

MACROMYCETES OF CHINA

by Mao Xiaolan

中国蕈菌

卯晓岚 著



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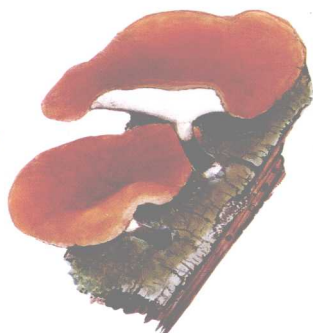
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谨将这本中国蕈菌科学绘画图著，敬献给我国
菌物学开拓者和奠基者

(按姓氏笔画排序)

王云章教授 (1906年10月12日生)

邓叔群教授 (1902年12月12日~1970年5月10日)

袁维蕃教授 (1912年5月15日~2000年9月18日)

戴芳澜教授 (1893年5月4日~1973年1月3日)



中国蕈菌

内容简介

这是一部中国蕈菌彩绘图著。系统记载了各类蕈菌 881 种，隶属 65 科，214 属，581 个图版，共计彩图 1041 余帖。绝大多数彩图是从 20 世纪 60 年代开始，在全国各地野外考察采集标本时绘制的。其中记述食用菌 485 种，药用真菌 321 种，毒菌（毒蘑菇）201 种，木材腐朽菌 161 种，树木外生菌根菌 330 种。另外，已驯化培养的食、药用菌 65 种，部分物种的经济用途有待研究。每个种除有彩色绘图外，还从形态特征、生态习性及分布地区等方面作了记述。在本图著前边对中国蕈菌物种资源、地理区系特点作了记述。还对各类蕈菌有关专业知识、科学术语等以图示或图解说明。书后附有物种中、英文名称和拉丁学名索引及参考文献。

本图著可供菌物学研究、教学，食用菌、药用真菌科技工作者，食品加工和商贸人员，卫生防疫和有关农林牧等科技工作者以及菌物爱好者参考。

Brief introduction This is a color illustration book of Macromycetes from China which covers 881 fungal species belonging to 214 genera of 65 families with more than 581 watercolors and 1041 illustrations. Among them 485 are edible mushrooms, 321 medicinal mushrooms, 201 poisonous mushrooms, 161 wood-rotting fungi, 330 ectomycorrhizal fungi and more than 65 cultivated mushrooms. Most of these watercolors were made in the field of fungal forays since 1960s. Morphology, ecology and distributions of each species are also provided in details. Fungal resources of China and their floristic characters, basic knowledge and terminology about fungi are mentioned or illustrated in the first part of the book. Indexes of Chinese, English and scientific names of fungi and references are attached at the end of the book. This lovely illustrations provides useful information of fungi from China to mycologists, managers, farmers, students and mushroom fans.





著者简介



卯晓岚 菌物学家，1939年生，籍贯甘肃陇南武都。1964年大学毕业后到中国科学院微生物研究所工作。长期从事大型真菌分类、物种资源、地理分布和生态区系等有关研究。曾五次承担国家自然科学基金项目，两次承担中国科学院重大支持课题以及参加真菌地衣开放实验室的有关研究工作。

1967年开始，进行野外考察研究，到全国31个省市区（包括香港、台湾）采集、收集标本。1977~1981年参加中国天山托木尔峰登山科考研究，1982~1986年又参加中国西藏南迦巴瓦峰登山科考研究。在多年全国考察研究的基础上，首次将全国蕈菌地理分布划分为七个区，将蕈菌的生态习性分为五种类型。在20世纪60年代调查毒菌及其中毒情况，将毒菌按中毒反应由原来的4种类型增加为6种类型。

发表论文及有关文章90多篇；撰写、编著图书41部（本）。其中自著、主编的有《西藏大型经济真菌》、《毒蘑菇识别》、《中国经济真菌》、《秦岭真菌》、《南迦巴瓦峰地区生物》、《中国大型真菌》、《真菌王国奇趣游》以及这部《中国蕈菌》等。合著的有《食用蘑菇》、《毒蘑菇》、《西藏真菌》、《香港蕈菌》、《中国药用真菌图鉴》、《中国菇类栽培》、《灵芝现代研究》、《神奇的雅鲁藏布江大峡谷》等。

1967年开始野外考察并绘制新鲜标本彩图，至今共计绘图约1500幅。1981年参加北京等地科学画展并获奖。1982年被中国植物学会推荐参加悉尼第十三届国际植物科学画展，这是我国蕈菌科学绘画首次在国外展出。1983年作为“中国植物科学画”在美国等地展出。2003年部分绘图应邀送香港中文大学展出。2004年又作为科学画插图在中国科技馆展出，并获“最高荣誉奖”。2005年350多幅蕈菌科学画在中国科技馆、江苏南通经济开发区作为“中国食用菌、药用菌及毒菌等经济真菌科学画展”分别展出。2007年应第五届国际菌根食用菌大会组委会之邀请，展出中国蕈菌科学绘画145帖，大会特发“突出贡献”奖牌。纪念中国食用菌协会成立20周年，授予对产业突出贡献者荣誉称号奖。

1984年《食用蘑菇》获中科院重大科技成果二等奖；1980年“天山托木尔峰登山科学考察”获中科院科技成果二等奖；1987年《西藏真菌》作为中国青藏高原科考系列图书获中科院科技进步特等奖、国家级成果一等奖；1990年《中国药用真菌图鉴》获中科院自然科学二等奖，1989年此书参加法兰克福国际书展；1995年《西藏大型经济真菌》获西藏自治区科技进步二等奖、中科院自然科学三等奖、'93北京优秀科技图书一等奖；1998年《神奇的雅鲁藏布江大峡谷》获“中宣部五个一工程奖”；2002年《中国大型真菌》获第13届“中国图书奖”。

个人多次获表彰和奖励，1977年天山托峰登山科考获“国家体委嘉奖”；1983年和1997年两次为中科院表彰的“野外工作先进个人”；1990年获“竺可桢野外工作者奖”（全国性奖）。2003年被评选为中国食用菌协会首届“十大新闻人物”。曾任中国菌物学会常务副理事长及秘书长，现任中国食用菌协会副会长、中国食文化研究会常务理事等职。

Brief The Author

Mao Xiaolan, mycologist and painter, was born in Wudu of Gansu Province, China in 1939. He worked as a scientist at the Institute of Microbiology in the Chinese Academy of Sciences (CAS) after graduating from university in 1964. At the CAS he worked on taxonomy, resources, ecology, geographical distributions and microflora of macro-fungi. In addition, he participated in five major research projects financially supported by the National Foundation of Natural Sciences of China, and was in charge of two important research projects supported by the CAS, as well as being involved with some of research programs of the Systematic Mycology and Lichenology Laboratory before retiring from the CAS in 1999.

Since 1967, Mao Xiaolan has made fungal field trips to 31 provinces (autonomous regions and municipalities) in China, including Hong Kong and Taiwan. He took part in the scientific expedition to Mt. Tuo-Mu-Er of Tianshan (1977-1981) and Mt. Namiagbarwa (1982-1986). As a result of his own investigations carried out during field trips over the many years, Mr. Mao has proposed that the geographical distribution of mushrooms should be divided into seven regions in China, and that mushrooms anywhere in the world could be divided into five ecological types. In addition, he has also proposed six types of poisonous reaction caused by toxic mushrooms, whereas only four were recognized previously.

Mr. Mao has published more than 90 scientific papers and articles, and wrote or edited 41 books. The following books were written or edited-in-chief by Mr. Mao: *Tibetan Economic Macrofungi*, *Identification of Poisonous Mushrooms*, *Chinese Economic Fungi*, *Fungi of Qin-Ling Mountains*, *Biology of Mt. Namiagbarwa Region*, *Macrofungi of China* and *Tour to the Interesting Fungal Kingdom*. The book *Macromycetes of China* will be published soon in 2009. Mr. Mao participated in compiling or editing the following books: *Edible Mushrooms*, *Poisonous Mushrooms*, *Tibetan Fungi*, *Mushroom[CI] of Hong Kong*, *Icons of Medicinal Fungi from China*, *Cultivation of Mushrooms in China*, *Modern Research on Ling Zhi* and *Mysterious Brahmaputra Grand Canyon*.

In the 1960's the lack of colored film for photography meant that Mr. Mao, who is good at botanical drawing, had no choice but to make color illustrations for his fungal collections in the field. Since 1967 he has produced approximately 1500 watercolors of fungi. His fungal watercolors have been shown at exhibitions of botanical drawings in China and overseas, and have received many awards since 1981. In 1982 some of Mr. Mao's fungal watercolors were nominated and shown at the Thirteenth Sydney International Exhibition of Botanical drawings, which was the first time Chinese fungal watercolors had been presented overseas. In 1983 The Exhibition of Chinese Botanical drawings was held in USA which also included his fungal watercolors. His colored illustrations were invited to be exhibited at the Chinese University of Hong Kong in 2003. In 2004 Mr. Mao received a Top Honorary Award when his colored fungal drawings were shown at the exhibition of national botanical drawings and illustrations of China held at the Chinese Scientific and Technological Museum in 2004. Also, 350 fungal watercolors were presented at the Exhibition of scientific drawings of Chinese edible, medicinal and poisonous fungi held at the Chinese Scientific and Technological Museum in October 2005 and the Nantong Economic Development Zone in November 2005 respectively.

The team members of the scientific expedition to Mt. Tuo-Mu-Er in the Tianshan Mountains and the book of *Edible Mushrooms* received the Second Class Merit of Significant Scientific Achievements from CAS in 1980 and 1984 respectively. The book *Tibetan Fungi*, which was one of a set of publications produced by the team of the Qingzang Plateau Scientific Expedition, won a National First Class Merit of Scientific Achievements and Science-Technology Progress Award from CAS in 1990. In the same year *Icons of Medicinal Fungi from China* obtained a Second Class Merit of Natural Sciences from CAS as well as being presented at the Frankfurt International Book Exhibition two years later. *Tibetan Economic Macrofungi* was given a Science-Technology Progress Award (Second Class) from the Tibetan Autonomous Region, and Third Class Merit of Natural Sciences from CAS as well as the first prize at the Beijing Excellent Science-Technology Publications fair in 1995. In 1998 *Mysterious Brahmaputra Grand Canyon* obtained the "Five-Ones Project Award" from the Propaganda (Publicity or Promotion) Office of Central Committee of the Communist Party of China. *Macrofungi of China* won the 13th Award of "Books of China" in 2002.

Mr. Mao has received many personal commendations and endorsements. He received a commendation from the National Physical Education Committee for his outstanding performance in his participation in the scientific expedition to Mt. Tuo-Mu-Er of Tianshan Mountains in 1977. He has twice won the Award of Outstanding Field Worker from CAS in 1983 and 1997 respectively, and the Zhu Ke Zheng Field Work Award in 1990. He was chosen as one of the "10 News-Stars" by the Edible Fungi Association of China.

Mr. Mao is a former Administrative Vice-President and Secretary-General of the Mycological Society of China and is Vice-President of the Edible Fungi Association of China and Executive Council Member of the Dietetic Culture Society of China.

千姿百态菌王国
 营养味鲜是食菌
 免疫功能新时尚
 药用医病最悠久
 扶正固本促健康
 毒素应用展前景
 误食毒菌需慎防
 腐生寄生和共生
 维持生态作用强
 科学考察走全国
 纪实彩绘撰篇章

卯晓岚书



Poetry of mushroom scientific drawing

China has vast territory and abundant resources, beautiful and expansion of grassland, widely distraction tree in forest, enrichment and boundless field, magnitude nature ecosystem, abundance of fungi species, dazzle the eyes with all the colors of rainbow, thousand of pose in mushroom kingdom, pleasing flavor and savory of mushroom, new fashionable of nutrition function, long history for the medicinal fungi, take mushroom cure disease and make

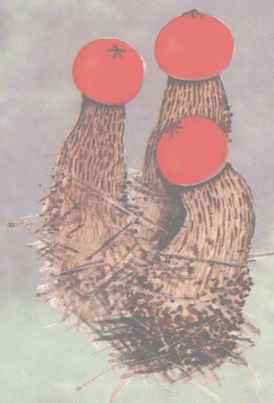


中国蕈菌科学绘画



华夏地大亦物博
草原丰美又辽阔
森林苍莽广分布
田野无限更肥沃
生态系统特庞大
菌物种类颇繁多
五彩缤纷色斗妍

people health, poison mushroom shown the good foreground care for prevent poisonous with mistaken poisonous mushroom, saprophyte, parasitical and symbiosis, strong effects in maintain the ecosystem, country-wide scientific expedition and investigation, record drawing make a canto.



致谢

江苏安惠生物科技有限公司长期坚持以科技为先导，以中医药理论为基础，以食、药用菌为天然原料，研究、创新、开发自主知识产权的健康食品。经过多年努力，安惠公司已成为食、药用菌行业率先发展的企业，并在国内外同行业中享有盛誉。公司董事长陈惠先生，注重企业文化建设，同时继承和发扬中国传统食、药用菌文化，于2004年在江苏南通经济技术开发区内创建世界第一座独具特色的中华灵芝文化馆，对弘扬和创新灵芝文化作出了新的贡献。

为进一步促进食、药用菌等物种资源的广泛研究和开发应用，推动健康食品产业的新发展，陈惠董事长积极策划，倾力支持编写这部《中国蕈菌》大型彩绘图着，就在国内外学者倡导科学与艺术并重、融合、统一发展的新时期出版了。作者谨表以诚恳地致谢。



Acknowledgements

Persisting in the idea “Technology is leading” and basing on theory of traditional Chinese medicine, Jiangsu Alphay Bio-Tech Co., Ltd dedicates to scientific research and development of health food which owned intellectual property rights by using edible & medicinal mushroom. After great efforts for many years, Alphay has become one of the leading enterprises and enjoys good reputation in edible & medicinal mushroom industry at home and abroad. In order to inherit and carry forward traditional edible & medicinal mushroom culture and enrich enterprise culture. In 2004, the first Ling Chih museum in the world was founded by Alphay’s President Mr. Hui Chen. He makes new contributions to advocation and innovation of Ling Zhi culture .

For the extensive researches, exploitation and application on the resource of edible& medicinal mushroom.,as well as for new development of health food industry, President Mr. Hui Chen planned and offered strong support for publication of “Macromycetes of China”. In the age of equal attention, fusion, and unified development should be paid to science and art which advocated by scholars from home and abroad, Macromycetes of China is published smoothly. I am grateful to president Mr. Hui Chen for publication of “Macromycetes of China”.



中华灵芝文化馆一角



祝

蕈菌科技发展
菌业兴旺吉祥



序一

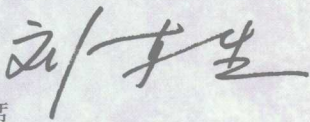
中国科学院从20世纪60年代开始，多次组织了有关大专院校参加的多学科综合考察，其中将真菌等生物种类资源及生态变化影响等都作为重要的考察研究内容之一。长时间来我国已在动物、植物、菌物物种多样性等研究方面取得了巨大的成果，为国土整治、经济区域划分、物种资源保护，提供了科学依据和奠定了基础。1997年我国已被列入全球生物多样性最丰富的12个国家和地区之一，其丰富度名列第八位。

回顾1977~1979年中国天山托木尔峰登山科考，1982~1984年中国西藏南迦巴瓦峰登山科考，我曾任科考队队长。那时卯晓岚还是科考队年轻的成员，他承担蕈菌即大型真菌（Macromycetes, Macrofungi）的考察研究任务，而且取得了很大收获。天山托峰科考他个人还获“国家体委嘉奖”。西藏南峰科考时，生物组还深入雅鲁藏布江大峡谷考察，探明其真菌物种多样性更丰富。他还鉴定、分类研究了珠穆朗玛峰自然保护区的大量标本。在此基础上收集资料，首次撰写出版了《西藏大型经济真菌》。多年野外考察成绩突出，被中科院两次评为“野外工作先进个人”，并获“竺可桢野外工作者奖”。

王云章教授和裘维蕃教授是我熟知的菌物学家，这两位已对我国真菌物种研究作出了重要贡献。他们当时就很关心和支持卯晓岚的野外考察研究工作，更赞赏其野外标本彩色绘图。于是自1967年卯晓岚考察采集首次绘画标本图开始，就将绘图作为一项野外考察工作任务。40年来他已经走过包括香港、台湾在内的31个省市、自治区，常常在艰苦环境条件下又要考察又要绘图，可见他每一张彩图都来之不易。功夫不负有心人，现在他将长期绘制的彩图精心整理，撰写出版的这部《中国蕈菌》专著，融汇了880多种约1041幅彩图，这在我国生物考察研究史上也是罕见的。

这部将要与读者见面的《中国蕈菌》，反应了我国蕈菌物种的多样性，对进一步研究物种、开发应用资源具有重要的参考价值。同时还展示了我国五颜六色、姿态各异、绘画逼真的蕈菌，具有观赏价值，令人大开眼界。我觉得这部彩绘蕈菌专著，诚然是科学与绘画艺术相结合的高品位著作，其科学内容和水平均不亚于国际同类图书。我为之喜悦，愿以序称赞。

中国科学院院士
中国探险学会主席
中国青藏高原研究会主席
2008年1月



Foreword-I

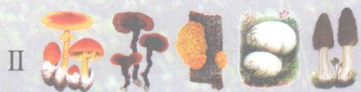
Chinese Academy of Sciences (CAS) has organized several multi-scientific expeditions since 1960s. Investigation of fungal resources and their ecological variations was always one of important projects. These expeditions have promoted research on diversity of plants, wildlife, fungi and made great achievements which has provided sound scientific data and foundation for land care, economic zone elimination and conservation of their resources. In 1997, China was placed on the list of the top twelve richest countries (regions) in biodiversity and takes the 8th place.

I was the team leader of expedition of the Mt. Tuo-Mu-Er of Tianshan Mountains in Xijiang, 1997-1999 and Mt. Namiagarwa in Tibet, 1982-1984. It was still young when Mao Xiaolan participated the expeditions but he made great achievements on investigation of macro-fungi though. He received a Commendation from the National Physical Education Committee for his contributions during the expedition of the Mt. Tuo-er-mu of Tianshan mountains. The biological group went down to the Brahmaputra Grand Canyon and discovered the fungal diversity was greater than expected in the expedition to Mt. Namiagarwa in Tibet. He also collected and identified a large number of fungal collections from the Mt. Zhumu-langma Natural Reserve. He wrote and published the book of 'Tibetan Economic Macro-Fungi' after years work in Tibet. He twice received Award for his outstanding performance in the field and the Zhu Ke Zhen- Field Work Award from the CAS for his outstanding field work.

Professor Wang Yunzhang, and Qiu Weifan, well-known mycologists in China encouraged and supported Mao Xiaolan's field work and greatly admired his colored illustrations of fungi made in field trips. Since Mr. Mao produced his first colored illustration of fungi in 1967 making colored illustrations of his fungal collections has become one of the standard tasks associated with field trips. Mr. Mao has traveled over 31 provinces(autonomous regions and municipalities), including Hong Kong and Taiwan in the last 40 years. His watercolors of fungi were often completed under field harsh conditions. "Macromycetes of China" is a fruit of his years hard work which includes 880 fungal species with 1041 colored illustrations. This beautiful book is an exceptional success in the Chinese history of biological expeditions.

"Macromycetes of China" reveals the fungal diversity in China and provides useful information for research and development of use these valuable fungi. The lifelike-watercolors of diversity of colorful fungi in this book not only provides fungal knowledge to the readers but also is an art pleasing to both your eyes and mind. This Illustrations represents an excellent example of combination of science with art which has international standard. I am so grateful for it to write the Forward to the book.

Liu Dongsheng
Academician, Chinese Academy of Sciences
President, China Exploration Society
President, China Society on Tibet Plateau
January, 2008



序二

蕈菌是大自然的一类真菌生物，物种多样，分布广泛，其中最常见的是菇类。我国古人食用、药用蕈菌历史悠久，大约在6000年前就采食蘑菇了。而今将蕈菌中无毒可食的称为食用菌，可药用的称之为药用真菌，还有比较多的可加工成保健食品，另有少数有毒的称作毒菌等。现在在卯晓岚先生的这部《中国蕈菌》专著中大多数种类都有记述，每种均有栩栩如生的手绘彩图展示。

蕈菌许多色彩亮丽，千姿百态，具有观赏价值。如灵芝等许多种类不仅可药用，同时具有丰富的文化内涵，于是历代文人雅士赋诗作画，赞不绝口。西方真菌学家也被众多蕈菌所吸引，自18世纪以来研究出版了许多科学画集，供人们进一步认识、观赏以至于鉴别食用菌和毒菌。

中医药是我们的国粹。药用真菌是中药的组成部分。千百年来大量的典籍中所记载的药用真菌久经考验而延用不衰。药用真菌目前也引起西方医药学界的关注。在这部蕈菌专著里，不仅包括了传统药用真菌茯苓、猪苓、冬虫夏草、蛹虫草、蝉花、银耳、马勃、木耳、灵芝等，还有现代研究开发的云芝、灰树花、金针菇、香菇、猴头菇、安络小皮伞、樟芝、桦褐孔菌、桑黄等具有新药效成分的种类。

在我最初研究灵芝药用时，就认识卯先生，他长期从事我国蕈菌研究，考察收集标本，同时野外绘制标本彩图。他已撰写出版了《食用蘑菇》、《中国经济真菌》、《香港蕈菌》和《中国大型真菌》等多部有影响的图著。但他仍对事业不断地追求和不懈地努力，现在又将40多年来爬山涉水、艰苦考察采集中绘制的蕈菌彩图，按真菌学分类系统挑选整理、撰文、编辑出版。融汇物种880余种，彩绘图近1130幅，这是他最新完成的又一部巨著。对我国蕈菌物种资源的研究开发、应用和保护，提供了重要的信息和依据。

这部以图文并茂为特点的图著，恰逢21世纪高科技年代出版，可谓顺应时代潮流的出版物，是中国蕈菌科学与绘画艺术相融合的图著，它并不逊色于国际同类出版物。我寄希望于这部凝聚着作者血汗和艰辛的专著，这是他对长期从事食药等蕈菌研究、开发应用以及爱好者的奉献。吾有感于此，便写其序。

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Foreword-II

Mushrooms are one kinds of fungi that consist of hundreds of different species and are widely distributed in the nature. China has a long history of using edible and medicinal mushrooms. Collection and consumption of mushrooms can be traced back to 6000 BC. Mushrooms can be used as foods, medicines or healthy foods. Poisonous mushrooms are not very many compared with edible ones.. “Macromycetes of China” written by Mr Mao Xiaolan is a colored illustrations of fungi which covers very many fungal species.

Many mushrooms are very colorful and have a great variety of forms. They are lovely living creatures. For example, many species of Ling-Zhi (*Ganoderma* spp.) are not only used as medicines but also a subject for paintings and poems that has formed unique “Ling-Zhi culture” in China. Mushrooms have also attracted western mycologists who have published many fungal illustrations for study and distinguish of edible and poisonous mushrooms.

Traditional Chinese Medicine is the quintessence of Chinese culture and medicinal mushrooms are a part of Chinese medicines. The medicinal mushrooms were recorded in many Chinese classical books hundreds year ago and are still used now. Recently, medicinal mushrooms have attracted attention of western medicinal world. Not only the traditional medicinal mushrooms, such as *Poria cocos*, *Grifola umbelleta*, *Cordyceps sinensis*, *Cordyceps militaris*, *Cordyceps sobolifera*, *Tremella fuciformis*, *Calvatia lilacina*, *Auricularia auricula* and *Ganoderma lucidum* are illustrated in this book but the book also includes *Coriolus versicolor*, *Grifola frondosa*, *Flammulina velutipes*, *Lentinula edodes*, *Hericium erinaceus*, *Marasmius androsaceus*, *Antrodia camphorata*, *Fuscoporia oblique* and *Phellinus igniarius* that are newly discovered containing new pharmaceutical components.

I knew Mr. Mao from the time when I started my medicinal research on Ling Zhi. He has studied on mushrooms for many years. He made colored illustrations of his mushrooms when he collected his specimens in the field. He has published many impressive fungal illustrations, such as “Edible Mushrooms”, “Economic Fungi of China”, “Hong Kong Mushrooms” and “Macro-fungi of China”. He did not stop his writing though. He, however, recently compiled his more than 1130 fungal watercolors made in the last 40 years to an illustrations of fungi of China which is going to be published soon. This book covers 880 species and is a great fungal book that provides useful fungal information for research and development of use of and protection of mushroom resources.

This book contains not only useful information of mushrooms but also magnificent watercolors of fungi. It is a timely publication for this high-tech 21st century. It is an amalgamation of scientific knowledge and brushwork art with international level. I express great appreciation to this book that is made from author’s many years painstaking efforts. It is with this perception that I wrote this preface.

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