

吴征镒院士生平



吴征镒出生于官宦人家，1916年6月13日生于江西九江。祖父为恩科传胪，官至浔阳道台。父亲吴启贤任过北洋政府农商部主事和江苏省议员。他8岁入家塾，13岁考入江都县中，15岁考入江苏省立扬州中学，1933年（17岁）考入清华大学。他在清华受到了良好的“通才教育”，得名师朱自清、叶公超、陈桢、萨本栋、高崇熙等教授指导；转入专修植物学后，又得李继侗、吴韞珍先生指导，基础和学业大进。1937年7月毕业后留任生物系助教。

“七七事变”后，抗战爆发，华北危局频现；吴征镒参加步行团从长沙西迁到昆明，三校举西南联大旗帜，在昆明开始了八年抗战的蹉跎岁月。国事维艰，在从大西北，沿长江西上华中，经湘、黔至滇一路的植物感受，吴征镒心中萌发了要弄清楚植物时空发展和中国植物区系演变规律的梦想，立下终生志向：立足云南，放眼中国和世界植物的宏图大愿。1938年10~12月，在李继侗先生带领下，赴滇西瑞丽考察，首次目睹了热带、亚热带植物及群落的丰富多彩，写下《瑞丽地区植被的初步研究（附植物采集名录）》，这是他的第一篇论文。1940年6月，考取北大生物系张景钺主任的研究生。1942年在恩师吴韞珍先生病逝后，他毅然放弃研究生学业，承担其植物分类学教学任务，并着手整理吴韞珍先生从奥地利学者韩马迪（H. Handel-Mazzetti）处手抄的《中国植物名录》以及秦仁昌先生从英国皇家植物园、奥地利维也纳自然博物馆和瑞典乌普萨拉标本室拍摄的模式标本照片，补充文献、记录小环境和地理考察记载，意在汇编“中国植物名汇”，此事持续十载，制作卡片三万余张。借此，吴征镒熟记中国植物名称、生境、在群落中的位置及采集家等，多达到了如指掌的地步。这批卡片后来成为编纂《中国高等植物图鉴》和《中国植物志》的重要参考。此间，吴征镒还受中国医药研究所委托，整理明兰茂《滇南本草》，与经利彬、匡可任、蔡德惠先生合作编著完成《滇南本草图谱》第一集。该书为中国植物现代考据学的滥觞之作。

1949年北平和平解放，2月成立中国科学院植物分类研究所，吴征镒任副所长、研究员。1950~1956年间，吴征镒参加或领导了全国各大区资源综合考察，包括橡胶宜林地考察、中苏热带生物资源考察、华南林业考察及华南热带生物资源考察、华东农业考察等，足迹遍及粤、桂、黔、滇等地区，对中国植物区系、大农业、生态环境保护和合理利用资源等问题认识上有提升，并形成一些新的思路。“橡胶在北纬18~24°大面积种植技术”获国家发明一等奖（1982），吴征镒为获奖者之一。

1958年，年逾不惑的吴征镒，毅然呈报院领导请调云南昆明，得到院领导首肯，举家迁往昆明，出任昆明植物研究所所长，这是吴征镒一生中的最大转折点。到了云南，吴征镒潜心研究，终了其夙愿。

吴征镒认为研究资源和植被研究必须首先过区系关。他从《云南植物名录》1958（油印本）起步，主持编纂《云南植物志》，承担《中国植物志》一些大科的编研。1977年《中国植物志》唇形科（第六十五卷二分册、六十六卷）出版，1984年，《云南种子植物名录》出版。吴征镒在1959年

任《中国植物志》编委,1973年任副主编,1987年任主编,在主编任上,《中国植物志》共出版82卷册,约占全志的2/3。至2004年,《中国植物志》82卷126册全部出版。1988年起吴征镒不顾年高,担任中美合作编著的《中国植物志》英文修订版(即《Flora of China》)主编,对每卷均写出详细的审查意见。预计2013年《Flora of China》全部出版,这是中国植物学走向世界的坚实一步。《中国植物志》获2009年度国家自然科学一等奖。

《云南植物志》从1973年起步,至2006年全部出版,历时34年,共21卷(增索引一卷),是我国体量最大的地区植物志,吴征镒一直为该志主编。《云南植物志》获2010年度云南省自然科学特等奖。其间,吴征镒还主编了《西藏植物志》(五卷),并于1987年全部出版。至此他担任主编的《中国植物志》、《中国植被》、《西藏植物志》和《云南植物志》四部巨著终告完成,《Flora of China》的种子植物部分也已完成。这些专著为开展我国生物多样性、保护生物学、恢复生态学、植物资源开发利用以及系统与进化植物学等领域的研究奠定了坚实基础,在国际植物分类学等研究领域产生了巨大影响。

根据《邱园索引》(2005)检索结果,吴征镒在70余年的植物分类研究中,定名和参与定名的植物分类群有1766个(涵盖94科334属,其中新属22个),是中国植物学家发现和命名种子植物最多的一位。以他为代表的三代中国植物分类学家改变了中国植物主要由国外学者命名的历史。

1964年,在北京召开的亚洲科学讨论会上,吴征镒宣读了“中国植物区系的热带亲缘”一文,提出了我国植物区系地理及起源的新创见。

“文化大革命”初期吴征镒受到冲击,在“劳动改造”之中,利用闲暇时间查看各地中草药手册,订正中草药植物名称,做了四大本笔记,后来这些笔记成为《新华本草纲要》的底本。《新华本草纲要》(三卷)1993年获中国科学院自然科学二等奖。

1975~1976年,吴征镒两次进藏考察,从滇入藏,过三江峡谷,南至亚东、樟木,经青藏路返回,从而对西藏高原全貌有了实际感触。西藏归来,吴征镒到青岛疗养,期间他作了西藏植物名录,着手编纂《西藏植物志》,动作迅速,成效显著。在1980年5月的北京青藏高原科学讨论会上,吴征镒以“西藏植物区系的起源及其演化”为题作了发言,阐述了西藏植物区系的性质和特征。1986年,“青藏高原隆起及其对自然环境与人类活动影响的综合研究”项目获中国科学院科技进步奖特等奖,1988年获国家自然科学一等奖,吴征镒为获奖人之一。

自80年代中至90年代,吴征镒有机会对国内外植物区系进行更加广泛的考察。在国内,吴征镒再进东北、内蒙,上大兴安岭、长白山和千山,加深了对北方植物区系的感性认识。接着是二次入疆,实睹戈壁荒漠及早生草甸、草原植被、春雨和夏雨短命植物和原生苹果属自然林,直观天山、阿尔泰山云杉植被和其它林带分布。稍后又对华中的梵净山、张家界、天平山、神农架,华西的灌县卧龙、九寨沟、黄龙寺等地,乃至东南的武夷山、天目山、千岛湖等,直至宝岛台湾,从台北、台中到台南直至最南端海岸(1998),从而完成了国内的植物考察工作。再入粤海,总结热带人工群落的工作,对我国的植被类型和植物区系,特别从热带、亚热带到温带的植物区系分布的替代性和过渡性有了更为直接的感性认识。加上70年代两次进藏的考察和对中南半岛诸国的考察,对青藏高原的各种垂直植被带分布以及喜马拉雅与横断山脉的联系与区别,还有对中国南部热带季雨林与中南半岛的热带雨林的联系和分异等问题有比以往更为清晰的认识。

对国外的考察,从“小球推动大球”的美国代表团访华开始,1979~1996年间,吴征镒有机会到了除非洲大陆以外的各大洲诸国并不只一次的考察、访问或交流讲学。在与世界各国科学家的交流中,特别是召开的第十三次(澳大利亚悉尼)、十四次(西德柏林)、十五次(日本横滨)世界植物学大会,扩充了吴征镒的学识眼界,也让各国科学家对我国植物学研究有所了解。特别是澳洲之行,北达布里斯班,既见到了澳洲本土区系的特殊性,也巩固了亚-澳之间的联系印象。

1980年以后,与各国植物学家的交往有新的发展,吴征镒先后被选为美国植物学会外籍终身会员,瑞典皇家植物地理学会名誉会员,世界自然保护联盟(IUCN)理事,以及前苏联植物学会通讯会员。耄耋之年的吴征镒始渐脱烦劳事务,静心著书立说,并随读随写,与弟子协力系统完成了《中国被子植物科属综论》(2003)、《中国植物志(总论)》(2004)、《种子植物分布区类型及其起源与演化》(2006)、《中国种子植物区系地理》(2010)四本专著。

吴征镒从对国内外的实际考察而有感性认识,从感性认识又上升理性探索与思考,在各方面积累的基础上,对中国的植物区系的分布特点、起源、演化以及在世界植物区系大背景下的地位和意义有了一个比较完整的认识。在种子植物系统发育中,主要通过多年的植物分类学和植物区系学知识的积累,深入认识到时至今日,首先应掌握这样一个真理:生物的系统发育深受地球发生、发展的制约,地球演化的规律又深受天体演化规律的制约。认识到生命系统从一开始就形成绿色植物、动物和广义的微生物三者同源而又三位一体的生态系统,其中绿色植物一直占据第一生产者的地位发展至今。它们的演化并非单系、单期、单域方式发生和沿着上升而逐渐扩大的螺旋曲线演化,而是从一开始就多系、多期、多域地发生,并有节律地历经多次渐变和突变矛盾的解决,在地球的历次大事件、大变动中通过多次大爆发,愈喷发而愈大愈复杂的爆发式前进。进化的动力是地球上各类生物自身运动(遗传与环境是主要矛盾),由持续的矛盾的解决而不断爆发式上升,因而创立了三维节律演化和被子植物多系、多期、多域发生的理论。

在世界植物区系的大背景下,吴征镒具体分析了我国350多科、3100多属、3万多种种子植物,发展了系统演化与区系地理分化相结合、种系发育与区系发生、发展相结合的系统分析方法,由科及属(部分到种)分析,从而提出被子植物起源于两亿年以前(侏罗纪),太平洋作为泛古大洋从当时泛古大陆中在北半球东北部的一个海沟,经过海底扩张而演变为现今的太平洋,其后才有古地中海和印度洋的出现,最后才是大西洋的完全形成和现今地中海的形成等观点。这一理论有其地质、地史根据,而且是和绿色高等植物,以及与其协同进化的昆虫、鸟兽的生物地理分布规律相符的。澳大利亚、印度板块和非洲大陆各在南太平洋、印度洋中徘徊,分别形成的古南大陆和古北大陆之间的最近两次分合,而形成与被子植物发生、发展密切相关的两次泛古大陆。海陆的不同组合和以后在旧世界兴起的基本东西向的阿尔卑斯山、喜马拉雅山造山运动,和新世界的基本南北向的落基山、安第斯山造山运动,都分别影响了白垩-老第三纪以来第二次大爆发后高等植物各类群分布区的形成。

吴征镒在世界植物科属和区系地理的分异背景上所掌握的中国植物科属和区系地理的分异,构成了对种子植物系统发育、世界科属区系的发生,和近代西方有关学者所拟的图景有了许多基本不同,更加明确了上述演化方式和种属、区系的发生发展方式,初步创立了有关这些方面东方人的认识系统。

在1993年世界植物园协会以及大阪五人(中、英、美、日首席学者)座谈会上提出“人类生态、植物资源和近代农业”问题。吴征镒强调:人在利用自然生态系统中的各种措施的双刃性问题,

即人既可以成为最高级的生产者,也可以成为最大的破坏者。从而提出:人类利用植物资源的历史发展过程问题,以及近代农业不但要有微观上利用和改造植物遗传特性的一面,还要有在热带至温带以多层多种经营为核心的生态农业工程。认识到这些对立统一观点,在保护生物学和生物资源合理开发利用与有效保护工作中的根本思路和发展过程,或是吴征镒获得国际“Cosmos”奖的重要依据之一。他抓住了这一主要矛盾,即自然保护事业与当地的农业现代化发展过程密切结合,否则很难达到“有效”,因为人愈多,地愈少,必然对山林和湿地自然生态系统继续破坏,甚至掠夺。从这一当代迫切任务才引发吴征镒于1999年提出建立“野生生物种质资源库”的设想和建议。从1958年建议成立自然保护区到野生生物种质资源库的实施,是解决“人类生态、植物资源和近代农业”问题的必要措施。

几十年来,吴征镒培养了众多优秀的助手和研究生。近年来与诸弟子协作,除前述4本专著外,还完成了《论木兰植物门的一级分类——一个被子植物八纲的新方案》(1998)、《被子植物的一个“多系-多期-多域”新分类系统总览》(2002)、《世界种子植物科的分布区类型系统》(2003)、《中国植物区系中的特有性及其起源分化》(2005)等重要论文,代表他领导的科研集体自主创新性科学研究成果。

吴征镒认为这些成果要让后人在具体实践和认识中来不断完善并加以评议,才可以充分肯定或否定,体现了一个伟大学者应有的襟怀。

他先后获国家级一、二等奖7项(其中国家自然科学一等奖2项,国家发明一等奖1项),院省级一、二等奖8项。1995年获何梁何利基金会“科学与技术进步奖”,1996年获求是基金会“杰出科技成就团体奖”,1999年荣获日本花卉绿地博览会纪念协会“考斯莫斯国际奖”,2001年荣获云南省科学技术突出贡献奖,2003年荣获何梁何利基金会“科学与技术成就奖”,2007年获国家最高科学技术奖。

吴征镒信奉的人生格言是:博学之,审问之,慎思之,明辩之,笃行之。这是他母亲家的堂名“五之堂”的由来,源自《大学》中的一句儒家的话。他认为做科学研究必须经历三个境界:一是立志立题,确立科研思路;二是殚精竭虑,百折不挠;三是上下求索,终有所得。吴征镒正是在个人的志趣和社会发展的需要相结合中走完自己的人生道路。他一生热爱党,热爱祖国,热爱科学事业。他扎根边疆,淡泊名利,治学严谨,学识渊博,远见卓识,为我国植物科学事业鞠躬尽瘁,死而后已。

2013年6月20日凌晨1点31分,吴征镒因病医治无效,在昆明逝世。他曾用“出生于九江,长大于扬州,成人于北京,立业于昆明”来概括自己的一生。他的逝世,使我国科学界失去一位大师,植物学界失去一位巨擘。我们将化悲痛为力量,以吴征镒先生为榜样,继续完成其未竟的植物研究事业。

吴征镒先生永垂不朽!

吴征镒先生精神永存!

中国科学院昆明植物研究所
(吕春朝,彭华,李德铎)

2013年6月20日

In Memory of Wu Zheng-Yi (Wu Cheng-Yih) (1916–2013)

Wu Zheng-Yi (吴征镒 or Wu Cheng-Yih in Wade-Giles) passed away on June 20, 2013 in Kunming, Yunnan Province following an illness. He was Academician of the Chinese Academy of Sciences (CAS), Professor and Director Emeritus of CAS Kunming Institute of Botany (KIB).

Prof. Wu was born in Jiujiang, Jiangxi Province on June 13, 1916. He grew up in Yangzhou, Jiangsu Province and received his BA in Biology from Tsinghua University in Beijing (now Beijing) in 1937.

As a leading and world-famous botanist of China, Prof. Wu was most prestigious for his study in plant taxonomy, floristic geography and biodiversity conservation. Through the course of his scientific career, which spanned over 70 years, he made outstanding contributions in transplanting botany into China and internationalizing Chinese botany in the botanical domain of the world. With tremendous fundamental work, he clarified much of the taxonomic confusion of Chinese seed plants as well as their distribution. He also did remarkable work on the effective conservation of plant diversity and sustainable utilization of plant resources in China and other areas of eastern and southeastern Asia.

Plant taxonomy is fundamental for botanical study because correct identification and naming is necessary prior to any further research. Though Chinese people have had a long history of utilizing plants, modern taxonomic study was not introduced to China until the publication of *Botany* by Li Shan-Lan and A. Williamson in 1858, a work translated from the *Elements of Botany* written by J. Lindley. As China was driven into a series of wars after the middle of the 19th century, many species in China were collected and named by Westerners during that time, with their type specimens being preserved in many foreign herbaria. Prof. Wu succeeded in the entrance examination for graduate study in Peking University under the supervision of the Director Zhang Jing-Yue (张景钺) in June 1940. However, after the death of his teacher Wu Yun-Zhen (吴韞珍 Wu Wen-Chen) Wu decided to give up his graduate study and started to sort and classify the catalog of Chinese plant species hand-copied by Wu Yun-Zhen (Wu Wen-Chen) from H. Handel-Mazzetti and photographs of type specimens taken by Qin Ren-Chang (秦仁昌 ChingRen-Chang) from several European herbaria. He made a card for each species to which he added extra information of literature, habitat and distribution. Wu kept on doing this work for more than ten years and accumulated more than 30 000 cards. These cards, which are now stored in the library of Herbarium of Kunming Institute of Botany (KUN), played a useful part in the compilation and publication of *Flora Reipublicae Popularis Sinicae* (FRPS), *Iconographia Cormophytorum Sinicorum*, and more. The process of making the cards also made Wu more familiar with plant collectors and researchers, as well as the distribution and ecological niches of each species. Such work laid an important foundation for his future study on phytogeography.

Without a complete record of the national flora of China, nobody knew how many species there were in the country. As early as the 1930s, Chinese botanists (particularly Hu Xian-Su 胡先骕, better known as H. H. Hu) had been preparing and working hard for the compilation of a national flora, but it was impossible to carry out under the unstable situation at that time. It was not until the founding of the People's Republic of China that the compilation of FRPS was again considered, and the project was eventually initiated in 1958. Wu became the fourth editor-in-chief of the Editorial Committee of FRPS in 1987, and 82 books of 54 volumes

were published under his editorship. With the collaboration of 312 botanists in three generations and 164 artists who made 9081 line illustrations, the *magnum opus*, containing 126 books of 80 volumes in total, was finally completed in 2004 and recorded 31 180 species from China, making it the largest flora in the world. The work established a 'residence booklet' for every plant species in China, including their scientific names, morphological characters, distribution, uses and, so on, and thus greatly contributed to the conservation of biodiversity and the sustainable use of plant resources in our country. It won the first prize of the 2009 National Natural Science Award of China, which had been vacant for years. During the compilation of FRPS, Wu also chief-edited another two great works: *Flora Yunnanica* and *Flora Xizangica*. The former is the largest provincial flora and won the grand prize of the 2010 Yunnan Provincial Science and Technology Award.

Because the FRPS was written in Chinese, and was not readily accessible to the non-Chinese speaking countries, an English updated version of the FRPS, *Flora of China* (FOC), was needed. It was in 1988 that the FOC project was officially commenced, with Wu and Peter H. Raven being the co-chairs of the joint editorial committee. This project provided precious opportunities for collaboration among Chinese and non-Chinese botanists and was an important step for introducing the Chinese flora to the world. By today, 22 of the 25 volumes (except vols. 1-3) have been published.

The origin and evolutionary history of flowering plants have long been ambiguous and controversial, and no classification system could provide fully satisfying answers to the questions so far. Many taxonomists have proposed their own classification systems with several of them dominating in various periods, such as the systems of Engler and Prantl, Hutchinson, Takhtajan, Cronquist, etc. Although none of them can fully reflect the evolutionary history of plants, some have proven to be reasonable and useful to a certain degree. In 1998, Prof. Wu and his students and colleagues proposed a new classification system of angiosperms, the "polyphyletic-polychronic-polytopic" system (i. e., the eight-class system). Unlike other classification systems that were based only on morphological similarity between groups or evidence from cladistic analysis of molecular data, the eight-class system was derived from morphological and molecular data with special reference to data of modern geographical distributions. In this new system, the Magnoliophyta were divided into 8 classes, 40 subclasses, 202 orders and 572 families. Among them, 22 new subclasses (Annonidae, Illiciidae, Ceratophyllidae, Lauridae, Calycanthidae, Chloranthidae, Aristolochiidae, Polygonidae, Plumbaginidae, Bromeliidae, Zingiberidae, Juncidae, Poaidae, Paeoniidae, Papaveridae, Trochodendridae, Betulidae, Malvidae, Ericaceae, Myrtidae, Rutidae, and Geraniidae) and 6 new orders (Degeneriales, Aizoales, Platanales, Dipentodontales, Meliosmales, and Balanitales) were circumscribed. As the majority of early angiosperms were extinct, the system gave a general scheme of classification of eight lineages of angiosperms, which provided another practical and effective way for understanding modern plants.

Wu was also prestigious for his study in phytogeography. Being familiar with the composition, characteristics, floristic divisions and affinities of the flora of China, he developed a set of analytic approaches in phytogeography that had been widely used in China and elsewhere. From the 1990s to 2000s, he and his students published a series of papers and books on the phytogeography of China, such as *The Families and Genera of Angiosperms in China: a Comprehensive Analysis*, *The Area-Types of Seed Plants and Their Origin and Differentiation*, and *Floristics Geography of Seed Plants from China*. Based on an analysis of the distribution patterns of ca. 3 000 genera of seed plants in China, Wu established a scheme of classification of area-types for these genera, in which 15 types and 31 subtypes were recognized. This scheme has been widely used in analyzing

the national and regional floras of China at various levels and is helpful in understanding biogeographic issues , such as endemism , vicarism and disjunctive distributions. As floristic data accumulated with the completion of FRPS and progress of FOC , the scheme was modified and enlarged to include area-types of families of seed plants of the world , in which 18 types were recognized.

Apart from basic theoretical studies , Prof. Wu was also concerned with the economic development of China and kept pace with the international trends of botanical research. He took part in or was in charge of several projects of plant resources investigation. In the 1950s , he along with other scientists developer the key techniques to plant the rubber tree in southern China. In the 1970s , he and other researchers carried out a thorough survey on medicinal plants in China. Wu also gave advice to governments for rational utilization , introduction and domestication of natural plant resources. With the development of the economy , population explosion , and environmental destruction of China , biodiversity has been decreasing rapidly , and the demand for biological energy keeps increasing sharply. Considering this situation , Wu wrote to the then Premier Zhu Rong-Ji in 1999 , proposing to establish a germplasm bank of wild species in southwest China. The suggestion was soon approved by the government , and the germplasm bank was finally constructed and operated in 2007 in Kunming.

Wu spent much of his time travelling around the country to investigate the plant species and vegetation of various types in China. Between 1975–1976 , he made two field trips to Xizang (Tibet) when he was nearly 60 years old. From the 1980s to 1990s , he investigated the flora of north China , as well as the desert and grassland in Xinjiang; he also travelled to several mountains in south China and finally finished his field observations of the Chinese plants in 1998 after he came back from Taiwan. He had also been to many foreign countries on five out of the seven continents (except Africa and Antarctica) during 1979–1996. The visits not only enlarged his perspective on the study of worldwide flora , but also made domestic botanical research known to the world. “Vegetation of China ,” for which he was as the editor-in-chief , won the second prize of the 1987 National Natural Science Award of China and is still treated as an important subject matter of botany , agriculture , forestry and animal husbandry.

To identify plant specimens , Wu spent years of lonely work in herbaria. His passion and responsibility never faded , even when he was forced to work as a boiler fireman during the “Cultural Revolution”. He instructed his students patiently and tirelessly , and he won the highest esteem from the botanical community of China. Because he was familiar with almost half of the species in China , Prof. Wu was called the ‘living dictionary’ of Chinese plants. During Wu’s whole life , he himself named 1 766 new taxa. Being the person who named the most of seed plant taxa among Chinese botanists , Wu changed the history that Chinese plant species were long named by foreigners. Wu won 2007 China’s State Supreme Science and Technology Award because of his outstanding contributions to the research of Botany.

Wu devoted all of his life to botanical research in China. Peter Raven , a world-famous botanist and foreign academician of the CAS and Director Emeritus of the Missouri Botanical Garden , said ‘Wu did very solid fundamental , pioneering and farsighted work for Chinese botanical research.’ Wu worked rigorously but lived a plain and simple life. His passing is a great loss to the botanical community of China and the whole world. While we have lost a master in science and a giant in botany , Prof. Wu Zheng-Yi will remain our reverent director , esteemed supervisor and beloved mentor forever.

(PENG Hua , YANG Qin-Er , and LI De-Zhu)