, never counted them, are of an early concrete mixture, quite stable looking on the undamaged sides, but where they have been broken, poorly mixed rubble interior does not seem at all strong enough. However, these carried an overhead truck system for moving chalk from Margetts Pit below the Downs, to the wharf-side cement works. The plinths are about a metre square and several metres high.



Photos 10/11: We have now arrived at a new road, built in the last few years for southerly access to a new housing estate called Peters Village, the name of one of the old quarries that has lately been in-filled. From the other end of the development a four way roundabout takes you left across a new bridge over the river to the A228 and the M20 or M2, left or right respectively. We had seen this bridge earlier whilst passing the plinths, I had asked if it was just a footbridge, well, there's the answer. On the roundabout flat, steel plates have been cut into a collage of designs and left to rust; the designs have been mounted on a tubular steel arch depicting the natural and industrial history of the area

Photo 12: When we had first got to the river from the church, the tide was coming in with the river running fast upstream. Due to various stops and discussions on what we were seeing, high tide had passed, with the river now ebbing and water flowing to the estuary. We were now standing at the entrance to the new village, where a path led down to a new esplanade, built along the riverside below blocks of flats and houses. A launch was making its way upstream and leaving large ripples, chevrons, from its stern, as it ploughed through the water. These appeared to ride up and down as the ebbing river forced them downstream. The confusion of the two forces formed a myriad of ripples as they gradually collapsed away from the launch. But they were also breaking and reforming as longer, thinner ones as they also spread across the width of the river. It had a quite mesmerising effect - isn't nature grand?



Photo 13: These low level, river level walks may not always have spectacular geology, certainly not at this end of the country – our soft rocks of clay and chalk tend to get rounded, with slumps, nothing grand like mountains and canyons. We have fields of green with trees and bushes, grass covers everything not cultivated, sheep and cattle graze; being close to a river adds towns and villages, farms and orchards. However, by taking a look at the geological map for this area – BGS 272, Chatham – we can see a whole new dimension. The Medway rises near Turners Hill, West Sussex, running 70 miles to its



estuary between the Isle of Grain and Sheppey, one of the longest rivers in the southeast. Its tidal limit is Allington Lock, a few miles short of Maidstone. On its way it flows around the southern edge of East Grinstead; through Forest Row; across the northern side of Ashdown Forest, which are all in Sussex; then, Ashurst to Penshurst, Kent, coming off the high Weald to Tonbridge; across the Low Weald to Maidstone and on to Rochester. We would need the use of BGS maps 288 Maidstone; 287 Sevenoaks; 303, Tunbridge Wells; and 302 Horsham, to follow its full extent.

I digress. Here at the lower levels of our river we can see, by the different colours the BGS use, where it has carved a way to the sea. A series of meanders across a floodplain, here 750 to 1500 metres across, leaves river alluvium and deposits of *Head* beyond that. Head is a poorly-sorted material of angular rock debris which can cover hill-slopes, being deposited by *gelifluction*; this being the term for the flow of saturated rocks over frozen ground. From the BGS map it would seem this head material covered a fair width of the river valley once. Higher up, on the chalk downs, a material known as ‘Clay with Flints’, covers an expanse of the Upper Chalk from its erosion over the eons of time. Chalk breaks down to clay by the efforts of weathering and biodegradation, leaving a veneer of stone and soil, which itself gets further refinement, and so on.

Where this has eroded away from weathering and *solifluction*, (this being the movement of soil and small particles downhill by continually freezing and thawing), the three formations of the chalk are found, Lower, Middle and Upper, as one walks up the slope of the Downs. Lower down the Cretaceous System outcrops of the Gault Clay and Folkestone Sands occur towards Maidstone. Towards the estuary, Thanet Sand and London Clay, rocks of Tertiary age, are seen. What I find quite striking is the gap in the chalk Downs at Rochester, where the Medway flows through. Rivers will flow where it is easier to run and I wonder if there was a fault of some size here to allow it to do so, maybe a result of Alpine movement after the London Clay was deposited, as that formation is also either side of the gap.



Photos 14/15: From the new housing we crossed the road and took a bridleway up the lower slopes of the Downs where we followed a muddy track through an avenue of trees. We exited here into a much sunnier and warmer area and continued onto a stone track between fields. We stopped at a five-bar-gate where a notice asked us not to enter without permission. This had been Peters Pit, hence the name of the new village, and had also been an important chalk fossil collecting area.

It is also one of those pits recently filled with waste from the local papermill and water treatment works at Aylesford. Another stop before the church was a little further on at a pond, newly positioned for the local wildlife, in a liner of plastic on top of a shallow defile especially formed for the purpose. At various points around it, and at other points on this walk, were what appeared to be steel tubes protruding from the ground with metal covers; I thought they might be dipping points to check groundwater levels. However, I was reliably informed by our leader they are checking points, but not for that purpose. They are there for checking for the possibility of contamination of the ground-water should the liners under the waste get breached.

For my part, I have found our visit today to have been a thoroughly informative one along the flood defences and around the church, it has certainly given me 'food for thought' and, on behalf of the group, I would like to thank Anne once again for showing us this area's intriguing history and geology.

References

Small booklet on St. Mary's Church, Burham.

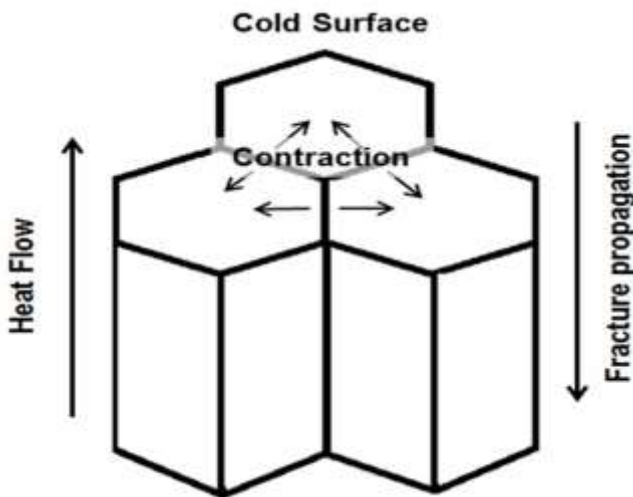
BGS Map BGS 272 Chatham; BGS 288 Maidstone; BGS 287 Sevenoaks; BGS 303 Tunbridge Wells and BGS 302 Horsham.

OS Explorer Map 163 Gravesend; OSE 148 Maidstone; OSE 147 Sevenoaks; OSE 136 High weald and OSE 135 Ashdown Forest.

Columnar Basalt

Gary Woodall

Columnar jointing in basalt forms as a lava flow cools. During the cooling heat flows outwards and the volume of basalt decreases (as hot things tend to take up more space than cooler ones). This places a stress on the lava flow which contracts and creates fractures which will propagate down through the flow. If the flow is pretty regular in its composition contraction tends to occur from regularly spaced centres thus forming hexagonal columns, though columns with 5 and 7 sides also occur.



Devils Tower, Wyoming

Columnar formations can be seen at many locations around the world and often they are protected as a part of a national park. They will have been seen by our ancestors many thousands of years ago and they had different explanations as to how they were formed.

One of the most famous, especially since the film *Close Encounters of the Third Kind*, is the Devils Tower in Wyoming USA. This was formed by the cooling of a huge volcanic plug, and the individual columns are gigantic. (Note the trees for scale)

The Native Americans call the formation 'Bear Lodge' and have a different explanation for the columns on the tower.

In the Lakota Sioux legend, six girls were out picking flowers when they were attacked and chased by a gigantic bear. The Great Spirit felt bad for them, and raised the ground beneath their feet. The bear gave chase and attempted to climb the newly formed tower, but they couldn't get to the top. The bear fell off, clawing the sides of the monolith.



Another legend concerns our own Giants **Causeway in Northern Island** which I visited recently on a cruise around the British Isles. The site is truly spectacular and you can freely walk on the top of the columns, though you obviously cannot collect one!

The Irish giant Finn MacCool was challenged by the Scottish giant Benandonner to a fight. Finn built the causeway so that he could reach Scotland for the fight but as he approached he saw that Benandonner was much larger so he ran home to his wife, Oonagh. She told him to get into their baby's cradle. Impatient for the fight Benandonner crossed the causeway and saw Finn in the baby's cradle. Upon seeing what he thought was a baby, he thought that if the baby was this big how much bigger would the father be, and fled back to Scotland tearing up the causeway as he went. Today the other end of the causeway can be seen on the Isle of Staffa.



The Isle of Staffa, Inner Hebrides, Scotland

There are a few, much smaller, columnar formations that can be seen in various quarries in England. One of these is in Derbyshire at Calton Hill Quarry where a dyke displays columnar jointing.

Much closer at Rock-a-Nore, Hastings where a berm to protect the sea wall was constructed many years ago out of columnar basalt. It is only occasionally exposed but individual blocks that have broken away can be seen on the beach. (See next page)



**Berm of Columnar basalt, Rock-a-Nore, Hastings
Calton Hill, Derbyshire**

The following was supplied by Fred. The original compilation by the late Mick Cuddiford

Fossil Collecting Jive and Terminology By Marc Behrendt (and several dozen terminology donators)

I have compiled a list of terms used by fossil collectors around the country and Europe, terms that may not be in every (or any) textbook. Beware - the use of the terms is authentic, however unknowledgeable friends and family members may think you have been out in the sun too long, if you try to use too many of these terms in one sentence.

A bit of a hybrid - similar to Moroccan special

A popping - an ammonite or other fossil that bursts in two to give a pos and neg.

AEPU (Automated Environmental Preparation Unit) - the back yard deck

Argillaceous - (*warning: gratuitous educational content*) description of rock, simply stated, means a rock that contains clay sized particles

Beauty - I found it (See "Junk")

Bessie path - cow trail

Bite - trilobite

Blown - an ammonite where the body chamber has a hole in it where the gas build up caused a blow out

Boffo - a super find, the best of the day/trip/year

Boulder - it was too big to break up or take home

Brach - brachiopod

Bucket brigade - a scout troop at a fossil site

Bug - either a trilobite or something crawling from under an overturned rock

Butter layer - trilobite bed

Calcareous - (*warning: gratuitous educational content*) simply stated, a rock that contains carbonate. Hard shale is probably Calcareous.

Carcrapodon - the shark tooth equivalent of a yechinoid

Cops - Phacops

Crier - broken beyond repair

Cry-babies - ruined specimens

Ditto - Ditomopyge

Euk - Eucalyptocrinites

Euk top - Eucalyptocrinites cup

Flaky - description of shale that breaks up into small fragments

Flexie - Flexicalymene

Flipp'n Stones - turning over large slabs of sedimentary rock

Fubar - fouled up beyond all recognition

Gastropod - snail

Gem - a perfect or spectacular specimen

Gigantabite - A monster-size representative for any species trilobite

Gnarly - large, 3 dimensional

Grott ball - very poor specimen

Gumbo mud - what Morrison and Chinle Formation bentonite clay turns into if you get it wet.

Has potential - probable junk, but worth taking home to check out.

Hash - storm deposits
Horror ball - see grott ball, only worse
Implement of death - Estwing tool
Invite - fellow fossil hunter allows you to help with a dig, usually means you provide money, food, tools, and other supplies, and the unique chance to watch someone else work a fossil site.
Junk - you found it (See "Beauty")
Junkasters - (aka Halfasters) - echinoids and sea stars that are not flawless in the field
Leaverite - junk, fossil better left in the field, as leave 'er right where you found it.
Lens - specific layer of shale or rock bearing fossils
Leo- Leonaspis
Machine-gun Kelly - poorly air-abraded prepared specimen
Major score I - the float that really did lead to mother load and you got some dug out to take home. (See "Surface Float")
Major score II - "I bought a flat/box/carload/estate at a great price."
Maniac - any fossil collector except for me
Missing a piece...- a range from a fleck of shell missing to most of the shell missing, depending whom the description is intended
Moroccan Special - trilobite "slightly" augmented
Nacked - broken fossil
Napp - trim away unwanted matrix
Nody buster - a large hammer
Noid - crinoid
Packy - Paciphacops
Paleorapist - a collector with no regard for technique or fences
Pig - another word for gnarly
Pod - cephalopod
Pop - to split a nodule into 2 halves
Private stash - a collecting site you don't even tell your friends about.
Pseudo - Pseudogygites
Robust - large 3-dimensional fossil or description of potent post-collecting drink
Screamer- a really big bug (See "Bug")
Snail - gastropod
Spotted - your excavation site has been discovered by other collectors
Stash - hide bags of unsplit nodules for later attention in better weather
Sticky - hard to prep matrix
Surface float - the little chips that weather out on the surface and lead you to the mother load (sometimes) such as a petrified log (See Major Load)
Survey mode - walking an area rapidly to see what's there, while trying hard not to pick anything up or get too intent on one area, because if you do, you just know you'll miss out on better stuff in the next gully
Trilobutts - pygidia
Triloparts - disarticulated trilobite remains
Tutt - a box of or a single fossil that you do not bother to buy or pick up in the field.
Vacuuming - picking up every fossil there is at a site and leaving none behind
Yechinoids - echinoids that should have been collected 5 years ago
"&%ow" - I dropped my rock hammer on my foot.
"&*\$@" - I smashed my rock hammer onto my thumb
"&*\$%#@#@" - I smashed the fossil instead of my thumb

The Editor – suggests also

Chukite – Well, we thought it might be something

Fubarite – A rock composed of more than 90% Fubar

Snafu - All Fubarite and little else—and it rained the whole time!

A Field Trip to Folkestone—November 9th 2019

A report supplied by 'Orville' Wright



After a very poor weather forecast the day before, Saturday found Paul, Trevor and Richard meeting up with clear blue sky overhead. We made our way down the sodden path and steps to the beach, easy going down as you could slide most of the way down.

The earliest rocks at Folkestone consist of Lower Greensand exposed to the north of the town and run through a sequence of Lower Greensand, Gault Clay and Chalk, dating from approximately 120 to 80 million years old and were deposited within a shallow marine environment.

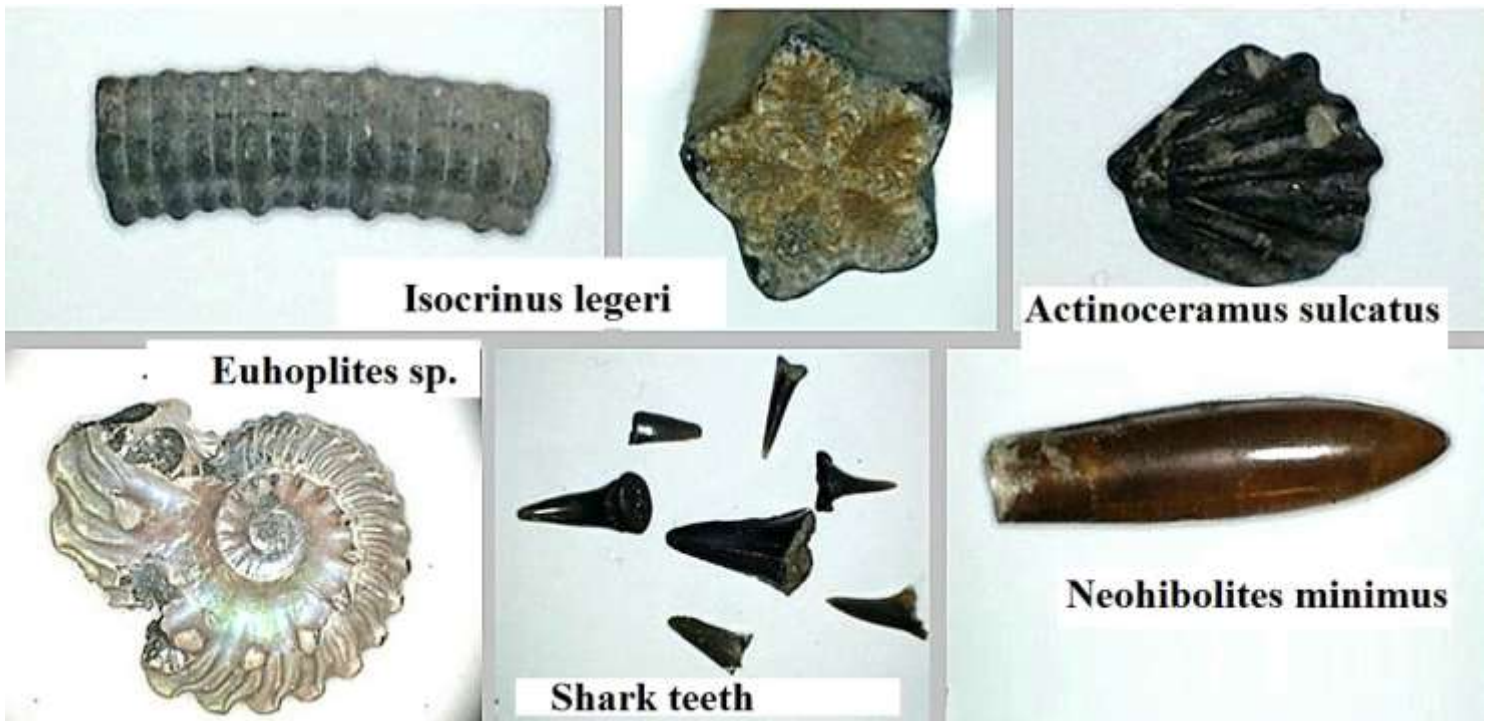
The chalk was the first stop as the tide was still a bit high to work much of the beach.



Not many samples from here but a couple of *Terebratula* (see below) and Paul found a sea urchin in the fallen rubble.



The chalk searched, we headed round Copt Point to find the Gault clay exposure on the beach. Belemnites, Ammonites, Button coral, Crinoids and some Shark teeth were found here.



Finally to the Greensand where the only sample of note was an Ammonite (*Douvilleiceras mammilatum*) washed out and wedged in a gap between the rocks.

The day coming to an end and as the sun started to meet the horizon we headed back up the mud slide and headed home. We had not found a lot of good samples but what we did have were of reasonable quality so well worth the effort. The weather held till we got back to the car and as we left the rain promised by the forecast to be all day long finally arrived with dusk.



Autumn Round-Up (starts here for easier editing)

September 11th 2019

Members brought along and discussed specimens recently found

September 18th 2019

Tony gave a talk on The Faroe Islands.

Wednesday September 25th 2019

It was specimens beginning with letter J. So I took along Jet and Jasper. Others widened the definition considerably – Jaws, Jurassic, Joss Bay.

October 2nd 2019

Ann Barratt gave the second part of her talk on the Algarve.

October 9th 2019

The subject was the London Clay. Members brought along specimens from a recent trip to Sheppey

October 16th 2019

Anne Padfield gave a talk on metamorphism.

October 23rd 2019

The subject was Chalk. Fossils and stratigraphic logs

October 30th 2019

The AGM

November 6th 2019

The subject being microscopes, (and application to geology).

November 13th 2019

Gault Clay at Folkestone, where there had been a field trip on November 9th. Specimens also from other locations.

November 20th 2019

Brian gave a talk on Granite – going through all the mineral combinations and variations.

November 27th 2019

Specimens beginning with the letter K, as in Kyanite, Kimmeridge Clay, Keuper Marl, fossils from the Kimmeridge.

December 4th 2019

Nick talked on microfossils.

December 11th 2019

End-of-term party

Portraits of Canyon Land **Photos and text from Dave Talbot**

Storm over the Painted Desert – travelling north on US89 from Cameron to Page. These soft rocks are well rounded from wild weather as can be seen in this view, they are formed from mudstones and bentonitic clays derived from volcanic ash in a myriad of colours. This is ‘badland’ topography where only scrub grows, very little of that. This is the edge of the Painted Desert at the Moenkopi Plateau. The rocks are Chinle Formation and Triassic in age, about 210Ma. (9399)



The Colorado River meanders from Dead Horse Point State Park

– these meanders of the river have cut down through rocks of Jurassic age to Upper Carboniferous age, 160 to 310Ma as the Colorado Plateau uplifted. From the bottom up they are Pennsylvanian Elephant Canyon Group; Moenkopi and Chinle Formations of the Triassic; Jurassic Wingate Sandstone, Kayenta Formation; only Quaternary alluvium and wind deposits top those. The canyon below is approx. 2000 feet deep with the White Rim Sandstone bench exposed above the river and where the White Rim road, a trail for anything from 4WD vehicles, dirt bikes, horses and even ‘shanksies pony’ can attempt it, not saloon cars, and is 100 miles long around Island In The Sky Nat. Park and 1200 feet above the river.... ‘Thelma and Louise’ did not stand a chance!! (0101)



Goosenecks State Park – Looking down to the San Juan River highly reddened by suspended sediment, just north of Mexican Hat, which itself is north of Monument Valley, Utah. The river has cut down through the Honaker Trail and Paradox Formations where it winds around these huge buttresses of sand, silt, mud, shale and limestone. The rocks are of Pennsylvanian age from 320 to 286Ma, the canyon is 1000 feet deep. The depth of the gorge/canyon as in other cases on the plateau is due to the rapid uplift of the plateau causing entrenchment of the river and its meanders having already formed. The canyon width is due to weathering and mass-wasting. (9788)



Goblin Valley State Park – remnants of a much larger plateau now form the shapes of these sandy and silty ‘goblins’. From the bottom up one can see how the myriad of vertical joints between horizontal beds of soft sand, silt and harder limestone have allowed meteoric water to erode and wash the cliff face. This constant weathering has shaped and rounded the stone until, as at the front, there is very little left. The rocks are Entrada Sandstone of the Middle Jurassic, they are eolian dunes of a large sand-sea which spread over a huge area of Utah, Wyoming, Colorado, Arizona and New Mexico; arches in Arches NP are the same rock. Goblin Valley can be found on a side road off Utah24 south from I70. (0195)



Monument Valley – the reddish-brown colour of the Organ Rock Shale is almost hidden here by early morning mist creeping around the buttes, pinnacles and mesas of the Valley. Atop this the harder, though highly jointed, sandstone of the De Chelly Formation breaks along those joints causing some large pieces to fall and giving quite distinctive blocky shapes, (9778).



St. George Dinosaur Discovery Site –

During the late Triassic/early Jurassic about 200 Ma a huge area of freshwater, known as Lake Dixie, was home to many dinosaur types, with fish, crustaceans, plants and early mammals. The protective building over the site protects a section of this ancient shoreline and the many fossils and trackways found within it. Some blocks on show in the building are from outside, where the playground and car parks are now sited, having been removed for further investigation. To date, 2017, 26 layers had been recognised with foot-prints of Gigandipus, Eubrontes, Grallator, Phytosaur, Megapnosaurus and Dilo-phosaurus. Other fossils include fish parts, crustaceans, wood, plants, mudcracks and ripples and burrows. Other than Dilo-phosaurus I did not recognise any of these other types, however, Phytosaur was a late



Triassic short-lived archosaur similar to our crocodiles; this block is roughly three metres by two metres, (3385).

MFMS Meetings Jan-Apr 2020

15 Jan	2020	Welcome back and planning	All members
22 Jan	2020	Northumberland	Brian
29 Jan	2020	Specimens beginning with letter “L”	All members
05 Feb	2020	Q &A	Tony
12 Feb	2020	Pre-Cambrian (Mostly rocks)	All members
19 Feb	2020	Gastropods	All members
26 Feb	2020	Microscope night	All members
04 Mar	2020	Brazil	Ann
11 Mar	2020	Specimens beginning with letter “M”	All members
18 Mar	2020	Brachiopods	All members
25 Mar	2020	Diagenesis and concretions	TBA
01 Apr	2020	Party	All members



Azurite



Barytes



Crocoite