

Evolutionary Treasures

岁月菁华

ZHEJIANG UNIVERSITY PRESS
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Fossil Types Annotated

化石档案与故事

中国科学院南京地质古生物研究所 编

杨 群 主编



Amphimachairodus palanderi

Neogene; Gansu
NIGPAS Collection #MV169



Fuxianhuia protensa

Cambrian 2nd Epoch;
Chengjiang, Yunnan



Neuropteris gigantea

Late Carboniferous; Jiangxi
NIGPAS Collection #PB2621

Traumatocrinus hsui

Middle Triassic; Guizhou
NIGPAS Collection #6889



Uvigerina mediterranea

Quaternary;
Atlantic

Phanerozoic >

Palaeozoic

Mesozoic

Cenozoic

Cambrian Ordovician Silurian Devonian Carboniferous Permian

Triassic Jurassic Cretaceous

Paleogene Neogene Quaternary

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Edited by Nanjing Institute of Geology and Palaeontology,
Chinese Academy of Sciences

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Chief Editor YANG Qun



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前言

中国科学院南京地质古生物研究所（简称南京古生物所）是专门研究古生物的国家级科研机构，成立于1951年，其前身是前中央研究院地质研究所及前中央地质调查所等机构的古生物室（组）。目前，它是我国唯一从事古生物学（古无脊椎动物学与古植物学）和地层学研究的专业机构，被誉为“国际三大古生物研究中心之一”。

古生物见证了生命起源和生物演化历史。古生物化石以及产出化石的岩石地层是南京古生物所科学家的主要研究对象。地层就好像是一本书，记录了地球的历史，化石则保存了地质历史上生命演化的历程，见证了地球表面沧海桑田、气候变化、火山爆发、板块运动、天地撞击等地质历史事件，也记录了地球表面生态系统的变迁，物种起源、灭绝、更替及其与自然环境协同演化的历史。

南京古生物所几代科学家为了中国的古生物学科发展，历经艰辛，在门类古生物学、地球早期生命的起源与寒武纪大爆发、澄江生物群、热河生物群、重大地史时期生物起源－辐射－灭绝与复苏、生物地层学与全球标准层型剖面 and 点位（俗称“金钉子”）、青藏高原等中国各区域和南极综合科学考察等领域取得了丰硕成果。他们在 *Science*、*Nature*、*PNAS* 等国际著名学术刊物上发表的研究成果，多次被评为“中国基础研究十大新闻”、“中国十大科技进展新闻”、“中国科学十大进展”等；他们主持完成的“澄江生物群与寒武纪大爆发”荣获2003年国家自然科学奖一等奖。在中国现已建立的10个“金钉子”中，有7个是由南京古生物所科学家主持完成的。

南京古生物所英才辈出，建所以来先后有李四光、斯行健、赵金科、王钰、卢衍豪、穆恩之、李星学、顾知微、盛金章、周志炎、戎嘉余、金玉珩、陈旭和沈树忠等14位科学家当选为中国科学院院士（学部委员）。研究所的科学家先后承担和领导了多项重大国际合作项目，在国际古生物协会（IPA）和国际地层委员会（ICS）及其分会等诸多国际学术组织中担任主席、副主席、选举委员，并在中国多次主办具有重要影响的国际学术会议。

南京古生物所收藏了自中国古生物学诞生之日起，古生物学家近百年来在国内外采集的古生物化石。其中，已经研究、描述、图示并公开发表各类模式标本16万余件，收藏了著名学者如葛利普、李四光、孙云铸、尹赞勋等在1949年之前采集研究的标本，汇集了研究所建所以来在承担中国各门类化石、中国各纪地层划分对比和各纪地层界线层型剖面研究、青藏高原及南极地层古生物、澄江生物群、热河生物群等重要科研项目中取得的模式标本。

Preface

Fossils are direct evidence of evolution. Palaeontologists explore the fossil world in order to decode the history of biological evolution on the Earth, to understand the interaction of the biosphere and the physical environment in deep time, and to search for the roots of modern biosphere and indicators of the impact of human beings as a species to the ecosystem surrounding our society. In this atlas, we will show you beautiful assorted fossil specimens, which can silently tell the stories that happened on the Earth millions or even billions of years ago, all archived in Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS), mostly collected by NIGPAS scientists from different regions of China and elsewhere.

NIGPAS is widely known as one of the three major palaeontological research institutions in the world. The Institute was founded in 1951 with its roots extending to the former palaeontological laboratories in the National Research Institute of Geology (Academia Sinica) and the National Geological Survey of China before 1949.

NIGPAS excels in studies of invertebrate animal fossils, fossil plants and pollen-spores, microfossils (very small and better observed under microscopes), biostratigraphy (studying rock sequences using fossil occurrences and associated data), chronostratigraphy (time division and correlation of rocks using various criteria such as biozones, radiometric dates, geochemical signatures, etc.). NIGPAS houses modern research facilities including laboratories of palaeobiology, organic and inorganic geochemistry, sedimentology and data analysis, a library and information center, a type fossil repository, and a field station. We also have several public outreach platforms, including the Nanjing Museum of Palaeontology, a popular magazine *Evolution of Life* (《生物进化》) and a social cyberspace "Fossil Web" (化石网) with over 135,000 members.

NIGPAS has treasured generations of active palaeontological researchers who have devoted their life time in searching for fossils in all China to as far as the Antarctica and in working hard in laboratories with tremendous efforts to try to decode the meanings of the fossils — biological relicts from the earth history before the human being came along. Fourteen of the faculty members have been elected as academicians (or Members of the Earth Science Division) in Chinese Academy of Sciences, all being leading experts in relevant research areas worldwide, among many other well-known palaeontologists and stratigraphers, who contributed to the advancement of palaeontological discipline in China and to the world.

2005 年，南京古生物博物馆建成并向社会正式开放。博物馆展览以精美的古生物化石和科研成果为主体，包括“澄江生物群”、“热河生物群”等特异埋藏化石群中的珍贵标本，如奇虾、微网虫、中华龙鸟、雌雄孔子鸟、辽宁古果等化石标本，堪称国宝级化石精品。

岁月荏苒，菁华凝练。本图集向大家展示的，既有南京古生物所收藏的精品化石，也有南京古生物所科学家在探索生命演化历史的历程中的成果实例。每件化石的背后都有着精彩的故事；它们不仅再现了几十亿年来地球生命的恢弘演化史，还记录了中国古生物学充满艰辛曲折却又辉煌灿烂的百年发展史。

感谢科技部、国家自然科学基金委、国土资源部、中国科协、中国科学院、江苏省和南京市人民政府以及社会各界对南京古生物所的关心和支持！感谢国内外各兄弟单位和个人的支持与合作。

本图集编撰工作得到南京古生物所各位专家学者和各部门的大力支持；中科院古脊椎动物与古人类研究所邓涛研究员、汪筱林研究员在脊椎动物化石方面给予指导；部分历史素材源于《中国古生物学学科史》（中国科学技术出版社，2015）和南京古生物所未发表资料。由于编写人员的水平及编写时间所限，不足之处敬请批评指正。

杨 群 博士

中国科学院南京地质古生物研究所 所长

中国古生物学会 理事长

2017 年 7 月

This atlas displays a good sample of beautiful fossil collections in NIGPAS, including most precious specimens collected by pioneering palaeontologists in early 1900s and exquisitely preserved fossil specimens from the famous “Chengjiang Biota” and “Jehol Biota”, as well as other important fossil sites of various geological ages and geographic regions. This atlas is intended not only to show snap shots of the evolving biosphere on the Earth through millions and billions of years’ natural history, but also to show some footprints of NIGPAS scientists in their over 60 years’ scientific endeavors (plus pre-NIGPAS pioneers’ efforts). Their research achievements have widely received international and national recognition, many published in major academic journals such as *Science*, *Nature* and *PNAS* and granted the top awards for basic research in China.

Major funding of our research has come from Ministry of Science and Technology, National Natural Science Foundation, Chinese Academy of Sciences, China Association of Science and Technology, Ministry of Land and Resources (and the former Ministry of Geology and Mineral Resources), and the local governments of Jiangsu Province and Nanjing City. The collaborations with numerous researchers and field explorers throughout China and from other countries have been vital and necessary for all the achievements at NIGPAS.

The compiling team of this atlas would like to thank the support and contributions, by consultation, assistance in photography or material supply, from their colleagues of departments and offices at NIGPAS and from Prof. Dr. Deng Tao and Prof. Dr. Wang Xiaolin of the Institute of Vertebrate Paleontology and Paleoanthropology (CAS) in Beijing. Some of the historical accounts are based on the book *Chinese History of Palaeontology* (Press of Science and Technology of China, 2015) and unpublished documents from NIGPAS.

Prof. Dr. Yang Qun

Director of NIGPAS
President, Palaeontological Society of China

July, 2017

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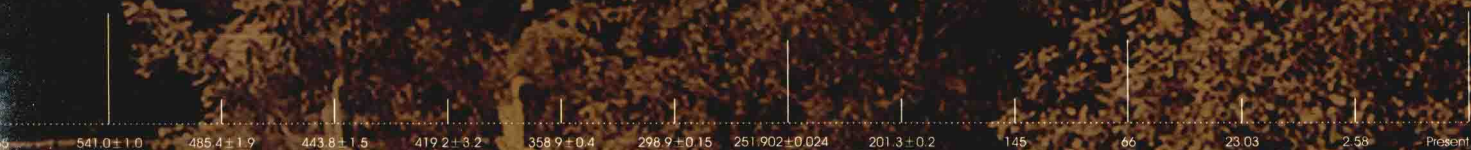
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史海掠影

Historical Spot Lights

Phanerozoic >



古代中国的化石记录 / Fossils Known to Ancient Chinese

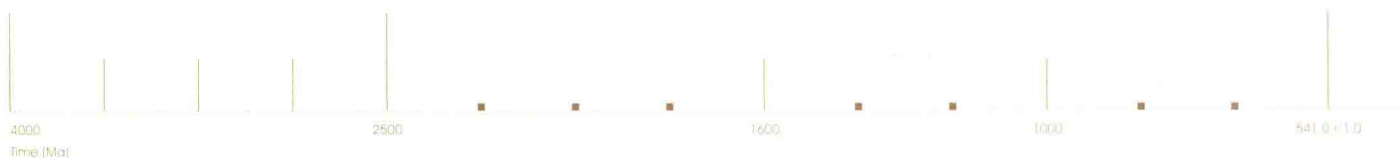


沈括 Shen Kuo
(1031–1095)

据文献记载，中国最早关于化石的记录出现在两千多年前春秋战国时期的《山海经》中，其中提到的“龙骨”“龙鱼”等就是脊椎动物化石。

北宋学者沈括在《梦溪笔谈》中首次明确表述化石的来源和本质（他所描述的“竹笋”经考证很可能是新芦木类化石），认为化石是经历沧海桑田，最终存留在岩石中的古生物遗体、遗物或生活痕迹。

In ancient China, fossils were noted in various literatures tracing back to the Warring States (475 B.C.–221 B.C.) to the Han Dynasty (206 B.C.–220 A.D.) in the monumental works “Shan Hai Jing”, in which “dragon bones” and “dragon fishes” were included as part of the natural resources in the volumes of encyclopedic texts and atlas. During the Northern Song Dynasty (960–1127), the famous scholar Shen Kuo (1031–1095), in his encyclopedic magnum opus “Meng Xi Bi Tan”, described the fossil plant from northern Shaanxi Province as “stone bamboos”, exposed due to the collapse of a river bank. These “stone bamboos”, according to their occurrence, are now assigned to *Neocalamites*, extinct tree-like horsetails of Triassic and Jurassic times (about 252–145 Ma). Because there were no “bamboo-type” plants in northern Shaanxi, Shen Kuo interpreted this occurrence as evidence of vast environmental changes since the formation of the fossils.





Neocalamites carrerei
卡勒莱新芦木
晚三叠世, 陕西宜君

Late Triassic; Yijun, Shaanxi
NIGPAS Collection #PB2256



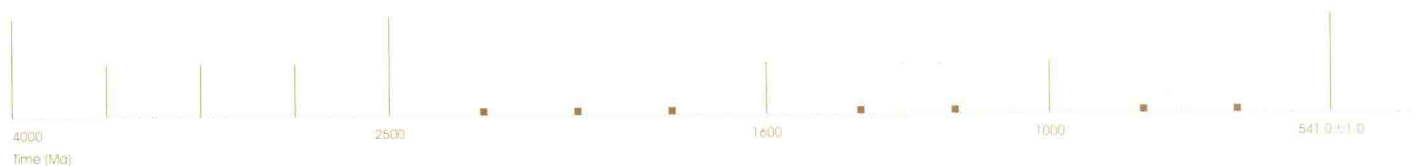
Calamites suckowii
钝肋芦木
二叠纪, 内蒙古清水河

Permian; Qingshuihe, Inner Mongolia
NIGPAS Collection #PB3908



黄庭坚 Huang Tingjian
(1045–1105)

北宋著名诗人、书法家黄庭坚收藏了中国第一件经人工打磨的
鹦鹉螺类化石标本——中华震旦角石 (*Sinoceras chinense*),
并在其上镌刻了他的亲笔题诗：“南崖新妇石，霹雳压笋出。
勺水润其根，成竹知何日。”





The ancient poet and calligrapher Huang Tingjian (1045–1105) wrote a poem for the fossil nautiloid (now we know it belongs to the widespread fossil species in South China: *Sinoceras chinense*, of Ordovician time more than 450 Ma (million years ago) with his beautiful calligraphy on the well-prepared specimen. This suggests that the ancient Chinese collected and prepared fossils as artworks and this piece may be the earliest fossil artwork well preserved by human beings.



中国古生物研究的先驱 / Pioneers of Palaeontology in China

德国学者李希霍芬 (Ferdinand von Richthofen, 1833–1905)

在中国旅行五年，他编著的 5 卷本著作《中国：亲身旅历及研究成果》，包括了古生物学的专论以及志留纪至第四纪地层的综合论述，成为我国地层古生物学发展早期的重要参考书。

Ferdinand von Richthofen spent five years extensively traveling in China, resulted in the publication of 5-volume book series — *China: Ergebnisse Eigener Reisen und Derauf Gegründeter Studien*, which included palaeontological works and stratigraphic syntheses of Silurian through Quaternary periods that later became widely referenced during the early years of the development of Chinese palaeontology and stratigraphy.

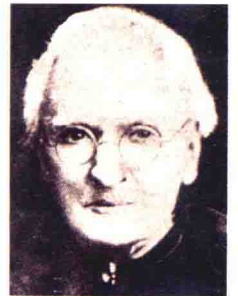


李希霍芬 F. von Richthofen
(1833–1905)

美国学者葛利普 (Amadeus William Grabau, 1870–1946)

他是对中国地质古生物学贡献最大的外国学者，曾在中国地质调查所和北京大学任教，培养了中国最早一批地层古生物学者。

American scholar Amadeus William Grabau is regarded as the most influential foreign figure to the development of Chinese geology and palaeontology. He taught in Peking University and in the National Geological Survey of China where the first generation of Chinese geologists and palaeontologists were trained.



葛利普 A.W. Grabau
(1870–1946)

法国学者德日进 (Pierre Teilhard de Chardin, 1881–1955)

他在 1923—1946 年长期调查中国的地层、古生物和区域地质，并为之作出重要贡献。

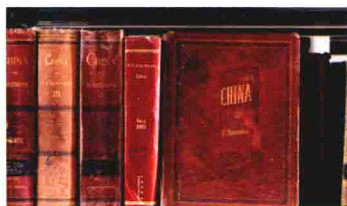
French scholar Pierre Teilhard de Chardin contributed to Chinese palaeontology and regional geology through almost 20 years exploration in wide regions of China during 1923–1946.

瑞典学者赫勒 (Thore Gustaf Halle, 1884–1964)

他于 20 世纪早期应邀在中国地质调查所工作，对中国古植物学的建立和发展贡献良多。

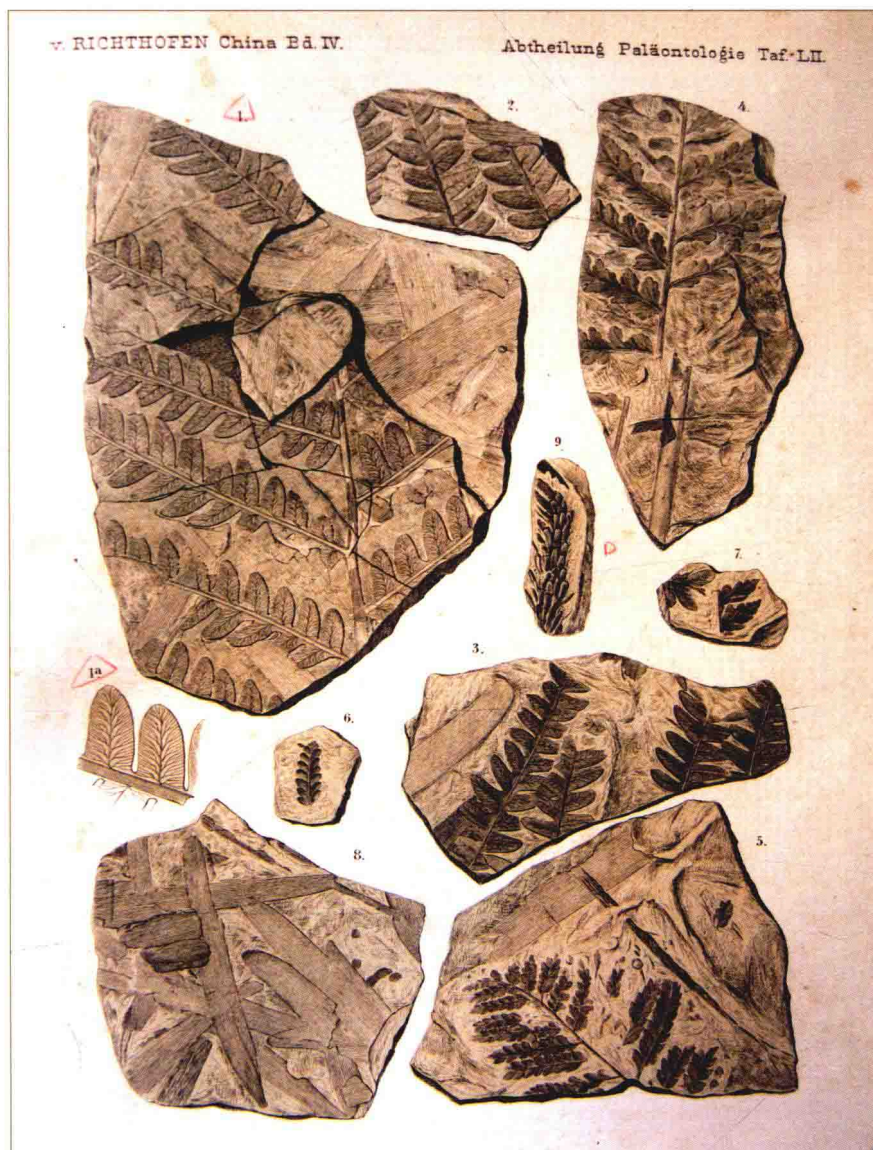
Swedish scholar Thore Gustaf Halle was instrumental in the development of Chinese palaeobotany as an advisor to the National Geological Survey of China in the 1910s.





李希霍芬的《中国》及植物化石图版

Five volumes of the works *China: Ergebnisse Eigener Reisen und Derauf Gezügelter Studien*, with one of the plates of fossil plants, by Ferdinand von Richthofen



Stereoplasmodoceras pseudoseptatum

假隔壁灰角石

中奥陶世，河北唐山滦县

葛利普1922年研究发表

Middle Ordovician; Luanxian, Tangshan, Hebei

Published by A.W. Grabau (1922)

NIGPAS Collection #58

章鸿钊 (1877—1951), 浙江湖州人, 1905 年留学日本, 入东京帝国大学地质学系学习; 1911 年毕业回国, 在京师大学堂农科任地质学讲师。中国地质事业创始人和奠基人之一, 中国地质学会首任会长。

Zhang Hongzhao (H.T. Chang, 1877–1951), born in Huzhou of Zhejiang, graduated from Department of Geology, Tokyo Imperial University, Japan in 1911. He taught geology in the Imperial University of Peking and became one of the key founders of Chinese geology. He was the founding president of Geological Society of China.

丁文江 (1887—1936), 江苏泰兴人, 1902 年留学日本, 1904 年留学英国, 1911 年毕业于格拉斯哥大学, 获地质学、动物学双学士学位。中国地质事业创始人和奠基人之一, 牵头创办中国第一个地质机构——中国地质调查所。

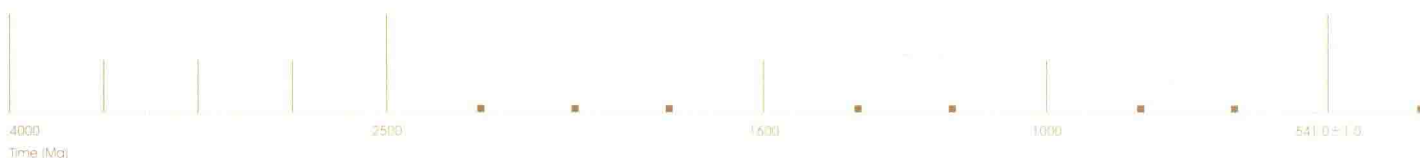
Ding Wenjiang (V.K. Ting, 1887–1936), born in Taixing of Jiangsu, majored in zoology and geology in University of Glasgow (Britain) during 1907–1911. He was also one of the key founding scientists of Chinese geology. In 1916, he became the founding director of the National Geological Survey of China.



丁文江 Ding Wenjiang
(1887–1936)

翁文灏 (1889—1971), 浙江鄞县人, 1908 年留学比利时鲁汶大学地质系, 1912 年毕业, 在 23 岁时成为中国地质学界第一位博士。中国地质事业创始人和奠基人之一, 中国第一张着色全国地质图的编制者。

Weng Wenhao (W.H. Wong, 1889–1971), born in Yinxian of Zhejiang, studied in Department of Geology, University of Leuven (Belgium) during 1908–1912 and received the first doctoral degree in geology among Chinese scholars. He was also one of the key founders of Chinese geology; he compiled the first colored geological map of China.





Pecopteris sp.

栉羊齿 (未定种)

二叠纪, 云南宣威

丁文江采集, T.G. Halle 1927年研究发表

Permian; Xuanwei, Yunnan

Collected by Ding Wenjiang

Published by T.G. Halle (1927)

NIGPAS Collection #PB13



Protolepidodendron scharyanum

夏利安原始鳞木

早泥盆世, 云南曲靖

丁文江采集, T.G. Halle 1936年研究发表

Early Devonian; Qujing, Yunnan

Collected by Ding Wenjiang

Published by T.G. Halle (1936)

NIGPAS Collection #PB119