

Geography Report

By Jane Harrison

May's talk had the intriguing title "A Time of Waste: Sustainable Environmental Geoscience Solutions". Our speaker was Chris Greenwell, who is Head of Chemistry and Professor of Geochemistry, in the Department of Earth Sciences, at Durham University.

We are living at a time when waste is being challenged and zero waste options explored. We discovered that in the UK there are legal definitions of what is 'waste'. Government guidelines outline when a material is 'considered to be waste', 'likely to be waste' or 'might be waste'. The Waste Framework Directive even sets out the criteria whereby waste may cease to be waste after it's undergone a recovery operation, which might include recycling. This is to ensure a high level of environmental protection, as well as environmental and economic benefit.

Waste has been a byproduct of industry down the centuries. Chris is particularly interested to identify where chemical waste might be removed, repurposed, and reused. He described how at Saltburn, a product of ironstone quarrying on the Cleveland Hills, known as ochre, has been extracted from the river. This has been used to coat sand granules, which in turn have been successfully used to capture phosphates in the local water treatment works, thus reducing the need to buy-in iron salts.

Mining waste enters the river systems of large parts of upland Britain, including the South-West and North of England and Wales. Overlying Carboniferous limestones help to reduce the acidity of mine waters in areas like the Pennines but toxic heavy metals such as lead and zinc remain. Durham University have been involved in research to find sustainable natural materials to use in mine remediation. Seaweed – often a waste product itself – has been found to naturally contain high amounts of zinc, manganese, copper, and nickel. Biopolymer beads, created from seaweed, have been successfully used to extract those metals from river water. Initial experiments in the Ystwyth valley, in mid-Wales, demonstrated that in water with a zinc content of 20,000 parts per million, 90% of the zinc could be removed in 20 minutes. In theory metals could also be abstracted from the beads, but the amount removed would be small and unlikely to be commercially viable. The project is now being upscaled and its impact assessed. What might be next?

Little did we realise that waste could have so much potential - we went home with much to think about.

Next meeting: Thursday 18th July, 2pm, in The Witham. Geographical Smorgasbord.