Geology Group Newsletter – January 2021

Well, it's all over and now Christmas is as far away as ever! Hopefully, you all had the Christmas celebrations that felt right, proper and safe for you. As I write, 2021 is just around the corner; no doubt the combination of Brexit and Covid will provide some uncertainty and difficulty for us all, but I'm convinced better things are on the way – they could hardly be worse! We will get out on the hills again next summer.

My thanks this month goes to Dr Joseph Botting who gave us a talk on the research project he's involved in investigating the fossilised preservation of a wide variety of sponges in China. His search for these minute, soft bodied creatures, which have been preserved in this unique geological location, called a lagerstätte, is fascinating. In addition, we had the bonus of a second talk describing the quarry he has discovered near Llandrindod Wells which is full of fossils of a tiny and completely new species. This location can also be described as a lagerstätte. He and his wife are currently writing up the finds and plan to publish details in 2021.

Looking ahead, I would be very surprised if we are able to meet again in the Cube before September next year. Hence it is fortunate that we have only reached lecture No 14 of 48 in the series called "The Origin and Evolution of Earth: From the Big Bang to the Future of Human Existence"! These lectures give those of us tuning in the opportunity not only to learn but also to meet (virtually) our geology friends. As you know, this series is shown every week except when there is a monthly meeting. Details of the series and copies of the lectures shown to date are published on the Talks page of our website.

Miscellaneous

Tim Carter's history offering

New techniques for old rocks

Harvey Holl, who featured last month, was one of the first to allocate the Malvern Hills to a very early period in the earth's history. He was not alone in his interest in those rocks that were laid down before the start of the fossil record, however those who shared his interest were in the main an eclectic group of people, 'The Archeans', who had unconventional routes into geology, rather than being established academics or survey staff.

The most prominent group member who studied the Malverns was Charles Calloway. He started out as a Congregational minister, was by turns a museum curator and teacher and then became one of the foremost investigators of Pre-Cambrian rocks in Britain. His starting point was the Wrekin and other Shropshire hills, but he soon extended his studies to cover Charnwood Forest, the Malverns, Pembrokeshire, Anglesey and the NW Highlands. One of his first challenges was how to work out the sequences of old fossil-free sediments.

More relevant to Malvern was his interest in the petrology of igneous and metamorphic rocks, and in the wider issue of the processes that took place as metamorphic change was in progress. Such studies were not possible before the 1860s when the methods of geochemistry and the examination of thin sections of rock using polarised light came into widespread use. New thinking about metamorphosis extended the concept from the visible changes that took place in sediments under heat and pressure to encompass chemical and crystallographic changes in both sedimentary and igneous rocks.

In a series of articles, by both Callaway and by experts working on the interpretation of microscopic and chemical change, new perspectives on the origin of Malvern rocks were advocated. Callaway made very detailed studies of the shear zones found on the hills and worked with others to show how shear stress under conditions of heat and pressure, with infiltration of water and other

minerals, led to both crystal realignment and mineralogical change, for instance from hornblende into mica. The conclusion from these results was that most of the rocks that showed layering were altered plutonic igneous rocks rather than sediments, as postulated by Holl. Conservative but experienced fellow geologists found the radical proposal that extensive chemical change took place under shear stress hard to accept.

The Malvern Hills remained enigmatic throughout the nineteenth century:

- How did the types of rock found there arise? Opinions varied, with first Horner's view that all the rocks had a unity, as they shared the same suite of minerals but in differing proportions, Phillips' plutonic syenite, Holl's metamorphosed sediments and, at the end of the century, Callaway's sheared igneous rocks.

- How were the hills raised up? Horner's support for Huttonian plutonic uplift, Murchison's Silurian irruptions, then Phillips' fault to the east and unconformity with folds to the west and Strickland's theories of uplift and removal of newer strata. Finally, Groom's new views on tectonic processes, to be discussed next month.

The century saw the move from hand lens and hammer to microscope and laboratory, but with detailed field observation and accurate survey work throughout. These changes led to the growth of teamwork among different specialists to provide the base for new knowledge.

Malvern's status as a health resort, and one with a considerable affluent and leisured population, meant that the geology became a local asset. Amateur enthusiasts abounded, talks and field trips were popular and tourist guidebooks featured the unique nature of the Malvern rocks both as a source of wonder and as an explanation for the quality of the waters, the climate and the scenery.

Let us hope we can all enjoy them together in 2021!

West Midlands Regional Group of the Geological Society – check here for the latest list of free online activities.

In case you missed the Saturn – Jupiter conjunction because of our unkind weather, Geoff Carver has sent this link as an alternative.

For those of you still at the beginning of your understanding about geology, this link will take you to a basic but useful description of types of stone used in memorial stones found in graveyards.

What's New on the Website this Month

- Latest versions of the Newsletter & Geology Matters
- Updated Calendar
- Recording of Dr Joe Botting's talk, latest from the lecture series
- Quarry histories – Little Malvern quarry

Calendar

September on	Weekly	Lecture series: The Origin & Evolution of Earth
January	13	Lecture: Geology of Mars
February	10	Lecture: Luminescence
March	10	Lecture: Tsunamis
April	14	Lecture: The 5MY That Saw the Birth of Modern Britain **Note: at 2.00pm**

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