5 May 2017

Visit to National Museum of Wales, Cardiff

We are much indebted to Sue Munday for organising a full and stimulating programme for our visit, starting with two half-hour talks.

Our first speaker introduced us to the topic of deserts and dinosaurs in Wales, based on the Triassic/Jurassic outcrop near Cardiff.

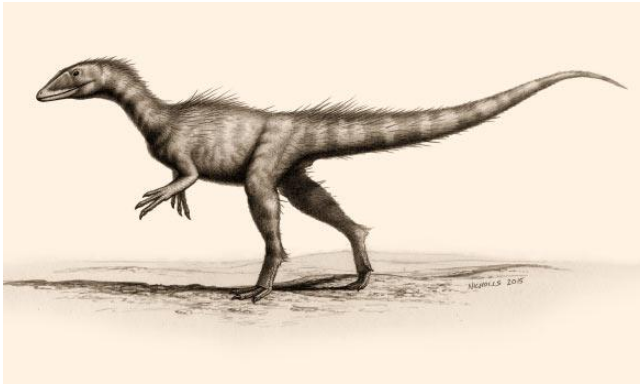
In the Mesozoic period, 215 – 200 million years ago, this area was on the edge of a continent comprising a near shore/lagoonal environment. The continental climate would have been a very hot desert rather like Saudi Arabia today. It would also have been affected by sea level rises, flooding the area, creating seasonal lakes, evaporates, flash floods and ripple beds.

It is in these ripple beds that the first traces of dinosaurs in Wales were found in Porthcawl in 1878 and 1879. These were three toed, similar to those of an ostrich today.

In 1898 the first fossils were found, in the same area those of a carnivorous Zanthodon cambrensis. In 1952 the remains of an early Jurassic Pantydraco caducus were found near Cowbridge, but it was not given its current name until 2003. It is thought to be a herbivore, probably bipedal, about 3 metres in length.

In 1974 On Bendricks Rock Barry a large number of footprints were found.

The latest finds, in 2014 and 2015 have caused much excitement, and were made by the Hanigan brothers at Lavernock Point. It is the first example of a new species, one that here was preserved in mud, the Dracoraptor hanigani. According to palaeontologists, it was a small, agile carnivore, about 70 cm tall and 2 m long, with a long tail and possibly furry. As an adult it may have grown to 3 m.



It was a distant cousin of *T. rex* and lived at the beginning of the Jurassic period, approximately 200 million years ago, possibly making it the oldest Jurassic dinosaur in the UK or even in the world.

It is thought that the fossil was from a juvenile animal as most of its bones are not yet fully formed.

Below are one of its teeth and some of the bones.

Our second talk was on the topic of meteorites, given by Jana Horak and started with some definitions:

Asteroid – a large rocky body orbiting the sun
Comet – dirty snowball/icy conglomerate of rock
Meteoroid – a small body
Meteor – commonly known as a shooting star
Meteorite – is a body which lands on earth
Meteor fireball is one that can explode in the atmosphere and strew debris over a large area

There are 190 known meteorite craters including the Ries crater in Bavaria which is 24 km across.

Most meteorites come from the asteroid belt which is kept stable by Jupiter's gravitational pull. Occasionally a body gets nudged from its orbit and can then head in our direction. Rarely does a comet become a meteorite but we do get material from the moon and Mars. The Mars samples are of igneous rock 2400 – 150 ma.

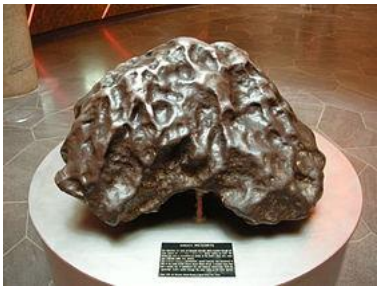
There are three types of meteorite:

Stony – chondrites which formed when various types of dust and small grains present in the early solar system or even from outside and accreted to form primitive asteroids. Achondrites contain an iron core with an achondrite crust. Together these make up 85% of known finds and provide much of what we know of the origins of our solar system dating from 4600 ma.

Within the chondrite group are the carbonaceous meteorites which are closest to what is included in comets with ice content. They contain organic compounds/amino acid link.

Iron – overwhelmingly consist of an iron-nickel alloy and come from planetary cores of planetesimals. They are rare but more readily recognised when found than stony examples. They are much more resistant to weathering and are much more likely to survive atmospheric entry.

They can be sculptured by air pressure on the molten metal as they near the earth as in the photo left



The photo right is an example of the Widmanstätten pattern which is the most commonly found and indicates an average to high nickel content – octahedrites. Hexahedrites have a low nickel content.

Stony-iron – consist of nearly equal parts of iron and silicates (mostly olivine).

Meteorites are magnetic and can be recognised by a fusion crust that forms in 20-30 seconds. The best recorded was the Chelyabinsk meteorite which was formed 4560 ma but suffered a major impact 290 ma.

Tektites are gravel sized bodies composed of black, green, brown or grey natural glass formed from terrestrial debris ejected during meteorite impacts.

After time for lunch and the chance to explore the Geology section of the museum we were introduced to the museum's stores of minerals and fossils including the examples below

I am much indebted to Hilary Edgeley for extra information on the meteorites and hope I have not misquoted her!