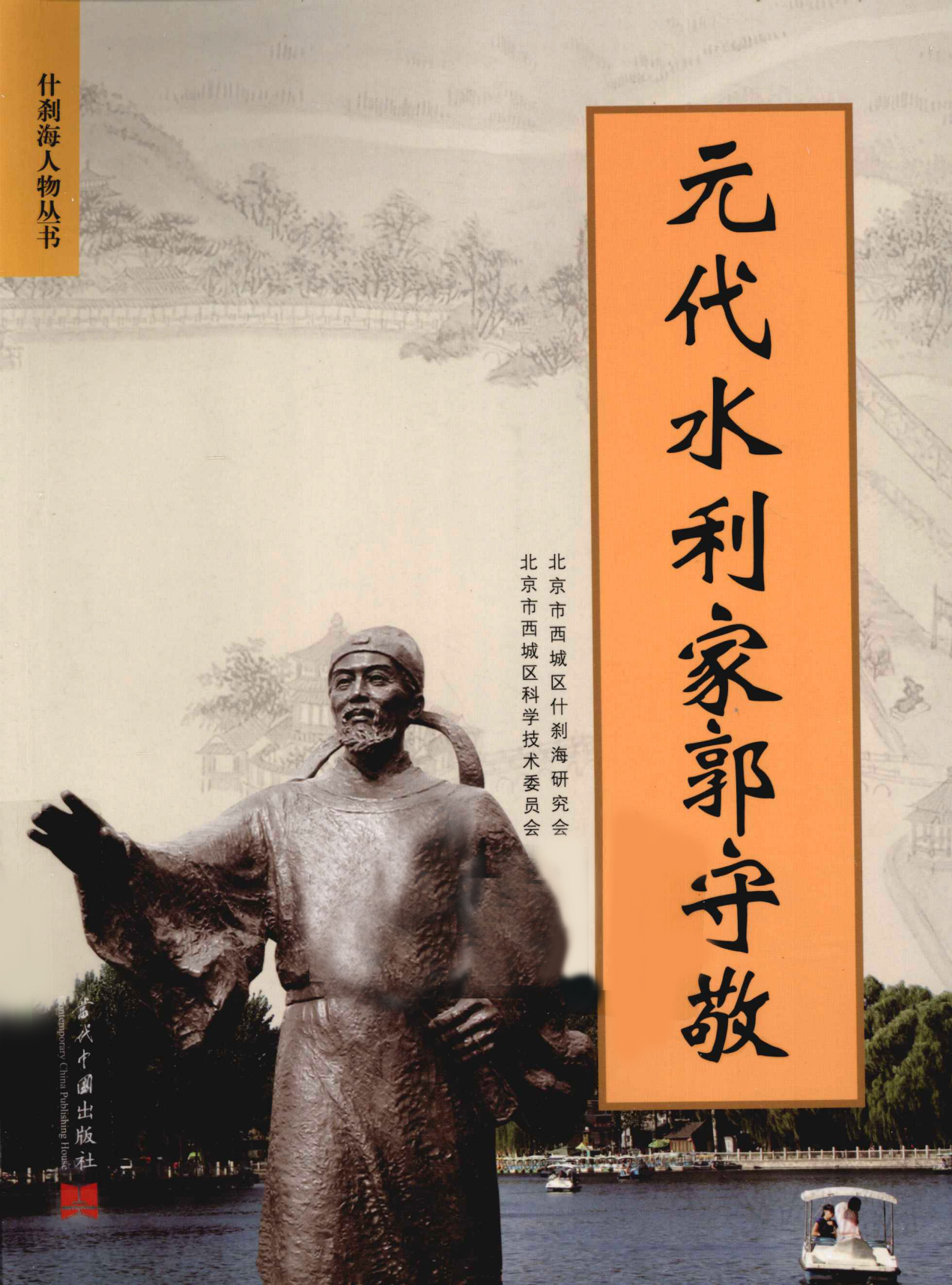


什刹海人物丛书

元代水利家郭守敬

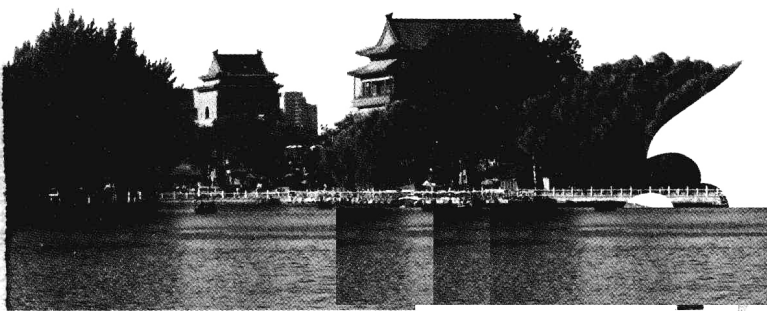
北京市西城区什刹海研究会
北京市西城区科学技术委员会

当代中国出版社
Contemporary China Publishing House



元代水利家郭守敬

蔡蕃 / 著



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当代中国出版社
Contemporary China Publishing House



图书在版编目(CIP)数据

元代水利家郭守敬/蔡蕃著;什刹海研究会,西城区科学技术委员会编. —北京:当代中国出版社, 2010. 10

ISBN 978-7-80170-901-1

I. ①元… II. ①蔡…②什…③西… III. ①郭守敬(1231~1316)—传记 IV. ①K826.1

中国版本图书馆 CIP 数据核字(2010)第 186082 号

出 版 人 周五一
责任编辑 陈立旭
责任校对 王小芸
装帧设计 古 手
出版发行 当代中国出版社
地 址 北京市地安门西大街旌勇里 8 号
网 址 <http://www.ddzg.net> 邮箱:ddzgcbs@sina.com
邮政编码 100009
编 辑 部 (010)66572154 66572264 66572132
市 场 部 (010)66572281 或 66572155/56/57/58/59 转
印 刷 北京润田金辉印刷有限公司
开 本 720×1020 毫米 1/16
印 张 14.75 印张 插图 79 幅 102 千字
版 次 2011 年 1 月第 1 版
印 次 2011 年 1 月第 1 次印刷
定 价 30.00 元

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序

郭守敬是中国元代伟大的科学家。在天文、水利、数学、测绘及仪器仪表制造等方面成就卓著，有多项发明创造领先于世界水平。他在天文学上的卓越成就，得到国际科学界的公认，饮誉中外。月球上有以郭守敬命名的环形山，太阳系里有以郭守敬命名的小行星。名垂星汉，环球共仰。

郭守敬同时也是中国元代伟大的水利家。他对河北、宁夏及京杭运河等地的注水均作出了巨大贡献，惠及子孙后代。他运用丰富的水利知识规划治理的北京水网，至今仍发挥着重要作用。有治水“神人”之称的郭守敬，经科学设计，周密组织，精心施工，真正实现了京杭运河的全线贯通，使江南漕船可以从北运河经通惠河直接驶入大都城内积水潭。通惠河工程取得的成就，是郭守敬一生水利建设实践与水利科学创新的结晶。为现代北京城的水利建设作出了贡献。

关于郭守敬在天文学方面成就的著述、传记、专著等已有多种，社会各界对此了解得比较深入和广泛。但是有关水利家郭守敬在水

利建设方面的著述、专著相对较少。

蔡蕃先生撰写的这本书，从水利科学的角度，经过严谨的考证，比较系统、具体、充分地阐述了郭守敬一生对我国水利建设，尤其是对元大都水利建设的伟大功绩和重要贡献。从而将水利家郭守敬在水利建设方面的卓越成就彰显于世，使人们对郭守敬的一生功绩与成就有了完整了解。可以说，这部书为各界人士对我国杰出科学家郭守敬的认识与了解提供了新的内容。

本书出版发行后，我们热切希望广大读者对本书提出宝贵意见，以便再版时修订。

北京市西城区什刹海研究会
北京市西城区科学技术委员会
2010年6月



Prologue

Guo Shoujing was a famous scientist in Yuan Dynasty. There were so many outstanding results in Astronomy, Water control, Mathematics, Mapping and Meter Manufacture area. And Guo's many inventions were to be ahead of world level in that time. Special in the Astronomy side, Guo's remarkable achievement was generally acknowledged by international scientific community. So that Guo is quite famous in the world. For example: there is a round mountain on the moon, which was named as Guo Shoujing. Also, there is a Guo Shoujing Asteroid in Solar system.

Guo is also a great Water control Scientist in Yuan Dynasty. He did a great contribution for water flooding control in Hebei, Ningxia, and Beijing-Hangzhou Grand Canal area etc. Also, according to his wealth of water control knowledge, he comprehensive developed the water network around Beijing. And these water network is still much used by people now. At the same time, through the hard-head calculation, well-rounded organization, and well-designed to successfully achieved full range of navigation of Beijing-

Hangzhou Grand Canal, so that Southeast Chinese goods and cereals could be directly transferred from North Grand Canal to Jishuitan of Dadu via Tonghui River. These contributions are not only benefit to the people, also are the greatest achievement in his whole life. Particular for the outstanding results of water conservancy works and innovation scientific water control for Beijing water network.

Till now, about astronomy, there are so many reasearch, writings, biography and monographs etc. were well known by people. But in the research of water control, compare with astronomy, related writings, biography etc. were very fewer. So that is a improtant pourse that the Mr. Fan Cai wrote this book.

In this book, according to the scientific water control way and the rigorous research, systematic, specific and sufficient to expound the great contribution on Chinese water control's construction, specially on the outstanding results of water control's contruction in Dadu, which was the Capital city of Yuan Dynasty. Therefore, to give a full display of Guo's excellent achievement on water control's construction, that let all people more complete to understand his contributions and achievement in his whole life. In other words, this book will provide a new content about this outstanding scientist—Guo Shoujing.

After publishing this book, we are willing to hope the broad ranks of reader will give more suggestions that will much help to benefit to the revise.

Beijing West District Shishahai R&D Institute
Beijing West District Science & Technology Committee
June, 2010





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绪 论

很多人都知道中国元代科学家郭守敬编制的《授时历》是当时世界上最先进的历法，而对郭守敬作为水利家的巨大贡献却不甚了解；很多人都知道京杭运河的伟大作用，却不甚了解真正实现京杭运河全线贯通的人是郭守敬；很多人都知道今日北京城始建于元大都，却不甚了解正是郭守敬的设计与施工，使元大都成为历史上北京水源问题解决得最好的时期，并奠定了今日北京城市供水的格局。分析其原因，一方面是历史文献中对郭守敬一生的水利成就的记载既少又分散，而关于他在天文方面作出贡献的资料相对较多；另一方面是长期以来对郭守敬水利上贡献的专门研究较少，宣传上更缺乏深入分析，或者泛泛而言，或者笼统带过。本书通过翔实史料的解读与分析，重点对郭守敬毕生在水利方面的实践活动，以及他在水利工程方面取得的成就进行记述和评述，让更多的人全面了解这位 13 世纪中国最伟大的水利家和科学家。

13 世纪初叶，我国正处于分裂局面，宋、金、西夏、西辽等同时并立，吐蕃地区四分五裂，而更北边处于氏族部落后期的蒙古族



则日益强大。1206年成吉思汗统一蒙古各部，建立蒙古汗国，1215年占领金中都，改金中都为燕京。到1218年，蒙古汗国占据了河北、山东、山西大部分地区。1227年西夏灭亡。1229年成吉思汗第三子窝阔台继位大汗。1234年蒙古与南宋合兵灭金，统治了整个北方。1236年，郭守敬的家乡河北邢州被蒙古汗封给了李鲁带，农民、当地汉族群众降为奴。郭守敬就出生在这种动乱的年代。1251年拖雷的长子蒙哥当上了蒙古大汗，将大沙漠以南的军政大事管理权交给了拖雷的第四子忽必烈。1260年忽必烈在蒙哥死后被立为蒙古大汗，不久，他依中原制度称皇帝，采用中原纪年，改年号为中统。至元八年（1271）正式建立“大元”国号，五年后统一全中国。

郭守敬1231年生于今河北省的邢台市。少年郭守敬跟随祖父郭荣学习天文和水利。16岁时拜刘秉忠为师学习了近两年，20岁时便显示了在水利方面的才华。32岁时，经张文谦推荐，郭守敬在上都受到忽必烈的召见。郭守敬向忽必烈提出了全面发展华北水利的六项建议，得到了忽必烈的赞赏。忽必烈当即授予郭守敬“提举诸路河渠”的职务。第二年，郭守敬被加授银符、副河渠使。34岁时，他被派到西夏。在他的设计、指导下，很快修复了被战争破坏的引黄灌渠，大大促进了当地的农业生产。35岁时，郭守敬升为都水少监。为元大都建设需要，他设计并指导兴建了引永定河水通漕运的工程。永定河水漕运成功地使用三十余年，这在永定河历史上是绝无仅有的。郭守敬41岁升为都水监，掌管全国的水利建设。几年后郭守敬受命到山东、河北、江苏等地考察汶、泗及御河相连通的情况，为京杭运河的改造进行实地勘测和规划。郭守敬46岁时，都水监并入工部，任工部郎中。这一年，元朝开始编修新历法，设立太史局（后改称太史院），任命张文谦和另一位大臣张易主持这项工作；郭守敬则被任命为同知太史院事，参加历法改革工作。参加修历的主要人员都有明确的专业分工，王恂负责历法的推算，郭守敬



主要负责各种仪器的制造和天文观测。他的工作为新历的编写提供了科学的原始数据。新历颁行后，郭守敬又用了五年时间进行新历法的编写、定稿工作。56岁时郭守敬最后编写完各种历法书籍共105卷，而《授时历》是当时世界上最好的历法，领先欧洲300年。

完成历书编写的郭守敬，第二年又投入到山东运河的建设中。他与都水监马之贞一起负责会通河的修建，到至元二十六年（1289）山东运河竣工，就此完成了京杭运河山东段的改造工程。

两年后，61岁的郭守敬在对北京地区水资源详细调查的基础上，向忽必烈提出了修建大都至通州的通惠河引温榆河上游的泉水到大都，并使大都至通州通航的方案，得到批准。这是京杭运河的最后一段，也是修建运河最困难的一段。郭守敬精心设计，并亲任工程总指挥。经过近一年的施工，完成了通惠河的建设。使江南漕船可以由北运河直接驶入通惠河，到达大都城内的积水潭，真正实现了京杭运河的全线贯通。通惠河工程取得的成就，是郭守敬30年来水利实践与水利科学上创新的结晶。他当年开创的永定河与白浮引水方案，奠定了今日北京城市引水的格局。

晚年的郭守敬，一直工作到86岁去世。对他一生水利上的成就和功绩，他的学生暨太史院接班人齐履谦在《知太史院事郭公行状》（以下简称《行状》）中作了全面的概括：

决金口以下西山之筏，而京师材用是饶。

复唐来以溉濒河之地，而灵夏军储用足。

引汶泗以接江淮之派，而燕吴漕运毕通。

建斗闸以开白浮之源，而公私陆费由省。

本书作者在多年研究郭守敬及古代运河与漕运的基础上，着重对郭守敬兴建华北水利，修复宁夏引黄灌渠等方面所作出的贡献进

