中国科学院中国孢子植物志编辑委员会 编辑

中国海藻志

第二卷

红藻门

第一册 紫球藻目 红盾藻目 角毛藻目 红毛菜目

郑宝福 主编
李钧 副主编

科学出版社

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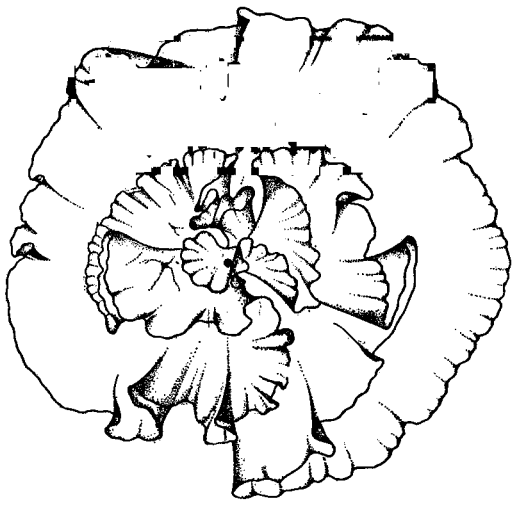
中国科学院知识创新工程重大项目
国家自然科学基金重大项目
（国家自然科学基金委员会　中国科学院　国家科学技术部　资助）



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FLORA ALGARUM MARINARUM SINICARUM

TOMUS Ⅱ RHODOPHYTA

NO. Ⅰ PORPHYRIDIALES ERYTHROPELTIDALES GONIOTRICHALES BANGIALES

REDACTOR PRINCIPALIS
Zheng Baofu
VICE-REDACTOR PRINCIPALIS
Li Jun

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内 容 简 介

本书记述了我国海产红藻门红藻纲红毛菜亚纲的四个目——紫球藻目、红盾藻目、角毛藻目和红毛菜目，共4科9属69种，其中有28种4变种6变型为我国发现的新的分类单位。目、科、属都有形态特征的描述。每个种都有拉丁文学名、同物异名、形态特征、习性、产地和分布等；并附有根据本国标本绘制的形态图74幅及国内外最新参考文献及索引；书末有种的外形图版13面。书中还包括新种的拉丁文描述及分门、纲、目、科、属、种的中名和学名检索表。

本书可供大专院校、科研机构及生产单位的生物学、植物学和藻类学工作者以及有关学科的科研、教学人员参考。

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序

中国孢子植物志是非维管束孢子植物志，分《中国海藻志》、《中国淡水藻志》、《中国真菌志》、《中国地衣志》及《中国苔藓志》五部分。中国孢子植物志是在系统生物学原理与方法的指导下对中国孢子植物进行考察、收集和分类的研究成果；是生物物种多样性研究的主要内容；是物种保护的重要依据，对人类活动与环境甚至全球变化都有不可分割的联系。

中国孢子植物志是我国孢子植物物种数量、形态特征、生理生化性状、地理分布及其与人类关系等方面的综合信息库；是我国生物资源开发利用、科学研究与教学的重要参考文献。

我国气候条件复杂，山河纵横，湖泊星布，海域辽阔，陆生和水生孢子植物资源极其丰富。中国孢子植物分类工作的发展和中国孢子植物志的陆续出版，必将为我国开发利用孢子植物资源和促进学科发展发挥积极作用。

随着科学技术的进步，我国孢子植物分类工作在广度和深度方面将有更大的发展，对于这部著作也将不断补充、修订和提高。

中国科学院中国孢子植物志编辑委员会

1984 年 10 月 · 北京

中国孢子植物志总序

中国孢子植物志是由《中国海藻志》、《中国淡水藻志》、《中国真菌志》、《中国地衣志》及《中国苔藓志》所组成。至于维管束孢子植物蕨类未被包括在中国孢子植物志之内，是因为它早先已被纳入《中国植物志》计划之内。为了将上述未被纳入《中国植物志》计划之内的藻类、真菌、地衣及苔藓植物纳入中国生物志计划之内，出席1972年中国科学院计划工作会议的孢子植物学工作者提出筹建“中国孢子植物志编辑委员会”的倡议。该倡议经中国科学院领导批准后，“中国孢子植物志编辑委员会”的筹建工作随之启动，并于1973年在广州召开的《中国植物志》、《中国动物志》和中国孢子植物志工作会议上正式成立。自那时起，中国孢子植物志一直在“中国孢子植物志编辑委员会”统一主持下编辑出版。

孢子植物在系统演化上虽然并非单一的自然类群，但是，这并不妨碍在全国统一组织和协调下进行孢子植物志的编写和出版。

随着科学技术的飞速发展，人们关于真菌的知识日益深入的今天，黏菌与卵菌已被从真菌界中分出，分别归隶于原生动物界和管毛生物界。但是，长期以来，由于它们一直被当作真菌由国内外真菌学家进行研究；而且，在“中国孢子植物志编辑委员会”成立时已将黏菌与卵菌纳入中国孢子植物志之一的《中国真菌志》计划之内并陆续出版，因此，沿用包括黏菌与卵菌在内的《中国真菌志》广义名称是必要的。

自“中国孢子植物志编辑委员会”于1973年成立以后，作为“三志”的组成部分，中国孢子植物志的编研工作由中国科学院资助；自1982年起，国家自然科学基金委员会参与部分资助；自1993年以来，作为国家自然科学基金委员会重大项目，在国家基金委资助下，中国科学院及科技部参与部分资助，中国孢子植物志的编辑出版工作不断取得重要进展。

中国孢子植物志是记述我国孢子植物物种的形态、解剖、生态、地理分布及其与人类关系等方面的大型系列著作，是我国孢子植物物种多样性的重要研究成果，是我国孢子植物资源的综合信息库，是我国生物资源开发利用、科学研究与教学的重要参考文献。

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中国科学院中国孢子植物志编辑委员会

主编　曾呈奎

2000年3月　北京

Preface to the Cryptogamic Flora of China

Cryptogamic Flora of China is composed of *Flora Algarum Marinarum Sinicarum*, *Flora Algarum Sinicarum Aquae Dulcis*, *Flora Fungorum Sinicorum*, *Flora Lichenum Sinicorum*, and *Flora Bryophytorum Sinicorum*, edited and published under the direction of the Editorial Committee of the Cryptogamic Flora of China, Chinese Academy of Sciences (CAS). It also serves as a comprehensive information bank of Chinese cryptogamic resources.

Cryptogams are not a single natural group from a phylogenetic point of view which, however, does not present an obstacle to the editing and publication of the Cryptogamic Flora of China by a coordinated, nationwide organization. The Cryptogamic Flora of China is restricted to non-vascular cryptogams including the bryophytes, algae, fungi, and lichens. The ferns, a group of vascular cryptogams, were earlier included in the plan of *Flora of China*, and are not taken into consideration here. In order to bring the above groups into the plan of Fauna and Flora of China, some leading scientists on cryptogams, who were attending a working meeting of CAS in Beijing in July 1972, proposed to establish the Editorial Committee of the Cryptogamic Flora of China. The proposal was approved later by the CAS. The committee was formally established in the working conference of Fauna and Flora of China, including cryptogams, held by CAS in Guangzhou in March 1973.

Although myxomycetes and oomycetes do not belong to the Kingdom of Fungi in modern treatments, they have long been studied by mycologists. *Flora Fungorum Sinicorum* volumes including myxomycetes and oomycetes have been published, retaining for *Flora Fungorum Sinicorum* the traditional meaning of the term fungi.

Since the establishment of the editorial committee in 1973, compilation of Cryptogamic Flora of China and related studies have been supported financially by the CAS. The National Natural Science Foundation of China has taken an important part of the financial support since 1982. Under the direction of the committee, progress has been made in compilation and study of Cryptogamic Flora of China by organizing and coordinating the main research institutions and universities all over the country. Since 1993, study and compilation of the Chinese fauna, flora, and cryptogamic flora have become one of the key state projects of the National Natural Science Foundation with the combined support of the CAS and the National Science and Technology Ministry.

Cryptogamic Flora of China derives its results from the investigations, collections, and classification of Chinese cryptogams by using theories and methods of systematic and evolutionary biology as its guide. It is the summary of study on species diversity of

cryptogams and provides important data for species protection. It is closely connected with human activities, environmental changes and even global changes. Cryptogamic Flora of China is a comprehensive information bank concerning morphology, anatomy, physiology, biochemistry, ecology, and phytogeographical distribution. It includes a series of special monographs for using the biological resources in China, for scientific research, and for teaching.

China has complicated weather conditions, with a crisscross network of mountains and rivers, lakes of all sizes, and an extensive sea area. China is rich in terrestrial and aquatic cryptogamic resources. The development of taxonomic studies of cryptogams and the publication of Cryptogamic Flora of China in concert will play an active role in exploration and utilization of the cryptogamic resources of China and in promoting the development of cryptogamic studies in China.

C.K. Tseng
Editor-in-Chief
The Editorial Committee of the Cryptogamic Flora of China
Chinese Academy of Sciences
March, 2000 in Beijing

《中国海藻志》序

中国有一个很长的海岸线，大陆沿岸 18 000 多公里，海岛沿岸 14 200 多公里和 300 万平方公里的蓝色国土，生长着三四千种海藻，包括蓝藻、红藻、褐藻及绿藻等大型底栖藻类和硅藻、甲藻、隐藻、黄藻、金藻等小型浮游藻类，分布在暖温带、亚热带和热带三个气候带，包括北太平洋植物区和印度西太平洋植物区两个区系地理区。中国的底栖海藻多为暖温带、亚热带和热带海洋植物种类，但也有少数冷温带及极少数的北极海洋植物种类。

中国底栖海藻有 1000 多种。最早由英国藻类学家 Dawson Turner（1809）在他的著名著作《墨角藻》（*Fuci*）一书里就发表了中国福建和浙江生长的 *Fucus tenax*，即现在的一种红藻——鹿角海萝，福建本地称之为赤菜 *Gloiopeltis tenax*（Turn.）Decaisne。Turner（1808）还发表了 Horner 在中国与朝鲜之间朝鲜海峡的海面采到的 *Fucus microceratium* Mert.，即 *Sargassum microceratium*（Mertens）C. Agardh，现在我们认为是海蒿子 *Sargassum confusum* C. Agardh 的一个同物异名。在 Dawson Turner 之后，外国科学家继续报道中国海藻的还有欧美的 C. Agardh（1820），C. Montagne（1842），J. Agardh（1848，1889），R.K. Greville（1849），G.V. Martens（1866），T. Debeaux（1875），B.S. Gepp（1904），A.D. Cotton（1915），A. Grunow（1915，1916），M.A. Howe（1924，1934），W.A. Setchell（1931a，1931b，1933，1935，1936），V.M. Grubb（1932）和日本的有贺宪三（1919），山田幸男（1925，1942，1950），冈村金太郎（1931，1936），野田光造（1966）。

最早采集海藻标本的中国植物学家是厦门大学的钟心煊教授。钟教授在哈佛大学学习时就对藻类很感兴趣，20 世纪 20 年代初期到厦门大学教书时，他继续到福建各地采集标本。在采集中，他除了注意他专长的高等植物之外，还采集了所遇到的藻类植物，包括海藻类和淡水藻类。但钟教授只是限于采集标本和把标本寄给国外的专家，特别是美国的 N. L. Gardnar 教授，他从来不从事研究工作。最早开展我国底栖海藻分类研究的是曾呈奎。他在 1930 年担任厦门大学植物系助教时就开始调查采集海藻，第一篇论文发表于 1933 年初。南京金陵大学焦启源于 1932 年夏天到厦门大学参加暑期海洋生物研究班，研究了厦门大学所收集的海藻标本，包括冈村金太郎定名的有贺宪三所采集的厦门标本，于 1933 年也发表了一篇厦门底栖海藻研究的论文，可惜的是他在这篇文章发表之后便不再继续海藻研究而进行植物生理学研究了。第三个采集和研究中国底栖海藻的中国人是李良庆教授。李教授 1933～1934 年间在青岛和烟台采集了当地的海藻标本，并把标本寄给曾呈奎，以后两人共同发表了“青岛和烟台海藻之研究”一文（1935）。此后，李教授继续他的淡水藻类的分类研究，但海藻的分类研究便停止了。因此，在 20 世纪 30 年代到 40 年代一直从事中国海藻分类的研究者只有曾呈奎一人。20 世纪 40 年代后期，曾呈奎从美国回到了在青岛的国立山东大学担任植物系教授兼系主任，有两个得力助手张峻甫和郑柏林，共同从事底栖海藻分类研究。20 世纪 50 年代，

张峻甫同曾呈奎一起到中国科学院海洋研究所（及其前身中国科学院水生生物研究所青岛海洋生物研究室）工作，继续进行海藻的分类研究。郑柏林则在山东大学及后来的山东海洋学院、青岛海洋大学（现名中国海洋大学）进行我国底栖海藻的分类研究。同期，朱浩然和周贞英教授也回国参加工作，朱浩然进行海洋蓝藻分类研究，周贞英进行红藻分类研究。50年代我国台湾还有两位海藻分类学者即江永棉和樊恭炬，这两位教授都是美国著名海藻分类学家George Papenfuss的学生。樊恭炬后来回到大陆工作。因此，在20世纪50年代进行中国底栖海藻分类研究的中国藻类学家除了曾呈奎以外，还有朱浩然、周贞英、张峻甫、郑柏林、江永棉、樊恭炬等6人，共7位专家。从50年代后期起，有更多的年轻人参加进了海藻分类研究中来，如周楠生、张德瑞、夏恩湛、夏邦美、王素娟、项思端、董美玲和郑宝福。60年代以后开始进行底栖海藻分类研究的还有陆保仁、华茂森、周锦华、李伟新、王树渤、陈灼华、王永川、潘国瑛、蒋福康、杭金欣、孙建章、刘剑华、栾日孝和郑怡等。我国前后从事大型底栖海藻分类研究的人员有30多人。

我国海洋浮游藻类及微藻类有2000多种。1932年倪达书在王家楫先生的指导下，开展了这项工作，当年发表了“厦门的海洋原生动物”一文，其中有20页是关于甲藻类的，当时甲藻是作为原生动物研究的。从1936年起倪达书单独发表了几篇关于海南岛甲藻的文章；新中国成立后，倪达书把工作转到了鱼病方面。金德祥从1935年开始进行浮游硅藻类的研究，两三年后正式发表论文，以后也进行底栖硅藻的分类研究。20世纪50年代朱树屏和郭玉洁参加浮游硅藻类分类研究，以后参加硅藻分类研究的还有程兆第、刘师成、林均民、高亚辉、钱树本和周汉秋。参加甲藻分类研究工作的还有王筱庆、陈国蔚、林永水、林金美等。参加浮游藻类分类研究工作的前后也有十几人。

中国孢子植物志的五个志中，《中国海藻志》的进展较慢。这是因为《中国海藻志》的编写不但开始的时间较晚而且最基本的标本采集工作也最为困难。要采集底栖海藻标本，必须到海边，不仅在潮间带而且在潮下带，一直到几十米深处才能采到所要的标本。采集浮游藻类标本，问题就更大了。在许多情况下，船只是必需的。如只采集海边的种类，利用小船则可，但要采集近海及远海的浮游植物就必须动用海洋调查船且只能作为海洋调查的一个部分，费用必然加大。

我国从20世纪50年代中期开展海洋调查，共进行全国海洋普查三到四次，还有几次海区性的调查。如近几年来的南沙群岛海洋调查迄今已有三次，每次都采集了大量的浮游海藻标本。大型底栖海藻的调查，北起鸭绿江口，南至海南岛，西沙群岛、南沙群岛沿海及其主要岛、礁都有我们采集人员的足迹。参加过海洋底栖和浮游藻类调查的工作人员有好几十人。近年来，浮游藻类已从微型的发展到超微型的微藻研究，如焦念志小组已开展了水深100米以下的种类研究，最近在我国东海黑潮暖流区发现了超微原核的原绿球藻 *Prochlorella*，十几年前在我国南海也有发现。单就中国科学院海洋研究所一个单位而言，四十几年来采到的标本就有18万多号，其中底栖海藻蜡叶标本12万多号，浮游藻类液浸标本6万多号。

微藻还是养殖鱼虾苗种的良好饵料。在20世纪50年代，张德瑞及其助手发表了扁藻的一个新变种——青岛大扁藻 *Platymonas helgolandica* var. *tsingtaoensis* Tseng et T. J. Chang，但由于研究微藻分类的确比较困难，同时其他工作也很紧张，所以微藻

的分类研究没有继续下来。20 世纪 80 年代后期，曾呈奎感到饵料微藻类的分类研究很重要，说服了陈椒芬进行这项工作，前后发表了两个新种——突起普林藻 *Prymnesium papillatum* Tseng et Chen（1986）和绿色巴夫藻 *Pavlova viridis* Tseng，Chen et Zhang（1992），但不久，这项工作又停了下来。海洋微藻是一个很重要的化学宝库，特别是其中含有不饱和脂肪酸、EPA、DHA 等。李荷芳和周汉秋发表了几种微藻的化学成分。我相信，随着海洋研究的深入，海洋微藻及饵料微藻类的分类工作必将再次提到日程上来。

早在 2000 年前，我们的祖先就有关于大型海藻经济价值的论述。在《本草纲目》和各沿海县的县志中记载了许多种经济海藻，如食用的紫菜、药用的鹧鸪菜、制胶用的石花菜、工业用的海萝等。近年来对微藻的研究也包括了饵料用的种类以及自然生长的种类，这些都是富含 EPA、DHA，鱼类吃了就产生“脑黄金”的种类，对人类非常有益。中国人研究海藻 70 多年了，发表了好几百篇分类研究论文。我们认为现在是将我们的研究成果集中起来形成《中国海藻志》的时候了。因此，我们提出中国孢子植物志的编写应包括《中国海藻志》。

在《中国海藻志》中，大型底栖海藻有四卷，包括第一卷蓝藻门、第二卷红藻门、第三卷褐藻门、第四卷绿藻门；浮游及底栖微藻三卷，包括第五卷硅藻门、第六卷甲藻门和第七卷隐藻门、黄藻门及金藻门等。我们根据种类的多少，每卷有若干册，每册记载大型海藻 100 种以上或微藻 200 种以上的种类。毫无疑问，每卷册出版以后仍将继续发现未报道过的种类。因此，一段时间以后还得作必要的修改和补充。

知识是不断地在扩大的，科学也是在不断地发展的。今天，我们的海洋微藻类，除了硅藻类和甲藻类材料比较丰富以外，其他的知道得还很少。由于海洋调查的范围在不断地扩展，调查方法也不断地改善，必然会加速超微型藻类的发现，大型海藻也会有新发现。我们关于海藻分类的知识也不断地在扩大。我们希望 10 年、20 年后，第二版《中国海藻志》会出现。

中国孢子植物志编辑委员会主编　曾呈奎

2000 年 3 月 1 日　青岛

Flora Algarum Marinarum Sinicarum

Preface

China has a long coastline of more than 18,000 kilometers, coastline of the islands of more than 14,200 kilometers and 3 million square kilometers of blue territory, in which are found 3 to 4 thousand species of macroscopic, benthic marine algae, including blue-green algae, red algae, brown algae and green algae, and microscopic planktonic algae including diatoms, dinoflagellate and other microalgae occurring in three climatic zones, warm temperate, subtropical and tropical zones, and two biogeographic regions, the Indo-west Pacific region and the Northwest Pacific region; there are very few cold temperate species and even arctic species.

There are more than 1000 species of benthic marine algae in China. One of the earliest reported species is *Fucus tenax* published by Dawson Turner in 1809, a red algal species, now known under the name *Gloiopeltis tenax* (Turn.) Decaisne, collected from Fujian and Zhejiang provinces. A year earlier, Turner reported *F. microceratium* Mert., collected from somewhere near the Korean Strait between China and Korea. This is now known as *Sargassum microceratium* (Mert.) C. Agardh, currently regarded by us as synonymous with *S. confusum* C. Agardh. After Turner, there are quite a few foreigners reporting marine algae from China, such as C. Agardh (1820)、C. Montagne (1842), J. Agardh (1848, 1889), R.K. Greville (1849), G.V. Martens (1866), T. Debeaux (1875), B.S. Gepp (1904), A.D. Cotton (1915), A. Grunow (1915, 1916), M.A. Howe (1924, 1934), W.A. Setchell (1931a, 1931b, 1933, 1935, 1936), V.M. Grubb (1932) and the Japanese K. Ariga (1919), Y. Yamada (1925, 1942, 1950), K. Okamura (1931, 1936) and M. Noda (1966). The first Chinese who collected algal specimens is Prof. H.S. Chung at Amoy (now Xiamen) University in the early 1920s. Prof. Chung, a plant taxonomist, while a student at Harvard University was already interested in algae, although he was a taxonomist of seed plants. As a botanical professor, he had to collect plants from Fujian province for his teaching work; he also collected various kinds of algae, both freshwater and marine. He was unable to determine the species of the algae and had to send the specimens abroad to Prof. N.L. Gardner of U.S. for determining the species names. The first Chinese who collected and studied the seaweeds is Prof. C.K. Tseng, a student of Prof. Chung. He started collecting seaweeds in 1930 when he served as an assistant in the Botany Department, Amoy (Xiamen) University. He published his first paper "Gloiopeltis and the Other Economic Seaweeds of Amoy" in 1933, the first paper on Chinese seaweeds by a Chinese, when he was a graduate student at Lingnan University, Guangzhou (Canton). The second Chinese studying Chinese sea-

weeds was Prof. C.Y. Chiao of Jinling University, Nanking. Chiao came to Amoy in the summer of 1932 and studied the algal specimens deposited at the herbarium of Amoy University, including specimens collected by the Japanese K. Ariga and identified by Okamura. He studied these specimens and published a paper, "The Marine Algae of Amoy", in late 1933. This was the second paper on Chinese seaweeds by a Chinese. Unfortunately Chiao did not continue his work on seaweeds and turned to become a plant physiologist. The third Chinese who was involved in studies on Chinese seaweeds was Prof. L.C. Li who collected seaweeds in Qingdao and Chefoo in 1933～1934 and cooperated with Tseng on an article "Some Marine Algae of Tsingtao and Chefoo, Shantung" (1935). Prof. Li continued his work on taxonomy of China freshwater algae, and gave up his study of Chinese seaweeds. Thus in the 1930s and 1940s, only a single Chinese, C.K. Tseng, consistantly stuck to the study of Chinese seaweeds. In the late 1940s, when C.K. Tseng returned to China and took up the professorship and chairmanship of the Botany Department at the National Shandong University in Qingdao, two assistants, Zhang Jun-fu and Zheng Bai-lin took up seaweed taxonomy as their research topic. In the 1950s, Zheng Bai-lin remained in Shandong University, now Qingdao Ocean University and Zhang Jun-fu moved to the Institute of Oceanology with C.K. Tseng. Since the early 1950s, both Zheng Bai-lin and Zhang Jun-fu continued their research work on seaweed taxonomy. Professor Chu (Zhu) Hao-ran, participated in the taxonomy of cyanophyta and Prof. R.C.Y. Chou (Zhou) kept on her work on Rhodophyta. Both returned from the U.S. to China. There are two phycologists from Taiwan, Chiang Young Meng and Fan Kang Chu, both students of the American phycologist, George Papenfuss. Later, Fan Kang Chu returned to the mainland. There are, therefore, seven phycologists in the early 1950s working on taxonomy of seaweeds. In the late 1950s there are a few more workers on marine phycology, such as N.S. Zhou, D.R. Zhang, E.Z. Xia, B.M. Xia, S.J. Wang, S.D. Xiang, M.L. Dong and B.F. Zheng who eventually turned to taxonomic research. In and after the 1960s, a few more phycological workers are involved in taxonomic studies of seaweeds such as B.R. Lu, M.S. Hua, J.H. Zhou, W.X. Li, S.B. Wang, Z.H. Chen, Y.C. Wang, G.Y. Pan, F.K. Jiang, J.X. Hang, J.Z. Sun, J.H. Liu, R.X. Luan, L.P. Ding and Y. Zheng. Dr. Su-fang Huang is also active in phycological work in Taiwan. There are altogether more than thirty persons involved in the collecting and research on Chinese benthic marine algae.

There are more than 2 thousand species of planktonic marine algae in China. It was started by Professor Wang Chia-Chi, the famous Chinese Protozoologist and his student Prof. Ni Da-Su; they studied the marine protozoas of Amoy and published in 1932 a paper, including many species of dinoflagellates which they treated as protozoas. Prof. Ni Da-Su published a series of papers on Hainan dinoflagellates beginning with 1936. Taxonomic studies of the diatoms was initiated by Professor T.S. Chin (Jin) who started the research in 1935 and published his first paper in 1936. In the 1950s, Prof. S.P. Chu

(Zhu) and his student, Y.C. Guo started their research on diatoms. In the sixties and afterwards, participating in the collecting and research on diatoms are Z.D. Zheng, Y.H. Gao, J.M. Lin, S.C. Liu, S.B. Qian and H.Q. Zhou, and on dinophyceous algae are G.W. Chen, Y.S. Lin, J.M. Lin and X.Q. Wang. Altogether, there are more than 10 persons involved in research on the taxonomy of planktonic algae.

In the five floras of the Cryptogamic Flora of China, the *Marine Algal Flora* was initiated the latest, and progress the slowest, because collecting of the algal specimens involves lots of difficulties. Collections of benthic seaweeds will have to wait until low tides when the rocks on which the seaweeds attach are exposed or by diving to a depth of 5～10 meters for these seaweeds. For planktonic algae, one needs a boat and the necessary equipment for the coastal collection and for collecting planktonic algae in far seas and oceans, one has to employ ocean going expeditional ships. The cost is enormous.

China has initiated oceanographic research on the China seas in the late 1950s and early 1960s, which provide opportunity for phytoplankton workers to obtain samples from the various seas of China. Collection of benthic seaweeds extended from Dalian, Chefoo and Qingdao in the Yellow Sea in the north to Jiangsu, Zhejiang and Fujian coastal cities in the East China Sea and Guangdong, Gongxi, Hainan provinces, including Xisha (Paracel) Islands and Nansha (Spratley) Islands in the South China Sea in the south. For the last fifty years, the staff members of the Institute of Oceanology, CAS, collected more than one hundred twenty thousand numbers of dry specimens, and sixty thousand number of preserved specimens.

From more than 2000 years ago to recent time China has already quite a few records of seaweeds and their economic values in herbals and district records, for instance, the purple laver or Zicai (*Porphyra*) for food, Zhegucai (*Caloglossa*) as an anthelmintic drug, Shihuacai (*Geldium*) for making agar, Hailuo (*Gloiopeltis*) for industrial uses etc. In recent years, microalgae are found to contain good quantities of valuable substances, such as EPA, DHA. For the last seventy something years, Chinese phycologists have been devoted to study their own algae and have published hundreds of scientific papers on algal taxonomy dealing with the Chinese marine algae. We believe now is the time for them to publish *Marine Algal Flora*. Therefore when we have decided to publish Cryptogamic Flora of China, we insist that we should include our *Marine Algal Flora*. We have decided to publish the *Marine Algal Flora* in 7 volumes, 4 volumes on benthic macroscopic marine algae, or seaweeds, and 3 volumes on microscopic planktonic marine algae, namely, Vol. 1. Cyanophyta, Vol. 2. Rhodphyta, Vol. 3. Phaeophyta, Vol. 4. Chlorophyta, Vol. 5. Baccilariophyta, Vol. 6. Dinophyta and Vol. 7. Cryptophyta, Xanthophyta, Chryeophyta and other microalgae. On the basis of the number of species in the group, the volumes may be divided into a few numbers, when necessary and each number will deal with about 100 or more macroscopic species and 200 or more microscopic species. There is no question that after the publication of a group, more

species will be reported in the group.

Knowledge is always in the course of increasing and science also in the course of growing. Today, our study on microalgae is very limited, with the exception of the diatoms and to a less extent, the dinoflagellates. With the increase of microalgae investigations, and the improvement of the collecting methods, discovery of more microalgae, especially the piccoplanktonic algae, such as *Prochlorella* discovered by Jiao Nian-zhi in China, will be made. New benthic seaweeds will also be reported. Our knowledge of the taxonomy of marine algae will keep on increasing. We hope in the next 10 or 20 years, the second edition of *Flora Algarum Marinarum Sinicarum* will appear.

C.K. Tseng in Qingdao
March 1, 2000