Occasional Erratics

Newsletter of the

MEDWAY FOSSIL AND MINERAL SOCIETY

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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
Examining the coal slag heap for plant fossils at Betteshanger Country Park, Kent, April 2019

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Contents of this edition No.12

Editor's notes.

Welcome to edition No. 12 *Occasional Erratics*. I thank Gary for his contribution. This is the first of his series on American Parks. Then comes a report by myself on the quest of a bryozoan reef, in the Upper Chalk, at Hucking. Then a report on a field trip to the Coal Measures at Betteshanger Country Park. We had a road show at the Guildhall Museum, Rochester, and then I had a look at the micro-content of the London Clay of Sheppey. Then a comment on some Tertiary outliers in NW Kent. There is a report on the Kent Show. Finally a report on our Spring program and our proposed Autumn program

American Parks Part 1: Introduction

by Gary Woodall

America, as many of you will know, has some very spectacular landscape, ranging from forests and deserts to mountains and prairies. The best of these areas are preserved as national parks. In the contiguous USA there are some 45 National Parks and I have been fortunate enough to visit 19 of them. I first went to the USA on a coach trip organised by the Geologists Association back in 1991. This trip started in Salt Lake City went down through Utah to Moab, then to Arizona and the Grand Canyon, back into Utah for Bryce and Zion canyons then through Death Valley on the way to Yosemite, ending in San Francisco about 3000 miles. I did a 3 week fly drive with my wife in 2003 covering mainly Arizona and Utah with a loop into Death Valley, California. We started and ended in Las Vegas, Nevada to which Virgin Airways had just introduced direct flights from Gatwick. We did another in 2015 to Colorado and Wyoming flying in and out of Denver. The distance driven in both these holidays was a little over 3000 miles each time. Through work I had a few extended 'business' trips to the USA going to Arizona, Texas and several visits to Florida. I also had an unplanned trip to California when I was stuck in Hong Kong when the Icelandic volcano erupted in 2010.

In addition to national parks there are also national monuments some of which are larger than many national parks. The basic difference between the two is that national parks are protected due to their scenic, inspirational, education, and recreational value. National monuments have objects of historical, cultural, and/or scientific interest, so their content is quite varied. For example, national monuments protect wilderness areas, fossil sites, military forts, ruins, and individual buildings such as Ford's Theatre, where President Lincoln was assassinated. All of these parks are run by the National Park Service, who in addition to operating the parks act as the police and many officers carry a gun. Just imagine a park warden in Britain wielding a colt 45, I would be quite concerned for anyone dropping litter!

In addition to National Parks and Monuments there are national preserves, national forests, national seashores, national historic sites and state parks many of which contain very spectacular scenery, Dead Horse Point in Utah is particularly good.

The first national park in America and indeed the world was Yellowstone. It was created in 1872 by president Ulysses S Grant in order to preserve the unique landscape. Perhaps the most famous park is the Grand Canyon. This is not the largest at 1900 square miles , Death Valley is 5260. (By the way the county of Kent is only 1440 square miles!) The Grand Canyon is not even the most visited national park at 6.3 million visitors a year, Great Smoky Mountains has 11.4 million. Most parks are in the western states with a few in the east, understandably the middle great plains area there are virtually no parks.

A lot of the parks display very interesting geological or natural features and In this series of articles I will highlight these. I will concentrate on the lesser know parks which I believe could be of interest to members thinking of a tour of the USA. I would, of course, be happy to help anyone planning a trip.

American Parks Part 2: Rocky Mountain

by Gary Woodall

Rocky Mountain National Park is some 80 miles northwest of Denver, Colorado, and as the name suggests it is set in the heart of the Rocky Mountains. Despite having 4.4 million visitors a year, making it the fourth most visited national park, this park is often bypassed on trips to the American southwest, the very good coach tour run by several companies starts in Denver, goes north to Rapid City, across Wyoming to Yellowstone, loops down through Utah visiting Bryce and Zion canyons and lastly the Grand Canyon in Arizona , finishing at Las Vegas. The reverse route is often followed as both Denver and Las Vegas have convenient direct flights to the UK. But Rocky Mountain National Park is usually omitted from the itinerary. This is a great shame as it provides a rare opportunity to see the mountains from the top without the need for climbing or using a cable car as there is a road, the Trail Ridge Road which is the highest tarmac highway in the USA going up to just over 12,000 feet.

Looking across Bear Lake.

The park is only some 415 square miles in size (remembering the Grand Canyon is 1900), but to see even just the main sights takes 2 days. The park only has one main road with a few side loops and can get very busy, especially at weekends. Best advice is to arrive before 9 am and keep ahead of the crowds. It is open all year round but only during late spring to early autumn is the park fully accessible snow closing the higher elevations late autumn to early spring. Most visitors stay in the town of Estes Park just outside the entrance to the park. Here there are many hotels, restaurants and souvenir shops.

One of the most popular areas is Bear Lake, and at peak times it is very difficult to get parked there, but the National Park Service (NPS) runs a shuttle bus from larger parking lots further from the lake. The view across the lake is spectacular with the forest and mountains looming on the skyline. But it is well worth leaving the parking lot and walking the mile long trail around the lake. In addition there are numerous other trails in this part of the park many rewarding the visitor with spectacular views and even waterfalls.

Set off early to drive the Trail Ridge Road, (see photo next page) it starts in Horseshoe Park a u-shaped glaciated valley then climbs up through pine forest until the alpine, treeless, elevation are reached. There is an exceptional flora here similar to that found in the arctic tundra. But it is primarily for the views of the mountains that you come here for, as the road climbs to just over 12000 feet. It is worth stopping at some of the many parking areas to take in the scenery. After 25 miles you reach the Alpine Visitor Centre where there is a very welcome restaurant. Even into early summer there are several feet of snow and breathing is very laboured at this altitude but luckily you do not have to hike far from the car to see the scenery.

Alpine tundra on Trail Ridge Road

Rocky Mountain National Park is also justly famous for its wildlife. It is home to Bears, Coyotes, Moose and Beavers, though you will be very lucky to see these. But you have a good chance to see Elk and Bighorn Sheep, the latter being the symbol of the park. We had a fantastic view of an Elk at the Alpine Visitor Centre, it was silhouetted against a mountainous backdrop. When we were driving back we noted a large number of cars pulled up along the road and people gathering off to the right. So we parked up and walked over the ridge to see a group of male Bighorn Sheep. I made sure I stayed back as one man was nearly head-butted but luckily for him the sheep did not make contact.

Bighorn Sheep

Elk

The park is interesting geologically with mostly igneous rocks including a few lava flows. But the main attraction geologically is the evidence of glaciations. Don't miss the visitor centres as they all contain interesting displays and the staff are on hand to give advice on park conditions and what to do. In fact it is probably wise to go there first but I was too eager to get to the sights before they became too crowded!

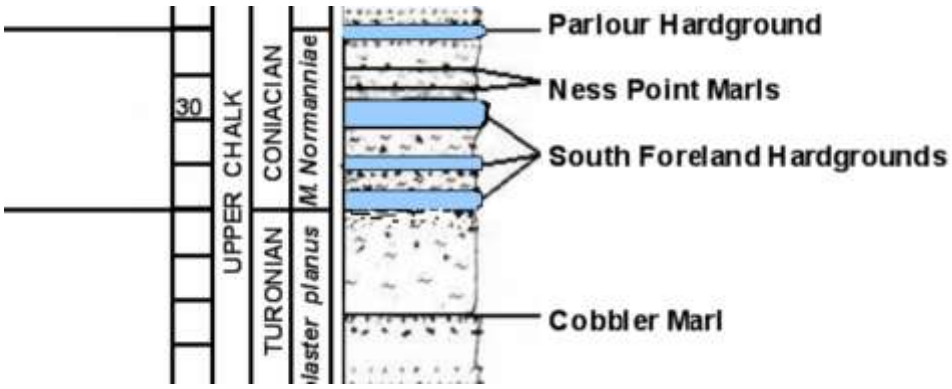
The search for a Chalk Bryozoan Reef.

Nick Baker

Coral reefs tend to be common in the Palaeozoic, but in the Mesozoic onwards corals tend to occur as single items. So no coral reefs in The Chalk. But, what about bryozoa? In the Pliocene of Suffolk, the misnamed Coralline Crag is largely composed of bryozoa. So, what about bryozoan reefs in the Chalk?

I think it was late in 2012 that I first came to the village of Hucking. I think it's two pubs, two farms and a church. There is a lane that runs through the village, past the church, which then slopes down to the west. About 200 metres west of the church is a chalk bank. I collected a chalk sample from the bank, as one does, about 2kg. On getting it home, drying it out, freezing in sodium sulphate solution, then on thawing it collapsed into a mass of white twigs. It seemed that these bryozoa comprised about half of the mass of the chalk. The question on my mind was twofold—where had I been within the Chalk strata, and was this bryozoan event continuous across country. Could it be found on the coast? At St Margaret-at-Cliffe perhaps? Or inland at Boxley Hill, which still has accessible Chalk at that same horizon. The curious aspect of the Hucking bryozoa is that I have not found them anywhere else and they are not illustrated in *Fossils of the Chalk*. And what was more frustrating was that I did not find them on subsequent visits. The amount of bryozoa present suggests that if this does not constitute a reef, then it certainly comes close.

So, where was I? The area of Hucking is shown in the map on the right. My location was in the steep slope of the lane, shown to the west of the village. There used to be several chalk pits to the south, now overgrown and shown as the line of woodland. The sections are described in the Maidstone memoir but the descriptions do not take us very far. Terms such as 'coarse-grained chalk' are strange. Nor does the use of the term *Micraster Praecursor*. *Micraster Leskeii* is not mentioned, but if this is the *Planus* zone then that would have been the common *Micraster* species. The text refers to 'high in the *Planus* zone' and (in the memoir) the small sketch map shows the boundary of the *Planus* and overlying *Cortestudinarium* zone (now roughly coinciding with the base of the *Decipiens* zone) as coinciding in the area of the village. In the new zonal scheme the boundary of the *Planus* and *Decipiens* zones is included in a 4-metre band called the zone of *Micraster normanniae*.

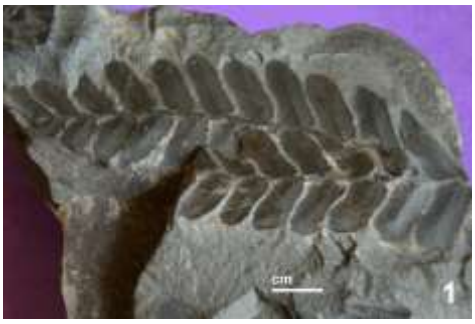


If the same level of Chalk is to be found with relative ease it would be at the top of the pits at Boxley Hill. The sections to the left can be seen partly in the gully to the east of the top-most levels. The Chalk there is rich in bryozoa, but I have never found the "Hucking White Twigs" there. Needs some more research.

Field Trip to Betteshanger Country Park
April 20th

Nick Baker

A select party of six of us were blessed with a truly beautiful day, with just about the right temperatures. Betteshanger is a nature reserve centred on the former Betteshanger coal mine. Part of the waste heap of the mine provides a rich Coal Measures plant fauna. The black shaley coal provided the most common fossils, although the specimens were often packed together to such an extent that individual plants were often rendered indistinct. None the less, some really fine specimens were found. Other material could be found by splitting open the clay ironstone, although the specimens were relatively sparse, compared within the shale, but when they did occur, they were good.



Specimens found included those in the numbered photos above.
1, Neuropteris; 2, Stigmaria; 3, Sphenophyllum; 4, Calamites; 5, Asterophyllites; 6, Annularia.

The site is managed by Geo-conservation/Kent. The age of the represented strata ranges from the Westphalian-Asturian sub-stage to the Stephanian– Stephanian B substage. 320 to 315 MA BP.

The other photos show Andy and Brian working the site.

Road show at Rochester Guildhall Museum—May 26th

The annual road show, run by the Medway Fossil and Mineral Society and Geo-Conservation/Kent took place at the Rochester Guildhall Museum on May 26th. The exhibits show the wide diversity of activity, collection, research, curation and teaching carried out by the members, especially on local geology and geological conservation. But we go further afield in terms of volcanic and metamorphic studies, as well as minerals. So, we could say that the societies have most of geology covered, so to speak. But this year, footfall was down on recent years, and the day of the week seems to be crucial. In three orders of descending preference it seems to be, 1, Saturday; 2, Sunday; 3, Sunday next door to a bank holiday. This year we had the third slot. Needs consideration.


ASK THE
EXPERT

London Clay—A solitary close look

Nick Baker

We are all very familia with the macro fossils that are found in the London Clay in the are of the Thames Syncline, but a search at the small level may well come up with the unexpected. Some weeks back Trevor Wright gave me a sample of clay. The sample was unusual in that it showed a seam of broken shells. First off, I gave the clay lumps a quick rinse to make sure that there was no contaminating beach sand. As it was, the excavator had done a good job and there was no contamination. So, next to dry out the clay at 100C. This has the effect of dehydrating the clay minerals, so that further hydration will cause the minerals to collapse. It also ensures that any reagents will penetrate the clay. I usually go to the second stage and

201905050_01
LONDON CLAY
Eocene_Sparnacian_London Clay

Nick Baker Collection
Sample collected by T. Wright

Clay sample in cliff 450m N by E of Swanley Farm, Warden, Isle of Sheppey, Kent
TR 003732
20190505

01	Worm tube	12-13	Gastropods	39	Bone joint socket
02	Fish tooth	14-19	Foraminifera_*Maginulina enbornensis*	40-41	Squalis minor ?
03-04)		21-23	Foraminifera_'Lenticulinids'	42-43	Foraminifera_*Maginulina enbornensis*
20)	Bryozoa_*Cheilostome*	24	?	44	Vertebra
05-06	Shell fragments	25	Fish vertebra	45	Teredo sp.
07-08	Fish Otoliths	26-27	Foraminifera n/i	46	Vertebra
09	Teredo sp.	28-37	Fish Otoliths	47	Pupa
10-11	Fish Otoliths	38	Tooth	49-53	Foraminifera_'Lenticulinids'
				54-57	Brittle Star fragments

immerse the sample in a concentrated solution of sodium sulphate, and placing it in a deep freeze. The sulphate will permeate the clay but not any calcite, silica, pyrite or phosphate fossils. Subsequent thawing will cause the clay to disintegrate , leaving the fossils intact. This stage can be repeated. However, London Clay, like Gault, is very tenacious, and a lot of the fossils were still encased in blobs of clay. What is the answer? - boiling in washing soda solution for five minutes. This will give you very clean fossils. It will also destroy some carbonatious material. And if you are looking for micro-selenite, you won't find because it has just been converted to chalk! However, you should have a good pristine micro-fauna. Note—in the sample no seeds were found, and the process would not have destroyed pyrite. In this first run I found all the specimens from 1 to 27.

So pleased was my customer, with this result, that he returned to the site at Warden and got the remainder. It totalled 1.814kg—exactly 64 ounces (4lbs). I repeated the process, with a little difficulty, and recovered the remaining fossils shown on the slide. The clay sample was something of an enigma. Firstly, it contained a higher than expected proportion of silica silt (2.76%). The breakdown in size was as follows.

Large material	>500 microns	1.09%	.019kg
	125-500 microns	0.68%	.012kg
Silica silt	31-125 microns	2.76%	.050kg
Clay	< 31 microns	95.47%	1.733kg

One would not expect any silica to be present in a clay environment over 100km from land. However, the London clay on the Isle of Sheppey is in the upper portion of the formation, and that the Claygate and Bagshot sequences are close by. Could there have been early inputs of sandy material from a migrating coast-line to the south? Also, the shell material appears to have been broken prior to burial—more reminiscent of a higher energy environment than the prevailing clay.

So, what about that fauna. First of all there seem to be no Ostracods. A colleague of ours has commented that Ostracods are of freshwater only. Sorry, fake! Handle any Chalk sample and you will be handling millions. This absence of Ostracods is unexpected and I cannot account for it, save to say that none are mentioned in the *London Clay Fossils of Kent and Essex*, Rayner et al. 2009. On the other hand, Foraminifera are well represented, mainly as small Lenticulinids and as larger types, such as *Maginulina*. There was an abundance of Brittle Star (starfish) fragments, - a few shown in 54-57. Fragments of Bryozoa (*Cheilostome*) are shown in 03-04,20. Also in abundance were Otoliths (Fish ear bones) 07-08, 10, 28-37. Fish vertebrae were common, and one item (39) appears to be a joint socket, but the prize item goes to 40-41, a minute shark tooth, which appears to be *Squalis minor*. But one, otherwise enigmatic item (47), which I originally thought was a claw fragment, appears to be an insect pupa.

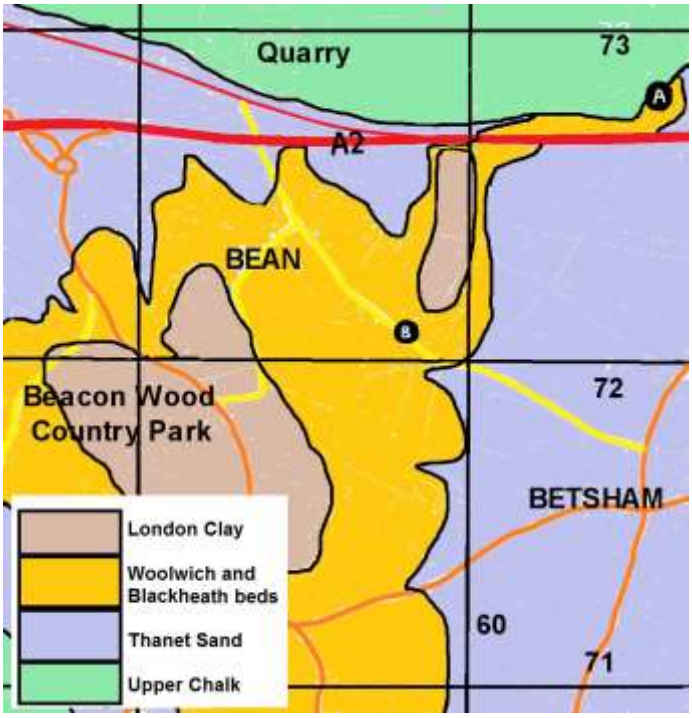
Some Lower Tertiary outliers of North West Kent

Nick Baker

My title is carefully chosen, particularly in the word ‘some’, since I am not intending this as a comprehensive list of localities but rather comment on other inland sites, as opposed to Abbey Wood or Beacon Hill. The first locality used to give specimens of larger molluscs, while the second produces micro or miniature specimens. The two areas are Swanscombe and Bean. I said ‘used to’ in the case of Swanscombe because it is now victim of the urbanisation of Thameside, guarded by heavy metal fencing. So where was it when I saw it?

The sketch map below-left shows the main geological outcrop of the Bean and Darenth outlier. Low angles of dip tend to mean that the boundaries are generally altitude-controlled. So, the high ground to the south-west of Bean village is composed of London Clay, while the surrounding lower land is mainly Thanet Sand, the intervening beds being the Woolwich and Blackheath series. On two occasions in 1982-83, I was exploring a woodland at point “A” at grid TQ 606728, 1250m due north of the cross-roads at Betsham and just to the north of the A2 road.

The ground here was covered with shell fragments, mainly *Brotia.* In the picture below is, 1, *Brotia melanoides*; 2, *Polymesoda cordata*; 3, *Tympanotonos funatus*: 4, ?*Odontaspis sp*; 5, *Corbicula cuneiformis*. All of this fauna occurs in the Woolwich beds, and *Polymesoda* only in the Woolwich beds.



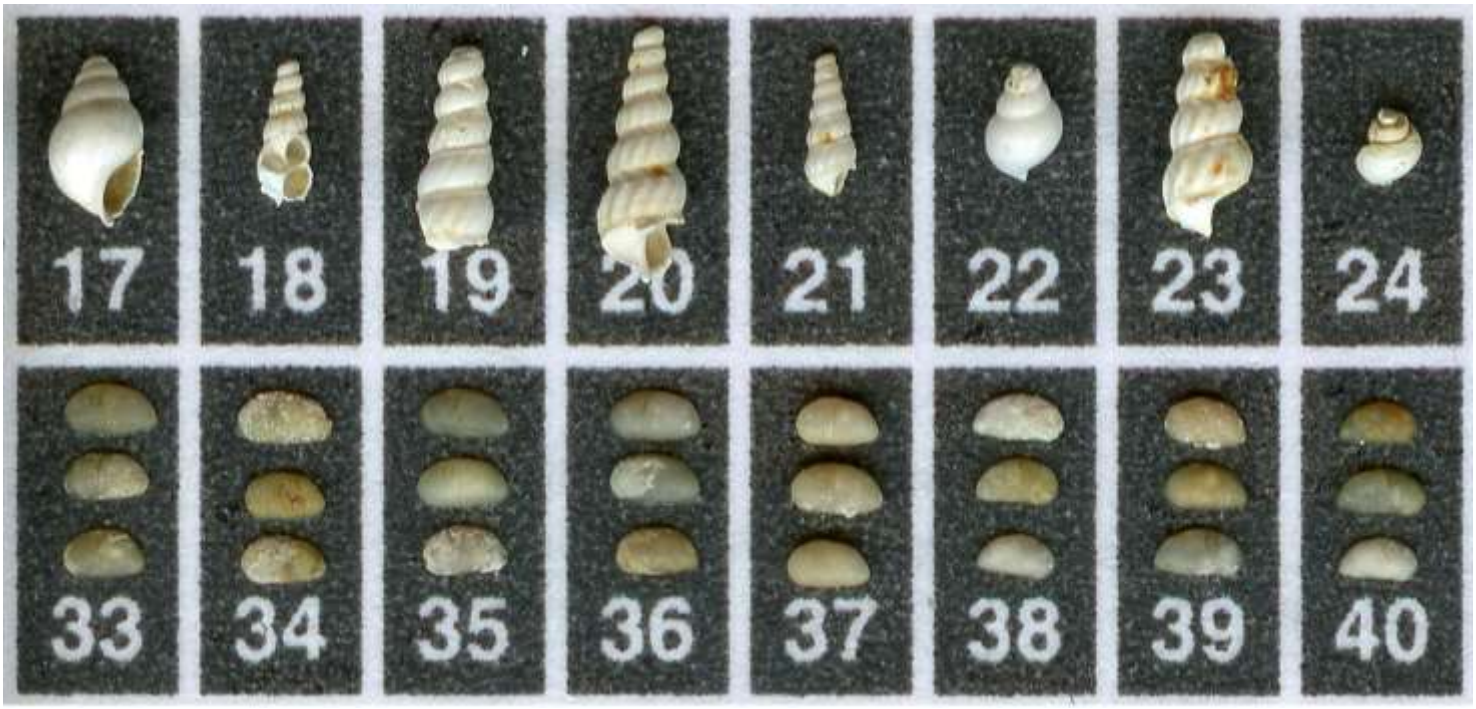
The ground to the northwest sloped into a cliff, being the southeast corner of a massive chalk quarry. The slope was mainly of shelly Woolwich beds and Thanet Sand. Much of the shell material seemed to come from the Woolwich Shell Bed. For every intact shell there seemed to be around 100 fragments. I did not detect any definite Blackheath Beds on the higher ground, although I recall Blackheath Beds being cut into during construction of the A2 road, 100 metres or so to the south.

From 1994 onwards I made several visits to the area around Bean to take samples from the Woolwich shell Bed, which outcrops at several points in the area. At point "B" - grid point TQ 598721, a lane bank about 1000m northwest of the crossroads at Betsham, I took samples from the shell bed There were hardly any large intact specimens. From 2006, from the influence of Dr. A. J. Rundle, I made searches for micro-fossils. The Bean locality gave the material in the micro-slide shown below.

With the Woolwich Shell Bed, in a degraded slope it is difficult to get a clean sample– by that I mean without soil contamination. The bivalves suggest a marine fauna but it is difficult to say whether there any modern snails there. Identification aids are difficult to obtain for micro-faunas, and these are not juveniles.

A sample taken in 2013 attempted to sample solid clay only. Solid clay is rare here. The result is shown below

The marine character is more apparent, although I still cannot be sure of the gastropods. Below is an enlargement showing some of the ostracods.



In the next letter I hope to show the results from neighbouring areas and to be more definite on the age of some of the content.

The Medway Fossil and Mineral Society at the Kent Show Ground. July 5-7 2019

Nick Baker

I had not visited the Kent Show Ground before and I was amazed at the sheer area and activity on display. We had a corner of a tent, and we had quite a steady flow of visitors on the first day, including quite a few children. I am compiling this report at the end of the first day, so still two days to go. I think I can say we made good use of our allotted space, and I can say that we owe a lot to Fred Clouter and his skill and expertise in the production of our display boards. Gary had set up some Chalk material showing its likely appearance in 'the field' - very useful if you are a complete beginner in your hunting. Certainly, in the case of the Chalk, things do not appear in museum quality. Here follows some views of our exhibit on the first day. We acquired an extra table and Anne was able to set out a display of items from the Kent Geologists' Group.


Medway Fossil
and
Mineral Society

Details of the exhibits. Chairman not included !

Photos supplied by Trevor Wright

Spring Roundup –2019

Jan 16 Welcome back and do-it-yourself evening
Jan 23 Program planning
Jan 30 Specimens beginning with F—Fluorspar, flints, foraminifera, feldspar, felsite, fish, fish teeth
Feb 6 Microscope evening
Feb 13 Fossils from North Africa
Feb 20 Brian gave a talk on a visit to Shetland
Feb 27 Odd and weird specimens—such as a scorpion in amber—the scorpion was impregnated in re melted amber.
Mar 6 A silent auction
Mar13 Specimens beginning with G—granite, graptolites, graphite, galena…
Mar20 Fred gave a number of illustrated talks on interesting geological location—his text on his talk on Copperas being not available.
Mar27 Fossil plants (but not the seeds)
Apr 3 Nick gave a talk on Flint, Silica and Rotting Sponges.
Apr10 End of term party
…….
May 8 Fred showed his results on the advertising displays for the Kent Show. Tony gave a talk on fossils—folk legend, environment, little known aspects
May15 Specimens beginning with the letter H. Holaster, Halite, Hornfels,
May22 Preparation for the May 26 roadshow
May26 Roadshow at the Rochester Guildhall Museum
May29 Brian gave a talk on some aspects of the Canary Islands
Jun 5 Minerals as crystals
Jun12 Plant seeds
Jun19 Specimens beginning with the letter I—Inoceramus, ignimbrite,
Jun26 Ann gave a talk on The Algarve
Jul 3 Preparation for the Kent Show. Program planning for the Autumn
Jul 5-7 Exhibit at Kent Show
Jul10 End of term party

Autumn Program

28 Aug 2019	Fossil display at RSPB Northward Hill	Tony
11 Sep 2019	Welcome back and summer finds	All members
18 Sep 2019	Faroes Talk	Tony
25 Sep 2019	Geological Alphabet - specimens beginning with "J"	All members
2 Oct 2019	The Algarve	Ann
5 Oct 2019	Field Trip - Sheppey	
9 Oct 2019	London Clay	All members
16 Oct 2019	Metamorphism	Anne
23 Oct 2019	Chalk	All members
30 Oct 2019	AGM	All members
6 Nov 2019	"Micromounts"	John, Anne, All members
9 Nov 2019	Field Trip - Folkestone	
13 Nov 2019	Folkestone	All members
16 Nov 16 2019	Fossil Roadshow Maidstone Museum	All members
20 Nov 2019	Microfossils	Nick
27 Nov 2019	Geological Alphabet - specimens beginning with "K"	All members
4 Dec 2019	Granite	Brian, All members
11 Dec 2019	End of Term Party	All members