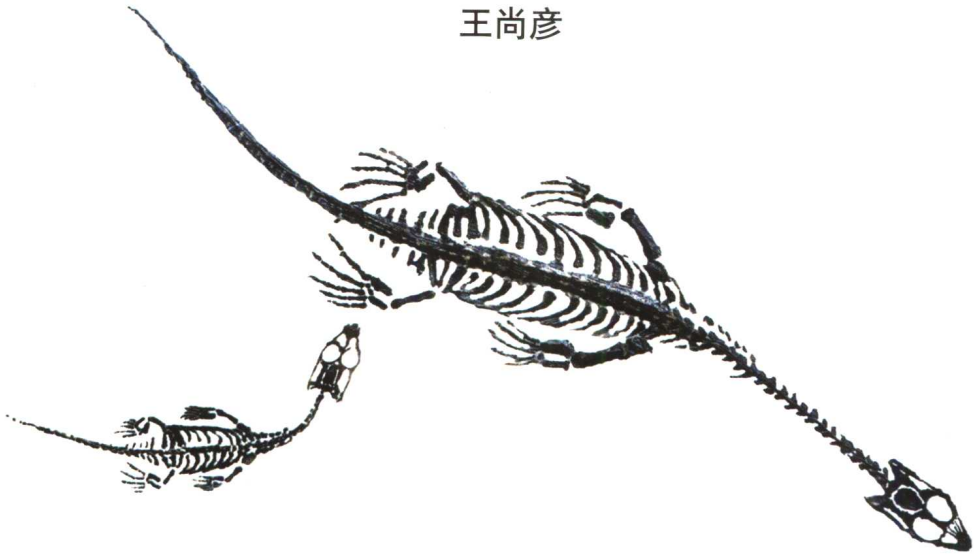
Approaching Triassic Sea of Guizhou Province in China

走进中国贵州的三叠纪海洋

——化石和喀斯特地貌精选图册

（中英文）

王尚彦



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Approaching Triassic Sea of Guizhou Province in China

—— *The Selected Pictures of Fossils and Karst Landforms*

(in Chinese and English)

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■ 内容提要

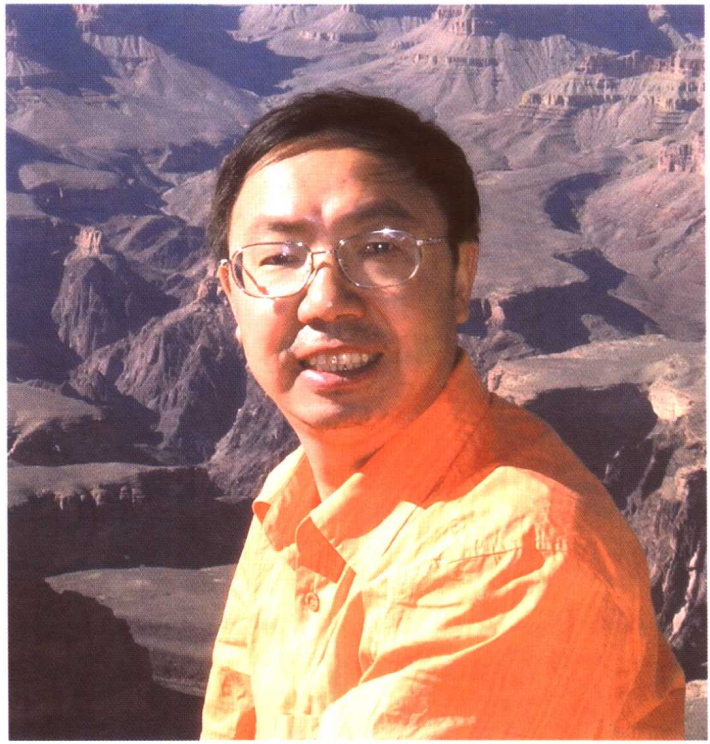
本书精选了中国贵州西部三叠纪岩层形成的优美奇特的旅游地质遗迹图片80多幅。主要包括贵州龙动物群、关岭生物群的化石图片和三叠纪岩层形成的喀斯特地貌图片，介绍了它们的基本特征。本书还介绍了相关地层古生物方面的地学基础知识。

本书为中英文对照的科普读物，可供非地质专业学生、教师参考，也可供地质工作者和旅游者赏析。

■ Abstract

In this picture album, there are photographs of 82 elegant and peculiar geological phenomenon which appear in Triassic strata in the western Guizhou Province, China. These pictures mainly include Guizhoulong Fauna fossils, Guanling Biota fossils and karst landforms, formed Triassic strata with an introduction of some pertinent scientific information. This book introduces some basic geological knowledge concerning stratigraphy and paleontology.

The album is published in Chinese and English. It is intended for geological popular science reading, and is referenced for the non-geological field of students and teachers. It is compiled for geologists and tourists.



王尚彦 近照

作者简介

王尚彦，博士，研究员，1961年11月生。2000年中国地质大学地层古生物专业博士毕业。中国科学院地球化学研究所出站博士后。中国地质大学、贵州大学硕士生导师，中国科学院地球化学研究所博士生导师，中国地质大学（武汉）地学院客座教授。长期从事地质矿产调查研究和管理工作，发表中英文专业论文69篇，出版专著9部。对华南陆相二叠系—三叠系界线、湘西、黔东寒武系白云岩相区层序地层、贵州遗迹化石、贵州区域成矿系列与成矿规律、贵州农业地质与优势农产品、贵州岩溶石山生态环境、关岭生物群生态环境、贵州西部古—中生代地层和贵州东部金矿等方面有比较系统的研究和总结。现任贵州省地矿局总工程师，《贵州地质》杂志主编。

A Brief Introduction of the Author

WANG Shangyan, Ph.D. , research professor, was born in November 1961. He graduated from the China University of Geosciences in 2000 with his doctorate degree in paleontology and stratigraphy. He did post-doctoral research in the Institute of Geochemistry Chinese Academy of Sciences from 2000 to 2004. He is a supervisor of MSc students at the China University of Geosciences and the Guizhou University, supervisor of DSc students at the Institute of Geochemistry Chinese Academy of Sciences, and visiting professor of the School of Geosciences and Resources at the China University of Geosciences. He has been working for geological investigation and mineral resources surveying and management. He has published 69 papers and 9 monographs. He has systematically studied and summarized research on the terrestrial boundary of the Permian and Triassic in South China, the Cambrian dolomite sequences in the western Hunan Province and the eastern Guizhou Province, the trace fossils of Guizhou Province, the metallogenic series and regional metallogenic regularities of Guizhou Province, the agricultural geology and famous agricultural products of the Guizhou, the ecological environment of the karst area of Guizhou Province, the paleoecological environment of the Guanling biota, the Paleozoic and Mesozoic stratigraphy in the western Guizhou, and gold deposits of eastern Guizhou province of China. He is chief geologist of the Guizhou Bureau of Geology and Minerals Resources Exploration and Development and chief editor of the *Guizhou Geology*.

序

在地质历史的三叠纪时期，在劳亚（Laurasia）大陆和冈瓦纳（Gondwana）大陆之间，存在一个特提斯（Tethys）洋。中国位于特提斯（Tethys）洋的东部。贵州这时大部分地区是浅海，沉积形成并保存了大量的沉积物。因此，贵州三叠纪地层分布十分广泛。贵州的三叠纪地层主要由碳酸盐岩（灰岩和白云岩）组成。这些三叠纪岩层形成了丰富、奇特、优美的地质遗迹，其中的古生物化石和喀斯特地貌景观最具代表性。这本画册把这些三叠纪地层的精彩内容展现出来，让读者以赏心悦目的方式，学习地球科学基础知识。

贵州丰富优美的地质遗迹，使贵州获得了6个国家级地质公园。在这些地质公园中，三叠纪地层组成的地质遗迹占重要地位。由于贵州三叠纪地层形成的地质遗迹，特别是产于晚三叠世地层中的关岭生物群和贵州龙动物群，科学意义大、观赏性强、珍奇罕见。贵州省政府和地学工作者，正在努力建设和申报以三叠纪海洋形成地层组成地质遗迹为主要内容的世界级"三叠纪地质公园"。这本图书为世界级"三叠纪地质公园"的申报

提供了重要材料。

这本图书包含了地层古生物基础知识、关岭生物群和贵州龙动物群，以及三叠纪地层组成的优美奇特的喀斯特地貌。精选的80多幅图片呈现了2亿多年前三叠纪海洋的地质遗迹形成的精彩画卷。许多图片非常珍奇。中英文对照的通俗的论述使读者面比较广泛。

这本画册把地球科学与旅游结合起来，内容通俗易懂，表现形式生动活泼，是一本既有科学性又有趣味性的地球科学科普图书，值得阅读和收藏。

中国科学院院士
国际地层委员会三叠纪地层分会副主席
殷鸿福
2007.2.24

Preface

A Tethys Ocean existed between the Laurasia Continent of northern hemisphere and the Gondwana Continent of southern hemisphere during the Triassic Period, 200～250 million years ago. China was located within eastern Tethys Ocean. Most areas of Guizhou were then shallow sea, in which preserved large quantity of neritic deposits. The Triassic strata are thus widespread in Guizhou Province. The Triassic strata of Guizhou are mainly composed of carbonates (limestones and dolomites). These Triassic beds have formed abundant, fantastic and elegant geological relicts, among which Triassic fossils and karst landscapes are the most representative. This picture album selects the essence of the Triassic scenes to enjoy the readers, in order that they may learn the basics of earth sciences in a pleasing way to both the eye and the mind.

Abundant and elegant geological relicts have won for Guizhou six national geoparks. The geological relicts formed by Triassic strata constitute the main parts of these geoparks. Considering that these Triassic relicts, especially the Late Triassic Guanling Biota and the *Keichousaurus* Fauna, possess scientific significance, excellent visual appreciation and precious rarity, the administration and geoscientists of Guizhou Province are striving for the construction and successful application of a Triassic World Geopark, with its essential contents composed of

geological relicts formed by strata deposited in the Triassic sea. This album will provide important material for the application of a Triassic World Geopark.

Contents of this picture album include basic knowledge of paleontology and stratigraphy, the Guanling Biota and the *Keichousaurus* Fauna, as well as the peculiar and elegant karst geomorphology formed by Triassic strata. More than eighty selected pictures display a magnificent spectacle of the geological relicts of Triassic sea, many of which are precious and unusual, and the explanations both in Chinese and English are simple in language easy for a popular readership.

This album aims at a better integration of geoscience and tourism, easily understood contents and lively manifestation. It is a book of popular geoscience, sciential and tasteful, thus worthwhile reading and collecting.

Academician of Chinese Academy of Sciences
Deputy Chairman of Triassic Period Branch of Stratigraphic Committee

2007.2.24

前　言

贵州省位于中国的西南地区，处于东经103°36'～109°35'，北纬24°37'至29°13'。面积176167平方千米，山地和丘陵占92.5%，喀斯特出露面积占61.9%。

贵州省沉积岩分布区占国土面积的80%左右。在出露的沉积岩中，三叠纪地层占35%～40%。三叠纪地层主要分布在贵州西部的三叠纪地层，主要由碳酸盐岩（灰岩和白云岩）组成。这些三叠纪岩层，形成了丰富、奇特、优美的地质遗迹，主要有古生物化石和喀斯特地貌景观。在贵州西部，以三叠纪岩层组成地质遗迹为主要内容的国家地质公园有4个，它们是以古生物化石关岭生物群为主体内容的"贵州关岭化石群国家地质公园"、以古生物化石贵州龙动物群和喀斯特地貌为主体内容的"贵州兴义国家地质公园"、以溶洞景观为主体内容的"贵州织金洞国家地质公园"和"贵州六盘水乌蒙山国家地质公园"。

贵州有"公园省"之称，有丰富的旅游资源。旅游资源以少数民族风情和自然风光为主。自然风光中又以喀斯特地貌为主体内容，它们是地质作用的产物，是地质遗迹，是旅游地质资源。在这些地质旅游资源中，以三叠纪岩层形成的景观占大多数。很多非常优美、奇特的著名地貌景观分布在贵州西部。

2004 年，笔者提出整合贵州西部三叠纪岩层形成的地质遗迹旅游资源，申报和建设世界级地质公园（王尚彦，2004）。

笔者长期在贵州省从事地质矿产调查研究和管理工作，收集了大量贵州地质资料。组织参与了贵州省国家地质公园的申报工作，对贵州地质公园的情况比较了解。一直有一个愿望，想通过图片方式，直观地反映出贵州旅游地质资源的优美和独特，用科普形式向国内外读者介绍贵州旅游地质资源。在该思想的指导下，精选了贵州西部三叠纪岩层形成的古生物和喀斯特地貌景观图片汇编成册。为便于理解，对贵州龙动物群、关岭生物群和地貌景观作了简单介绍，同时也介绍了有关地层古生物方面的基础地质知识。

本书力图把地学与旅游相结合，为贵州经济发展服务，并通过科普的方式普及地学知识。

Introduction

Guizhou Province is located in the southwest of China, from 103° 36' E to 109° 35' and 24° 37' N to 29° 13' N, with an area of 176167 km^2. 92.5% of the Guizhou Province is the mountainous area including 61.9% karst area.

Sedimentary strata are outcropped in about 80% area of the Guizhou Province. Triassic strata are outcropped in 35%～40% area of the Guizhou Province, and they are mainly distributed in the western Guizhou (west of the 106° E).

Triassic strata in the western Guizhou are composed of carbonates (limestone and dolomite). These Triassic rocks have formed plentiful, peculiar and beautiful geological traces, such as fossils and karst landform sceneries. There are four national geoparks formed by mainly the Triassic carbonates with geological traces in the western Guizhou. They include the Guizhou Guanling Fossil Community National Geopark which was established to represent the Guanling Biota, the Guizhou Xingyi National Geopark which was established to represent the *Keichousaurus* Fauna (*Keichousaurus* was found in Guizhou Province), the Guizhou Zhijin Cave National Geopark which was established to represent Karst cave sceneries, and the Guizhou Liupanshui Wumeng Maintain National Geopark which was established to represent mountainous landscapes.

Guizhou Province, known as "the park province", has abundant tourism resources. Of particular interest are the life styles of various local minorities and natural landscape sceneries including karst landforms. Karst landforms were formed predominantly by Triassic sedimentary rocks through geological movements. These landforms are the major resource for tourism

in Guizhou Province. Many famous, beautiful and special landforms and sceneries are distributed in the western Guizhou. Therefore, it is suggested that the tourism resources formed by the Triassic geological traces in western Guizhou should be combined together for applying and constructing a world class geopark (Wang Shangyan, 2004).

The author has been working on the research and management of geological investigation and mineral resources exploration for the Bureau of Geology and Mineral Resources Exploration and Development of Guizhou Province, and has collected a lot of information on the geology of Guizhou. He has been involved in organizing the work for applying the Guizhou national geopark with full knowledge of it. He has an idea to introduce the beauty and uniqueness of the geological resources of Guizhou Province to various readers through the medium of pictures. Under the guidance of this idea, pictures of fossils and karst landscapes of the Triassic sedimentary rocks in western Guizhou province of China, have been carefully selected and edited into this picture album. In order to let readers understand this book easily, the *Keichousaurus* Fauna, the Guanling Biota, the karst landscapes, as well as some basic geological knowledge on the stratigraphy and paleontology have been simply introduced.

The author has made great effort to combine geological and tourism information into the book for serving the development of the Guizhou economy and for introducing geological knowledge to the public. Due to the limitations of the author, mistakes may exist in the book. All comments and suggestions pointed out by readers are appreciated.

目次

CONTENTS