

THE HONG KONG JOCKEY CLUB SERIES
香港賽馬會呈獻系列

中華人民共和國香港特別行政區
Hong Kong Special Administrative Region
of the People's Republic of China
25th 周年紀念
ANNIVERSARY

八大尋龍記

THE BIG 8

Dinosaur Revelation



展期延長至
Exhibition extended until

22.2.2023



展開尋龍之旅

Start a Journey to the World of Dinosaurs

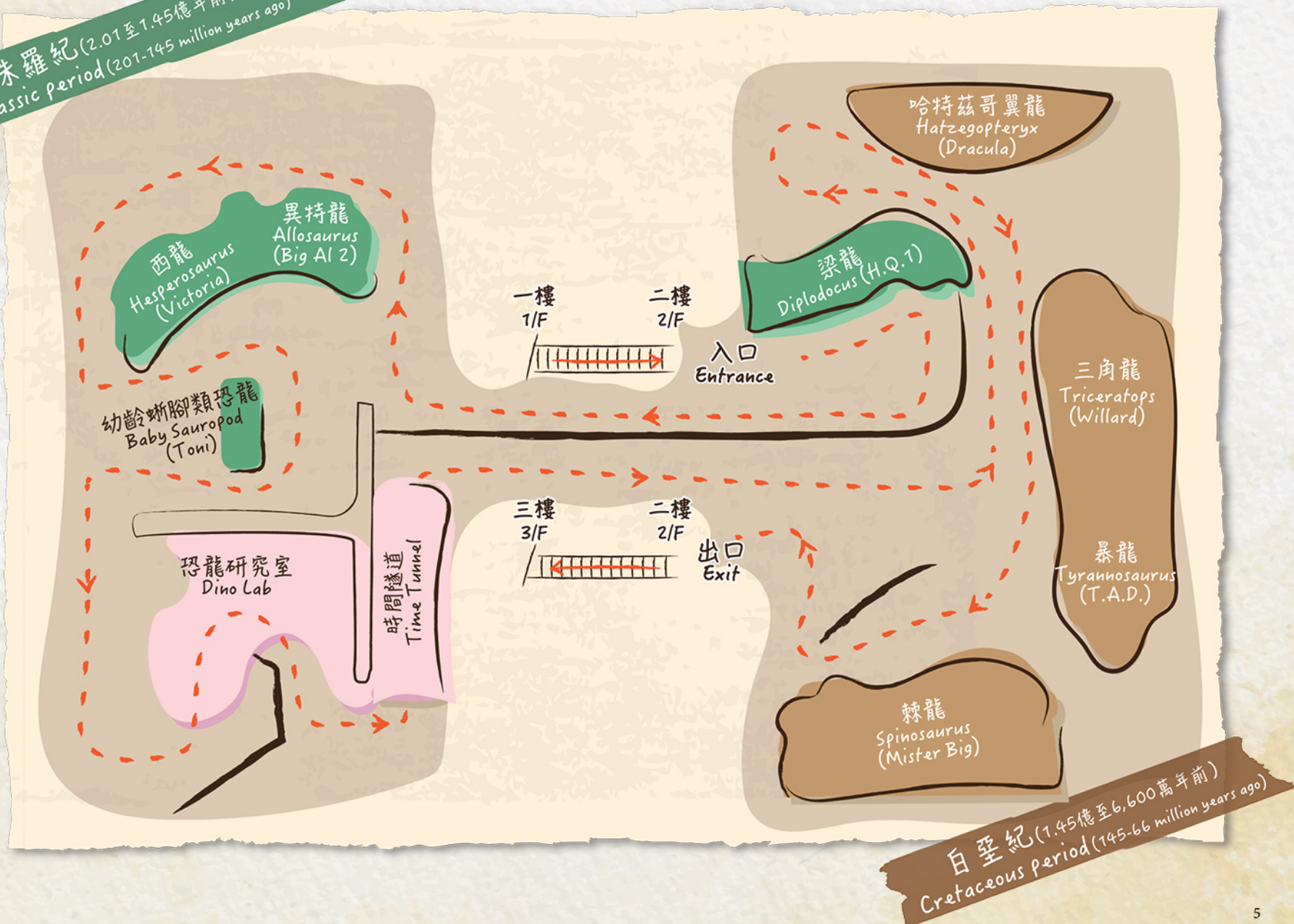
展品提供 Palaeontological Contributions

Siber Dinosaur Collection of the University of Zurich | Transylvanian Palaeontological Society, Romania
Aathal Dinosaur Museum, Switzerland | Bavarian State Collections of Palaeontology and Geology, Munich
University of Casablanca, Morocco | Institute of Paleontology, Mongolian Academy of Sciences
Dinosaur Museum Altmühltal, Germany

侏羅紀 (2.01至1.45億年前)
Jurassic period (201-145 million years ago)

恐龍是地球上出現過最矚目、最神秘的物種之一。我們怎樣能夠找到這些遠古生物的資訊？我們從牠們了解到甚麼？快來與這些精彩的史前生物親身見面，探索恐龍時代的奧秘和新發現。準備啟航迎接這趟終極的史前歷險吧！

Dinosaurs are among the most spectacular and most enigmatic animals ever lived on Earth. How do we uncover information about these ancient creatures? What can we learn from them? Come and meet with these spectacular prehistoric creatures face-to-face and explore mysteries and new discoveries of the golden Age of Dinosaurs. Get ready for this ultimate prehistoric adventure!



梁龍

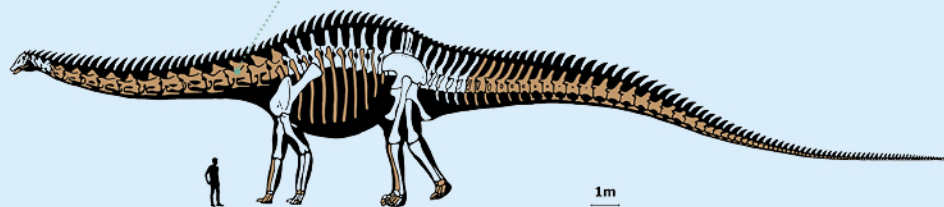
Diplodocus

我叫 H.Q.1
I'm

時代：侏羅紀晚期
(1.5億年前)
發掘年份及地點：
1990年，美國懷俄明州
Time: Late Jurassic
(150 million years ago)
Year of Discovery and Locality:
1990, Wyoming, USA



■發掘到的化石骨塊
Excavated bones



完整度(以骨塊數目計算)
Completeness (by bone count)

74%

- 梁龍的頸部共有15塊頸椎，而H.Q.1的頸椎保存得非常完好。細長的頸椎是長頸恐龍的典型特徵。

The neck of *Diplodocus* counts a total of 15 cervical vertebrae, and these are amazingly well preserved in H.Q.1. The elongated cervical vertebrae are the typical feature of the long-necked dinosaurs.

- H.Q.1的整幅骨架是特別為這次展覽而組裝！

The original skeleton of H.Q.1 has been exclusively mounted for this exhibition!



石頭伴菜

Stone as a side dish



由於梁龍下頷前排的釘狀牙齒不適合用來咀嚼植物，所以牠吞下一些大塊的卵石（稱為胃石），藉以幫助磨碎胃內堅韌的植物。一些現代的爬行類動物和鳥類也有此習性。



Peg-shaped teeth in the front row of *Diplodocus*' jaws were not built for intensive chewing of plants. In order to grind up plant material, the animal swallowed large pebbles (called gastroliths or stomach stones) which helped to grind tough plants inside its stomach. This phenomenon can be observed in some living reptiles and birds.



H.Q.1屬於巨大的蜥腳類恐龍。這植食性動物每天可能增重多達14公斤，與當今發育得最快的哺乳動物——藍鯨差不多。最大的蜥腳類恐龍之一——長頸巨龍，其體長23米，身高14米。

H.Q.1 belonged to a group of giant dinosaurs: the sauropods. These herbivores could likely grow by as much as 14 kilograms per day. That is about as fast as a blue whale, today's fastest-growing animal. One of the largest sauropods, *Giraffatitan*, was 23 metres long and 14 metres tall.

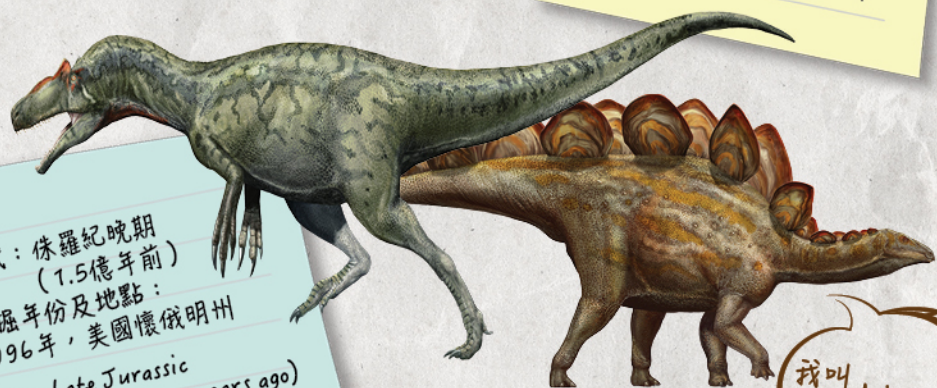
異特龍 和 西龍

Allosaurus and Hesperosaurus

我叫 Big Al 2
I'm

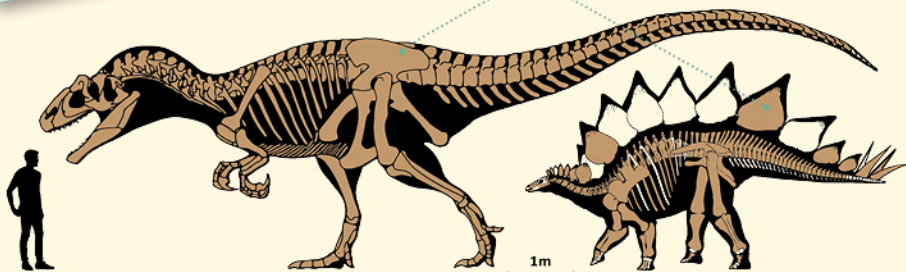
時代：侏羅紀晚期
(1.5億年前)
發掘年份及地點：1996至
1997年，美國懷俄明州
Time: Late Jurassic
(150 million years ago)
Year of Discovery and Locality:
1996-1997, Wyoming, USA

時代：侏羅紀晚期
(1.5億年前)
發掘年份及地點：
1996年，美國懷俄明州
Time: Late Jurassic
(150 million years ago)
Year of Discovery and Locality:
1996, Wyoming, USA



我叫 Victoria
I'm

發掘到的化石骨塊
Excavated bones



完整度(以骨塊數目計算)
Completeness (by bone count)

99%

完整度(以骨塊數目計算)
Completeness (by bone count)

87%

異特龍 Allosaurus

- 雖然Big Al 2由頭到腳都有各種疾病，但是牠擁有驚人的癒合能力。研究顯示這種古代的捕食者即使有嚴重骨折，仍然能夠倖存下來，而牠恢復的速度與現代鱷魚同樣地快。

Big Al 2 suffered from all kinds of diseases from head to toe, but he showed remarkable healing of traumatic injuries. Research shows that this ancient predator was able to survive some serious bone fractures, which suggests that dinosaurs recovered from injuries as quickly as crocodiles do today.

- 在Big Al 2的肋骨位置找到一塊植食性恐龍小骨塊、一顆古代肺魚的牙齒、一些骨頭碎塊和一塊胃石，相信是胃內的東西，也可能是這位捕食者的最後一餐。

A small bone from a herbivorous dinosaur, a tooth of a lungfish, bone fragments and a stone were found in the ribcage of Big Al 2, suggesting these were the stomach content and the last meal of this predator.



西龍 Hesperosaurus

- Victoria是首隻發現保存了皮膚的北美洲西龍(屬劍龍科)。其肋骨和骨板分別發現蜂巢狀的皮膚紋理和小塊皮膚。

This North American *Hesperosaurus* (belonging to the stegosauridae) was the first to be discovered with preserved skin. The honeycomb-like skin patterns along the ribcage, and small pieces of skin on the armour plates were found.

- 劍龍的骨板可能具有多種功能：
防禦——骨板具有主動式的防禦功能，特別是因為它們不是牢牢的固定在這恐龍的皮膚上。當面對攻擊時，西龍會傾斜一側，而其骨板的鋒利邊緣便會傾側向對手，令對手被嚇退，改移到其它地方尋找更容易處理的食物。
體溫調節——骨板表面有皮膚覆蓋着，且內有血管。西龍可能利用其骨板在白天吸收太陽光，在晚上散走身體額外的熱量。

Stegosaur plates may serve multi-functions:

Defence - the bone plates served an active defensive function, especially since they were only loosely anchored to this dinosaur's skin. When *Hesperosaurus* listed to one side in response to an attack, the sharp edges of the plates would tilt toward its antagonist, which would presumably look for a more tractable meal elsewhere.

Thermoregulation - the bone plates were covered with skin and vascularised. *Hesperosaurus* might have used its plates to soak up light from the sun during the day and dissipate extra body heat at night.



異特龍 和 西龍

Allosaurus and Hesperosaurus

侏羅紀武器

Jurassic weaponry



- ✓ 異特龍是最可怕的掠食性恐龍之一，擁有致命的下顎和爪來襲擊和殺死獵物。

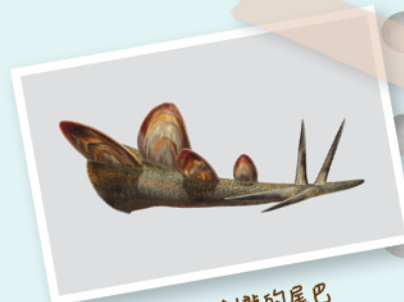
Allosaurus, one of the most fearsome predatory dinosaurs, had deadly jaws and claws to injure and kill its prey.

- ✓ 西龍和劍龍尾部末端帶有長刺，可將攻擊者連皮帶肉刺穿。單是左右擺動這些威力驚人的尾巴，大概已足夠嚇退不少捕食者。

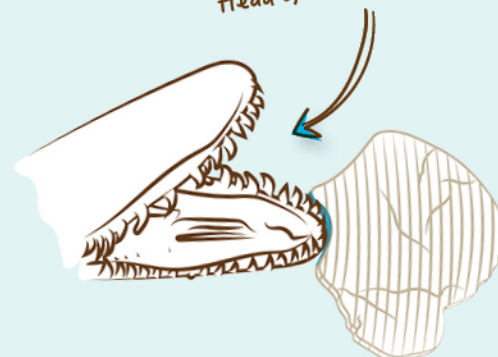
Hesperosaurus and Stegosaurus evolved long spikes at the end of the tail, which could pierce through the skin and muscles of attackers. Swinging these deadly tails from side to side may have been enough to deter many predators.



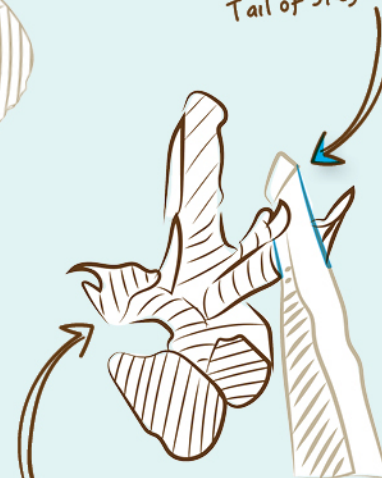
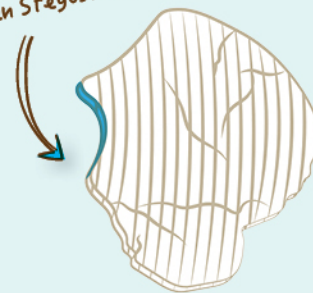
異特龍頭部
Head of Allosaurus



劍龍的尾巴
Tail of Stegosaurus



被咬的劍龍骨板
Bitten Stegosaurus plate



被劍龍尾刺刺傷的異特龍尾椎
Spike damaged
Allosaurus tail vertebra

- ✓ 異特龍和劍龍的化石往往在同一地方被發現，但這並不代表牠們相處融洽。劍龍身上一些缺失化石的形狀與異特龍的咬痕相符；一些異特龍的骨骼上則有遭受劍龍尾刺刺傷的痕跡。

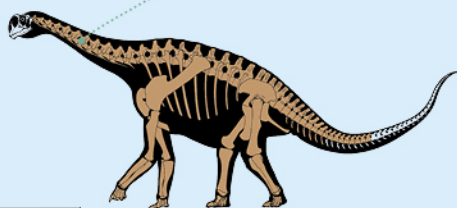
Fossils of Allosaurus and Stegosaurus are usually found at the same site, but that does not mean they got along well. Some of the missing parts of the Stegosaurus fossils match the bite marks of Allosaurus; some Allosaurus bones show puncture wounds by Stegosaurus tail spikes.

幼齡蜥腳類恐龍

Baby Sauropod

我叫
I'm Toni

時代：侏羅紀晚期
(1.5億年前)
發掘年份及地點：
1999年，美國懷俄明州
Time: Late Jurassic
(150 million years ago)
Year of Discovery and Locality:
1999, Wyoming, USA



發掘到的化石骨塊
Excavated bones

1m

完整度(以骨塊數目計算)
Completeness (by bone count)

95%

- Toni很可能是一隻年幼的腕龍，是世界上幼齡長頸蜥腳類恐龍之中保存最完整的標本，亦是北美侏羅紀的恐龍發掘工作之中令人驚訝的一大發現。

Toni, a possible juvenile brachiosaurid sauropod, is the best-preserved specimen of a young long-necked dinosaur worldwide and is one of the most exciting discoveries from the Jurassic period of North America.

- 為何Toni會保存得如此完好？因為一場巨大的泥石流在短短數秒間把牠掩蓋，故此其骨骼化石非常清晰，並保存良好。

Why is Toni such a well-preserved specimen? Because a huge mudslide buried it in just a few seconds, thus his skeleton is so amazingly articulated and preserved.



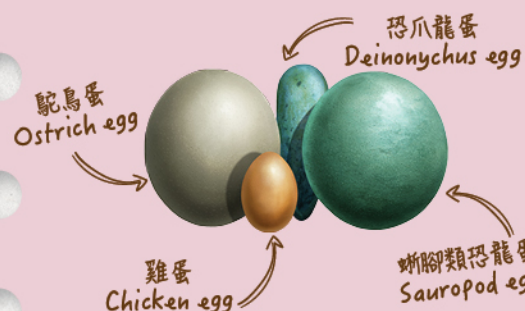
Toni化石 fossil

恐龍蛋

Dinosaur eggs

- 跟大部分現代爬行動物和所有鳥類一樣，恐龍都會產卵。現今科技的進步使科學家能夠復原一些恐龍蛋的顏色。掠食性恐龍與現代鳥類的蛋有時會帶有斑點和色彩。Toni極有可能是圖中右方的大圓蛋孵化出來。

Dinosaurs, like most modern reptiles and all birds, laid eggs. Recent advances in technology have even allowed scientists to reconstruct the colour of some dinosaur eggs. The eggs of modern birds and predatory dinosaurs were sometimes speckled and colourful. Toni would have most likely hatched out of a large round egg on the right in the image.



蜥腳類恐龍蛋內胚胎的復原圖
Reconstruction of a sauropod embryo inside an egg

哈特茲哥翼龍

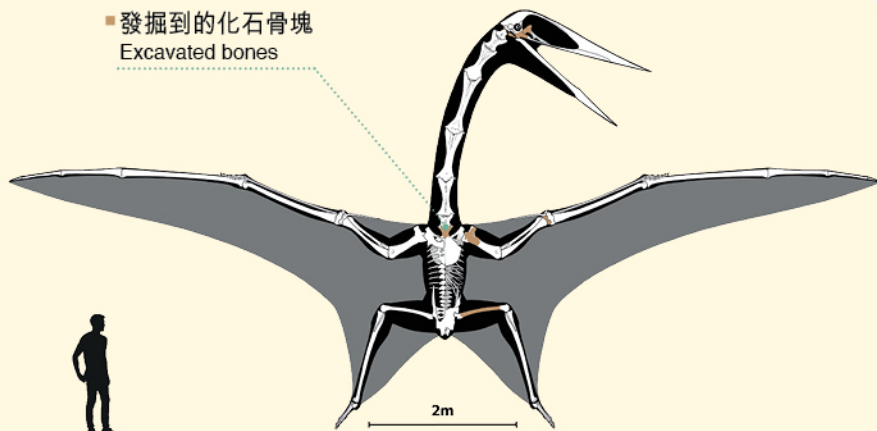
Hatzegopteryx

我叫
I'm Dracula

時代：白堊紀晚期
(6,600萬年前)
發掘年份及地點：
2009年，羅馬尼亞川西凡尼亞
Time: Late Cretaceous
(66 million years ago)
Year of Discovery and Locality:
2009, Transylvania, Romania



■發掘到的化石骨塊
Excavated bones



展出的為一比一復原骨架模型
The display is a 1:1 reconstructed skeleton model

- 翼龍是飛行動物，因此其骨頭非常輕，骨壁極薄，通常不足一毫米厚。因為這些空心的翼龍化石骨頭相當脆弱，而與其他史前動物的大型骨塊相比，它們形成化石的機會較低，故此完整的翼龍骨骼非常罕有！

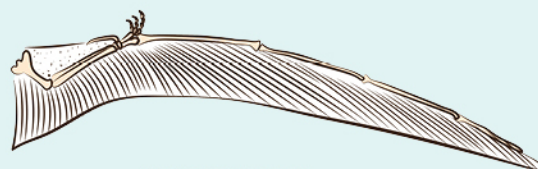
Because they were flying creatures, pterosaurs had very light bones with extremely thin bone walls, often less than 1 millimetre in thickness. Hollow pterosaur bones are extremely fragile, and they fossilise less frequently than the massive bones of other prehistoric animals. Complete pterosaur skeletons are very rare!

- 翼龍的翅膀前緣有一塊被稱為翅骨的獨特骨頭，這微小的桿狀物能支撐翼龍肩部與腕部之間的翼膜部分。在飛行時，這塊小骨頭會保持翼膜的邊緣堅挺且穩固。

Pterosaurs had a unique bone, known as the pteroid, on the leading edge of their wings. This tiny rod-shaped element supported the wing membrane located between the shoulder and wrist of the animal. This small bone kept the membrane as a rigid, stable edge during flight.

翼龍是不是恐龍？

Is a Pterosaur a dinosaur?



一般翼龍翼的構造
A generalised pterosaur wing



一般鳥翼的構造
A generalised bird wing

- 翼龍不是恐龍！兩者雖同屬爬行動物，但翼龍只是恐龍的近親。恐龍是生活在中生代的陸生動物，擁有直立的肢體，能採取直立步態。翼龍主要以飛行作為移動方式，是第一類擁有動力飛行能力的脊椎動物。大多數鳥類就像翼龍一樣，能夠飛行，但其生理構造和翼龍的大不相同。這是演化生物學中的「趨同演化」。

Pterosaurs are definitely not dinosaurs! Although both are reptiles, pterosaurs were close relatives of dinosaurs. Dinosaurs were terrestrial animals living in the Mesozoic and possesses upright limbs which could adopt an erect gait. Pterosaurs mainly used flight as their way of moving, and were the first vertebrates with the ability of powered flight. Most birds are capable of flying, just like pterosaurs, but they are physiologically different. This is called 'convergent evolution' in evolutionary biology.

三角龍

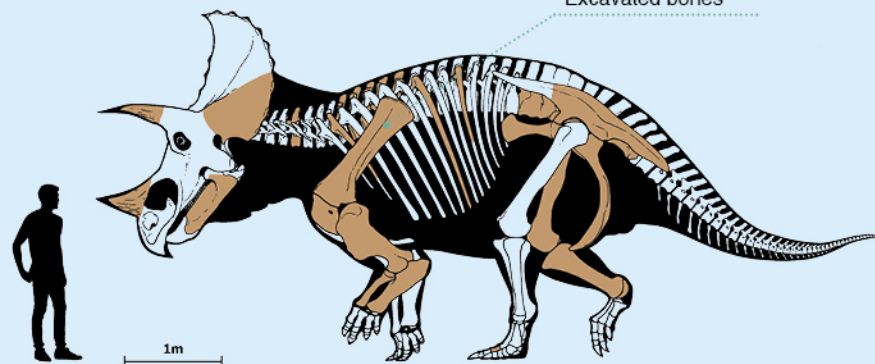
Triceratops



時代：白堊紀晚期
(6,600萬年前)
發掘年份及地點：
2017至2018年，美國北達科他州
Time: Late Cretaceous
(66 million years ago)
Year of Discovery and Locality:
2017-2018, North Dakota, USA



■發掘到的化石骨塊
Excavated bones



完整度(以骨塊數目計算)
Completeness (by bone count)

48%

- 從負重的大腿骨（即股骨）的長度推斷，Willard是迄今已知最龐大的角龍類恐龍之一。角龍類的頭骨是所有已知的陸生生物中最大的——Willard的頭骨長達2.35米！

The length of the thigh bone (femur), a weight-bearing bone, suggests that Willard was one of the largest ceratopsian dinosaurs ever discovered. Ceratopsidae had the largest skulls of any all known land animal: Willard's skull measured 2.35 metres in length!

- Willard骨頭上有些可能是由巨型牙齒造成的大洞，相信牠是被巨型掠食性恐龍殺死或開膛破肚。在白堊紀晚期，只有暴龍才能造成與孔洞大小和形狀吻合的咬痕。

Large holes in the bones show that Willard was possibly punctured by large, massive teeth. It is assumed that he was either killed or disembowelled by a giant predatory dinosaur. In the Late Cretaceous period, only a *Tyrannosaurus* could leave bite marks matching the size and shape of the holes.

恐龍滅絕之謎

Mystery of dinosaur extinction

- ✓ 三角龍是見證恐龍時代終結的物種之一！一顆小行星在現今的墨西哥海岸撞擊地球，當場消滅了撞擊點附近的所有動物，但它沒有即時把全球的生物毀滅。小行星撞擊地球後，大量塵土和酸性物質在空中飄浮，塵土遮擋陽光並帶來了長久的「冬天」，而酸性物質則使海洋急速酸化。這個「冬天」和海洋酸化令地球氣候急劇變化，科學家相信這就是白堊紀末滅絕事件的真相！

Triceratops is one of the species that witnessed the end of the dinosaur era. An asteroid hit the Earth off the coast of what is now Mexico and killed all the animals in near the impact site, but it did not immediately end all life on the Earth. After hitting the Earth, it hurled a huge amount of dust and acidic materials into the atmosphere that blocked the sunlight, causing a long 'winter' and acidified the ocean. Scientists believe that this 'winter' and the acidification of the oceans caused dramatic climate change, which was the real cause of the Cretaceous-Palaeogene extinction.



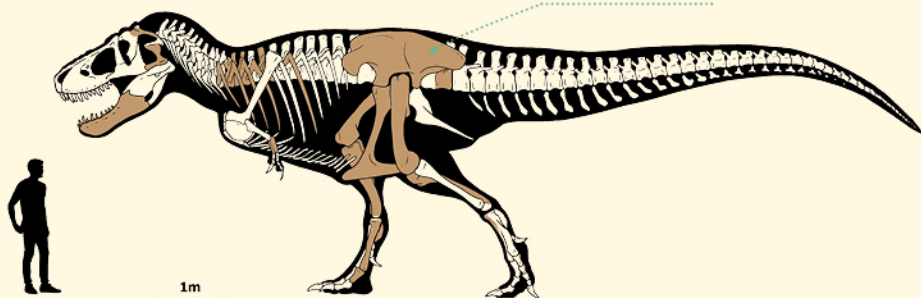
暴龍

Tyrannosaurus



時代：白堊紀晚期
(6,800至6,600萬年前)
發掘年份及地點：
2007年，美國南達科他州
Time: Late Cretaceous
(68-66 million years ago)
Year of Discovery and Locality:
2007, South Dakota, USA

■發掘到的化石骨塊
Excavated bones



完整度(以骨塊數目計算)
Completeness (by bone count)

30%

- T.A.D.的化石標本紋理細緻，外層穩固，由於發掘地點的沉積物含有豐富鐵質，因此化石表面帶有天然深褐色。

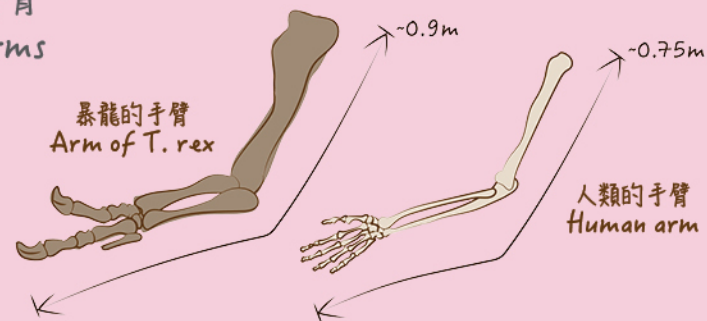
The bones of T.A.D. (The American Dragon) show beautifully preserved details, solid outer surfaces, and a natural dark brown patina, which is common to fossils recovered from iron-rich sediments.

- 暴龍（又稱「暴君蜥蜴」）的大眼睛朝向身體前方，雙眼視野重疊的範圍寬廣，使這位捕食者具備出色的距離感。這隻巨獸同時擁有敏銳的嗅覺、能咬碎骨頭的碩大顎部和呈刀刃狀的牙齒。

Tyrannosaurus rex (*T. rex*), the 'Tyrant Lizard King', had large forward-facing eyes with a wide binocular range (overlapping fields of vision). This equipped this predator with excellent depth perception. The *T. rex* also had an excellent sense of smell, very strong bone-crunching jaws and blade-shaped teeth.



纖纖雙臂 Tiny arms



- ✓ 跟人體比例相比，暴龍的手臂非常短小。有些假設認為暴龍的手臂用於幫助牠們從地面起來，又或是細小的前肢能避免牠們進食屍身時被其他暴龍意外截肢。要注意的是，雖然暴龍的手臂以這種體形的動物而言頗為脆弱，但仍比人類的手臂強壯。「暴君蜥蜴」活着的時候，只有兩隻手爪顯露出來，而縮小的第三隻爪則隱藏於皮膚內。

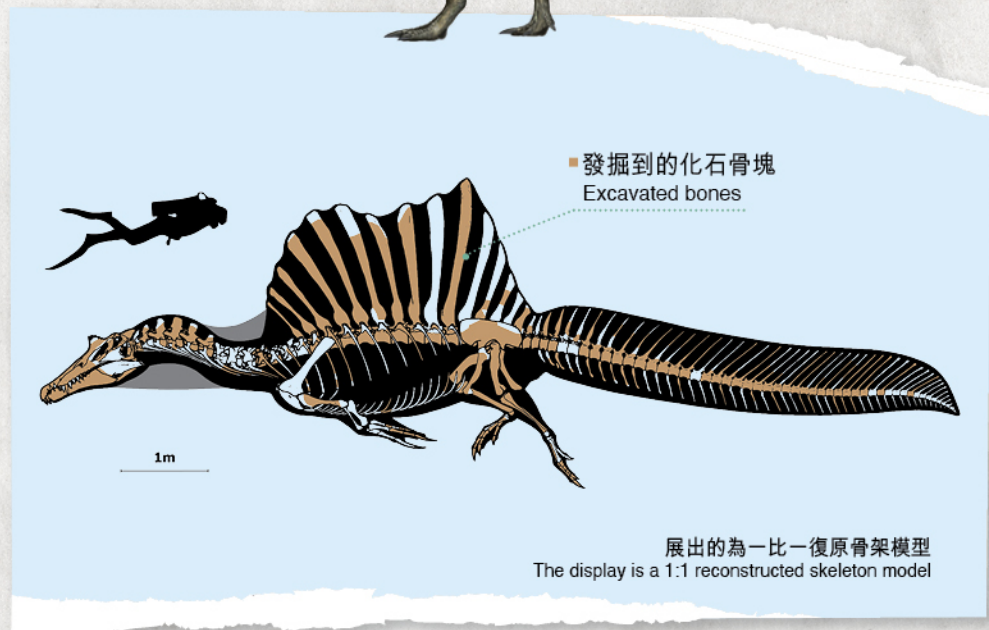
The arms of *T. rex* famously look very short when compared with human proportions. Some suggests that they helped the animal get off the ground, or that their small size prevented accidental amputation by other *T. rex* when feeding on a carcass. Note that the arms of *T. rex* were weak for an animal of this size but still stronger than a human arm. When the 'Tyrant Lizard King' was alive, only two of the three hand claws were visible. The reduced third claw was hidden underneath the skin.

棘龍

Spinosaurus

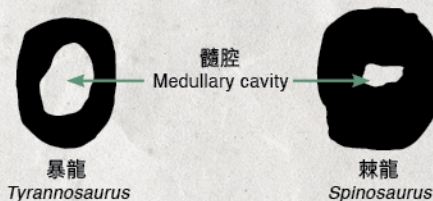


時代：白堊紀
(1億至9,300萬年前)
發掘年份及地點：
2008年至今，摩洛哥卡瑪卡瑪層
Time: Cretaceous
(100-93 million years ago)
Year of Discovery and Locality:
2008 - ongoing, Kem Kem Beds,
Morocco



- 棘龍水生習性的一個重要證據隱藏在骨頭之中。與其他恐龍相比，棘龍的骨質密度出乎意料的高。高骨質密度、高強韌度的骨頭能增加動物自身的重量，對其控制浮力非常重要。

One important line of evidence for the aquatic habits in *Spinosaurus* is hidden inside its bones. The bones of *Spinosaurus* were surprisingly dense when compared with those of other dinosaurs. Dense, compact bones in living animals make them heavier and are important in buoyancy control in the water.



恐龍股骨（大腿骨）中的髓腔的截面圖
Cross-section of medullary cavity inside the femur (thigh bone) of dinosaurs



- 棘龍的尾部像是一組以槳狀推進的結構，推動巨大的棘龍在水中前進。棘龍的尾部跟瘰螈和鱷魚的尾部相差不大，卻與迄今為止發現的其他恐龍尾部截然不同。

The tail of *Spinosaurus* is a paddle-like propulsive structure that would have propelled this giant through the water. It was not dissimilar to the tails of newts and crocodiles, but unlike any other dinosaur tail found to date.

吃魚的恐龍 Fish-eater

- ✓ 棘龍的牙齒呈圓錐形，這形狀尤其適合捕捉像魚這類滑溜的獵物。此外，棘龍的鼻孔位於頭骨上較後的位置，這令牠在大部分頭部浸沒於水中時亦能呼吸。

The teeth of *Spinosaurus* were conical, this means they were particularly well-suited to catching slippery prey, such as fish. In addition, the nose opening in *Spinosaurus* was located far back on the skull, allowing the animal to breathe with much of its head submerged in water.



給人類的忠告

Messages to Humans

研究恐龍能夠讓人類了解地球的歷史，從而讓大家思考過去，認識未來的挑戰！

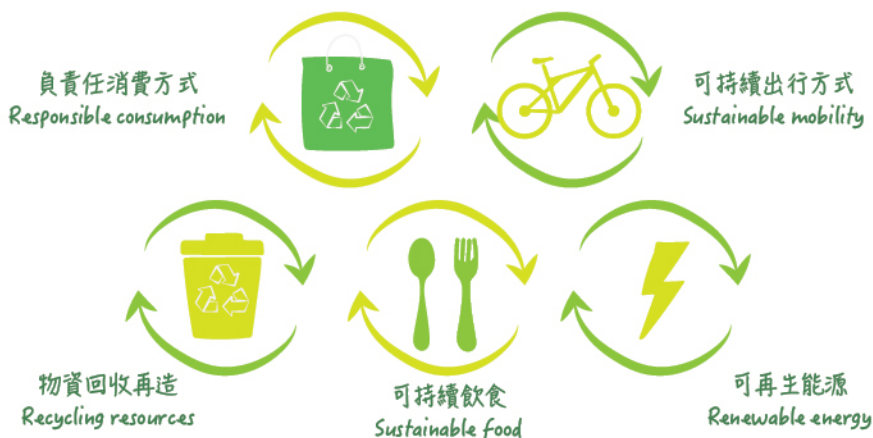
恐龍曾統治地球千百萬年，但牠們在6,600萬年前突然滅絕。當時有一顆小行星墜落地球，導致全球氣候迅速變化，繼而令多個物種相繼滅亡。事實上，地球在過去的數十億年間曾經歷了許多次平緩的氣候變化。然而，近代出現的人為氣候和環境變化的規模相當大，而它所帶來的各種影響亦已經漸漸浮現。如果人類想為後代保留一個宜居的地球，大家必須採取相應的行動。

我們冀望這展覽能夠啟發大家，思考全球暖化、極端天氣和生物多樣性減少所帶來的嚴重後果，並採取適當的行動來維持地球上的生物多樣性，及實踐可持續的生活方式，以免為時已晚。

Studying dinosaurs allows human beings to glimpse into Earth's history and recognise the challenges of the future!

Dinosaurs dominated the world for millions of years. Yet they went extinct about 66 million years ago. An asteroid impacted Earth, causing rapid global climate change, and subsequently resulting in the mass extinction. In fact, Earth has gone through many, many gradual changes in climate over billions of years. However, the anthropogenic climate and environmental change have been so prominent in the recent years, and the effects have gradually emerged. If human want to preserve a habitable planet for future generations, we must step up on climate action.

We hope this exhibition will inspire everyone to contemplate the serious consequences of global warming, extreme weather events and biodiversity loss, and take appropriate action to help conserve biodiversity on Earth and live sustainably before it is too late.



梁龍 *Diplodocus*

異特龍 *Allosaurus*

西龍 *Hesperosaurus*

蜥腳類恐龍 *Sauropod*

哈特茲哥翼龍 *Hatzegopteryx*

三角龍 *Triceratops*

暴龍 *Tyrannosaurus*

棘龍 *Spinosaurus*

恐龍齊齊印

Dino Stamps



尋找AR恐龍

Find the AR Dinosaurs

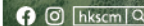


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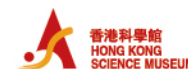
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