3400 BC built the great cairn on the top, the legendary grave of Queen Maeve of Connacht who was an Iron Age chieftain about 300AD. Also, there are 8 other cairns, passage tombs, enclosures and monuments built on the hill around the same time. One particular feature of the great cairn is that, as well as limestone, the variety of stones and boulders include many of which are of igneous and metamorphic origin. Maybe the people who used the cairn as a ritual and ceremonial site came from as far afield as Galway, Connemara, and brought offerings in the form of their local often colourful, stone.

Reference – Knocknarea – Westrup R – Sligo – County Geological Site Report & Rosses Point – The Natural History of Sligo and Leitrim.

Whatever the interest of the visitor to Ireland, there are a wealth of attractions matching those of countries across the world and this corner of the Emerald Isle with its attractions can satisfy most requirements. When the attractions have been visited and one leaves the tourist honeypots, it is a peaceful, restful and friendly place.

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Remote learning at Wells Cathedral School

by David Rowley (Head of Geology at Wells Cathedral School)

Introduction

There are approximately 200 schools and colleges teaching A level geology. The course is broad and scientific emphasising the distinctiveness of geology in its own right as well as its interconnections with the other sciences and geography.

The last two years have proved challenging for society and in this article, I will reflect on the ways in which one school in particular was affected by and coped with the peculiar circumstances of 'remote learning'.

Wells Cathedral School is where I have taught geology (and geography) for over thirty years. (For those unfamiliar with the terminology it may be worth mentioning that 'senior school' begins in Year 7, GCSE year is Y11 and A levels are completed in Y13.) It is a wonderfully busy, thriving school of boys and girls, day pupils and boarders, British and overseas pupils, from 3 years old – 18 years old. Around a quarter of Wells pupils are talented specialist musicians who balance their musical & academic commitments within a 'conventional' school of hockey, rugby, cricket, Duke of Edinburgh's Award, CCF, drama, outdoor education and much else besides.

Introduction of Lockdown

In March 2020 just prior to Government restrictions coming into force, teachers from W.C.S. went to their classrooms, gathered textbooks, folders and other resources and prepared to start teaching from home.

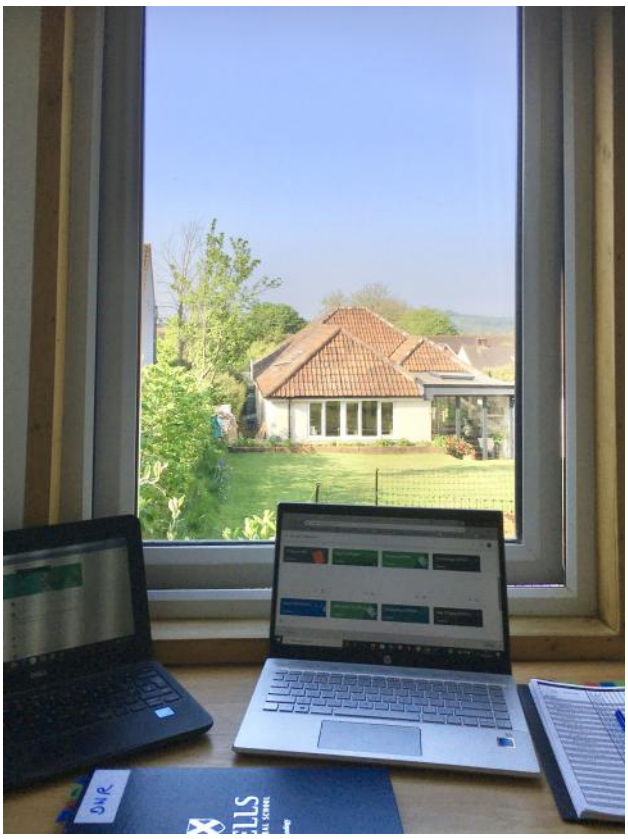

Fig. 1: the classroom

Our school's 'bring your own device' policy (which requires pupils to bring a Chromebook/laptop to all lessons) had been in place for three years and was about to play a crucial part in our ability to engage with pupils remotely and deliver worthwhile & stimulating lessons.

The 'Google Classroom' is an application allowing teachers to post worksheets, instructions and resources online for both lessons and homework. Remote learning required us to make full use of the Google Classroom as well as 'Google Meet' (the equivalent of Zoom).

We were fortunate that the use of the Google classroom was already part of our usual working practice, and that the skills required for us to use presentations, documents and spreadsheets were well established among (most) pupils and teachers.

So, with all this in place, how did the school adapt, what was the learning experience like, and what were the challenges?

School-wide adaptations

One way systems, year group bubbles, social distancing, hand sanitising & mask wearing became the norm. Meetings and assemblies were livestreamed to tutor groups and classes in their 'bubbles'. Teachers were not allowed to linger in the staffroom, pigeonholes could be checked but social areas were out of bounds. Teachers retreated to their classrooms for sandwiches at lunchtime while pupils were admitted to and seated in the dining

hall strictly by year group. Before long (and quite unexpectedly in some cases) humanities teachers craved the company of mathematicians, while scientists missed spending break time with the English department!

Remote learning

In geography & geology pupils had contact with their teacher (albeit remotely) in almost every lesson. Some classes were inevitably in more of a lecture style with PowerPoint presentations made available to pupils, in others the teacher facilitated the completion of online worksheets or other tasks following a live (or recorded) introduction.

The school looked to manage the inevitable increase in 'screen time' by minimising homework and made other adjustments from time to time to look after the wellbeing of teachers and pupils. For instance, our scheduled lessons on Saturday mornings (for Y9-Y13) were relocated into midweek slots so that pupils had a complete weekend break, lessons were reduced from 60 minutes to 50 minutes to create breathing space and time away from a screen.

From my experience, many pupils seemed to enjoy working hard until 4pm knowing that they had then finished for the day with no homework!

To begin with, a sea of faces greeted the teacher in 'Google Meet' lessons, but increasingly & unsurprisingly over a period of weeks emojis took the place of human faces as pupils turned their cameras off. Compromises were necessary to ensure that video cameras were switched on at important times in lessons and some leeway was given when pupils were 'getting on with work'. Skilful use of the chat function by the teacher and apps for pupils to 'raise a hand' or give a 'thumbs up' kept pupil engagement high. As in most lessons there would be those who are naturally active, some who are engaged (soaking it up) but not regularly contributing their ideas and others who need more encouragement to get involved.

Some hard-working quiet pupils saw remote lessons as a way to get on with their work, achieve good marks and perhaps feel less pressure to interact with the teacher and their peers. One positive was that by March/April 2020 the classes were already in the middle of the school year, good classroom relations had already been established and teachers already knew the pupils well when lockdown began.

Wifi and broadband issues at home created some legitimate reasons for pupils to switch their cameras off and also created the need for many lessons to be recorded for pupils to watch/re-watch at a later date. With a number of our pupils living in other time zones (particularly in Hong Kong), our afternoon lessons were in their late evening so those international pupils weren't required to attend 'live' but could catch up prior to the next lesson by watching the recordings.

Our international pupils would later create challenges for teacher-based assessments further down the Covid line.

Teaching and learning was intense, we roughly kept pace with our schemes of work, but pupils couldn't develop the expected level of practical and fieldwork knowhow. Term ended in summer 2020 with the full expectation that we would be able to catch up in the school year 2020/2021 with things 'back to normal'. However further Covid positive tests meant that some pupils continued to have to isolate into the new school year.

Practical lessons and fieldwork

Though practical lessons and field trips were not possible, creative solutions were employed to try to simulate those essential practical experiences.

Field sketches (https://www.e-rock.co.uk/broadhaven)

Fig. 2, virtual field trips (http://www.see.leeds.ac.uk/virtual-landscapes/demo/) & the 'Instagram challenge' in which pupils found spectacular field locations on Instagram and planned what observations & measurements they would make before comparing locations with a friend.

Figs. 3 & 4: Practical lessons involving hand specimens were also moved outdoors when the weather allowed

By Autumn 2020 some local field trips were again allowed, however restrictions were in place to make them Covid-safe:

- A seating plan was used for both outward and return minibus journeys.
- Masks were to be worn on the vehicle.
- No sharing of equipment was allowed, equipment (such as hand lens, compass & clinometer) was sanitised, individually issued in a Ziplock and sanitised prior to reuse. (Fig. 5).
- Working safely is one of the assessment criteria for A level geology fieldwork and so pupils updated their own risk assessments to include COVID.
- Careful choice of locality to facilitate easy social distancing among the group (Fig. 6).
- Teacher used a laser pointer to guide pupils to maintain social distancing.

Fig. 5: sanitised field equipment

Fig. 6: pupils observing social distancing

Blended learning

Though the number of actual positive Covid tests was thankfully small throughout the Pandemic, overseas pupils, travel restrictions & self-isolation created the need for 'blended learning' in which most pupils were back in the classroom with others joining lessons remotely.

This situation lasted from September 2020 through until Easter 2021, by which time lessons were almost back to normal. When physical lessons were possible, rigid seating plans were in place and pupils were required to sit facing forward rather than clustered around a table to facilitate group work.

Blended learning for geology practical lessons proved particularly difficult to coordinate, photographs or webcam images being a poor substitute for hand specimens. When sufficient hand specimens were available, they were allocated to pupils individually and not passed around.

CAGs and TAGs

In 2020 Centre Assessed Grades (CAGs) were used, these were effectively predictions based upon the work pupils had achieved thus far and rewarded the steady hard workers. This caused a certain amount of alarm for those pupils who tended to leave things to the last minute, as there was no terminal assessment and teachers were asked to use a range of past paper tests, homework and grades accumulated over the course. Based on these data teachers were asked to award a grade based on pupils' likely performance in a summer exam based on and extrapolated from past performance. Pupils were ranked within each letter grade; a government algorithm was then used to modify the results to approximate the performance in previous school years in that subject. Across the country grade inflation was an inevitable consequence of the system, with centres erring on the side of the candidate, yet the system was evidence based with 'umpire's call going in the batsman's favour'. With a cohort of between 8 and 10 pupils, geology doesn't have the numbers to reliably demonstrate a 'normal distribution', in my admittedly small sample the algorithm took our weakest pupil (a solid C grade) and awarded him an E despite evidence to the contrary, seemingly because some previous cohorts had E grade candidates.

By 2021 the system was modified to become 'Teacher Assessed Grades' (TAGs). Summer *externally assessed* exams were cancelled with plenty of warning given to schools, pupils, and parents. The instructions were to use a range of data to inform the grade, which was to be awarded, based solely on performance, not with an eye to 'what they would have got in the summer exam'. Various pieces of evidence were eligible to be used including end of topic tests, mock exams, essays and a series of internal tests held in exam conditions in the summer term (with exam boards providing additional assessment resources.

The administrative process did cause considerable anxiety for teachers, each school/college having its own set of peculiar challenges and there was inevitable variation between centres on how they graded their candidates. Pupils in other parts of the world were being assessed online with little possibility of true exam conditions, and time zone considerations were needed

when planning tests.

As geology is a one-person department, I collaborated with a colleague in a similar position at another school to ensure that our assessments were fair and appropriate in the planning stage as well as cross moderating each other's marking. Ultimately the range of assessments used did everything to confirm the ability our opinions of the candidates and as such was fair and reassuring.

CONCLUSIONS

The pupils at Wells were well served during the COVID -19 pandemic and engagement in learning was high in most cases despite the challenges. The cohort missed out on some fieldwork opportunities (not least a trip to Iceland) but good use was made of localities within walking distance and the relaxation of restrictions did enable some trips to take place.

Fig. 7: Colima Volcano, Mexico

The variety of content which is an essential feature of geology helped to maintain interest, it was also great to be able to draw upon former pupils to deliver talks in remote lessons on topics such as the 'Colima Volcano' Fig. 7 and 'Exploration geology in Africa' to help inspire the next generation.

It is good to be able to move forward having developed some new skills, as well as being able to return to the familiarity of classroom teaching & learning.

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Moving Stone: Lewis bolts – their use by the Romans in construction of Aquae Sulis (Bath) and elsewhere

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Have you ever wondered how the Romans moved and lifted the commonly huge blocks of stone used in the construction of their temples, amphitheatres and civic buildings? This short article explores the use and history of the lewis bolt, an ingenious tool devised by the Greeks, used extensively by the Romans, but with continued use through medieval times until the early-20th century (Fig. 1). Lewis bolt holes are documented here from the Roman Baths at *Aquae Sulis*, Bath, and elsewhere, and compared with 18-19th century examples.

Fig. 1: Five lewis bolts from David Pollard's collection from the Box-Corsham mines. The total length of the largest (top left) is 53 cm.

Introduction

The Greeks and Romans constructed many wonderful substantial buildings which in many cases utilised large blocks of natural stone. The Roman Baths and Temple Complex at the World Heritage Site of *Aquae Sulis* in Bath is typical. Those blocks of Middle Jurassic oolitic limestone (Bath Stone), you see around the Great Bath and below present ground-level in the Precinct of the Temple to Minerva, each weighs a tonne or more (a cubic metre of limestone weighs approx. 2.3 metric tonnes). They would have required some real effort and ingenuity to raise them up to heights of several to many