

影像水陆庵

IMAGES OF SHUILU'AN

中国西安文物保护修复中心 著
美国西北大学学术技术部

Jointly produced by the Xi'an Center for the Conservation and Restoration of Cultural Relics
Northwestern University Information Technologies Department of Academic &
Research Technologies Advanced Media Production Studio



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编者说明

1. 本书是在中美合作《三维扫描及数字化图像制作技术在蓝田水陆庵的应用研究》项目成果的基础上编辑而成，图书的出版也是项目成果之一。
2. 该项目由中国西安文物保护修复中心与美国西北大学学术技术部先进媒体制作室负责并具体实施完成。项目得到中国国家文物局、陕西省文物局和美国梅隆基金会的经费及物力支持，也得到西安市文物局和蓝田县文物部门的积极配合与支持。
3. 本书采用中文和英文，内容包括正文和图版两大部分。正文说明合作项目及应用技术的基本情况。图版采用的图像是从水陆庵项目高清晰的二维图像、虚拟漫游、三维模型、建筑横截面图、元数据和互联网界面等近 800GB 的数字图像资料中精选而出，以全视角的效果，反映了水陆庵及其彩绘泥塑群的历史、艺术、宗教和研究价值，也体现出数字化图像技术在文化遗产领域的应用前景。
4. 本书的出版得到中国国家文物局、陕西省文物局和美国梅隆基金会的支持，对此表示诚挚的谢意，同时也对支持本书出版的其他相关部门、单位、个人和项目组成员表示感谢。

Editor's Note

1. The compilation of this book has been based on the results of the Sino-American collaborative project “Applications of 3D scanning and digital image production technology at the Shuilu'an Temple in Lantian” and the publication of this work is also one of the outcomes of that project.
2. The Xi'an Center for the Conservation and Restoration of Cultural Relics and the Northwestern University Department of Academic Technologies (NUAMPS) were responsible for the project and its implementation. The project received financial and material support from the State Administration of Cultural Heritage, the Shaanxi Provincial Bureau of Cultural Heritage, and the Andrew W. Mellon Foundation. It also received active cooperation and support from the Xi'an Municipal Bureau of Cultural Heritage and the antiquities authorities of Lantian County.
3. This work is published in both Chinese and English, and its contents are divided into text and illustrations. The text describes the basics of the collaboration and the technologies used. The pictures used for the illustrations have been carefully selected from almost 800Gb of digital data, and represent high-resolution 2D images, VR's, 3D models, architectural plans, metadata and Web interfaces.
4. The State Administration of Cultural Heritage, the Shaanxi Provincial Bureau of Cultural Heritage, and the Andrew W. Mellon Foundation have supported the publication of this work, and we extend to them our deepest appreciation. We would also like to thank all the other organizations, agencies, individuals and team members who have lent their support to the publication of this work.

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序 —

陕西蓝田古属京畿之地，文化遗产众多。考古发掘材料证明，距今约115万年的蓝田猿人，就在县境内公王岭一带繁衍生息。周安王二十三年（公元前379年）开始置县，以《周礼》玉之美者为蓝，县出美玉，故名蓝田。蓝田，玉山蓝水，风景秀丽，明代诗人刘珣有“天下名山此独奇，望中风景画中诗”之句，赞美蓝田山水之美。而水陆庵即坐落于这青山绿水之间，更兼有“小敦煌”之称的精美彩绘塑像群，令人流连。

作为遗产大国，中国政府一直致力于对文化遗产的保护，水陆庵一直受到陕西省政府的关注和保护。同时，陕西省文物管理机构十分注重采用现代科技手段保护古老的文明，注重与世界先进国家进行文化遗产的保护交流活动。陕西省文化遗产保护机构自20世纪80年代就开始与有关国家开展文化遗产保护交流活动，并卓有成效，许多国际友人因对陕西文化遗产保护工作的突出贡献，获得了中国政府和陕西省政府的赞誉和奖励。可以说，陕西文化遗产科技保护的蓬勃发展与国际有关遗产保护机构的帮助和支持是分不开的。

当今世界，科技与文化交融，数字文化遗产更是其中一个热点。中国西安文物保护修复中心与美国梅隆基金会、美国西北大学合作开展的《三维扫描及数字化图像制作技术在蓝田水陆庵的应用研究》正是采用这种现代技术来实施对文化遗产的保护和研究。中美双方采用高清晰度的数字技术和三维扫描技术对水陆庵精美的彩绘泥塑群进行了拍摄、测量，完成了全面储存翔实准确、多层次、多角度的水陆庵数字信息，为今后水陆庵泥塑的保护、研究、传播和交流以及其他遗产数字项目提供了技术、资料的基础。这项陕西文化遗产保护国际科技合作成果，受到陕西省政府赞赏和全国各界的关注，对陕西其他应用数字技术保护、保存文化遗产项目起到指导和典型示范的作用。

本书是中国西安文物保护修复中心与美国梅隆基金会和美国西北大学合作研究项目的介绍和总结。两国科技人员以一种新的方式保存、诠释中国悠久传统文化，使人们既可以感受历史遗产之美，也可以看到现代科技之奇。

即将搁笔之际，欣闻西安文物保护修复中心获批文物保护国际科技合作基地，这是对中心数年来文物保护国际科技合作成绩的一个肯定。望借此契机，中心更进一步，真正成为知名的国际化的文物保护机构。

是为序。

劉雲輝

Preface I

Because of its location near many ancient capitals, Lantian in Shaanxi Province has an abundance of historical and cultural heritage. Archeological evidence has shown that as far back as 1.15 million years ago, the Lantian Ape Man lived and flourished in the vicinity of the Gongwang Hills within this county. A county was first established here in the 23rd year of King An of the Zhou Dynasty (379 BCE). According to the *Zhou Li (Rites of Zhou)*, blue jade was regarded as the most beautiful jade, and because beautiful jade was produced in this county, it was named “Lantian” (“Blue Jade.”) With its jade-like mountains and blue rivers, Lantian’s scenic beauty was praised by the Ming poet Liu Ji, who wrote that “Of all the famous mountains in the land, this is the most extraordinary, with scenery within the view and poetry within the painting.” The Shuilu’an Temple is located amid these verdant hills and streams, and with the painted clay sculptures which have given it the nickname of “Little Dunhuang”, it makes the visitor reluctant to leave.

As a country with a rich past, China’s government has been consistently mindful of the conservation of its cultural heritage, and the Shaanxi provincial government has devoted attention and conservation efforts to the treasure that is the Shuilu’an Temple. At the same time, heritage conservation agencies in Shaanxi have placed great emphasis on using the techniques of modern science and technology to protect their ancient civilization, and they have stressed the need for exchanges in heritage preservation work with advanced countries around the world. Such exchanges began in the 1980’s and have been highly productive. Many international friends have made outstanding contributions to heritage conservation work in Shaanxi, and have received recognition and awards from both the national and provincial governments. It is fair to say that the robust development of scientific conservation efforts in Shaanxi is inseparable from the assistance and support of international heritage conservation agencies.

At present, the integration of science and culture and the digitization of cultural heritage are particularly topical. The project on “Applications of 3D scanning and digital image production technology at the Shuilu’an Temple in Lantian” undertaken collaboratively by The Xi’an Center for the Conservation and Restoration of Cultural Relics, the Andrew W. Mellon Foundation and Northwestern University is precisely one which uses modern technology for heritage conservation and research. The Chinese and American teams utilized high resolution digital technology and 3D scanning to photograph and measure the painted clay sculptures of the Shuilu’an Temple. By comprehensively capturing accurate, multilevel and multi-perspective digital information from the Temple, they have provided a technical and informational foundation which can be used for future conservation, research, dissemination and exchange efforts at the Temple, as well as in other digital heritage projects. The outcomes of this international collaboration on scientific heritage conservation in Shaanxi have been favorably received by the Shaanxi provincial government and have been noted in other countries and circles. The project offers guidance and a model for other digital conservation and preservation efforts in Shaanxi.

Images of the Shuilu’an is both an introduction to and a summation of this collaborative project between The Xi’an Center for the Conservation and Restoration of Cultural Relics, the Andrew W. Mellon Foundation and Northwestern University. The technical specialists from both countries have found a new way to conserve and present China’s ancient

traditional culture. Through this work, the reader can appreciate both the beauty of the historical relics and the wonders of modern science and technology.

It gives me great pleasure to receive word that the Xi'an Center for the Conservation and Restoration of Cultural Relics has been designated a key center for international scientific and technological cooperation in heritage conservation. This is an affirmation of the Center's work in this area for the past several years, and I hope it will use this opportunity to make yet more progress and become a truly well known international institute of heritage conservation.

Liu Yunhui

序 二

本书是为推广科学技术、光大文化遗产这一普惠天下的共同事业，由众多远隔重洋、文化迥异、勤奋献身、才华横溢之团体齐心协力所获硕果的见证。此类成功合作是不同因素汇聚的成果，其结晶就是本项目的发展与完成。

第一个因素当首推水陆庵。这一独特建筑及其蕴藏的历史性艺术雕塑举世无双，与所有名副其实的伟大艺术一样令人叹为观止。笔者曾有幸在庵中工作，庵中之雕塑及其艺术魅力堪称永恒，今日观之与五年前首次观看时一样精美绝伦。

成功国际合作之第二个因素系有一支层层协力的全能团队。为本书效力的正是这样一支队伍，从斥资机构的资助，到书中所列主要参与团体，到陕西省当地各级支持，都为一个共同夙愿和目标同心奋斗。此项目的主要执行单位是中国西安文物保护修复中心和美国西北大学学术技术部，而敦煌研究院及我们的欧洲合作者林星格文化公司的参与充分反映了技术的全球化，显示这是个真正的 21 世纪项目。

此次成功合作之第三个因素是专心投入的工作人员。没有他们，这项工作是不能完成的。美方项目经理斯特芳妮·佛斯特不厌其烦地协调在美国的工作，同时也监督现场的图像采集；拉尔斯·胡布里克则负责与我们欧洲合作者的联系与制作。

美国前总统西奥多·罗斯福说：“生活所能赋予之最佳奖赏莫过于为值得献身之事业艰苦奋斗之机会。”本书就是这样一项事业，这样一项多方合作、艰苦奋斗、值得献身的事业。

哈伦·瓦拉克（万里）

Preface II

This book is an example of the good that can come from the collaboration of geographically distant and culturally disparate, yet dedicated and talented groups working for a common beneficial cause for the development, and distribution of technology and cultural heritage. A successful collaboration such as is this is the result of many pieces existing and coming together in one specific time and place. All of the pieces came together in the development, and completion of this project.

The Shuilu'an Temple is, of course, the first piece. The unique building, and the historical and artistic sculptural treasures that exist within it are one of kind in the world. It falls in to the realm of the incomprehensible, like all truly great artistic works. After having had the privilege to have worked in the temple I can say that the sculpture and the physical effect of the art in the Temple does not diminish over time, it remains as startling and beautiful on the seeing it now as it did when first introduced it over five years ago.

The second piece of a successful international collaboration is that there must be a comprehensive team that exists and functions together at all levels. This project had such a team, from the support of the funding organizations, the principal participating institutions listed in this book, to the support at all levels in Shaanxi Province. The principal implementers of this project were the Xi'an Center for Conservation and Restoration of Cultural Relics and Northwestern University, but the involvement of the Dunhuang Academy and our European partner, Linsinger Kultur, fully demonstrates the globalization of technology and shows it to be a truly 21st century endeavor.

The third piece of this successful collaboration was the dedicated staff without whom it would never have been completed. Stefani Foster, the U.S. project manager worked tirelessly managing the domestic production as well as overseeing the on site photo acquisition, and Lars Hubrich managed the communication and production done with our European partner.

To quote an American president, Theodore Roosevelt, "Far and away the best prize that life offers is the chance to work hard at work worth doing." Surely this was such a project, one that many groups had to collaborate and work hard, and one that was surely worth doing.

Harlan Wallach

水陆庵与彩绘泥塑群

蓝田水陆庵位于中国陕西蓝田县城以东10公里的普化镇王顺山下，距西安约60公里。蓝田水陆庵以琳琅满目的彩色泥塑著称于世，为陕西年代最久、规模最大、保存最完整的佛教雕塑群，具有极高的历史、艺术和研究价值，有着“小敦煌”之美誉，现为中国国家级重点文物保护单位。

蓝田水陆庵南依巍峨秦岭，北临涛涛灞河。蓝水出悟真峪后，一分为二，将水陆庵环绕成一个天然的鱼形小岛。据《蓝田县志》记载，水陆庵为悟真寺的“蓝诸庵水陆殿”。悟真寺创建于隋开皇年间（公元581~604年），宋重修多宝塔碑文载：“山中有寺乃是隋朝兴建，唐时扩建，命尉迟敬德监修。”悟真寺是佛教净土宗的发祥地，是一座著名的皇家寺院，净土宗的名僧善导大师和净业大师曾在此开坛讲经。其后，法成、慧远、慧超等净土宗的高僧先后皆较长时间居住于此。悟真寺僧人重多，殿宇鳞次，规模扩展到悟真峪的南普陀和北普陀地区，“蓝诸庵水陆殿”

水陆庵鸟瞰图 Bird's-eye view of Shuilu'an



就建在北普陀。到了明代，秦藩王朱怀墀于嘉靖四十二年至隆庆元年（公元1563~1567年），动用能工巧匠，大兴土木修缮庙宇，精雕细绘重整壁塑，历时五年竣工。朱怀墀的母亲经常到这里烧香拜佛，把水陆殿奉为家祀佛堂。悟真寺的“蓝诸庵水陆殿”，现名“水陆庵”可能与此有关。古往今来，历朝历代都对水陆庵进行了维修和保护，古朴清幽的寺院与参天郁葱的翠柏交相辉映，使之成为游览观光的胜地。白居易、王维、杜甫等许多文人墨客都在这里留下了诗篇。

现在的蓝田水陆庵坐西向东，占地面积6800平方米，有诸圣水陆殿五间、耳房两间、中殿三间、前殿五间，大殿至前殿之间南北各有厢房十三间，总建筑面积约1600平方米。1988年，又新修仿明歇山顶山门三间。水陆庵彩色泥塑集中于水陆殿内，殿外悬挂有中国佛教协会会长、著名书法家赵朴初题写的匾额。在这座面积不大的殿堂内，中国古代的雕塑工匠以卓越的智慧，在十三个墙面上精确合理地安排和塑造了三千余尊彩色泥塑。这些诸佛人物、亭台楼阁、山水湖海、珍禽异兽分布在大殿的角角落落，令人目不暇接。众多的彩色泥塑布局巧妙，大小各异，错落有致，不仅内容丰富，场面宏大，人物众多，而且佛教主题突出，层次分明。其以中隔墙的“横三世佛”造像为中心向四周辐射，对面东前檐墙西壁分别安排报身佛卢舍那和应身佛释迦牟尼造像。三世佛的背面雕塑有观世音、文殊、普贤菩萨，南、北梢间横墙上置药王菩萨和地藏菩萨五大菩萨造像。在三世佛两侧的南、北山墙上安排有佛本生、佛本行和佛经变等佛传故事的连环壁塑、悬塑。其中北山墙是以佛降生故事为中心，正中塑有释迦牟尼“托胎”、“降生”、“九龙浴”，而南山墙是以佛“涅槃”为中心，正中塑有“涅槃”的场景和人物。同时，南北山墙上还塑有相互连贯、气势磅礴、场面宏大的“五百罗汉过海”和“二十四诸天”等。在整个西檐墙的东壁布局着“佛升忉利天为母摩耶夫人说法”佛传故事巨幅彩塑群。在水陆殿里，佛教中的主要人物和佛传故事位置突出，形象显著，并且前后左右遥相呼应，陪衬烘托。水陆庵彩塑体现了我国古代雕塑巧妙多变的塑造技艺和强烈的艺术震撼力，既突出了佛教的思想内容，也反映了当时的社会生活。

唐代是中国佛教的兴盛时期，其佛教雕塑借鉴吸收了中外的雕塑和绘画技巧，创造了许多具有民族特色的佛教艺术作品。到了明代，蓝田水陆庵佛教雕塑艺术在继承中国佛教艺术传统的基础上，造像群和壁画的艺术风格更加趋向写实，增添了世俗生活的色彩。在蓝田水陆庵的彩色泥塑群上，雕塑匠师们在保留了唐代佛教雕塑技法的同时，充分发挥了泥塑的工艺技巧和绘画手法。从大到五六米高的主佛或菩萨，小到四五厘米的比丘或乐伎，无论是骨架、胎体和雕塑手法，还是造型、神态、色彩、服饰，都体现出了中国泥塑灵活多样的雕塑技艺特点，圆雕、浮雕、镂空等技法展现得淋漓尽致。这些艺术大师们雕塑的诸佛、菩萨，形体丰满，神态逼真；阿难、迦叶睿智温顺，老成稳重；天王和护法力士凶猛威武，忠心不二；佛传故事中的连环壁塑、悬塑，人物鲜活，情节生动。同时，佛座、

背光、亭台楼阁、古刹宝塔装饰繁缛富丽，凝重辉煌；珍禽瑞兽、鱼鸟花草更是惟妙惟肖，栩栩如生。水陆庵中泥塑表面敷以金箔，施红、黄、绿、青、紫、蓝、白等无机矿物颜料，展示出了中国古代彩绘精湛的水平，形象生动逼真，质感细腻，色彩丰富。这些都在中国的艺术史上留下了光辉一页。

蓝田水陆庵的彩色泥塑群是中国佛教艺术的代表佳作之一，为研究中国宗教历史、建筑、雕塑、工艺、音乐和民俗等提供了重要的资料，是古代劳动人民留给世界的珍贵文化遗产。历年来，其都得到了中国政府的重视和保护，也得到国际文化遗产保护机构的帮助和支持。

The Shuilu'an and its painted clay sculptures

The Shuilu'an is located at the foot of the Wangshun Mountains in Puhua Township, 10 km. east of the county seat of Lantian in Shaanxi Province. It is approximately 60 km. from Xi'an. The temple is renowned for its dazzling clay sculptures, which are the oldest, largest and best preserved group of Buddhist sculptures in Shaanxi Province. They are a rare treasure and part of China's outstanding cultural heritage, with great historical, artistic and scholarly value. The temple has the lovely nickname of "Little Dunhuang," and is a nationally protected key heritage site.

The Shuilu'an is situated by the majestic Qin Mountains to the south and the rushing Ba River to the north. After passing through the Wuzhen Valley, the Lan River divides in two, forming the natural fish-shaped island on which the temple is located. According to the Lantian County Gazetteer, the Shuilu'an was once the Shuilu Pavilion within the Lanchu Nunnery of the Wuzhen Temple. The Wuzhen Temple was originally built during the Kaihuang reign of the Sui dynasty (581 ~ 604 CE). When its Duobao Pagoda was rebuilt in the Song dynasty, the stele inscription noted that "the temple in these mountains was built during the Sui and expanded during the Tang. Chi Jingde was ordered to oversee its rebuilding". The Wuzhen Temple was a famous imperial temple where the Pure Land sect of Buddhism flourished. The famous monks Master Shandao and Master Jingye both taught sutras there, and subsequently learned monks of the Pure Land sect including Facheng, Huiyuan, and Huichao lived at the temple for extended periods. The Wuzhen Temple had many monks and numerous buildings, and expanded all the way to the south Putuo and north Putuo districts of the Wuzhen Valley. The Shuilu Pavilion of the Lanchu Nunnery was built in north Putuo. From the 42nd year of Jiajing to the first year of Longqing during the Ming dynasty (1563 ~ 1567 CE), Zhu Huaijuan, Prince of Qin, employed skilled artisans and craftsmen in a major five-year reconstruction which involved exquisite painting and carving. Zhu Huaijuan's mother often came here to offer incense to Buddha, and adopted the Shuilu Pavilion as her family temple. The renaming of the Shuilu Pavilion of the Lanchu Nunnery as the Shuilu'an Temple may have been related to this episode. Over the years and generations, the Shuilu'an Temple has been oft-repaired and maintained. Its plain and ancient buildings are set off by verdant towering pine trees, just as its natural beauty and deep-rooted religious culture enhance each other. Hence, the Shuilu'an Temple has naturally become both an attraction for visitors in search of scenic beauty and a place of worship for the religiously devout. Many famous writers of old, including Bai Juyi, Wang Wei and Du Fu, have their travel records and poems here.

The present-day Shuilu'an Temple lies west and faces east, and occupies a total area of 6,800 sq. m. The five-bay Shuilu Pavilion houses the religious figures and has two side wings; there is a middle pavilion with three bays, and a front pavilion with five bays. There are thirteen side chambers each lining the north and south sides between the main pavilion and the front pavilion, and a total floor space of approximately 1,600 sq. m. In 1988, a new Ming style front gateway with three openings was added. The clay sculptures of the Shuilu'an Temple are located within the Shuilu Pavilion, above which hangs a horizontal plaque inscribed with the words "Shuilu'an" written by the renowned calligrapher Zhao Puchu, President of the Chinese Buddhist Association. Inside, along the thirteen wall surfaces within this pavilion of modest size, are arranged some three thousand painted freestanding, wall and hanging clay sculptures, as well as wall paintings. These were crafted by ancient Chinese artisans with great ingenuity, using superb traditional folk art decorative techniques and a variety of artistic methods. The many Buddhist figures, buildings and balconies, landscapes and oceans, and unusual animals are arranged over every nook and cranny of the pavilion and dazzle the eye. The numerous sculptures are cleverly laid out, vary in size and orderly in their