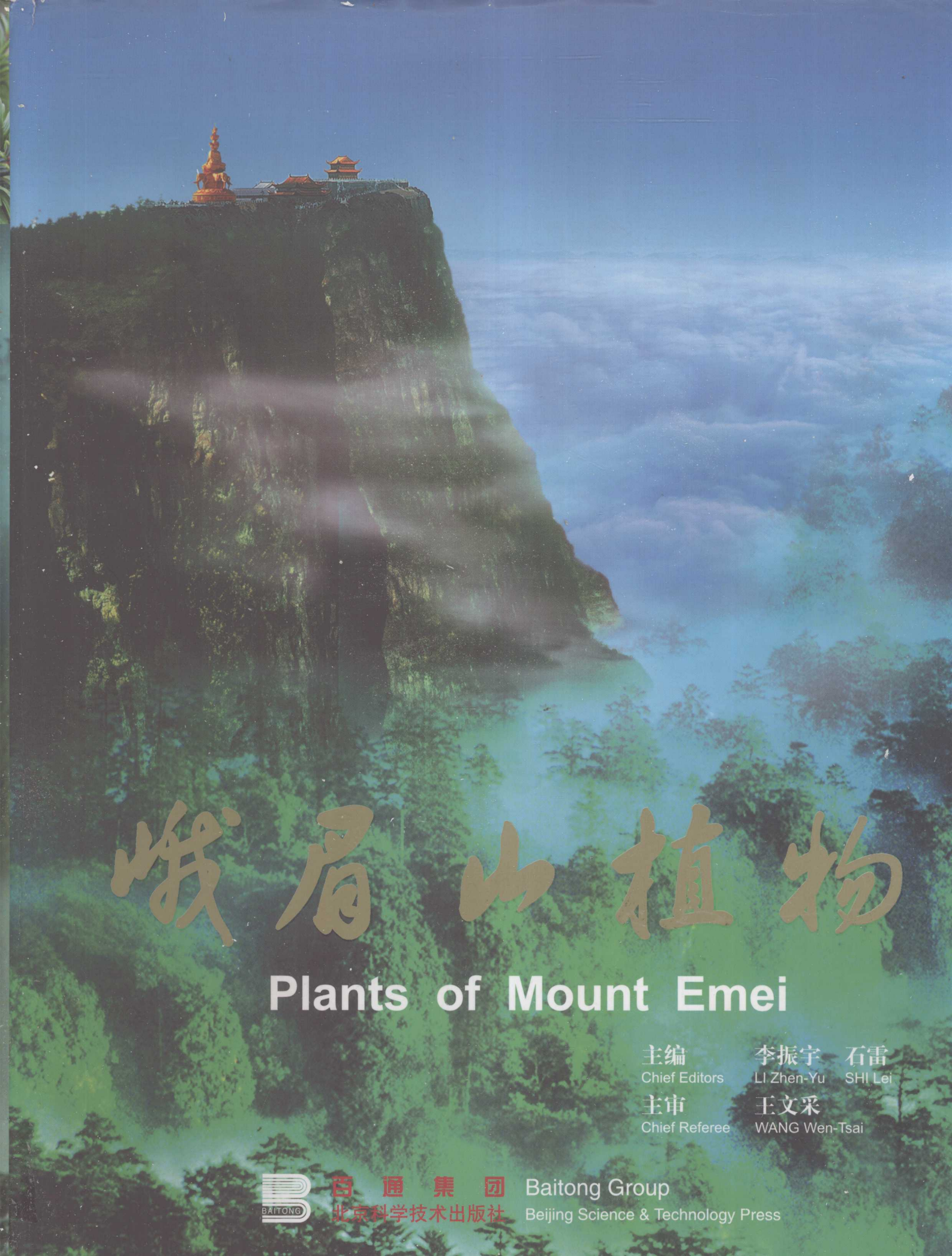

峨眉山植物

Plants of Mount Emei

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中国科学院植物研究所
Institute of Botany，the Chinese Academy of Sciences
峨眉山风景名胜区管理委员会
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图书在版编目（CIP）数据

峨眉山植物 / 李振宇，石雷主编. —北京：北京科学技术出版社，2007.10

ISBN 978-7-5304-3597-7

Ⅰ. 峨… Ⅱ. ①李…②石… Ⅲ. 峨眉山—植物志 Ⅳ. Q948.527.1

中国版本图书馆 CIP 数据核字（2007）第 144733 号

峨眉山植物

出版发行：百通集团
北京科学技术出版社
策划编辑：王 斌
责任编辑：罗明娟 王 藏 范 琛
经 销：新华书店
印 刷：广州培基印刷镭射分色有限公司
规 格：850mm×1168mm 1/16
印 张：30.75
版 次：2007 年 10 月第 1 版
印 次：2007 年10 月第 1 次印刷
ISBN 978-7-5304-3597-7/Q·017
定 价：328.00 元

地址：广州市中山大道东郊工业园建中路 16 号首层 电话：020-85558200
http://www.btbook.com

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序

天下名山峨眉山从青藏高原东缘和成都平原西缘之间的海拔约 500 m 处突然拔地而起，达到 3 099 m 的海拔高度，成为群峰耸峙的雄伟山体。山体的无数奇峰沟壑、瀑布溪流与其拥有的多种类型的茂密植被形成奇丽的景观，也形成了极为丰富、复杂的植物区系。

我国近代植物分类学研究和植物采集的历史较短，是在 20 世纪初才开始起步的。鸦片战争之后，欧洲植物采集者蜂拥而来，其足迹逐渐遍及我国各省、区。1877 年，英国外交官 E. C. Baber 首次到峨眉山考察。1887 年，英国药学家 E. Faber 进山采集植物标本。接着，英国采集家 A. E. Pratt 于 1889、1890 年也来到峨眉山采标本。1893 年，俄国地理学家 G. Potanin 到甘肃南部和四川西部采集，也到过峨眉山。英国园艺学家 E. H. Wilson 从 1899 年到 1918 年 5 次来我国，先后为 Veitch 园艺公司和哈佛大学阿诺德树本园采集了大量种子、百合属鳞茎以及植物标本等，在 1903、1904、1908、1910 诸年曾到峨眉山进行过深入采集。在 1910 年，日本采集家 I. Yamazuta 到峨眉山采集。他们所采集的植物标本分别收藏在英、美、俄、日等国的植物标本馆中，供这些国家的分类学家研究，其研究成果则分别发表在诸国的相关植物学期刊上。

我国的近代植物分类学研究大概是在钱崇澍、胡先骕、陈焕镛、刘慎谔诸先生分别在 1915 年及稍后时期自国外学成回国，在南京、北京、广州等地建立植物学研究机构，培养学生之后才开始展开的。国人中首次到峨眉山进行植物学考察的学者乃是四川大学教授方文培先生，他从 1927 年起一直到 20 世纪 40 年代多次到峨眉山考察，采集到大量植物标本，其副号标本不仅寄给国内有关植物所，同时也寄给英、美、法等国的植物标本馆，他的采集工作为峨眉山植物区系的研究做出了突出贡献。在方老之后到峨眉山考察的还有汪发缵（1931）、俞德浚（1932）、郑万钧（1936）、杜大华（1936）、吴中伦（1936）、刘慎谔、王战（1938）、姚仲吾（1939）等先生（1937 年，抗日战争爆发后，钱崇澍、裴鉴两位先生分别从上海和南京逃到重庆，他们也曾访问过峨眉山），他们和方老采集的大量标本为峨眉山植物区系的研究奠定了坚实基础。方文培先生根据对峨眉山标本的研究发表了一些论著，在 1942～1946 年，他

与诚静容等先生合作编写了 2 卷 4 册的巨著 《峨眉植物图志》。此外，其他学者如杨衔晋、俞德浚、裴鉴、吴中伦、禹海涵等先生也发表了有关峨眉山植物区系、植被和资源植物的论文。自 20 世纪 30 年代，我国不少植物分类学家开始进行专科、专属的分类学研究，这些工作以及后来开展的《中国植物志》和 《四川植物志》的编写工作，为弄清楚峨眉山植物区系起到了重要作用。据我所知，在 20 世纪 40 年代，静生生物调查所的陈封怀先生进行我国毛茛科的分类学研究，他在 1943 年根据峨眉山标本发表了黄连一新变种 *Coptis chinensis* Franch. var. *omeiensis* Chen，到 1965 年，北大医学部的诚静容先生在研究黄连属时将此变种提升到种的等级：峨眉黄连[*Coptis omeiensis* (Chen) C. Y. Cheng]，同时她与肖培根先生合作发表了特产峨眉山一带的黄连属又一新种三角叶黄连 (*Coptis deltoidea* C. Y. Cheng et Hsiao)。此后，我在承担的《中国植物志》三个科的编写过程中根据采自峨眉山的标本，发表了以下新种和新变种：毛茛科的峨眉翠雀花 (*Delphinium omeiense* W. T. Wang)、拳距瓜叶乌头 (*Aconitum hemsleyanum* Pritz. var. *circinatum* W. T. Wang)、巨苞岩乌头 (*A. racemulosum* Franch. var. *grandibracteolatum* W. T. Wang)、峨眉唐松草 (*Thalictrum omeiense* W. T. Wang et S. H. Wang)、巨齿唐松草 (*T. grandidentatum* W. T. Wang et S. H. Wang，根据方文培先生采的标本)；荨麻科的翅棱楼梯草 (*Elatostema angulosum* W. T. Wang)、伏毛楼梯草 (*E. strigulosum* W. T. Wang)、细角楼梯草 (*E. tenuicornutum* W. T. Wang)、峨眉楼梯草 (*E. omeiense* W. T. Wang，根据方文培先生采的标本) 和多脉楼梯草 (*E. pseudoficoides* W. T. Wang)；苦苣苔科的峨眉半蒴苣苔 (*Hemiboea omeiense* W. T. Wang) 和峨眉吊石苣苔 (*Lysionotus omeiensis* W. T. Wang)。在 1976 年，我和几位同事承担的《中国植物志》毛茛科完稿，根据该科植物地理分布的资料，我看到与峨眉山有关的两个情况：一个是峨眉山以东的四川省和重庆市的毛茛科的属和种的数目都比较少，为 18 属，约 80 种；而从峨眉山西行进入横断山区，则属数、种数均突然大为增加，为 29 属，约300 种。另一个现象：广布于青藏高原的高原毛茛 [*Ranunculus tanguticus* (Maxim.) Ovcz.] 也分布于峨眉山，并自此山北上沿青藏高原东缘越过秦岭分布到黄土高原上的五台山和接近荒漠的贺兰山。此外，我国特有植物，具独特二叉分

枝叶脉的独叶草（*Kingdonia uniflora* Balf. f. et W. W. Smith）自峨眉山沿青藏高原东缘北上，在四川西北折向东方，再沿甘肃秦岭南坡东达陕西太白山。从上述两例可见，青藏高原东缘是我国地质历史时期中植物在南北方向进行迁移的一条重要通道。

1981～1983年，中国科学院组织有关研究所进行横断山区综合科学考察，采集到大量植物标本。1983年底，有关研究所进行工作总结时决定编写《横断山区维管植物》一书，但非常遗憾的是由于那次考察的区域未包括峨眉山，又由于想减少此书的编写工作量，竟决定此书不包括峨眉山及邻近地区，从而失去一次全面研究峨眉山植物区系的机会。也在那时，日本学者荻巢树德先生正在四川大学方文培先生处进修，他对峨眉山植物区系进行了深入研究，可惜其研究成果至今未曾发表。

最近，我高兴地得知李振宇、石雷教授和一些专家合作，经过参考大量文献，研究大量标本之后编写出《峨眉山植物》一书。书中包括苔藓植物、蕨类植物和种子植物的名录，以及自然概况、濒危和特有植物、植物资源等，内容很丰富，但我想最重要的是揭示了峨眉山植物区系的“真面目”。峨眉山如此狭窄的区域范围内的高等植物物种的数量竟达到了3 703种，其中，包括了106种特有植物，569种引为模式的植物，以及158种濒危植物，这些数字足以说明，峨眉山确实是植物区系方面的一座奇山、宝山，这在世界的大山中也属罕见。我相信，本书的出版定将为峨眉山植物区系的研究以及峨眉山植物资源的保护和合理利用起到积极的促进作用，同时，本书也为广大群众了解峨眉山植物区系提供参考，起到普及植物学的作用。看到本书即将付印出版，我感到十分高兴，谨在此向本书作者们表示衷心的祝贺！

中国科学院院士 王文采

2007年7月23日

Preface

Emei Shan, a mountain known worldwide, is as magnificent includes Jinding, Qianfoding and Wanfoding. From the western edge of the Chengdu Basin at 500 m elevation, it rises suddenly to 3 099 m on the southeastern edge of the Qinghai-Xizang Plateau. It's numerous fantastic peaks and ravines, waterfalls and rivulets have resulted in a diversity of attractive landscapes that provide a complexity of environments that support an extremely rich and complex flora.

Plant taxonomy and plant collecting by Chinese botanists began late in China, in the early 20th century, in comparison with such activities in western countries. Hence, it was not Chinese but foreigners who first conducted research on the flora of Mount Emei. After the Opium War, European plant collectors and collectors of other natural history objects swarmed in and gradually left their footprints over most of the provinces and regions of China.

In 1877 the British diplomat, E. C. Barber, was the first European to visit Mount Emei, followed in 1887 by British pharmacologist E. Faber, who collected herbarium specimens. Faber was followed in 1889 and 1890 by the British collector, A. E. Pratt, whose goal also was to gather specimens. In 1893, the Russian geographer, G. Rigory Potanin visited and collected on Mount Emei on his way to southern Gansu and western Sichuan. From 1899 to 1918, the British horticulturist, E. H. Wilson, visited China five times to gather a great number of seeds, bulbs of Lilium and plant specimens; he made extensive collections on Mount Emei in 1903, 1904, 1908, and 1910. In 1910, the Japanese collector I. Yamazuta collected on Mount Emei. The specimens gathered by these foreigners are housed in herbaria in Britain, the United States, Russia and Japan, with duplicates in other herbaria outside of China where they were studied by western taxonomists. The findings and research based on those collections were reported in the publications of those countries.

Modern taxonomic research in China started in 1915, or slightly later, when S. S. Chien, H. H. Hu, W. Y. Chun and T. N. Liou returned to China after completing advanced studies in botany abroad. They not only founded the major botanical research institutions in Nanjing, Beijing, and Guangzhou, but trained a great number of students in modern taxonomic research. Among their students was W. P. Fang, the first Chinese scholar to visit Mount Emei to conduct botanical investigations and later a professor at Sichuan University. From 1927 to the 1940s, Fang repeatedly visited Mount Emei where he gathered a great number of herbarium specimens. Besides the specimens he retained at Sichuan University, he sent duplicates to herbaria in China as well as to herbaria in Britain, the United States, France, and other countries. Through his collecting efforts, Prof. Fang made an outstanding contribution to the understanding of the flora of Mount Emei. Following Fang, F. T. Wang (1931), T. T. Yu (1932), W. C. Cheng (1936), T. H. Tu (1936), C. L. Wu (1936), T. N. Liou, C. Wang (1938) and C. W. Yao (1939) went to Mount Emei for botanical research. In 1937,

at the start of the anti Japanese war, S. S. Chien and C. Pei also visited Mount Emei on their way to Chongqing after their respective escapes from Shanghai and Nanjing. The herbarium specimens collected by these senior scholars, including those by Professor W. P. Fang, are of considerably significance in studies of the flora of Mount Emei.

Based on his collection of herbarium specimens, W. P. Fang published a series of papers and books. From 1942 to 1946 he and C. Y. Cheng jointly compiled and published a monumental 2-volume work (in 4 bound volumes) *Illustrations of Omei Plants*. Other scholars, including Y. C. Yang, T. T. Yu, C. Pei, C. L. Wu, H. H. Yu *et al.* also published on the flora, vegetation and economic plants of Mount Emei.

In the 1930s, Chinese plant taxonomists began to undertake monographic studies of the plants of China. Their publications and the compilation of the *Flora Reipublicae Popularis Sinicae* and *Flora Sichuanica* are of importance in clarifying the flora of Mount Emei. In the 1940s, F. H. Chen of the Fan Memorial Institute of Biology carried out taxonomic studies on the Ranunculaceae of China. In 1943, based on herbarium specimens, he published a new variety, *Coptis chinensis* Franch. var. *omeiensis* Chen. In 1965, however, when studying *Coptis*, C. Y. Cheng of the Medical Department of Peking University raised Chen's variety to the rank of species, *Coptis omeiensis* (Chen) C. Y. Cheng. C. Y. Cheng and P. K. Hsiao jointly published an additional new species, *Coptis deltoidea* C. Y. Cheng et Hsiao. When I was preparing the accounts of three families for *Flora Reipublicae Popularis Sinicae*, I also published some new species and new varieties of Ranunculaceae based on herbarium specimens collected on Mount Emei, including *Delphinium omeiense* W. T. Wang, *Aconitum hemsleyanum* Pritz. var. *circinatum* W. T. Wang, *A. racemulosum* Franch. var. *grandibracteolatum* W. T. Wang, *Thalictrum omeiense* W. T. Wang et S. H. Wang, and *T. grandidentatum* W. T. Wang et S. H. Wang (based on herbarium specimens collected by W. P. Fang).

New species in the Urticaceae included *Elatostema angulosum* W. T. Wang, *E. strigulosum* W. T. Wang, *E. tenuicornutum* W. T. Wang, *E. omeiense* W. T. Wang (based on herbarium specimens collected by W. P. Fang) and *E. pseudoficoides* W. T. Wang. New species in the Gesneriaceae include *Hemiboea omeiense* W. T. Wang and *Lysionotus omeiensis* W. T. Wang.

In 1976 when two of my colleagues and I completed the manuscript of the Ranunculaceae for the *Flora Reipublicae Popularis Sinicae*, I discovered two distributional phenomena in the family related to Mount Emei: fewer species in fewer genera occur in the regions of Sichuan and Chongqing east of Mount Emei; only 80 species representing 18 genera. Westward from Mount Emei to the Hengduan Mountain region, however, the number of species rapidly increases to 300 and the number of genera increases to 29. Another phenomenon: *Ranunculus tanguticus* (Maxim.) Ovcz, is widely distributed on the Qinghai-Xizang Plateau. It also grows on Mount Emei and occurs northward along the east edge of the Qinghai-Xizang Plateau. the

range then turns eastwards from northwestern Sichuan along the south slope of the Qinling Mountains in Gansu to Mount Taibai in Shanxi. Obviously, from the above two examples, we can say that the east edge of the Qinghai-Xizang Plateau has been an important corridor for plants migrating north and south during geological time as well as an area where a large number of ancient and modern species are preserved.

From 1981 to 1983 the scientific expeditions of the institutions under the Chinese Academy of Sciences collected a great number of plant specimens from southwestern China. At the end of 1983 a decision was made to compile a list of the collections and write a book, *Vascular Plants of Hengduan Mountain Region.* It is a pity that the Hengduan Mountain scientific expeditions did not include Mount Emei. Furthermore, to reduce the work load of the compilers, the *Vascular Plants of Hengduan Mountain Region* does not contain accounts of the plants of Mount Emei and adjacent regions. Consequently, an opportunity for an extensive study of the flora of Mount Emei was lost. During that same period, a Japanese scholar, Mikinori Ogisu, was studying under Professor W. P. Fang at Sichuan University and conducted an intensive study of the Mount Emei flora. I am sorry to say that until now I have not seen a published account of his achievements.

Recently, I was pleased to learn that Professors Li Zhen-yu, Shi Lei and others are compiling a list of plants and writing a book *Plants of Mount Emei* that is rich in content, including lists of bryophytes, pteridophytes and seed plants, a survey of the natural features of Mount Emei, an account of the endangered and endemic plants, economical plants, and so on. What I believe to be the most important aspect of the book is that it reveals the true characteristic of the flora of Mount Emei. There are 3 703 higher plants species distributed in Mount Emei, including 106 endemic plant species, 569 plant species induced as types and 158 species recognized as endangered plants. This number of species fully explains why Mount Emei is such a wonderful mountain and such a botanical treasure. Such richness and diversity is seldom seen among the mountains of the world. I believe that the publication of this book will definitely promote the study of the Mount Emei flora and help in the development and rational use of its economic plants. At the same time, the book will be a references for readers who are interested in understanding the flora of Mount Emei and it will also play a role in spreading botanical knowledge. I am very delighted that this book is bound for the press. Here I convey my cordial congratulations to the authors.

Wang Wen-tsai

Member of Chinese Academy of Sciences

前　言

峨眉山位于中国四川省西南边缘向青藏高原的过渡地带，地处北纬29°16′30″～29°43′42″，东经103°10′30″～103°37′10″，海拔3 099 m，相对高差近2 600 m，森林覆盖率93%，是著名的旅游胜地和四大佛教名山之一。峨眉山峰峦迭嶂，飞瀑流泉，植被繁茂，以其雄秀奇丽的自然风光和神话般的佛教胜迹而闻名于世，是一个集自然风光与佛教文化为一体的中国国家级山岳型风景名胜区，1996年12月被联合国教科文组织遗产委员会列入《世界文化与自然遗产名录》。

峨眉山不仅风光秀丽，而且自然环境优越，地质地貌独特，生物气候垂直带明显，在天下名山中实属罕见。峨眉山富集了丰富的植被类型和复杂的区系成分，素有“天然植物园”之称，吸引了国内外众多的植物学工作者，他们通过标本采集和研究，发现了大量的新植物。峨眉山现代植物分类研究始于19世纪。1887年，英国人E. Faber首次到峨眉山采集。我国首次到峨眉山进行植物学考察的学者是方文培教授，他从1927年起多次到峨眉山考察，为峨眉山植物区系的研究做出了突出贡献。众多的专家学者参与峨眉山植物的采集和研究工作。《中国植物志》、《四川植物志》和《Flora of China》的编辑和出版，为峨眉山植物区系的研究奠定了坚实的基础。然而，峨眉山的植物资源本底的原始文献极为分散，缺乏系统性整理。峨眉山入选《世界文化与自然遗产名录》后，迫切需要开展野生植物资源调查与评价，整合植物区系的基本信息，为峨眉山自然遗产的保护、数字化管理以及特色植物资源的合理开发利用奠定基础。

在中共乐山市委、市人民政府和峨眉山风景名胜区管理委员会的大力支持和资助下，立项开展了“峨眉山野生植物资源调查与评价”和“《峨眉山植物》编研”的工作。该项目由中国科学院植物研究所和峨眉山风景名胜区管理委员会主持，组织了中国科学院成都生物研究所、四川大学生命科学学院、中国科学院华西亚高山植物园、四川省中药学校、四川省自然资源研究所峨眉山生物站、日本东方植物文化研究所、中国科学院华南植物园、国家种苗生物工程重点实验室、复旦大学管理学院、国家林业局保护司、国家林业局中国野生动植物保护协会、国家林业局国有林场和林木种苗工作总站、美国哈佛大学植物标本馆、俄罗斯科学院科马洛夫植物研究所等单位的专家学者，收集整理了大量文献资料，参考了《中国植物志》、《Flora of China》、《四川植物志》、《中国高等植物》、《峨眉植物图志》、《四川植被》、《中国树木志》、《峨眉山志》、《峨眉药

用植物》、《四川濒危珍稀植物》等著作和《植物分类学报》、《云南植物研究》、《川药校刊》等刊物，考证了国内主要标本馆的标本，对峨眉山的植物资源进行了补充调查，在此基础上完成了峨眉山植物名录。

本书共分四章：第一章自然概况由王祺执笔；第二章濒危和特有植物由石雷和魏来执笔，模式植物中苔藓植物由吴鹏程执笔，蕨类植物由张宪春执笔，种子植物由李振宇、邬家林和许介眉执笔；第三章资源植物由庄平执笔；第四章高等植物名录、苔藓植物门苔类由李粉霞和汪楣芝执笔，藓类由贾渝执笔，蕨类植物门由张宪春、王丽执笔，种子植物门主要由李振宇和荻巢树德执笔，其中兰科和爵床科分别由郎楷永和邓云飞执笔。附录发表 2 个新组合和 2 个新变种，附有中文名和拉丁名分科索引。

本书共收载了峨眉山高等植物 280 科 1 271 属 3 703 种，包括苔藓植物 70 科 196 属 402 种、蕨类植物 45 科 105 属 430 种、种子植物 165 科 970 属 2 871 种。附有照片 454 张。

根据国家林业局和农业部颁布的《国家重点保护野生植物名录（第一批）》和《濒危野生动植物国际贸易公约》（CITES），峨眉山濒危植物共有 158 种，隶属于 21 科 77 属。

峨眉山有特有植物 43 科 79 属 106 种，包括苔藓植物 2 科 2 属 2 种、蕨类植物 4 科 8 属 11 种、种子植物 37 科 69 属 93 种。

引为模式的峨眉山植物为 569 种，其中，苔藓植物 3 科 3 属 3 种、蕨类植物 21 科 49 属 121 种、种子植物 84 科 253 属 445 种。

本书在编写过程中，承多位专家和分类学工作者协助鉴定标本，国内主要的标本馆，如中国科学院植物研究所标本馆（PE）、中国科学院成都生物研究所标本馆（CDBI）、四川大学标本馆（SZ）、四川省中药学校（EMA）、四川省自然资源研究所峨眉山生物站（ESR）、中国科学院华南植物园标本馆（IBSC）、中国科学院昆明植物研究所标本馆 （KUM）等提供方便和帮助，在此向他们表示衷心的感谢。

感谢百通集团和北京科学技术出版社对本书出版的大力支持。

由于本书编写时间较短，编著者的业务水平有限，错漏之处，欢迎批评指正。

李振宇　石　雷

2007 年 8 月

Forward

Mount Emei (29°16′30″～29°43′42″N, 103°10′30″～103°37′10″ E; at an elevation of 3 099 m) is located at the boundary between the southwestern edge of the Sichuan Basin and the southeastern edge of the Qinghai-Xizang Plateau. The difference in elevation between the base and the summit is 2 600 meters. The forest coverage is about 93%. It is a world famous for its attractive natural scenery and as one of the sacred mountains of Chinese Buddhism. In December, 1996 Emei Shan was designated by UNESCO's World Heritage program as the Mount Emei Scenic Area.

The natural scenery of Mount Emei is not only visually attractive, but environmentally complex. The wide variety of habitats have resulted in numerous vegetation types and a rich and highly diverse flora. Hence, the mountain has often been referred to as a natural botanical garden and has attracted numerous botanical workers from various parts of the world. Through the collection of specimens and on-site investigations, a great number of new species of plants have been discovered.

Modern taxonomic research on the flora of Mount Emei began in the 19th century. In 1887 E. Faber, from Great Britain, was the first to collect botanical specimens on the mountain. The first Chinese scholar to study there was Professor W. P. Fang, who, beginning in 1927, visited Mount Emei numerous times for field investigations. Fang, made remarkable contributions to the study of the flora of Mount Emei and through his reports attracted numerous specialists and scholars to investigate the flora of Mount Emei and to collect specimens.

The compilation and publication of *Flora Reipublicae Popularis Sinicae*, *Flora of China* and *Flora Sichuanica* have laid a solid foundation for the study of the plants of Mount Emei. The original literature on the economic plants of Mount Emei is extremely scattered, however, and studies in that area are still insufficient.

When Mount Emei was designated a World Heritage Scenic Area, it became clear that there was an urgent need to investigate and assess the wild plant resources of the mountain and to integrate the basic data on the flora in a digital management system. These steps are imperative to insure the protection of the natural resources and the rational use of the unusually rich plant resources.

With support from the Leshan Municipal Party Committee and Municipal Government and the Emei Shan Municipal Party Committee and Municipal Government, and considerable financial support from the Mount Emei Scenic and Historic Interest Area Administration, two research projects, 'Investigation and Assessment of Emei Shan Wild Plant Resources' and 'Plants of Mount Emei' were initiated in 2007. The project is under the auspices of the Institute of Botany, Chinese Academy of Sciences (CAS), and the Mount Emei Scenic and Historic Interest Area Administration. To collect and sort through the vast amount of literature and data will involve numerous experts and scholars from various institutions, including the following: Chengdu Institute of Biology, Chinese Academy of Sciences (CAS); Life Science College of Sichuan University; West China Subalpine Botanical Garden, CAS; Sichuan School of Traditional Chinese Medicine; Emei Shan Biological Station of Sichuan Institute of Natural Resources; Japanese Institute for Research of Oriental Plant Culture; South China Botanical Garden, CAS; Key Laboratory of National Seedling Biological Engineering; School of Management of Fudan University; Conservation Division of the State Forestry Agency (SFA); China Wildlife Conservation Association, SFA; General Working Station for State Forest Farms and Forest S eedlings, SFA; the Harvard

University Herbaria; the Komarov Botanical Institute, Russian Academy of Sciences.

A List of Mount Emei Plant Names has been prepared based on a literature search and on specimens housed in the major herbaria of China. Major works consulted for the compilation of the *List* include *Flora Reipublicae Popularis Sinicae*, *Flora Sichuanica*, *Iconographia Cormophytorum Sinicorum*, *Illustration of Omei Shan Plants*, *Vegetation of Sichuan*, *Sylva Sinica*, *Annals of Emei Shan*, *Emei Medicinal Plants*, *Sichuan Rare and Endangered Plants*, *Acta Phytotaxonomica Sinica*, *Yunnan Botanical Research*, and *Chuan Yao Xiao Kan.*

This book contains 4 chapters: Chapter 1. Natural settings written by Wang Qi; Chapter 2. Endangered and Endemic Plants by Shi Lei and Wei Lai, with accounts on the bryophytes by Wu Peng-cheng, on pteridophytes by Zhang Xian-chun, and on seed plants by Li Zhen-yu, Wu Jia-lin and Xu Jie-mei; Chapter 3. Economic Plants by Zhuang Ping; Chapter 4. List of Higher Plants, Bryophyta, Hepaticae by Li Fen-xia and Wang Mei-zhi, Musci by Jia Yu; Pteridophyte by Zhang Xian-chun and Wang Li, and seed plants by Li Zhen-yu and Mikinori Ogisu, with the Orchidaceae by Lang Kai-yung and Acanthaceae by Deng Yun-fei. Two new combinations and two new varieties are published in the Appendix. The Chinese names and a Latin family index are placed at the end of book.

The book accounts for 3 703 species in 1 271 genera of 280 families of higher plants, including 402 species of bryophytes in 196 genera and 70 families, 430 species of pteridophytes in 105 genera and 45 families, and 2 871 species of seed plants in 970 genera and 165 families. There are also 454 photographs of plants of Mount Emei.

According to the *China National Key Protected Wild Plants Index* (first edition) jointly issued by the China National Forestry Agency and the China National Agricultural Department and the Convention on International Trade in Endangered Species (CITES), 158 species of plants in 77 genera and 21 families on Mount Emei have been recognized as endangered.

Mount Emei has 106 endemic plant species in 79 genera and 43 families, including 2 species of bryophytes in 2 genera and 2 families, 11 species of pteridophyte in 8 genera and 4 families, and 93 species of seed plants in 69 genera and 37 families.

The names of 569 species of plants are bases on collections from Mount Emei. These include 3 species of bryophytes in 3 genera and 3 families, 121 species of pteridophytes in 49 genera and 21 families, and 445 species of seed plants in 253 genera and 84 families.

In the course of compiling this book, we are greatly indebted to many experts and taxonomic workers for their talent and expertise and for the energy they expended in the identification of specimens. The publication of this book would be impossible without the assistance of our colleagues from PE, CDBI, SZ, EMA, ESR, IBSC and KUN. The hard work and long hours devoted by so many toward the production of this work are evident in Baitong Group and Beijing Science and Technology Press. To you all, we express our most profound thanks and admiration.

Li Zhen-yu Shi Lei
August 2007

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第一章 自然概况

第一节 自然地理背景

峨眉山位于中国四川省西南边缘向青藏高原的过渡地带，北距四川省省会成都约 160 km，东距历史文化名城乐山约 30 km，坐落于峨眉山市西南 7 km 处（图 1A–C）。峨眉山发脉于昆仑山的北岭，北岭分秦岭和岷山，岷山发邛崃，由邛崃蜿蜒而至峨眉突起金顶、千佛顶、万佛顶三峰，峻峭峥嵘，屹立于大渡河与青衣江之间，雄秀西南。峨眉山主峰为金顶，最高峰万佛顶海拔 3 099 m，相对高差近 2 600 m（图 1D），其风景区范围：东至黄湾乡唐河坝（东经 103°27′35″，北纬 29°33′4″），西至峨眉与洪雅交界处（东经 103°15′22″，北纬 29°30′53″），北至黄湾乡尖峰顶（东经 103°18′29″，北纬 29°36′59″），南至万公山（东经 103°19′12″，北纬 29°28′43″），景区总面积 154 km^2（凌作培，2005）。

峨眉山是著名的旅游胜地和四大佛教名山之一，以其秀丽的自然风光和神话般的佛教胜迹而闻名于世，是一个集自然风光与佛教文化为一体的中国国家级山岳型风景名胜区。峨眉山的生物、土壤和气候垂直带非常明显，佛教文化历史悠久而内涵丰厚，构成了其“雄、秀、神、奇”的特色，素有“植物王国”、“绿色宝库”、“药国仙山”、“地质博物馆”和“佛国仙山”之称，并有“峨眉天下秀”之赞誉（黎昌谷，1990；张立生，1998；陈文文，2003；张瑞文，2004；茹勇夫，2004）。1996 年 12 月 6 日峨眉山—乐山大佛被联合国教科文组织遗产委员会列入《世界自然与文化遗产名录》。

第二节 地质和地貌

地质学上峨眉山被称为“峨眉断块带”，是一座悬崖峭壁众多的背斜断块山，西部隶属峨眉—瓦山断块带。峨眉山主要的地质构造包括 3 大褶皱和 6 大断层：即峨眉山背斜、桂花场向斜和牛背山背斜以及峨眉山断层、观心庵断层、万年寺断层、初殿断层、牛背山断层和大峨寺断层（详见《峨眉山志》编撰委员会，1997；凌作培，2005；图 2）。峨眉山区地层出露较全，缺失志留系、泥盆系和石炭系，总厚度达 7 000 多米。其中，晚元古代—三叠纪中期主要为海相沉积，三叠纪晚期为海陆过渡相沉积，侏罗纪—古近纪早期为河湖相沉积，古近纪晚期至新近纪为冲积层、洪积层和冰川沉积等。该区地层保留了典型的沉积相标志和大量的古生物化石，为研究沉积相、复原古环境和进行全球生物地层学及生物地理学研究提供了重要的地史学资料。

峨眉山地区在晚元古代（距今 8.7～6.0 亿年）是一片汪洋大海，海底沉积了厚达 1 258 m 的碳酸盐岩（张立生，1998），即现在出露于洪椿坪至九老洞一带的白云岩，含藻类化石：*Emeishanella irregulare* 和 *Palacomicrocgstis aggregatus* 等。晋宁期末（距今 10～8.5 亿年）的地质构造运动——晋宁运动使峨眉山地区褶皱回返为一个低平的地台区，同时，大量的花岗岩岩浆侵入地壳，形成了峨眉山的基底岩系和背斜的核心部分，即今天出露于石笋沟、洪椿坪、牛心寺和张沟一带的峨眉山花岗岩。寒武纪时期（距今 5.4～4.9 亿年），峨眉山地区地壳缓慢沉降，但升降运动不明显，沉积了砂岩、页岩和碳酸盐为主的白云岩，出露于遇仙寺、九岗子和洗象池一带，构成峨眉山背斜的两翼，含丰富的化石：*Wutingaspis omeishanensis*，*Chittidilla transversa*，*Renalcis mimicusa* 和 *Eoplectonema* sp. 等。奥陶纪早期（距今 4.8～4.7 亿年），峨眉山地区受加里东运动的影响，地壳上升，首次成为陆地，残余地层主要为石英砂岩、泥岩、页岩、白云质灰岩和泥质粉砂岩等，构成峨眉山背斜的两翼，分布于阎王坡和大乘寺等地，含丰富的三叶虫化石：*Wanliangtingia transversa*，*Didymograptus omeishanensis* 和 *D. dachengsiensis* 等。此后，峨眉山地区处在长达近 2 亿年的剥蚀之中，导致在地层剖面中缺失了中奥陶世至石炭纪的地层，二叠纪地层不整合地覆盖在早奥陶世的地层之上。