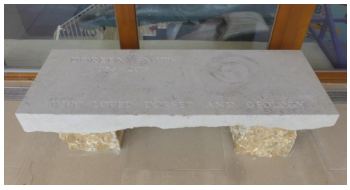
Dorset GA Group

Newsletter Winter 2018

Contents

Welcome to the Winter Newsletter!

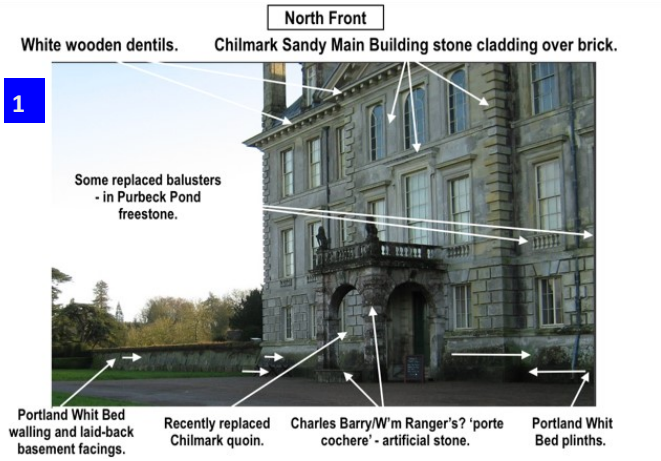
In this edition we have quite an eclectic mix, which is good! I am grateful to all the contributors, especially those submitting fieldwork reports and offering regular features. I'm also pleased to feature serialised features like Pete's on Kingston Lacy. Any suggestions are very welcome for the next edition. May I take this opportunity to wish all members a pleasant festive season and a happy, healthy New Year. *Kelvin*



Doreen Smith event (see pages 4-5)

Kingston Lacy House Part 1 : Exterior Stone

Ten years ago we were allowed to visually identify and photo record the building and decorative stones of this National Trust property for Newsletter publication and many captioned photos were printed in the August 2010 issue (see website) This is the first of a series of by area descriptions to be used as a Reference Guide to this property and to archive this record. In due course, more photos will be available in the Secular Buildings Section of the Dorset Building Stone website so that all specimen types can be located and well identified visually on site. Annotated photos (1 - 4) of the compass-point House fronts show the main types of stone displayed in various exterior features. More detailed comment and plain photos are included as necessary. Feedback and corrections will always be welcome. ***All photos are by kind permission of the National Trust.'***



Chilmark/Wardour Upper (oolitic) Building Stone was in part used from 1663-7 at Kingston Hall structurally as well as decoratively sculpted. (3 & 7) However, only when Charles Barry clad the brick building in Chilmark/Wardour Lower (quartz sandy/glauconitic) Main Building stone in the 1830's did we see it almost replicate Kingston Maurward's Portland stone- clad example. The William Bankes' now neo-classical Italianate palladio included new Portland Whit Bed tilted back slab facings to the North front ….

...front ground floor containing oyster shell set on new plinths (6) and the extensive south front Portland Stone terrace. Strangely. the ground-level main entrance Portland Stone plinth line contains unfinished tooling and unmatched block facings (4 & 5). This questions the sincerity of Barry's attitude to William Bankes, along with the Caroe & Martin (National Trust) architect's report on the structural errors deliberately concealed from William Bankes (or perhaps effected after he was exiled?).

In addition to the wooden balustrade to the roof there's another on the south front (Lower/Main Building Stone) and others including the north front (7) of white Purbeck as window sills seen in the first main photo. Weathered Wardour/ Main Building Stone has been occasionally replaced - and these examples below are the wrong way up - both old and new. (8 & 9). The National Trust west front restoration tablet and close-up photo is of Middle Purbeck stone. (10)

The east front (11) predates the William Bankes & Barry stone cladding and additions. The main service access but the now formal garden area is not open to the public.

The loggia feature is always dark to the eye compared to the commonly whiter Portland limestone seen to the left and the loggia stone has not been publicly recorded or yet identified. Portland Limestone or softer Chilmark/Wardour would be the best choice for this heavy blockwork feature.

The loggia base, pillar blockwork and arches are not mere cladding and the same stone may well comprise the newly required ground floor walling. (12) The rusticated loggia facings might well be of artificial stone. There seems to be no duplicated rustication pattern in the loggia or porte cochere blockwork from a distance (3) and any architect would have sensibly precluded it if quietly using Rayner's stone.

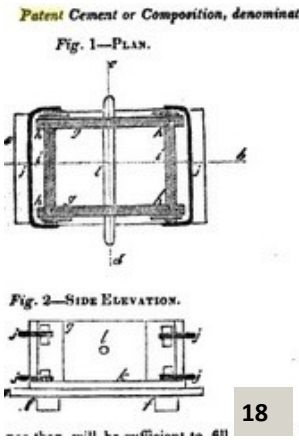
Barry had difficulty being paid properly by William Bankes and the natural stone sculpting costs of both these features would have been extraordinarily high, so it would have been wise to keep any Rayner input a 'trade secret' given 60% of the cost could have been thereby saved. High status natural stone building in the 18th century could be replicated artificially from the early 19th century, but records are very incomplete. This presumably because high status for patrons and a good living for architects was best assured by full discretion.

Man-made cement-based stone today is the basis of the world-renowned decorative Haddenstone Ltd. and of abundant suppliers of faux facing stone to meet modern rural building regulations. Kept at a safe public distance, the fruit-filled garden urns (13) seem modelled after the contemporary ceramic Coade stone designs and may have been made to order from Austin & Seeley Ltd. who used a cement mixture similar to Rayner along Coade stone garden lines. Time and cost savings over natural stone sculptures would have been far greater than for dimensional building stone. The Victorian popularity for artificial garden stone features was much in favour and lasted well beyond Albert and Victoria's choices for Osborne House in the 1880's.

It would be remarkable if the Kingston examples were hand carved from natural Portland or Wardour Stone as in the 18th century. My private access for stone examination ceased with the redundancy of House manager Bob Gray. This article may give rise to further permission to identify more east front stones. However, the porte cochere can be readily examined and very interestingly Rayner and Barry also used rusticated mouldings at their contemporary 1835 new-build of St. Mary Wesley church in the tower's top stage. (14)

Furthermore, the St. Mary's plain blockwork was 'lime and sand coated'. The Kingston Lacy porte cochere weathering suggests some plain blocks possibly coated rather than being artificial stone faced per se - whilst the rusticated blocks show little or no weathering? (15-17) Clearly Rayner was producing both kinds of block for Barry whilst the St. Mary church and Kingston porte cochere plus loggia were being built. Rayner patented and publicised his limestone textured block making method and produced both Portland and Ragstone textures from his Ranger's Patent Stone Manufactory, based in Lambeth. The Portland version was described as being visually indistinguishable from true Portland limestone to even professional course masons. The copyright free Creative Commons image allows us to visualise the process - to which even rusticated mould plates could be inserted for any variety or number of faces that would be required to avoid detection due to any duplication. (18) The texture of the Kingston porte cochere blocks are individually rusticated in appearance but there's notably no evidence at all of any clean chiselling marks. For today's observers they probably look more moulded than to have ever been directly stone chiselled. Our final suspicious photo (19) shows some of an enormous unbroken but thinnish mounting plate or bench and duplicated rustication on one very large supporting plinth stone. A top left plinth corner crack also looks rather more cement like than fractured granular limestone. ***Peter Bath***


17



18


19

References:

1) Kingston Lacy – The National Trust (1994).
2) Caroe, M. B. "Kingston Lacy, Dorset: an architectural case history." ASCHB Transactions 10 (1984).
3) References to William Rayner artificial stone are available via various websites.

Doreen's farewell.

The farewell to Doreen Smith at the Etches Collection on Saturday 6th October was very well attended by over 70 people with family and friends from as far away as Australia. There was a good sprinkling of geology friends including Susan Brown from the G.A. with her husband David who with Doreen have been supporters of the Lyme Regis Fossil Festival for many years. People started to gather for 4pm or earlier in some cases to enjoy another view of the Etches Collection. (I have been there on several occasions with groups and you always feel you ought to let others have a good look rather than pushing to the front!) There was a PowerPoint presentation recording Doreen's life to entertain as people gathered and chatted. We also had the opportunity to view the memorial bench (supported by DGAG and members) which is now located on the veranda of the Etches Collection. It is made of Spangle or Blue Bit (Portland Limestone from Purbeck).

Following the bar opening around 5pm, food was served just before 6pm which was excellent, and I think Doreen would have been pleased with the offering. The main course was followed by some short speeches from Doreen's brother from Australia and her son as well as a poem from Bob Chandler and an appreciation from me as well as a champagne toast. I didn't know who was going to give speeches on the day, so it was difficult to plan what to say but I concentrated on how Doreen organised events such as the Fossil and Mineral Fair (Wimborne) and gave her time without seeking credit such as selling donations on E-Bay with the proceeds going to DGAG.

I also mentioned her contribution to events such as the Chairman's and President's Picnic each July and the Christmas Workshop. Doreen also travelled to represent DGAG at the G.A.'s Festival of Geology at UCL in London as well as the Hampshire Fossil and Mineral Show at Lyndhurst on numerous occasions.

Doreen was quite a private person and I was astonished to read Bob Chandler's appreciation of Doreen's life and contribution to geology in the September G.A. Newsletter. It will be difficult to replace such a giving person and we will long remember Doreen's contribution to DGAG. RIP. ***Alan Holiday***

Recent DIGS activity.

The DIGS group has continued to be very active through the summer into the autumn with conservation work at the Rockpit Farm (Maiden Newton), Todber, the Upwey road cutting, Wanderwell (Bridport), Holt Farm (Melbury Osmond) Steeple Pit (Purbeck) and Crack Lane (Langton Matravers).

The session at the Upwey road cutting was particularly interesting as the group was being filmed by a Belgian film company who were in the UK to make a documentary about how features such as geological exposures along the roadside are often ignored. They were also filming in the N.W. of Scotland, South Wales and Cheddar. Although the Upwey cutting is not officially a DIGS site (it is part of the Bincombe SSSI) the group has been looking after it since 2011. The site is important as it exposes the boundary between the Portland Limestone through the Purbeck Beds, possibly into the Wealden. As an inland exposure it is highly accessible. Despite the efforts of DIGS members, the exposure is slowly deteriorating due to weathering over which we have no control!

The session at Crack Lane in October was the annual collaboration with Wessex OUGS. As usual we had a good turnout with some enthusiastic activity for a couple of hours in the morning although some members worked on into the afternoon. We managed to extend the exposed face of Purbeck Burr (Broken Shell Limestone) so the two former quarry sections are now joined. The conservation was followed by a lunch stop at the Square and Compass (where Charlie Newman demonstrated some working of Kimmeridge Oil Shale to make bracelets). Later we had an enjoyable walk from Renscombe Farm via Chapman's Pool to St Aldhelm's Head and return via St Aldhelm's Quarry. The weather was brilliant with excellent views as far as Portland. For further information on DIGS sites and activity see the website https://dorsetrigs.org.uk/ ***Alan Holiday***

Trilobites of the British Isles book review

Trilobites of the British Isles by Dr Robert Kennedy & Sinclair Stammers.
384pp soft back. Siri Scientific Press £37.75 + p&p. siriscientificpress.co.uk
The first comprehensive work on British trilobites was a monograph (very detailed) by Slater, written 1864 -1888 but never finished. The next one is this book (published 2018).
It is not an introduction to trilobites so a little knowledge helps, nor is it complex. If you know what a cephalon, thorax and pygidium are you probably know enough. (head, body and tail area, so now you do know enough).
The first 16 pages cover the usual bits about the authors, introduction, acknowledgements and history of research. The main sections on Cambrian (p17-57), Ordovician (p18-256), Silurian (p257-335), Devonian (p336-343) and Carboniferous (p344-358). References and index (p359-384). Each section has a few pages on paleogeography, stratigraphy and locations with the vast majority are of photographs of trilobite fossils. The photographs are all of excellent quality and properly captioned, all on heavy quality glossy paper.
The book covers 343 species and sub-species, many examples are the best preserved known to science. I didn't know there was such variation in British trilobites - never mind Morocco.
If you are interested in trilobites - **BUY IT!** Now where did I put my Carboniferous trilobite from Derbyshire? ***John Scott***

Geology for young people.

As you may know I help with Rockwatch which is a geology club run through the G.A. nominally for 8-16 year-olds but younger siblings often attend. For over ten years there has been an annual visit to Dorset in late July/early August staying at Leeson House at Langton Matravers. *(continues on page 6)*

This year was no exception and the group of around 25 children and parents had excellent weather. One day was spent at Abbotsbury, Portesham and Portland. The second day was at Kimmeridge visiting the Etches Collection in the morning and Steve leading the group on the beach in the afternoon. The third day was spent on Purbeck. There are also activities in the evening and on the afternoon of the first day and the morning of the last day. The parents and children come back year after year as they enjoy it so much. This year we had a change in group as some of last year's group have now gone on to university to study geology. However, Philip Vixseboxse (now at Bristol University) continued his long association with the group. He is co-author of a paper in the Proc. Geol. Assoc. June 2018 on the Ediacaran fauna of Charnwood Forest, so a Rockwatch person who is definitely going places!

In October I took a group of year 2 children (6 years old) from Frome Valley School (Crossways) for a fossil collecting session at Ringstead. This was the fourth year running I had taken such a group. Unfortunately, we chose a day which was definitely autumnal, while the day before had been summer! It was so rough we couldn't get down the ramp to the beach the tide was so high with the strong onshore wind. So we walked towards Osmington Mills and get down onto the beach further west. Collecting was not too brilliant but they all found some examples of Ostrea delta and even one piece of Ringstead Coral Bed. The children loved it and were very enthusiastic about their finds. So hopefully some more geologists in the making. ***Alan Holiday***

Inspecting the fossil log at Rocket Quarry

Fossil collecting at Ringstead Bay

Recent events involving DGAG

DGAG and DIGS had stalls and displays at two local geology fairs in the summer. In July we attended the Purbeck Fossil Fayre, based at the Square and Compasses in Worth Matravers. Unfortunately, it was the one duff weekend in a glorious summer! On the Saturday we had a few visitors, but our marquee wasn't well-signposted. Sunday was a complete wash-out owing to an unseasonal storm. We had better luck at the Hampshire Fossil and Mineral Fayre in early September where we had a lot of interest from visitors and sold quite a bit of merchandise. In October we had the Holiday Rocks talks at Broadmayne which had a disappointing turn-out from the membership. Nonetheless, those present enjoyed interesting talks on Alpine Switzerland and France by Alan, Malcolm and myself, plus the complexities of metamorphic rocks in south-west Norway, ably explained by Giles Droop. ***Kelvin Huff***

DIGS and DGAG displays at Worth Matravers (left) and Lyndhurst (right). (KJH)

Alan also represented the DGAG at the Annual G.A. Festival in London in November.

The Hot Rock Slot!

Komatiites

As hot rocks go, komatiites are probably the ultimate, at least as far as the Earth's crust is concerned. Komatiites are ultramafic lavas (defined as having bulk MgO contents of >18 weight %) and are therefore the nearest things there are to the volcanic equivalents of peridotite. The name comes from the Komati River in South Africa, the locality where they were first found.

With one notable exception, komatiites are restricted to Precambrian shield areas, and are one of the characteristic rock-types of the ancient volcano-sedimentary successions known as 'greenstone belts'. They were originally described in the late 1960's from the ~3500Ma old Barberton Greenstone belt in the Kaapvaal Craton, but have since been found in many greenstone belts of Archaean and early Proterozoic age (e.g. in the Yilgarn Block of Western Australia, the Superior Province of Canada, the Zimbabwe Craton, West Greenland etc). Most greenstone belts have undergone some plastic deformation and low- to medium-grade regional metamorphism, so it is rare to find komatiites that preserve their original igneous textures and mineralogies. The only known Phanerozoic komatiite occurrence is on Gorgona Island, Colombia, where lavas with up to 20% MgO form part of a late Jurassic to Cretaceous accreted oceanic plateau.

Within any given greenstone belt, komatiites tend to be associated with other more 'normal' volcanics (basalts, andesites, rhyolites, agglomerates), as well as various sediments, including those of shallow-water facies (e.g. cherts, banded ironstones, conglomerates, stromatolitic limestones etc). In the late Archaean Belingwe Greenstone Belt, Zimbabwe, komatiites constitute *ca*. 10-15% of the succession. Many of the komatiite flows have pillow structures indicating subaqueous eruption. The Belingwe volcano-sedimentary rocks unconformably overlie older gneisses, indicating that this greenstone belt was deposited on pre-existing continental crust in what some geologists think was some kind of back-arc setting (though it is unlikely that plate tectonics, in its present form, operated back in the Archaean). If oceanic crust existed in the Archaean, it is likely to have consisted mainly of komatiite.

The original igneous mineralogy of komatiites is dominated by olivine (close to the Mg-end-member, 'forsterite', in composition), clinopyroxene and minor chromite, and, in the least altered samples, these minerals are set in a glassy groundmass. Plagioclase feldspar is absent. The olivines and pyroxenes of komatiites display a variety of unusual textures indicative of rapid quenching related to supercooling, the most distinctive of which is 'spinifex texture', named after a kind of Australian grass. This is a texture characterised by long, narrow, skeletal, platy, bladed or needle-like crystals of olivine and clinopyroxene, either in sub-parallel sheaves (**Figure 1),** radiating fans, or random orientation **(Figure 2)**. Individual crystals may be up to a metre long yet <1mm thick. The clinopyroxenes tend to be needle-like, branched or feathery and arranged in radiating sheaves, whilst the olivines tend to be ladder-like with hollow cores (Figure 2). These crystal habits contrast dramatically with those of porphyritic volcanic rocks in which large, typically stubby, crystals ('phenocrysts') are set in a fine-grained groundmass. Porphyritic textures are generally taken as evidence of a two-stage cooling history, with the phenocrysts representing a period of slow crystallisation in a magma chamber, and the groundmass representing rapid cooling during eruption. Spinifex texture, on the other hand, implies a one-stage history of rapid cooling during eruption, in other words that komatiites were erupted as liquids with no suspended crystals. For that to happen, komatiite eruption temperatures had to be **very** high.

Laboratory melting and crystallisation experiments on komatiites indicate that the crystallisation interval in a bulk-rock composition with 32 wt.% MgO (close to the high-MgO end of the range) extends from *ca*. 1650ºC to 1150ºC at atmospheric pressure. Given that komatiites were erupted as crystal-free liquids, this means that at least some of them must have been erupted at temperatures above 1650ºC (i.e. white-hot!). Such liquids would have been extremely runny (with calculated viscosities of *ca*. 0.1 poise, i.e. similar to that of blood at body temperature) and presumably erupted extremely rapidly.

(article continues on page 8)

Fig.1. Weathered surface of an exposure of komatiite from Western Australia, showing spinifex texture. Image: www.alexstrekeisen.it/english/vulc/spinifex.php.

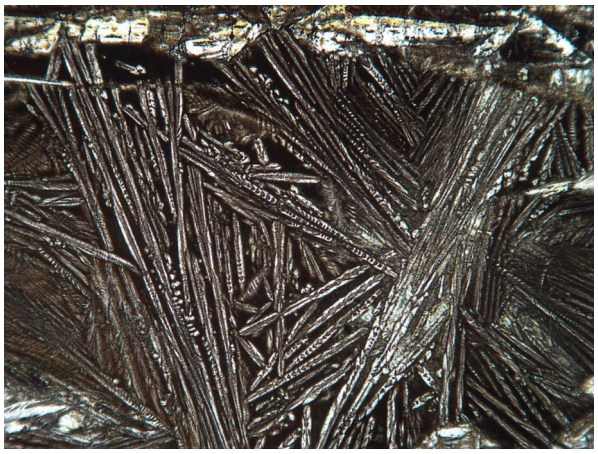


Fig.2. Photomicrograph of spinifex texture in a komatiite from the Belingwe Greenstone belt, Zimbabwe. Note long thin olivine crystals, some of which have hollow cores, and (at left) fans of feathery clinopyroxene. Long axis of field of view = 2mm.

It is generally accepted that komatiitic magmas were generated in the mantle by high degrees of partial melting of peridotite. With peridotite, as with any source rock being melted, the greater the degree of partial melting (i.e. the greater the proportion of melt), the more closely the melt composition approaches that of the source rock. Being ultramafic themselves, and thus compositionally similar to likely mantle source rocks, komatiitic liquids probably require degrees of partial melting in excess of 50%. The very high eruption temperatures would be consistent with this, but in turn require melting either at very great depth or under a much higher geothermal gradient than at the present day, or both. Some researchers have interpreted komatiites in terms of the mantle plume hypothesis, with komatiites being produced in the deeper, hotter regions of a plume and the associated basalts being produced where the head of the plume meets cooler mantle rocks. In any case, the virtual restriction of komatiites to the early Precambrian implies that the thermal regime necessary for such high degrees of partial melting no longer exist in the Earth's upper mantle.

Komatiites are of considerable economic importance as they are important hosts of many Archaean nickel and gold deposits. Nickel is a trace element which resides in olivine and is partitioned into the liquid upon melting, so komatiitic magmas are likely to have been relatively rich in nickel. The possible mechanisms responsible for the concentration of the nickel to form ore deposits are still hotly debated, as is the relationship between komatiites and gold deposits. ***Giles Droop***

I am grateful to Giles for agreeing to share his knowledge as a regular feature here. Kelvin

<u>Visit to Dorset by Malvern U3A Geology Group.</u>

A group of 27 members of the Malvern U3A Geology Group came to Dorset 1st-5th October and stayed at the Rembrandt Hotel in Weymouth. This was a small part of the overall group I learned as they have around 180 members and 80 regularly attending talks that are put on – pretty impressive! They visited the museum in Lyme Regis on the Monday afternoon followed by a talk by me in the evening to give them a flavour of what they were going to see the rest of he week. On Tuesday we visited Portland and took in the Heights, Kingbarrow Quarry, Bowers Quarry, the West Weares, raised beaches at Portland Bill and a quick visit to Chesil Cove to see Chesil beach. We also went to the Fleet at Camp Road and found a few *Nucelolites scutatus.* Wednesday was a Lulworth and Kimmeridge day with a visit to the Etches Collection. The group had an excellent afternoon with Steve showing them round. Peter Bridges, the Malvern organiser had a very detailed schedule but unfortunately, we didn't manage to cover everything at Lulworth in the morning partly because of bus transport. Thursday the group visited Burton Bradstock and Freshwater, Charmouth and Bowleaze Cove. Charmouth was a real disappointment with little if any fossil material found. ***(continues on page 9)***

There are large cracks in the path along the cliff top due to the extended period of dry weather. The final morning was spent at Monmouth Beach including the Ammonite Graveyard. The group thought the visit had been a great success and are looking forward to their next residential field trip. ***Alan Holiday***

Following on from Alan's article and by coincidence I hosted a visit from the Lewes U3A group in September. As I run the Dorchester U3A group I somehow got persuaded to help the National Advisor set up a subject support website. Chris Roach from Lewes U3A contacted me via that and their visit was the result. We followed a similar itinerary to the one Alan has described and everyone seemed very impressed with Dorset's Geology. My group has now been invited to Sussex by way of reciprocation. I think this may also be the way forward for local G.A. groups. Unfortunately, their Jurassic Coast boat-trip was cancelled owing to high winds but no matter, we had more time on Portland! ***Kelvin Huff***

DGAG Field Trip to Charterhouse 9th August 2018

I grew up in the West Mendips and so when I saw the trip to the Charterhouse advertised I had a pretty good idea of what it was going to be about. I have visited the area many times and knew bits and pieces about the geology and history but lacked a comprehensive overview. I hoped that by going on the trip I would be able to fill some gaps in my knowledge. What unfolded was a fascinating day in which Martin was able to bring to life the history of lead mining in the area and its relation to the underlying geology. All my expectations were far exceeded and I am very grateful to Martin for all the time he must have spent researching and planning the day.

The trip started at the roadside parking just past the Charterhouse Outdoor Activity Centre on the bend where the minor road from Burrington to Priddy crosses the valley colourfully called Velvet Bottom. The road itself on its high embankment crossing the valley provided Martin with one of his first stories. On 10th July 1968, a storm deposited over 4 inches of rain in a day onto very dry ground and severe flash flooding occurred, especially in the narrow valleys north of the Mendips where bridges were washed away and people killed. The Velvet Bottom embankment acted as a dam which eventually burst and this must have sent a wall of water rushing down the valley and into Cheddar Gorge although no-one witnessed this.

This starting point is in the middle of the historic Charterhouse minery where there is much evidence of the mining and processing of lead ore which has taken place since Roman times. This activity has greatly changed the shape of the valley and the first part of the day was spent going up and around the lumps and bumps made of mining spoil to visit the scattered sites of interest. These were many and varied. We learnt that much of the present landscape is the result of the final phase of activity in the nineteenth century which mainly involved reworking the spoil heaps of Roman and Elizabethan mining. We visited circular buddle pits where the crushed ore was washed, the 3m square entrance to Stainsby's Shaft dug to depth of 100m but now blocked a short way down, the remains of an 1850s silver extraction plant and most spectacular of all, the smelting plant with its ruined flues still visible – active 1849 to 1878 and employing 300 people at its height.

Older activity was visible at the so-called Roman Rakes where we had a good look at the Black Rock Limestone (BRL), at the base of the Carboniferous Limestone and one of the group found a nice piece of Dolomitic Conglomerate, formed as a desert flash flood deposit when the area was being eroded in Triassic times. This brings us onto the geology. The area is on the eastern end of the southern limb of the Blackdown pericline and we had good views NW to the high point (Blackdown) which is its core and is an inlier of Devonian sandstone (Portishead Formation [PO] aka Old Red Sandstone) surrounded by Carboniferous Limestone. Good discussions were had about this structure and Martin took us through its formation and subsequent history of erosion in the Triassic and inundation by the Jurassic sea. The PO & the Avon Group (AvG, aka Lower Limestone Shales) which were laid down on top of it are both impermeable and where they underlie the valley the land tends to be marshy. ***Continued on page 10...***

Small surface water streams form, only to sink into the permeable BRL soon after they have crossed the junction. The miners dammed the valley above the AvG-BRL junction to form a reservoir now mainly overgrown with reed beds. The position of the junction is clearly visible – when it is pointed out to you! – by the change of vegetation. We visited the entrance to Waterwheel Swallet, one of the caves which take the drainage southwest to resurge at the Cheddar Risings a couple of miles away. All you see is a padlocked steel cover, not very impressive, but the story of the mining artefacts discovered when it was being explored made this a nice little extra detail.

The first section of the itinerary east of the road finished with a walk onto Ubley Warren where the miners have followed surface veins of lead ore (mainly galena) leaving a field of parallel gorge-like drifts 3 to 5 metres deep. The rock is Black Rock Limestone which contains bands of chert well exposed in some places. It was pointed out that despite the limestone bedrock heather and gorse which are acid-loving plants are growing in places. This occurs because many parts of the Mendips are covered with thick soils derived not from bedrock but from loess blown in during the Ice Age .

The second section west of the start point was on good tracks which made it much easier going. We walked down Velvet Bottom on a track made of glassy slag from a second smelter which we passed but didn't see as it is hidden in woodland. We passed a very clear row of 6 buddle pits and a series of 4 very flat areas occupying the valley floor with 3 m. high walls at their downstream ends stepping down onto the next lower level. These are the remains of tailings pond and their dams which were built to clean up the water used in the buddling process by allowing the mineral residues to settle out.

We stopped for lunch close to where Velvet Bottom meets the north south valley that leads down into Cheddar Gorge. Martin pointed out the change in the colour of the limestone bedrock from dark to light grey. We had crossed from the Black Rock Limestone to the much purer Burrington Oolite which demonstrated that we had been heading away from the centre of the pericline.

Not for long, as after lunch we turned north and walked up the valley to Longwood towards the centre again. After a pleasant walk through ancient woodland we arrived back at the junction of the BRL and the Avon Group the position of which is approximately marked by the blockhouse that has been built over the entrance to Longwood Swallet. In wet conditions quite a sizeable stream sinks at various places near this entrance but in a dry summer the bed is dry for a long way above. The path then leaves the valley and heads west across a field to meet the Shipham to Charterhouse road. A weary mile further on we left the road over a style into the field that is the site of the Roman settlement. A large square platform is the only visible sign, but on the hill about half a mile to the northwest a much more prominent earthwork is visible, the amphitheatre. Unfortunately there is no right of way to it. We crossed the road for the final stop, the site of the Roman Fort. Again all that remains is low ridges marking the walls but its commanding position overlooking the minery gives a clear indication of its purpose.

We could have easily visited the fort earlier in the day but it was a great way to end the day and the cars were a only a couple of minutes away. ***Andrew Bradley***

Peveril Point and Swanage Bay. Saturday 8th September 2018

Swanage was colourful and busy that day with Morris Dancers and crowds in old-fashioned costumes! But we were able to park on the cliff not far from Peveril Point, ready to set off. There were thirteen of us including a new member which was nice, and Alan was leading us. We stood on top of the cliff just past the coastguard station, where there were useful information panels, and looked down towards the sea and Peveril Point itself and beyond in the distance to the Isle of Wight. Not far to our right was Durlston with its Portland Stone; between Durlston and Peveril Point the cliff curved round with various faults, landslips and the zig-zag path, but that wasn't our focus on this trip.

On the tip of the land at the Point we saw what appeared to be at first sight a tumble-down pile of rocks and sticking out in the sea more or less at right angles to the beach, two longish reef structures about 30m apart, facing in opposite directions, the one with strata dipping to the North, ***continues……***

the other with strata dipping to the South, both with approximately East-West strikes, so probably of the age of the Alpine orogeny , some 30 Ma. They seemed to be part of a significant fold structure, a syncline. The maximum stress would have been North-South but there may also have been some East-West pressure. The rocks themselves are Broken Shell Limestone, also known as Burr.

Standing on the beach looking up at the cliff there was more clear evidence of folding in the cliff and in the sea below, with a small anticline and then a syncline to the North. It appears that there is in fact a W- shaped fold with a syncline to the South, then an anticline, then a further syncline. The anticline shows up nicely as a circle in underwater surveys. We scrambled onto the pile of rocks at the tip, and tried to determine the strata. One of the most experienced members of our group, tried to follow a marker bed along the cliff-face and declared " something very strange is happening in these beds!". There was evidence of deformation in the clay on the South side of the point, which may have been due to tectonic movement or to mass-movement.

We looked at a big block showing the colour effects of mineralisation where water had percolated in the joint: the flat top bedding surface showed liesegang patterns with a ring around its edge, and the joint surfaces were covered in tufa. We noticed that the beds tended to be of just one species, such an ostracod Limestone bed, indicating that there could not have been much diversity at the time of deposition, buthe thin beds indicated rapid changes in environment, with wet periods giving rise to clay beds and dry periods to more carbonate-rich beds.

The beach was littered with pebbles and ex situ blocks of stone; among them were pieces of Purbeck Blue Marble, pieces of Burr, and dark blocks of Heathstone from the Poole formation. There were fossils: Alan said that the Unio Bed is well exposed on the south side of the structures; we saw a chunk of oyster bed, though this bed at the foot of the cliff here, is usually covered by the tide; we found trace burrows infilled with iron, iron staining in joints due to diagenetic processes and a block with clear slickensides. Alan picked up a piece with a small amount of vertebrate material, may-be the spine of a fish or shark. Sometimes remains of crocodiles have been found and recently a very early small mouse-like creature made the news. The succession has the Brokenshell Limestone was at the base, and above it first the Green Marble bed, then the Unio bed, and capped by the Red Marble bed.

We then drove over to the eastern side of Swanage towards Ballard Down, and onto the beach for our picnic, after which we walked southward and started looking at the coastal defences under the cliff. The Wealden exposure here is the longest in the UK, 756m long; it has interbedded beds of sand and clay, poorly lithified, so mostly not at all competent, which evidently has led to slumping.

The long shore drift is limited by a series of groynes, resulting in an accumulation of sand southwards, and some replenishment of the beach; these groynes proved a bit of an obstacle for the less fit among us as we scrambled over them and provided a few hilarious moments!

We stopped to look at the slippage below the Pines Hotel, one of whose out-buildings is perched precariously near the edge at the top of the cliff; in the winter of 2015-2016, £1.65M was spent on cliff protection and drainage, and ugly concrete reinforcement was installed against the cliff-face to try to prevent further trouble, along with drainage outlets, and rock-bolts. Planning permission has now been granted for the hotel to build up to 40 beach huts along the back of the beach to hide this mess.

In places we could see cross-bedding, indicating a fluvial environment at the time the beds were deposited, and we recognised some quite big pieces of lignite in the cliff, indicating deposits in swampy conditions in a shallow lacustrine environment: there was at the time of deposition no longer a fresh water lagoon, as when the Purbeck beds were laid, but instead meandering rivers and lakes, with fresh water, and no fossils other than pieces of lignite; the clays would have been flood plain deposits and the sands river sediment. In a few places the sand was quite well cemented, picked out by differential weathering, and with occasional iron-oxide spots standing out. Where the material in the sandstone is coarser, water can seep in and precipitate cementing material. We did find a few fossilised burrows, though these are less common in river environments than in marines ones. There was a section of cliff with orange iron-rich water oozing out, some manganese rich beds with lignite pieces, ***continues……..***

while rip-up clasts in more coarsely grained strata indicated storm events, and in one place the downward dip of the beds suggested a river entering a delta or lake. We inferred that the Wealden beds must have been laid down in quite varying conditions. The Wealden beds are succeeded by the Lower Greensand, not often visible, and laid down during a marine transgression, and this in turn by the Gault Clay and Upper Greensand. Sure enough, at the end of the beach we came under Ballard Down, with its chalky cliffs; there had been a massive landslip, and Upper Greensand boulders were scattered on the beach; the rotularia fossils in them indicate marine sediments. Finally. we retraced our steps back along the beach, back over the groynes, and to our cars, and thanked Alan for an excellent day where we had seen such a good variety of rocks. ***Alison Neil***

Purbeck Marble, Unio Bed (AH)

The group having lunch in Swanage Bay (AH)

DGAG Annual Dinner November 17th 2018

By my reckoning this is the 5th one I've organised so that makes it the 25th Anniversary of DGAG! 30 or so members sat down for a three-course meal at the Wessex Hotel in Dorchester. The after—dinner talk was by given Bob Chandler. The talk was entitled **"The Green Man of Brittany"** and covered the establishment of an on-site display and fossil gallery in Deux –Sevres Quarry, near Poitiers. Bob is acting as a consultant to the team. The project aims to erect an on-site exhibition gallery that demonstrates and displays the geology, fossils and industrial archaeology of this important region of fossiliferous Jurassic rocks. The focus is to provide a strong educational resource for visitors of all ages. As ever, I'm grateful for Alison's help dealing with the financial side of things, plus Alan's help with equipment and to our honoured guest speaker of course. By the way, a volunteer is needed for the latter slot next year! ***Kelvin Huff***

DGAG Annual Dinner 2018 with Bob Chandler. (KJH)

DGAG Field Trips and allied events 2018-19

Contact Malcolm Wright (Field Trip Officer) on m.wright603@btinternet.com or 01305 259712

While the County Museum at Dorchester is closed for refurbishment it has been decided by DGAG in collaboration with other groups to run a series of earth science based lectures from January 2019 to the end of 2020 when the Museum is planned to reopen.

Wednesday 9th January 2019. DGAG lecture: "Oil in Dorset" by Alan Holiday. Venue: County Hall, Dorchester, 7.00 p.m. Entry: £5.

Saturday 12th January 2019: DGAG AGM at Broadmayne Village Hall. Followed by a talk: "Coastal protection, but does it work?" by Alan Holiday.

Thursday 28th February: Kimmeridge Bay, Leader: Alan Holiday.

Saturday 23rd March: Purbeck, including a quarry. Leaders: Trev Haysom and Alan Holiday.

Friday 3rd To Monday 6th May 2019: Weekend residential field-trip to the Vale of Glamorgan. Contact Kelvin Huff for more details and registration.

Thursday June 6th: Haytor and Dartmoor. Leader: Alan Holiday.

Thursday July 4th: Lyme Regis. Leader: Geoff Townson.

Website: https://dorsetgeologistsassociation.org/

DIGS (Dorset's Important Geological Sites)
The group welcome anyone wishing to help with conservation work on Local Geological Sites. Please contact Alan Holiday if you are interested. Working parties go out on both weekdays and weekends.
alanholiday@btinternet.com

Wessex OUGS events
Please contact Jeremy Cranmer on: wessexdaytrips@ougs.org or telephone 01305 267133 to book a place. £2.50 day trip charge.

19th January Wessex AGM and lecture day at Wool. Leader: C. Morley.

Date tbc: NOC led by Millie Watts.

March (tbc): Palynology at Southampton University. Professor John Marshall.

6th April OUGS AGM. Swindon.

Membership renewals are now due!
Committee news:
We still need an Events Officer! Offers of help would be very welcome! *Kelvin*

DGAG Committee Members			
Chairman/Librarian/GA	Alan Holiday	01305 789643	alanholiday@btinternet.com
Secretary, Newsletter Editor and Sales	Kelvin Huff	01305 265527	kelvinhuff30@gmail.com
Treasurer and Membership Secretary	Alison Neil	01305 832937	alison.neil@madasafish.com
Fieldtrip Officer	Malcolm Wright	01305 259712	m.wright603@btinternet.com
Website Manager	Geoff Rowland		rowland.geoff@gmail.com
OUGS Liaison	Jeremy Cranmer		jeremydorset1@hotmail.co.uk
Ordinary	John Larkin		jalarkin3@yahoo.co.uk
Ordinary	John Scott		johnandsuescott16@gmail.com
Ordinary	Robert Chandler		aalenian@blueyonder.co.uk
Events Officer	*Vacant*		