



North Eastern Geological Society

Newsletter May 2023

UPCOMING EVENTS

FIELD TRIP PROGRAMME

The next excursion with Dr Andy Lane (28.5.23) will visit Permian material in the Marsden area. Contact Gordon Liddle Field trip secretary for details: gordon.liddle@hotmail.co.uk

PLEASE NOTE - The June trip to Nenthead is already fully subscribed.

FIELD TRIP / LECTURE REPORTS

Lecture - A geologist in India

Dr John Bristow South Africa Friday 17th February

John may fairly be described as a diamond geezer. He has had a career as a geologist in academe and industry, acquiring along the way a doctorate and considerable experience in mineral exploration and mining. He is the coordinator of the Overberg Geology group in South Africa, his home country. He knows about diamonds.

We were treated to a whirlwind exposition of aspects of India, starting with some statistics. A population of 1.4 billion is growing at 0.8% a year, with a median age of 28, and a population density of 464 people per square kilometre - the figure for South Africa is 49. 122 major languages are recognised and the country's diamond industry is responsible for the manufacture of more than 90% of the world's diamonds. The young population is educated, ambitious and hard working.

Human occupation in India has been documented from around 30,000 years ago. Much more recently the Gupta dynasty ruled from 370 to 550 CE, succeeded by the Mughals from 1526 to 1858. The East India Company started trading in 1608 and in 1858 Britain took over until Indian independence in 1947.

Though 122 languages are recognised in India, the main ones spoken are Hindi, English and Bengali. We are familiar with the existence of the caste system, ranging from Brahmin to Shudras and the Dalits (untouchables). 79% of the population are Hindu, 14% Muslim. There is a small Christian population concentrated in the south of the subcontinent while members of the Jain faith figure prominently in the families with long histories of working with diamonds.

Geologically India began as part of Gondwanaland, separating from that land mass 180 ma and heading north to collide with Asia. It is moving at 9-16cm per year and as a result of the collision Everest continues to rise at about 5cm per year. John touched on the construction of India from a series of cratons, and the significance of the basalt extrusion of the Deccan Traps about 65ma. The central highlands of India are separated from the Himalayas by the Indus/Ganges plain, a fertile region receiving the eroded sediment from the Himalayas.

John then proceeded on a grand tour taking in some of the major cities of India and tourist sights including the Taj Mahal as well as principal mining areas.

New Delhi traces its history to the 6th century BCE - the modern city is in fact a combination of cities with population now of more than 32 million. It is a trading and commercial hub for north India but not the principal financial centre, that accolade rests further south with Mumbai and Kolkata. He

reminded us of the origins of mathematics in the subcontinent and its significance for some remarkable buildings including a tapering tower (Qutb Minar) in New Delhi as well as the very slightly outward leaning towers of the colonnade of the Taj Mahal, built as such so that in the event of an earth quake they would fall outwards.

Jaipur, the Pink City (painted pink for the Prince of Wales' visit in the 19th century is considered the centre of the gemstone world where the full range of gemstones (from amethysts and emeralds to rubies and sapphires) are cut and polished. These gemstones, much "softer" than diamond require great skill when being cut, and Jaipur's skill in this area is recognised.

The **Krishna River** near Hyderabad has been recognised as a source of diamonds for over two thousand years. Alexander the Great brought diamonds back with him in 327 BCE. These stones are alluvial - ie they are washed out of the kimberlite pipes that bring them up to the surface as this extrusion is eroded. This mechanism grinds out smaller stones and leaves larger ones surviving. Some famous stones have been sourced here including the Koh-i-noor of the British coronation crown (108 carats) , cut from the Great Mughal (280 carat). The river rises in the Western Ghats and descends from a height of 1300m into a broad cultivated basin.

Not far away is the **Golconda Fort**, now a ruin but closely linked to the **Kollur mine** near by and at one time a place where valuable stones were kept.

The **Panna Mine** further north is still in use commercially but in 2005 was mined for a modest 78000 carats of diamonds (Botswana, the second largest producer mined over 30 million carats in the same year). John told us that the stones retrieved from the mine are more than a billion years old. India remains a small producer but deals with over 90% of rough diamonds. John reminded us of the origin of diamonds in depths of more than 150 km, subjected to pressures of more than 50 kilobars at temperatures above 1200° C, then brought to

the surface in the igneous structures of Kimberlite "pipes".

Raipur. John was involved in an assessment of this area, south of Hyderabad, for its suitability for diamond exploration which unfortunately due to a change of the political landscape of the region, was halted.

Mumbai is the epicentre of the diamond manufacturing world, one where adherents of Jainism are prominent among the 2,500 family businesses that were involved in the production of more than 29 billion dollars worth of diamonds exported in 2016. 8 of every 10 diamonds produced have been processed in India where the standard of production is very high and new technologies ("laser saws" and Sarine imaging, similar to CAT scanning) are being deployed in addition to traditional skills. Production costs of \$10 per carat in India compare very favourably with \$70 in Belgium and \$120 in South Africa.

John finished a fascinating insight into Indian life and culture and the place of diamonds in the economy with reflections on, among other things, the "fast food" Dabbawalas who long preceded the likes of Deliveroo and Just Eat in delivering large numbers of meals to workers each day and on the enormous expansion in car ownership which almost doubled in the decade from 2012 to 2022, while at the same time it remains not unusual to see elephants, camels and the famous Tuc-tuc three-wheelers on the roads still.

John was thanked for this whirlwind tour of the subcontinent that he advised us all to find time to visit.

College Valley field trip with Dr Ian Kille 17th March

The first excursion of the 2023 NEGS field trip programme started with a visit to the exceptional College Valley, with our leader Dr Ian Kille.

A large group gathered at Kirknewton to move into the Valley. It is privately owned and carefully controlled to maintain its pristine environment. Our party included a

botanist and ornithologists to add to our geological enjoyment.

This valley combines with others on the margin of the Cheviot to expose elements of its geological evolution. Essentially a Devonian event as the Scottish land area welded onto the Avalonian plate, the Iapetus suture lying to the south of the Cheviot. The study of that evolution had been supported by a good variety of publications recommended to the group members.

The earliest evidence of volcanic activity, was quickly added to by a huge Andesitic lava flow which possibly had multiple vents. The texture, colour and mineralogy are distinctive for the Cheviot. Millions of years later granite intrusions occupied the vent locations. The combinations of contrasting magmas, contact effects, subsequent dyke activity, erosion and latterly glacial modification have combined to produce the environment we were able to enjoy.



Hethpool Linn (photo Lewis McKenzie, Student Rep Durham Univ)

Ian started the excursion with a short walk to Hethpool Linn where that had cut a narrow gorge. We examined a wealth of pyroclastic material bed rock and from the stream bed to help orientate our awareness of the variety of lithologies. The bed rock was clearly volcanic, layered and deformed, Ian then developed his understanding in terms of an intruded dyke controlling the stream course at this location and discussing the range of materials we recovered.

A quick lunch at a henge site on the flood plain was a treat!

Up the valley a huge exposure of rock, Dunsdale Crag, was carefully studied. Ian introduced structural clues (e.g. jointing patterns) that can help interpret the exposure. The group were excellent, identifying distinctive lithological features and reasoning their origin.



Dunsdale Crag sitting adjacent to the fine textured pink rock this was an excellent exposure. Ian expanded its significance with discussion of the possible character of the rocks.

Returning to our cars the group had enjoyed a long day with good weather and excellent company.

A very warm thank you was provided to Ian from the group.

NEWS AND LOCAL EVENTS

The Geologists' Association is holding its annual conference in Kendal 22nd - 24th September 2023 at the Brewery Arts Centre

The conference will celebrate the 50th anniversary of the Westmorland Geological Society and the publication of a new GA

Guide on the Geology of Cumberland & Westmorland

Provisional Outline Programme:

Friday 22nd September

Visit to Kendal Museum's Mineral and Geology display

including a presentation from the Curator.

Canapés and refreshments will be served

Saturday 23rd September

Arrival & Registration

Talks and Posters followed by:

Conference Dinner in the Brewery Arts Centre,

www.breweryarts.co.uk

Sunday 24th September

A selection of Field Trips

Hosted by Westmorland Geology Association

<https://geologistsassociation.org.uk/conferences/>

And finally..

Regrettably we had to cancel the March lecture as the lecturer was unavailable at short notice - circumstances beyond our control.

The Field trips however have got off to a flying start with the excellent visit to the Cheviots (see above).

Any item you think newsworthy for the newsletter? Please contact myself John McNulty at huttonsedgewick@gmail.com