THE RECORD

EMGS 2016 summer programme: 6 excursions.

A visit to Richard Hawkes' workshop at the Sherwood Forest Arts and Crafts Centre at Edwinstowe focussed on the intricate techniques used in the preparation of museum quality fossil specimens.

A weekend visit to the Lleyn Peninsula was led by David Bate in glorious weather. Saturday covered the debate over the Precambrian/Cambrian/Ordovician age of the Gwna Melange, a giant submarine slide deposit well exposed along the north coast. Sunday was spent inland, including visits to Garn Fadryn, a mid-Ordovician sub-volcanic microgranitoid with associated andesitic lavas, and a col with exposures of a remarkable tourmalinite and fossiliferous sediments of Longvillian age.

A town walk to inspect the natural springs in and around Buxton, led by Albert Benghiat, was nearly marred by too much water. In equally bad weather, the visit to Grace Dieu Woods, on Charnwood Forest, led by Keith Ambrose to look at exposures of Precambrian, Carboniferous and Triassic rocks was cut short by rain.

Jim Riding repeated from the previous year his visit to the Bees Nest and Kenlow Top pits at Brassington to view the Miocene sediments preserved as karstic fills that survived Neogene and Quaternary erosion.

A visit to the Ashover inlier was led by Colin Bagshaw, taking in exposures of the Carboniferous sequence of limestone, shale, sandstone and tuff, together with the remains of the extensive lead and fluorite mining.

EMGS 2016-2017 winter programme: 8 meetings.

Rory Mortimer vividly brought geology and WW1 history together during his lecture on the Chalk of the Paris to London fast railway route. Collapse of part of the railway track along the TGV Paris-Lille line in 1994 caused a high-speed train to leave the track. Subsequent investigation by the French Geological Survey (with the speaker as International Reviewer) found that an undetected cavity remaining from the First World War frontline was the cause of the collapse. After intense rainfalls in 2000 and 2001, many ground collapses were reported close to the railway along the Somme valley and the Vimy Ridge, where chalk was the bedrock.

Daniel J Myhill described using carbonate clumped isotope thermometry to determine the precipitation temperature of carbonate minerals alongside their bulk isotopic composition (δ18O and δ13C) and to deduce compositions of the mineralising paleo-fluid δ18O. Constraints on the temperature fluid composition of mineralisation in the South Pennines indicate its association with late Variscan brittle failure, with mixing of warm basinal brine and cooler meteoric fluid.

Leah Nolan described Carboniferous gigantoproductid brachiopods from the Peak District that were sampled at high resolution (within individual growth lines) to assess seasonal variation within the organism's life-time. Analysis of the stable isotope composition (δ18O, δ13C) of biogenic calcite can reveal equatorial seawater temperatures and seasonality at a key point in Earth history, just prior to the main phase of the late Paleozoic glaciation. The data will contribute to debates regarding Palaeozoic tropical seawater temperatures that are considered by some to be warmer during interstadials such as the Brigantian.

Neil Worley described the complex development of mineralisation of the South Pennine Orefield, thought to have begun in the late Westphalian, when subsidence due to thermal sag took the limestone to burial depths of about 4000 m. Mineralized palaeokarst features are interpreted as hypogenic, formed by the interstratal circulation of confined hydrothermal water. Subsequently, acidic F-Ba-Pb-Zn-enriched fluid evolved in the Namurian basinal rocks and migrated into fractured limestone, to form the stratiform mineral deposits (flats) and the more irregular pipes. Fluid inclusions indicate that the mineralizing fluids were chloride-fluoride-rich, typical of oilfield brine, and isotope profiles suggest a sulphate evaporate source of sulphur, mainly from the Chadian Middleton Anhydrite.

Nick Longrich described giant marine reptiles and whales during the Eocene-Oligocene cooling event in transition from the marine reptiles that became extinct at the end of the Cretaceous. Fossils from the late Eocene of North Africa show that marine reptiles thrived alongside early whales, before disappearing near the Eocene-Oligocene boundary, which was associated with severe global cooling, the start of glaciation in Antarctica and the beginning of an Ice Age regime. The main new marine lineages were mammals such as warm-blooded pinnipeds, otters and birds that may have an advantage in colder waters because they can maintain high levels of activity compared to their cold-blooded prey.

Tom Dijkstra illustrated the catastrophic geohazards in Central China, specifically in the tectonically active region along the eastern margins of the Tibetan Plateau, within Gansu, Sichuan and Yunnan. All-too-common are destructive landslides in the dissected loess terrains around Lanzhou. He then described the 2010 Zhouqu disaster, where a debris flow destroyed more than 200 buildings and killed more than 1500 people.

Andrew Bloodworth used the construction of the mobile phone to demonstrate the recent rapid development of uses for many of the earth's rarer elements, including rare earth elements, platinum group elements and others from beryllium to zirconium. This included a look at ideas related to metal supply from geological and other sources, challenging some assumptions relating to non-renewable mineral resources and physical scarcity.

This year's Presidential Address by Vanessa Banks looked at the hydrogeology of the Peak District, notably the effects of the underlying geology on flow systems. Modelling of the catchments incorporates recharge, through-flow and discharge, in order to improve river basin management planning and fully utilise the value of the water resources in the Peak District for supply, leisure and ecosystem services.

Janet Slatter