

<<沉默的故事>>

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## 前言

Since the mid 1990s , there have been numerous scientifically important fossil findings from Hebei , Liaoning and Inner Mongolia in China. The studies of these fossils of feathered dinosaurs , pterosaurs , birds , mammals , reptiles , amphibians , insects , and plants have significantly increased our understanding of palaeontology , taxonomy , evolution , ecology and other natural sciences , re-written most text books on these subjects and raised the awareness and interest of the general public globally. Insects thrived , propagated and served important functions in their ecosystems from the Middle Jurassic to the Early Cretaceous. After sudden death , most likely due to poisonous gas and volcanic ashes , they were fossilized and preserved. Insect fossils , with excellent preservation of amazing details and broad diversity , have been discovered in large numbers from northeastern China. These insect fossils have silent stories to tell US. Living in the late Mesozoic and preserved in sedimentary rocks , these fossil insects have been studied at the Capital Normal University ( CNU ) in Beijing , under the leadership of Prof. Ren Dong and Prof. Shih Chungkun. Based on selected specimens from a vast collection of insect and plant fossils , we have reported our findings in the past 10 years—a period of our "foundation building. At present , we have a 30-member team of professors and graduate students. We have made some progress , but we also realize that more needs to be done and many areas to be upgraded. Engaging experts from universities and institutions around the world in joint research projects has greatly improved the efficiency and effectiveness of uncovering silent stories from these insect fossils. We have exchanged visits , shared fossil specimens , and conducted joint research work. Synergy , cooperation and mutual learning greatly enhance the outcome. On average , our CNU Team with collaborators publish 30 to 40 SCI papers annually. Based on our reported results and other relevant information in the literature , we put representative insect fossil treasures as the center piece of this book.

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## 内容概要

Insect fossil treasures from the dinosaur era ( 165 to 130 Ma ) in northeastern China are showcased in this book with their silent stories. Not only their taxonomy and morphology, but also their potential implications on natural sciences are presented here. Besides academic science, we highlight popular science by providing information on extant insects and insect-related stories. Elegant and beautiful photos of fossil and extant insects are shown to illustrate our stories while serving as visual arts. In addition to the 18 insect orders ( Chapters 5 to 22 ) , the book also covers fossil sites ( 1 and 4 ) , palaeogeology ( 2 ) , co-existing animals and plants ( 3 ) , palaeo-ecosystems ( 23 ) , pollination and "flower" visits ( 24 ) and insect mimicry ( 25 ) . Judging by the high diversity and the large population of the fossil insects, insects have certainly played critical roles in the evolution and eco-systems over eons, which in turn have made Insecta a highly successful class. Intended to appeal to a broad spectrum of readers ( such as palaeontologists, entomologists, evolutionists, palaeoecologists, fossil collectors, naturalists, hobbyists and students ) , we hope that readers will have fun while gaining new understanding and enjoying the artistic presentations. New fossil findings and further studies will continue to expand knowledge and deepen understanding in these fields. Getting young readers of this book to be interested in these fields, we hope some of them will be inspired to become entomologists or palaeontologists to make their contribution to natural sciences.

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作者简介

Dr. SHIH Chungkun is a Visiting Professor since December 2004 in the College of Life Sciences of the CNU on a volunteer basis. His research interests include morphology, taxonomy and evolution of northeastern Chinese fossil insects and their interactions with fossil plants. So far he has co-authored more than 40 papers on insect fossils and coevolution with plants, including a recent paper in Science. Dr. Shih received a B. S. (1972) in Chemical Engineering from the Taiwan University, a M. S. (1975) and Ph.D. (1978) in Chemical Engineering from the University of Pennsylvania, a M. S. (1978) in Operations Research from Wharton School, the University of Pennsylvania and a MBA (1982) in Marketing from the Fairleigh Dickinson University. He recently retired after 3 years with Merck and 28 years with Infineum, a joint venture between ExxonMobil Chemical and Shell Chemical. From 1998 to 2009, he was involved in business management for Infineum China and its two joint ventures in China. His business work for a joint venture company in Jinzhou, Liaoning started his passion and studies of insect and plant fossils, which led to his cooperative research with Prof Ren and other collaborators. He has given presentations on fossil treasures from the northeastern China in Singapore, China and USA. He resides in Scotch Plains, NJ with his family.

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## 章节摘录

Metamorphosis of Ephemeroptera is simple. The eggs , after being deposited into water , on aquatic plants or on other solid objects in water , hatch into nymphs. The nymphs live in water and feed on organic matters or debris , a few are predatory. Mayfly nymphs look like stonefly nymphs; but the former have 3 thread-like tails while the latter have only 2. Mayfly nymphs use gills on the abdomen segments for breathing. The nymphs will go through 10 to 50 ( usually 15 to 25 ) molts. Before the last molt , the nymphs digestive tract is sealed at both ends to form an air pocket , which causes the nymph to float up to the water surface. After months up to 4 years , the fully grown nymph molts into a winged sub-adult , called a subimago , which has dull and smoky wings. The subimago molts into an adult with clear wings within hours to 2 days. Adult mayflies emerge from molting in large numbers. The rise of nymphs popping out of water and the emergence of mayflies en masse stir up the water surface and attract predators. The male mayflies fly in a swarm above the water surface in a mating ritual. A male mayfly grabs a female flying into the swarm; they mate in flight as they sink slowly toward the ground or the water surface. Copulation only takes a few seconds. During the mating frenzy , multiple males may pursue a single female. Other males may take a different tactics by waiting on top of a female that has yet to molt into an adult. About 50 species are known to reproduce without mating ( parthenogenesis ) . No males have been found in 5 of these species ( Brittain , 1982; OToole , 2002 ) . Because mayfly nymphs are very sensitive to the quality of the water in which they live , they can be used as an index species to monitor water quality. Contamination by industrial and farm pollutants , low oxygen levels , or wrong water acidity would threaten the survival of these delicate species. Water pollution and acid rain have taken a heavy toll on the mayfly population in many countries , which in turn negatively impacts the fish population.

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