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Crossword answers:

Across: 2. Bath; 4. Vesicle; 6. Devonian; 8. Isotropic; 9. Cornbrash; 12. Mercia mudstone; 15. Pangea; 17. Stromatolite; 19. Theropod; 20. Quarry

Down: 1. Pumice; 3. Travertine; 5. Syncline; 7. Browns Folly; 10. Eclogite; 11. Chalcedony; 13. Evaporate; 14. Quartz; 16. Gabbro; 18. Orogeny

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Dinosaur Snippets

by Phil Burge

There was a time when I had an interest in Russian literature. I read a lot, including reading War and Peace twice (honestly). However, I had trouble with the names of the dramatis personae to such an extent that I merely recognised the shape of the name rather than try to read the name fully each time it appeared. Accordingly, I could not tell you a single name from any of the many books that I read. The same problem applied to my studies of palaeontology and particularly of the dinosaurs. The names are simply too long to remember! Time for a reinvigorated attempt at learning something about dinosaurs – including the names.

With all the recent advances in understanding of dinosaur morphology, colouration, brain case analysis, evolution and the frequent announcement of new dinosaur species you may be wondering as to whether a dinosaur snippet falls into this category of a new discovery – perhaps a new trace fossil, a minutiae of scale patterns or perhaps a new species of dinosaur.

Or you may have realised, almost instinctively that snippet refers to a short item of interesting news. There has been a lot of dinosaur news recently and here

follows a few snippets.

Dinosaur clade diagram

The standard view of the dinosaur phylogeny shows the development from the Archosaurs and splitting into the Ornithischians (bird hipped) and Saurichians (lizard hipped) with evolution of the Theropods (meat eating) and birds. In this model the birds developed from the lizard hipped dinosaurs.

A paper published in 2017 by M Baron et al in Nature throws this view on its head. The researchers looked at 457 anatomical characteristics across 74 types of dinosaur and from this a revised cladogram was developed. This places the Theropods closer in phylogenetic terms to the Ornithischians than the Saurichians.

To take one characteristic, Ornithischians and Theropod fossils show hair-like integumentary structures whereas those of Suarischians do not – as far as the fossil record currently shows. By way of an example, a paper published in 2013 entitled "An unusual basal Therizinosaur dinosaur with an Ornithischian dental arrangement from northeastern China" published in PLOS One, examines a fossil Theropod *Jianchangosaurus yixianensis*, which shows booth feathered features and dental characteristics associated with herbivores.

Apart from anything else this changed view of dinosaur phylogeny poses interesting questions about convergent evolution of certain characteristics (meat eating for example) within the Dinosaurs.

Footsteps

In March 2020 it was reported (BBC) that researchers from the University of Edinburgh had discovered a "dinosaur stomping ground" on Skye, this discovery adding to the known understanding of the ecosystem of the Middle Jurassic. Footprints included those of the

Fig. 1 Footprints from Skye, *Stegosaur Deltapodus*.

Stegosaur Deltapodus, a three toed Theropod.
In 1954 dinosaur footprints were found on a cave ceiling in Lower Jurassic rocks in Queensland. Initial interpretations suggested that these footprints were those of a quadruped Theropod – odd as Theropods were bipedal. The caves are closed but luckily researchers were able to go back to the original field notes and drawings housed under the stairs of the offspring of the geologist who first found the prints. From these, the researchers were able to conclude that it was not one dinosaur but two and indeed they were Theropods.

Fig. 2 Australian cave footprints

Much like buses, dinosaur footprints are found in threes. Another cave story, this time on the ceiling of the Castelbouc cave in France. These footprints are up to 1.25 metres long and probably belong to a new species of large herbivore, Titanosaur. The tracks were made around 166 – 168 million years ago. (From Nature 2nd April 2020).

Fig. 3 French cave footprints

Recent finds

A fossilised duck billed dinosaur has been discovered in a Moroccan mine and named A*jnabia odysseus,* family Lambeosaurinae, and dating to the end Cretaceous. Specifically phylogenetic analysis paces this specimen within the Arenysaurini clade which is a clade previously only known in Europe.

This specimen is a mere three metres long while some duck billed dinosaurs reached lengths of 15 metres. Duck billed dinosaurs arose in North America and then spread to South America, Europe and Asia. How did they get to Africa which was isolated by deep seas during the late Cretaceous? The lead researcher from the University of Bath, Nicholas Longrich describes this find as somewhat improbable and the species name gives a clue as to how the research team believe the dinosaur made its way to Africa – by swimming from Europe. (From Cretaceous Research, November 2020).

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