

DINOSAURS OF CHINA EXHIBITION

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In October I visited a special exhibition of dinosaurs from China that was held at Wollaton Hall in Nottingham. The theme was Dinosaurs - ground shakers to feathered flyers. Wollaton Hall is an Elizabethan mansion and houses the Nottingham Natural History Museum; it has also featured in the Batman movies as Wayne Manor.

The exhibition was enabled by a partnership between Nottingham University, Nottingham City Council and the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP) in Beijing. Around 26 uniquely preserved specimens were selected for the exhibition and made the 50 day journey by sea to the UK. The last time China loaned specimens to the UK was 1986! This exhibition was a unique opportunity as some of the fossils have not been on public display before, even in China.

The discovery and scientific identification of dinosaurs in China, until recently, has lagged behind the western world. However in the last 20-30 years it has lead the field, particularly since the discovery of soft-tissue preservation and feathered dinosaur fossils. Many of these exceptionally preserved fossils come from North-Eastern China and are termed the Jehul biota. The environment is believed to have been dominated by wetlands and lakes with seasonal rainfall.



Fig 1

Periodic volcanic ash falls created conditions

whereby fossilization took place quickly and anoxic conditions prevented decay and scavengers. The formations where these conditions prevailed are dated as Early Cretaceous 133–120ma.

The exhibition starts with familiar large 'ground shakers' and includes the tallest mounted skeleton ever to be displayed in the UK, at 13m. The neck and tail of the *Mamenchisaurus hochuanensis* (Fig 1) had to be bent in order to fit it into the great hall. This dinosaur was named by Young and Zhao in 1972. It was found in Hechuan County, north of the metropolis of Zhongqing and dates to the late Jurassic approx. 160ma.

Another display describes one of the first dinosaur discoveries made in China during 1939. Initial discoveries were put on display in Chongqing City in 1941 during WWII and proved to be a moral boost to the local population. Similarities between the China dinosaurs and USA/European dinosaurs should come as no surprise as the continents were more connected in the Jurassic before the



Fig 2

break-up of Gondwanaland.

The Exhibition also examines the evolution of dinosaurs into birds. This is the exciting part of the exhibition and what I went to see. The three themes on display present skeletal similarities, the nesting habits and the fossil feathers.

The habit of dinosaurs to nest was shown by a remarkable specimen of a small, 15cm, dinosaur called *Mei long*. (*Translation — sleeping dragon*) (Fig 2). It is preserved in life po-

sition with the head under an arm (wing) and tail coiled as though it was asleep, similar to a modern nesting bird. Although no feathers are preserved in this specimen, feathers have been found on closely related species. (Fig 2)

Another characteristic of dinosaurs is that of laying eggs in nests. Dinosaur eggs, like dinosaur foot prints, are very difficult to match to the dinosaur skeletons. Interestingly, the dinosaur *Oviraptor* (meaning egg-stealer) was found associated with a nest of eggs and was initially interpreted to have been caught in the act of stealing them but now appears to have been a good parent, guarding them. Unfortunately the name stuck. Oviraptor eggs and skeletons found in life position on top of a nest has enabled the match of eggs to skeletal remains.

The remarkable discovery of Feathers on dinosaurs was made in 1996. The fossil was found in Liaoning Province, China. Early Cretaceous dated at 125ma. *Sinosauropoteryx prima*

this was the first feathered dinosaur to be identified. It is approximately 1m long and soft tissue fossilization shows that it had 'downy-like' feathers. (Figs 3 & 4) Alternating dark and light banding in the tail has also been interpreted to be the fossilized remains of colour. (Close-up on righthand side.) Its discovery provides evidence for an early ancestor of the class Aves from Theropod dinosaurs.



Fig 3

The most remarkable specimens on display are two holotypes. (A holotype is the specimen that was first used to describe the species and from which other specimens should be compared. It is of immense scientific importance and cannot

be superseded, even if better specimens are subsequently found). These were allowed out of China under strict conditions—they could only be studied under glass cases. Chinese technicians were brought over to set up the displays and will return to dismantle them.

Caudipteryx dongi — Holotype — this was the first specimen to be described for this species in 1998 it was found in Liaoning Province, northeastern China and is Early Creta-



Fig 4

ceous in age. It is interpreted to be a flightless feathered dinosaur (Fig 5,6 & 7) about the size of a turkey. The presence of gastroliths in the stomach area suggest this dinosaur ate small stones to help it digest; similar to modern birds. The dark wing feathers are extremely well preserved. The bone structure and wing size suggest this was a flightless dinosaur and so feathers were an adaptation for mating and insulation. Like an ostrich it would have used its long hind legs for running.

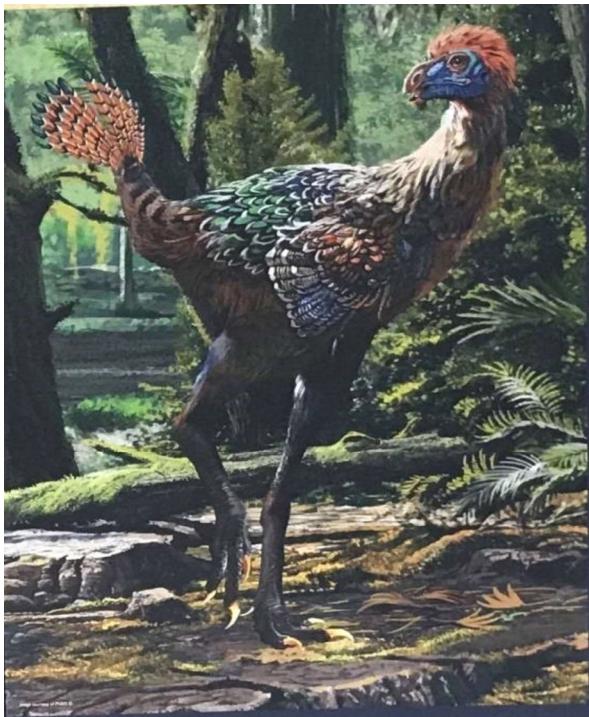


Fig 5, *C. dongi*, - artists impression

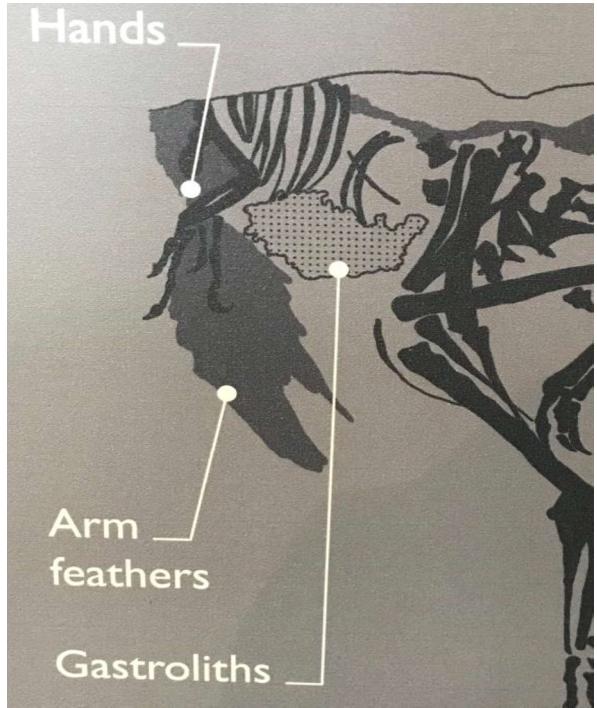


Fig 7 *C. dongi*—diagram



Fig 6 *C. dongi*—holotype

Microraptor gui —holotype — This specimen was found in western Liaoning, China. Early Cretaceous in age. It was first described by Zing in 2003 as a new species of *Microraptor* (*meaning* — *tiny thief*). It is believed that this dinosaur was carnivorous (Figs 8 &9). The fossil clearly has long feathers on all four limbs and tail. It essentially has 4 wings and



Fig 8 *Microraptor gui*

is interpreted to have been able to fly or at least glide because the feathers resemble modern flight feathers.



Fig 9 *M. gui*—artists impression

Overall the exhibition leaves one with overwhelming evidence for feathered dinosaurs. It demonstrates that feathers were not just an adaptation for flight and that many large dinosaurs possessed them too. The last part of the exhibition also shows the adaptation of dinosaurs to birds and a number of early 'true' birds which still retained the dinosaur-like features of teeth and bony tails. The exhibition has had over 100,000 visitors in the three months that it has been open and has been a unique experience for those who have been able to visit it. I'm glad I went.

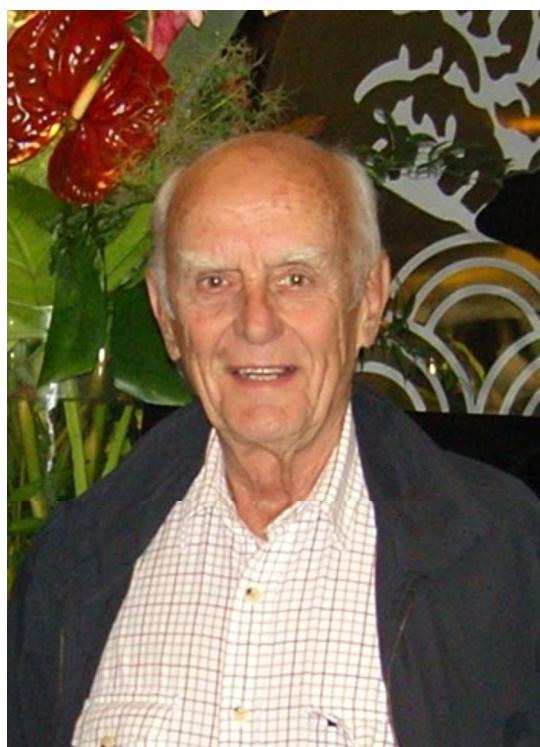
References:

Exhibition website: <http://www.dinosaursofchina.co.uk/>

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Obituary David Richard Workman 1935-2017



David Richard Workman passed away on September 4, 2017 after battling bravely an illness for over five years without complaint, and was able to die at home, as he wished.

David was born in the village of Chalford in Gloucestershire. His maternal grandparents lived in the valley below, where David spent most of his holidays. When he was 4 his family moved to Trowbridge, where his father had a job in a cloth mill. David won a Wiltshire County scholarship to Dauntsey's School and there he first developed an interest in geology. He became the first Member of his family to go to university.

David excelled in the earth sciences and completed both his BSc and PhD