

# 征程



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《征程:从鱼到人的生命之旅》是一部由三位来自不同国度的古生物学家还原与重建的中国古脊椎动物演化的历史，不仅回答了“我们从哪里来”，还让我们看到生命演化历程中充满的惊奇、偶然与不可思议。作者把这纵横5亿年的历史讲得生动有趣，恢弘而不失其细节，充满了形象的比喻和深刻的思考。本书特别聚焦了“从鱼到人”演化中的九个精彩转折，也值得读者悉心地品味。

这段史诗般的历程藉由15个有代表性的中国古生物群以及数万块珍贵的化石为凭证。一些我国特有的绽放着几亿年生命之美的高清晰化石图片和结构复原图系首次精心呈现，引领化石爱好者踏上远古生命的探秘之旅。同时，认知生命演化历程中的这些记录，正

是古生物学的魅力所在。

作者介绍:

舒柯文

加拿大维多利亚大学本科毕业，多伦多大学获得硕士，美国哈佛大学的博士毕业生。现为中国科学院古脊椎动物与古人类研究所副研究员，兼任学术刊物《古脊椎动物学报》的英文编辑。经常在中国和他的故乡加拿大进行野外古生物考察。不忙野外的时候会在研究所做恐龙和其他中生代脊椎动物的研究，或者努力学习汉语。这本书是他对古生物科普的首次主要尝试。

Corwin Sullivan is an associate research professor of the Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences. He completed his undergraduate education at the University of Victoria, Canada before going on to earn an MSc degree at the University of Toronto at Mississauga and a PhD at Harvard University. He is the English editor of *Vertebrata Palasiatica*, the Institute's peer-reviewed scientific journal. When not busy with fieldwork in China or his native Canada, he pursues research focussing on dinosaurs and other Mesozoic vertebrates at the Institute, and studying Chinese hard in leisure time. *From Fish to Human: the March of Vertebrate Life in China* is his first major science outreach effort.

王原

本科毕业于北京大学地质系古生物及地层专业，曾赴美留学，在中国科学院获得博士学位。现为中国科学院古脊椎动物与古人类研究所研究员，曾获中国国家自然科学基金和中国科学院杰出科技成就奖。发现和采集了很多重要的脊椎动物化石，喜欢研究化石青蛙和化石蝾螈。他倾尽心力担任的中国古动物馆馆长一职，决定了他还是讲述中国恐龙故事的高手。

Wang Yuan graduated from the Geology Department of Peking University and received his second MS degree in the US and his PhD from the Chinese Academy of Sciences. He is now a research professor of the Institute of Vertebrate Paleontology and Paleoanthropology, CAS, and serves as director of the Paleozoological Museum of China. He has been awarded China's National Prize for Natural Sciences and the Outstanding Science and Technology Achievement Prize of the Chinese Academy of Sciences. He has discovered and collected many important vertebrate fossils, and loves to study fossil frogs and salamanders. As the diligent director of a palaeontological museum in China, he also excels at telling the stories of Chinese dinosaurs.

Brian Choo

生于新加坡，少年移居澳大利亚，本科毕业于默多克大学，在澳大利亚国立大学获得博士学位，后在中国科学院古脊椎动物与古人类研究所做博士后研究（2009-2013），现就职于澳大利亚弗林德斯大学。他的主要研究方向是志留纪和泥盆纪的化石鱼类，偶尔也发表一些中生代海洋爬行动物的论文。他还是位自学成才的画家，曾为学术论文、科普文章、博物馆展览、图书、电视纪录片等绘制古代生命的科学复原图。

Brian Choo, currently at Flinders University, was born in Singapore but moved to Australia at a young age. He graduated from Murdoch University and received his PhD at the Australian National University before going on to work as a postdoctoral researcher at the Institute of Vertebrate Paleontology and Paleoanthropology, Chinese

Academy of Sciences, from 2009 to 2013. His research has focused primarily on fossil fishes from the Silurian and Devonian Periods, but he has also published occasional papers on Mesozoic marine reptiles. As a self-taught illustrator, he has provided scientifically rigorous life-reconstructions of fossil animals for academic papers, popular articles, museum exhibits, books and television documentaries.

目录: Part One Palaeozoic

Cold Blood and Scales

第一篇 古生代

冷血与鳞片的时代

第1章 The Chengjiang Biota: Dawn of the Vertebrates

澄江生物群：脊椎动物的出现

The forces of biological competition and predation, environmental change, and simple chance winnowed the field of early animal life, eliminating some creatures and thereby creating ecological space in which others could flourish.

生物竞争和捕食的力量、自然环境的改变，以及单纯的机遇在早期动物的生命中进行筛选，剔除了某些动物，也因此为其他动物的繁盛提供了生态空间。

[Key Transition 1: The Beginnings of the Backbone] 大事件1：脊梁骨的起源

What emerges clearly from the fossil record and the anatomy of modern hagfish, lampreys and sharks is that the evolution of vertebrae was not a sudden event.

化石记录以及现生盲鳗、七鳃鳗和鲨鱼的解剖结构明确地告诉我们，脊椎的演化显然不是一个突然的过程。

第2章 The Xiaoxiang Fauna: Fishing for Answers

潇湘动物群：“钓出”真正的答案

As greatly modified lobe-finned fish, we humans stroll about on our pelvic fins and use our pectoral fins to turn the pages of books like the one you are reading now.

我们人类其实就是一种“超级改进版”的肉鳍鱼，我们用“腹鳍”四处行走，并用“胸鳍”翻动书的书页，就像你现在正在做的这样。

[Key Transition 2: To Jaw-Jaw is Always Better] 大事件2：有颌的感觉真好

Vertebrates of different types use their jaws to crush the throats of prey animals, slice and grind their way through tough vegetation, and filter plankton out of seawater.

不同的脊椎动物用不同的方式使用它们的颌，有些用来咬破猎物的喉咙，有些切碎研磨植物，又或者从海水中过滤藻类。

第3章 The Zhongning Fauna: A New Breed of Vertebrate

中宁动物群：脊椎动物的新类型

Amid these remains of fierce predators and heavily armoured prey, a single jaw fragment measuring less than 10 cm in length and retaining only small denticles rather than true teeth might seem unremarkable.

就在这些凶猛的捕食者和重装甲的猎物的残骸之间，一段不起眼的颌骨化石隐匿其中。

[Key Transition 3: Fish Nearly Out of Water] 大事件3：即将离开水的鱼

The somewhat ironic upshot is that the first tetrapod limbs were probably used more for swimming than for walking.

值得玩味的是，最早的四足动物的四肢很可能更多地用于游泳而不是行走。

第4章 The Dashankou Fauna: Beasts and Belebey

大山口动物群：兽与蜥的世界

A particularly interesting beast from the Dashankou Fauna is the carnivore Raranimus dashankouensis, whose name means literally the “rare spirit from Dashankou”.

大山口动物群有一种有趣的动物叫大山口珍稀兽，直译就是“珍稀的大山口精灵”。

[Key Transition 4: The Egg, not the Chicken] 大事件4：先有鸡还是先有蛋

Next time you buy amniotic eggs in a supermarket, why not take a moment to appreciate the sophistication and adaptive value of the intricate biological structures that will soon be appearing on your dinner table?

下一次你在超市购买羊膜动物的卵时，在它们变成你的盘中餐前，何不花一点时间欣赏

一下这一充满进化意义的，复杂而精巧的生物学结构呢？

Part Two Mesozoic

The Empire of Dinosaurs

第二篇 中生代

恐龙的帝国

第5章 The Guanling Biota: Life Among the Dangling Crinoids

关岭生物群：与摇曳的海百合伴生的生命

Complete crinoids are among the most spectacular of all invertebrate fossils, looking for all the world like flowers in some garden tended by undersea giants.

完整的海百合化石绝对属于现无脊椎动物化石中最壮观的一景，它们看起来就好像由海底巨人精心照料的花园中的花朵一般。

[Key Transition 5: Back to the Sea] 大事件5：重返海洋

Ichthyosaurs, with their dorsal and caudal fins, went further in resculpting their bodies to suit the demands of the sea than perhaps any other amniotes except cetaceans.

鱼龙甚至长出了背鳍和尾鳍，这种为了适应海洋生活所做的身体改变，可能比除了鲸类以外的任何羊膜动物都走得更远。

第6章 The Lufeng Fauna: China's Oldest Dinosaurs

禄丰动物群：中国最古老的恐龙

A single partial lower jaw represents perhaps the greatest mystery of the Lufeng Fauna.

禄丰动物群最大的谜团可能来自一件下颌骨化石。

[Key Transition 6: The Stealthy Rise of Mammals] 大事件6：哺乳动物的悄然兴起

For nearly the first hundred million years of their history, mammals were inconspicuous, mainly insectivorous animals no larger than about one metre in body length, and for the most part much smaller.

在最初一亿年的演化历史中，哺乳动物毫不起眼，主要是食虫性的，身体长度不超过一米，而且在多数时间中其体长远小于这个长度。

第7章 The Dashanpu Dinosaur Fauna: Giants on the Earth

沙溪庙动物群：地球上的巨龙

By Shaximiao times the dinosaurs had assumed pride of place in the march of vertebrate life, towering over other terrestrial carnivores and herbivores.

在沙溪庙动物群的时代，恐龙已经在脊椎动物的“大游行”中占据了首要的地位，远超过其他陆生的肉食和素食动物。

第8章 The Daohugou Biota: Preserved in their Finery

道虎沟生物群：地层中的华丽霓裳

A few decades ago, palaeontologists believed that almost all Mesozoic mammaliaforms were small, land-dwelling insectivores, and species from the Daohugou Biota have helped to temper that substantially correct but excessively broad generalisation.

几十年前，古生物学者们还在坚信几乎所有中生代的哺乳形动物都是小型、陆生、食虫的动物，但道虎沟的物种有助于调和这一虽然大体正确，但适用度被夸大了的归纳性结论。

[Key Transition 7: Into the Skies] 大事件7：飞上蓝天

By the time pterosaurs went extinct at the end of the Cretaceous, birds had already joined them as denizens of the Mesozoic skies.

当翼龙在白垩纪末灭绝时，鸟类已经成为中生代天空中的姣客。

第9章 The Jehol Biota: Feathered Dinosaurs!

热河生物群：带羽毛的恐龙！

The feathers are long enough to suggest that Yutyrannus would have been rather shaggy, a murderous fuzzball stalking the forests of the Early Cretaceous.

羽王龙很像一个外表蓬松的凶残杀手，鬼鬼祟祟地游荡在白垩纪早期的森林里。

[Key Transition 8: A Profusion of Urvögel] 大事件8：美羽不怕多

Exactly how old feathers are, in evolutionary terms, is a matter of profound uncertainty. 从演化的角度观察，“羽毛的具体产生时间”是个很难回答的问题。

第10章 The Wangshi Fauna: A Vast Dinosaurian Necropolis

王氏动物群：巨大的恐龙墓场

Shandong is an appropriate setting for a rich trove of bones from a late chapter in the history of one of the greatest dynasties of all, that of the Mesozoic dinosaurs.

由此可见，这里作为中生代恐龙帝国余辉篇章的化石产地，的确十分合适。

Part Three Cenozoic

The Triumph of Mammals

第三篇 新生代

哺乳动物的大捷

第11章 The Qianshan Fauna: Life After the Apocalypse

潜山动物群：劫难后的新生

If niches in an ecosystem are like jobs in an economy, then mass extinctions create vacancies that are automatically filled by the first suitable candidates to step forward.

如果把生态系统中的生态位比做经济领域中的职场职位，那么生物大灭绝所创造的空位会自然而然地被那些最早适应的“求职者”所填补。

第12章 The Shara Murun Fauna: Hooves, Horns and Rams

沙拉木伦动物群：各种各样的蹄子和角

What Granger thought of lending his name to a large, and quite possibly aggressive and ill-tempered, Eocene herbivore is uncertain.

至于格兰杰博士对把他的姓氏授予这种巨型、好斗、脾气暴躁的始新世食草动物是什么心情，我们就不得而知了。

第13章 The Shanwang Biota: Almost Like Today

山旺生物群：往昔如今

Most of the major groups of vertebrates that dominate our modern world were already thriving in the Miocene, whereas the brontotheres and many other characteristic denizens of earlier Cenozoic epochs had long since succumbed to extinction.

现今统治地球的大多数脊椎动物的主要类群，在中新世时已经十分繁盛，而雷兽和其他诸多新生代早期的居民们则早已灭绝。

第14章 The Hezheng Biota: Horses, Hogs and Hyenas

和政生物群：马、猪和鬣狗们

However, the story of horses also exemplifies the baroque complexity of evolution, in that considerable diversification took place at every stage of the slow canter from Eocene horses to Equus.

马类演化的故事是典型的巴洛克风格——的确非常复杂：从只会慢跑的始新世马类到健步如飞的真马类，演化过程中的各个阶段都伴随着显著的多样性分异。

第15章 The Zhoukoudian Fauna: The First Beijingers

周口店古人类遗址：最早的“北京人”

The hyenas could easily have killed occasional Peking Folk or seized the bodies of individuals who had died of other causes, devouring them in the fissure and leaving only fragments of shattered bone.

鬣狗会很容易杀死偶遇的北京人，或把因其他原因死去的北京人尸体带回裂隙，大快朵颐，然后留下满地的碎骨。

[Key Transition 9: Ecce Homo] 大事件9：人类的黎明

In recent decades it has become clear from a variety of evidence, but above all from genetics, that humans are especially closely related to the African apes known as chimpanzees.

最近几十年越来越多的证据，特别是遗传学证据清晰地显示，人类与非洲的现生猿类——黑猩猩的亲缘关系特别近。

Concluding Thoughts: the March Continues, Under Fire

结语：演化在“枪林弹雨中”继续

A strong case can be made that a sixth mass extinction is unfolding in our modern world, as a result of human activity.

可以很有理由地说，由于人类的活动，我们现在的地球正在经历第六次大灭绝。

Afterword 后记

Further reading 延伸阅读

Appendix 1: Locations of Major Vertebrate Fossil Sites in China  
附录1：中国主要的脊椎动物（含人类）化石产地  
Appendix 2: Chinese Museums that display fossils to the public  
附录2：中国含古生物展陈的博物馆名录  
Index of Genus Names Used in the Book  
本书中使用的生物属名的索引  
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标签

- 科普
- 古生物学
- 自然科学
- 生物
- 进化
- 科学史
- 人类学
- 科学

评论

一次价格上并不普及的科普，形态上过于强势了，导致内容没有完美地呈现，不如老老实实做分开的两本，排版的行距松紧相当随意，许多提及的标本没有图

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脊椎动物，是具有脊椎骨的动物，包括两栖动物、爬行动物、鸟类、哺乳动物和绝大多数的鱼类。虽然鲨鱼和鳐鱼的骨骼是软骨而非硬骨，但软骨质的脊椎显而易见，所以把它们归入尊贵的脊椎动物自然毫无问题。无脊椎动物指身体背侧没有脊椎的动物。它们种类繁多，约占动物界物种数的95%。常见类型如昆虫、虾、蟹、蛛、蛤、螺、各种蠕虫等。化石中以三叶虫最为知名。地史时期极其漫长，不少地质古生物学家将其称为深时deep

time。脊椎动物演化的时间步伐以百万年或千万年计算。如果将地球的46亿年历史压缩到一年中，那么1月1日地球诞生；脊椎动物的演化直到11月18日下午才按下启动按钮；恐龙则在12月26日才灰飞烟灭。我们人类直到12月31日接近午夜时才姗姗来迟，正好赶上痛饮香槟并开启另一个46亿年的深时的伟大时刻！

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中文选择竖排版的时候有考虑过读者的感受吗？！ 这一点差评

内容详实、画面精美、用语幽默、装帧特别，值得收藏！“谨以此书献给中国古脊椎动物学之父杨钟健先生”，钦佩各位古生物学家、古人类学家做出的贡献，也欣赏作者们填补中国古脊椎动物成果科普的努力！

感觉同名展览是根据这本书来做的...内容很丰富，条理清楚，配图帮助很大

插图好看 原来中国有这么多恐龙化石 九大事件好可爱～

想去看看化石

这书设计真棒

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虽然英文版和中文版两边的附图不同给阅读增加了一点困难。翻译相当出色，属于门外汉看热闹也行，内行看看门道也行的有趣科学读物

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好玩

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专业性和独特性毋庸置疑，正是我所需。古生物迷必看。

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演进的过程真是迷人，但金线捋着捋着咋就变成了各种类别的走马灯式登场？

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不知道什么原因，读的时候特别容易出戏，经常一排排读着读着就不知道在讲什么了，仔细想想可能是并不难懂翻译腔造成的，既不难懂又不符合纯中文阅读习惯，所以不特别用心的话就出戏了。本想因此给4星，但是书装帧得太美了，也是很有专业性的读物，不忍减星呢。

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虽然作者们尽量科普了，可很多内容还是比较专业的，对普通读者来说有一定障碍～不过内容上还是很有开创性的，系统介绍国内古生物进化的书真心不多

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中英对照，但是是相当于左右两本书分开的再合订，设计很赞。  
不过，竖排版好看却不好看。  
编辑：竖排版习惯就看起来很顺畅了。而且编者非常用心的在每一纪都使用合适的书底颜色。中英对照连页码都能对应上。

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一本中外合著的专业书，对相关专业学英文估计有用，书的编排挺少见

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我们从冷血中走来，在灰烬中生存。



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## 书评

文津图书奖获奖图书。装帧考究，还是英汉对照的，中间的折页连接难得一见。价格也很不便宜啊！中文部分是竖排的格式，有不少彩色插图。确定是字太小，看不清楚啊！两岸三个出版社联合制作的丛书，很不错的思路啊！进化论的科普读物，老话题，新形式，值得推荐。

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还没有仔仔细细看完，总体上是不错的一本书，可以学到很多东西，不断探寻，求索才能有进步，发展…不错，推荐，值得一看

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今天拿到书，略一翻，还没细看。  
本书的专业性是无庸置疑的，只是有两个不方便处：一是中英文分开为两本书，两本书又用黑布粘合在一起，翻起来不太得劲；二是中文部分文字是竖排的，看起来不太习惯。当然，竖排版的好处是无法一目十行，只能认真看。另外，中英文两部分的图版...

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