考工记

翻译与评注

关增建 【德】Konrad Herrmann 译注

The Artificers' Record
Aufzeichnungen über die Handwerker

上海交通大学出版社
SHANGHAI JIAO TONG UNIVERSITY PRESS

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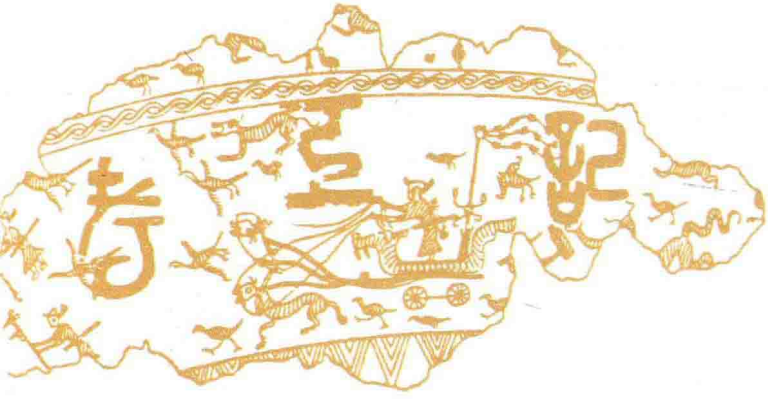

内容提要

《考工记》是中国目前所见年代最早的手工业技术文献，在中国科技史、工艺美术史和文化史上都占有重要地位。鉴于《考工记》对中国古代技术的发展具有极为重要的意义，本书将《考工记》翻译为现代汉语、英语和德语，并对其多处文本提出了新的解释，以飨全世界对科学技术的历史感兴趣的人们。本书对中国古代科技成就在世界的传播有所助益。

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前言

在世界诸多文明中，中华文明最为独特，这是因为只有中华文明连绵不绝，可以一直向前追溯5 000年。与之相应的是，有大量文字记录的文化被一代代传递下来。在古代中国，尤其是在汉朝（206 B.C.—221 A.D.）独尊儒术之后，统治者习惯于用文化来约束和引导社会精英的思维模式，以此统一人们的精神世界和道德准则。由此，对于中国古代社会来说，哲学和历史书籍占有至为重要的地位，这是不难想象的。与之形成对比的是，包含科技内容的书籍流传下来的则相对较少。

另一方面，战国时期（475—221 B.C.）却是一个特例。在中国历史上，该时期以其科学技术的飞速发展而著称。这一点已经被近几十年的考古发现所证实。中国古代有一些颇负盛名的技术书籍，《考工记》就是其中之一。该书被保藏于《周礼》一书的第六章，也就是最后一章中。

《考工记》是迄今所知中国最古老的技术书籍。该书的绝大部分内容约产生于春秋（770—476 B.C.）战国时期，这意味着它已经有了2 500多年的历史。由此，在世界范围内，它也是一部最古老的技术书籍。

另一方面，在春秋战国时期的一些哲学书籍中，也能发现一些科技内容。在墨子所著《墨经》中，这一现象尤为明显。《墨经》的形成时间与《考工记》基本是一致的，但《考工记》是第一部纯粹讨论技术内容的书籍。

《考工记》以经验知识为基础制订技术规范，为兵车制作、青铜技术、陶瓷制品以及弓箭制造等奠定了基础。该书首次对不同的青铜器依据其不同的功能要求，规定了其所对应的铜和锡的比例。《考工记》描述了融长度、容积和重量为一体的复合标准器的结构。500年后，王莽新朝依据该书的记述，制作了著名的复合标准器“嘉量”，该嘉量原物现在珍藏于中国台湾台北的故宫博物院中，供人们观赏。该书对复合标准器的记述，在世界范围内是最早的。《考工记》的生物分类思想也不同寻常，它认为，人也是生物群体中的一种。《考工记》还展示了当时人们使用的各种不同类型的陶瓷器，这在历史上也是首次。书中记载的城市建造规则，在后来中国的首都北京和其他一些城市的建造中，仍然可以看到。这些规则的目的是要维护社会秩序，它们是依据传统社会的要求，同时考虑到贸易和交通的需要而制订出来的。

《考工记》对于它所描绘的所有产品，都给出了制作该种物品所需材料的品种和其大小、体积及重量的具体数据，并对制作过程做了具体说明。同时，该书还多处提到如何对产品进行测试。正因为如此，该书作为一部技术书籍，同时也为生产的标准化、计量和质量保证奠定了基础。公元前221年，秦始皇统一中国，随后颁布了大量法令，要求书同文、车同轨，统一度量衡。显然，在此之前，中国社会在标准化、计量和质量保证领域的这一传统，已经存在了很久。

然而，长期以来，西方的科学技术史研究本质上囿于欧洲文明，只是到了近几十年，关于中国的科学技术史，英国化学家和科学史家李约瑟

(1900—1995)及其在中国和西方的同事们做了大量的开拓性研究工作，这才使情况有了变化。人们对欧洲之外的文明，特别是对中国文明的兴趣，有了明显的增加。李约瑟的研究旨在探讨各种民族科学的发展对世界科学的意义，探寻民族科学彼此之间的关系。

鉴于《考工记》对中国古代技术的发展具有极为突出的重要意义，我们决定将其翻译为现代汉语、英语和德语，以飨全世界对科学技术的历史感兴趣的人们。这也是《考工记》在世界范围内首次被翻译成英语和德语。在翻译过程中，我们借鉴了闻人军教授对《考工记》长期而又富有价值的研究成果。在此，我们谨对闻人军教授表示深切的谢意。我们还要感谢Matthew Klopfestein将《考工记》翻译成英语。

另一方面，将《考工记》翻译为现代汉语、英语和德语，首先要对《考工记》本身有所研究。实际上，我们在自己研究的基础上，对《考工记》多处文本都提出了新的解释。例如，在车的制作一章，关于车轮和车毂的尺寸问题；在青铜技术一章，关于出土的青铜器的铜锡比例与《考工记》的记载是否一致的问题；以及在王城中祖庙的设计的问题等，我们都得到了新的认识。我们期望未来的考古发现能够进一步澄清在《考工记》翻译中现存的那些问题。

愿我们的工作能对促进中国古代科技成就在世界的传播有所助益。

关增建

Konrad Herrmann

2014年于上海

Foreword

Among the civilizations of the world China is insofar unequaled, because only the Chinese civilization can look back on a continuous tradition of 5,000 years. Accordingly, a rich written culture has been handed down. In ancient China the rulers, especially since the victory of the Confucianism in the Han Dynasty (206 B.C.—221 A.D.) used the culture to align the thinking of the elite to unified moral and ethical principles. Therefore, it is not surprising that philosophical and historical works in the society of ancient China obtained high importance. Compared with this, relatively few works with scientific and technological content were conveyed to us.

But specially the Zhanguo period (475—221 B.C.) distinguishes itself by a lively development of science and technology which is also confirmed by archaeological findings in the last decades. One of the magnificent technological books of ancient China is the book *Kao Gong Ji* (*The Artificers' Record*) which was symptomatically "hidden" as the sixth and last chapter in the work *ZhouLi* (*Rites of the Zhou Dynasty*).

The work *Kao Gong Ji* is the oldest known book on technologies in China. Because this book for its greatest part probably originated on the border between the Chunqiu (770—476 B.C.) and the Zhanguo periods, that is about 2,500 years ago. *Kao Gong Ji* at the same time counts to the oldest technological works worldwide.

Also in the philosophical works of the Chunqiu and the Zhanguo periods one can find statements with scientific and technological content. This is especially true to the work *Mohist Canon* by Mo Di which originated about the same time as *Kao Gong Ji*. Nevertheless, *Kao Gong Ji* is the first book with purely technological content.

Based on empirical knowledge, *Kao Gong Ji* among others laid the basis for the manufacture of war carriages, the bronze technology, of ceramic products up to the manufacture of bows. For the first time in this book for different groups of bronze products according to their functional demands different mixing ratios between copper and tin are prescribed. *Kao Gong Ji* describes the structure of a combined measurement standard for length, volume and mass according to whose principles about 500 years later during the reign of Wang Mang the combined measurement standard "Jialiang" was created. The original can be admired in the National Museum in Taibei (Taiwan of China). The measurement standard described in *Kao Gong Ji* is the first worldwide to represent a combination of several measurement quantities. *Kao Gong Ji* specifies a classification of creatures in which it is remarkable that the man is also considered as a part of the fauna. For the first time in this book different types of ceramic vessels are presented which at that time were used. The rules for the building of cities laid down in *Kao Gong Ji* can be found in the construction of the capital Beijing and in other cities. These rules of city building aimed at guaranteeing social order according to the requirements of traditional society and at the same time enabling trade and transport.

To all products described in *Kao Gong Ji* qualitative data on the needed

kinds of materials and quantitative data about their sizes, volume and mass are attached, and the manufacturing process is detailed. Also in many places it is indicated how the products have to be tested. Consequently, this technological book at the same time laid foundations on standardization, metrology and quality assurance. When the emperor Qin Shihuangdi who in the year 221 B.C. unified China and afterwards issued a great number of edicts for the unification of the script, of weights and measures, and of the width of wheel tracks, in Chinese society there already existed a long tradition in the fields of standardization, metrology and quality assurance.

Whereas the research on the history of science and technology in the West long time was essentially restricted to the European civilization. In the last decades specially by the pioneering research work of the English biochemist and science historian Joseph Needham (1900—1995) and his colleagues in China and the West on the history of Chinese science and civilization. A change took place. The interest clearly shifted to the civilizations outside of Europe, namely to the Chinese civilization. Needham's research work put the task to explore the development of the national sciences to a world science and to trace the connections between the national sciences.

Due to the pre-eminent significance of *Kao Gong Ji* for the technologies developed in China we have decided to present this book to a worldwide reading audience interested in the history of science and technology in three translations: Modern Chinese and for the first time in English and German. At the translations we founded on the long standing, praiseworthy research of Professor Wenren Jun on *Kao Gong Ji* to whom we feel deeply indebted. Wholeheartedly we thank Dr. Matthew Klopfestein who had finished the Englih translation.

But the present translations into modern Chinese, English and German do not follow existing translations into modern Chinese in an uncritical way. Rather, in different places based on our research we have delivered new

interpretations of the original text. This for instance is true for the chapter on the manufacture of carriages regarding the sizes of the wheels and the hubs, in the chapter on the bronze technology for the reasons of the compliance and non-compliance of the composition of the bronze of excavated artefacts with the mixture ratios of the bronzes indicated in *Kao Gong Ji* and for the design of the ancestor temple in the king's city. We hope that future archaeological findings will clarify still open questions of interpretation of *Kao Gong Ji* .

May this edition contribute to propagate the knowledge about ancient China's scientific achievements all over the world!

The editors

Guan Zengjian and Konrad Herrmann

Shanghai, 2014

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白话文译注评

Commented Translation into Modern Chinese

Übersetzung ins Moderne Chinesisch mit Anmerkungen

原文：国有六职，百工与居一焉。或坐而论道；或作而行之；或审曲面势，以饬五材，以辨民器；或通四方之珍异以资之；或饬力以长地财；或治丝麻以成之。坐而论道，谓之王公；作而行之，谓之士大夫；审曲面势，以饬五材，以辨民器，谓之百工；通四方之珍异以资之，谓之商旅；饬力以长地财，谓之农夫；治丝麻以成之，谓之妇功。

译：一个国家的内部分工，有六种职事，百工是其中之一。国人中，有坐而论道者；有制订政令努力推行者；有审视材料外形考究其内在质地，以整饬五材[1]为民众制作[2]各种器物者；有奔走各地买卖珍宝异物以互通有无者；有辛苦劳作从事农耕以开发土地财富者；有整治丝麻制作衣被者。坐而论道者，称为王公；制订政令努力推行者，称为士大夫；审视材料制作器物者，称作百工；奔走各地买卖珍宝异物以互通有无者，称为商旅；辛苦劳作从事农耕以开发土地财富者，称为农夫；整治丝麻制作衣被者，称为妇功。

原文：粤无镈，燕无函，秦无庐，胡无弓车。粤之无镈也，非无镈也，夫人而能为镈也；燕之无函也，非无函也，夫人而能为函也；秦之无庐也，非无庐也，夫人而能为庐也；胡之无弓车也，非无弓车也，夫人而能为弓车也。知者创物，巧者述之守之，世谓之工。百工之事，皆圣人之作也。炼金以为刃，凝土以为器，作车以行陆，作舟以行水，此皆圣人之所作也。

译：粤[3]地没有专门制作镈[4]的工匠，燕[5]地没有专门制作函[6]的工

[1] 五材，根据汉代郑玄的理解，指金（铜）、木、皮、玉、土。

[2] 辨，古语通“办”，此处为“治理，整备”之意。

[3] 这里的“粤”通“越”，不是指现在的广东，而是指先秦时的越国，在今浙江一带。

[4] 镈，一种青铜工具，锄铲之类。

[5] 燕，指当时的燕国，在今河北北部和辽宁一带。

[6] 函，这里指皮甲或铠甲之类。