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CHINA-PORTUGAL JOINT LABORATORY
OF CULTURAL HERITAGE CONSERVATION SCIENCE
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封面图像：
亚洲大师建筑拼贴画
为致敬亚洲建筑师的成就而
作
图像作者：Mahdi
Motamedmanesh
Cover Image:
A collage of the
architectural masterpieces
of Asia, aimed to celebrate
the achievements of Asian
architects and engineers.
Image Credit: Mahdi
Motamedmanesh

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前沿研究 Research Fronts

亚洲建造史研究前瞻

A Research Perspective on Asian Construction History

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1. 建造史: 具有技术文化“偏见”的跨学科科学

(1) 建造作为一种文化

“我们建造什么以及我们如何建造, 反映了我们是谁。”

——第七届国际建造史大会 (里斯本, 2021)¹

2021 年在葡萄牙里斯本举办的第七届国际建造史大会 (7ICCH) 的开幕辞, 为建造史学科开辟了新的视野。它强调了建造史的研究, 不应仅限于关注技术挑战或施工过程本身, 而应关心人以及建造文化的互动。² 这反映在了会议的主旨议题 “建造文化史” 上, 这的确是此届会议的一个原创性贡献。

建造史的定义和范畴此前有不少作者讨论过。³ 7ICCH 主旨介绍中提供了一种建造史的新的诠释角度: “建造文化的研究意味着对一个社区的知识资本的变迁进行分析, 这种变迁反映在了他们的建造活动中。因此, 建造史是一个广泛的知识领域, 涵盖该活动的所有参与

1. Construction History: An Interdisciplinary Science with Technological, Cultural “Bias”

(1) Construction as a Type of Culture

“We are what we build and how we build.”

——7ICCH (Lisbon, 2021)¹

The opening remark of the 7th International Congress on Construction History (7ICCH) held in Lisbon (Portugal) in 2021 opened up a new perspective on the Construction History discipline. It emphasized that the study of construction history should not be limited only to the understanding of technical challenges or the process of construction itself, rather should engaged itself with people, as well as their culture of building.² Indeed, this was the original contribution of this congress, which was also reflected in the theme of the venue: “The History of Construction Cultures”.

Numerous authors have so far discussed the definition and scope of Construction History.³ The introductory section of the 7ICCH presented the most recent interpretation:

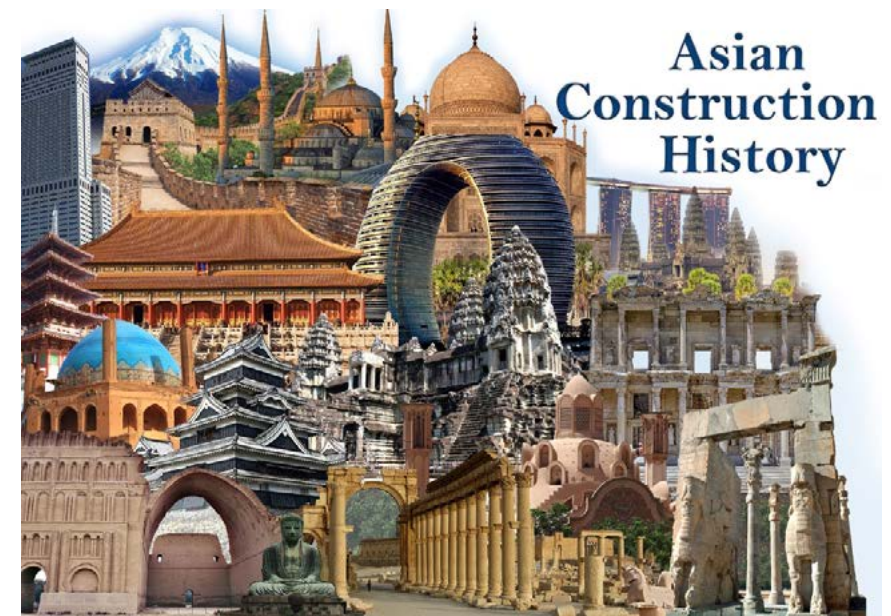


Fig. 1. 亚洲建筑杰作拼贴, 致敬亚洲建筑师与工程师的成就 (来源: 作者) A collage of the architectural masterpieces of Asia, aimed to celebrate the achievements of Asian architects and engineers (Source: authors)

者, 无论是集体 (承包商、材料生产商和供应商、学校、协会和机构) 还是个人 (工程师、建筑师、企业家、工匠)。在每个给定的地点和历史时期, 这些参与者都使用特定的技术、工具、机器和材料进行建造。他们遵循特定的规则和法律, 以特定的方式传授建造知识。他们的活动具有经济价值并属于特定的经济语境, 并且按照一系列社会和文化模式进行组织。”

这种诠释, 听起来更接近英国建造史协会的创始成员约翰·萨默森爵士在 1980 年代中期提出的 “建造世界的历史景观” 的概念。这一愿景唤起了人们对过去和现在建造社区的关注, 从而探索不同时期和地区的人们如何实现他们的建造。该研究取向, 关注了当前建造史阅读中被忽视的线索, 通过将建造史学科与人类学、哲学等其他领域相联系, 进而催生了新的知识领域。因此, 塞萨尔·戴利在 19 世纪提出的 “建造的哲学史” 的构想似乎与现实并不遥远。

“The study of construction cultures entails the analysis of the transformation of a community’s knowledge capital expressed in the activity of construction. As such, construction history is a broad field of knowledge that encompasses all of the actors involved in that activity: collective actors (contractors, materials producers and suppliers, schools, associations, and institutions) and individual actors (engineers, architects, entrepreneurs, craftsmen). In each given location and historical period, these actors build using particular technologies, tools, machines, and materials. They follow specific rules and laws, and they transfer knowledge on construction in a certain way. Their activity has an economic value and belongs to a particular economic context, and they organize themselves following a set of social and cultural models.”

This interpretation sounds closer to the concept of “the historical landscape of building world,” proposed in the mid-1980s by Sir John Summerson, one of the founding members of the British

¹ <https://7icch.org/7icch-presentation/>

² Davis defines “building culture” as “a conditioned system of knowledge, rules, procedure and habits” in which the building design and construction of each geographical region or time period is hold. Howard Davis, *The Culture of Building* (Oxford: Oxford University Press, 2006).

³ For more information, see Yiting Pan, James W.P. Campbell, “The Prequel of Built Environment: Studies of

Construction History in the UK”, *The Architect*, 2018 (5): No.195, pp.23-31; Mahdi Motamedmanesh, *The Influence of Architectural Form on the Development of Structural Systems: Tectonic Architecture and the Rise and Demise of New Families of Structure in West Europe Region and the US (1935-1965)*, PhD Dissertation, Technical University of Berlin, 2019. Chapter 2-Construction History: The Need for a Paradigm Shift, pp. 35-74.

(2) 建造史作为一门跨学科科学

与“建造世界的历史景观”模型相关的问题本质与范畴，超越了技术史或建筑风格史的视域。为了回答这些问题，建造史学者需要利用不同视角的互动，包括来自其他领域的视角，如：结构设计史、建筑实践史、职业发展史、社会变革或(紧张)关系史、工程经验/知识史、经济与资本主义史、劳工史、发展理论、城市史等。这就需要一种复杂的、超越建筑学科边界的“跨界”研究和“矩阵思维”。因此，建造史学者采用了跨学科研究方法，将自然科学、人文科学和工程学融合在一起。其中一些最常见的方法包括：

- 用于提出假设或追溯历史上的建筑师所采用的最初想法和施工策略的几何学分析
- 用于假设特定历史时期的施工过程的原比例重建，缩小比例的重建或虚拟建模实验
- 用于研究历史材料的组成和特征的考古学与化学分析
- 用于了解历史材料制造/加工工艺的X射线成像技术与实验室检测，结合现场细致的加工痕迹分析
- 用于了解历史建筑结构稳定性的极限分析、图形静力学、拉伸/剪切测试，以及3D激光扫描
- 用于揭示了建造方法变迁的档案研究、历史调查和现代和历史记录的文献研究
- 用于研究历史时期材料供应的经济学和统计学分析（例如价格、合同、采购等）
- 用于了解公众品味或社会偏好的艺术趋势评估、监管框架评估，以及社会经济参数评估

Construction History Society.⁴ This vision calls attention to the past and present construction communities,⁵ thereby exploring how people in different periods and regions materialize their buildings. This approach gives heed to neglected clues in the current reading of construction history, thus giving birth to new arenas of knowledge by connecting the Construction History discipline with other fields such as anthropology and philosophy. Thus, the idea of a “Philosophical History of Construction” brought forward by Cesar Daly in the nineteenth century seems not to be far from reality.⁶

(2) Construction History as an Interdisciplinary Science

The essence and scope of questions associated with the model of “historical landscape of building world” is beyond the history of technology or architectural styles. To answer them, construction historians need to draw upon the interaction of different perspectives, including those derived from other fields such as the history of structural design, the history of building practice, the history of professions, the history of social changes or tensions, the history of engineering experience/knowledge, the history of economy and capitalism, labor history, development theory, urban history, etc. This necessitates a sort of “cross-border” research and “matrix thinking” that is complicated and ventures beyond the boundaries of architectural disciplines.⁷ Thus, the interdisciplinary research methods employed by construction historians blend the natural sciences, the humanities, and engineering together. Some of the most common methods comprise:

- Geometric analyses to hypothesize about or trace the original ideas and construction strategies employed by historic architects
- Life-size reconstruction, and small-scale or virtual modelling to hypothesize about

(3) 建造史文化层面的技术“偏见”

跨学科方法的优势在于它提供了建造过往的多种认知维度，对地方性的建造传统和建造文化的全球理解显示出巨大的潜力。但另一方面，建造史的跨学科特征，也可能不可避免地使该领域的范畴显得宽泛而失去焦点。

然而，正如建造史上新兴“技术思维”流派的创始成员汤姆·F·彼得斯教授所指出的，“建造”本身应被视为一种文化（如政治学或社会学也是一种文化），具有它独特的“偏见”。换言之，彼得斯认为，建造史应关注每个地理区域或时间段内的技术文化的出现和进步。他认为，建造史的主流应始终关注技术与人类创造力的发展，同时应规避技术话语“政治化”，或被其他学科挟持。否则，就会对建造史学科的发展产生反作用。例如，彼得斯指出，过度关注技术的社会层面，将使建造史领域“简化为”仅以建造为名的社会史。

2. 亚洲建造史：呼吁跨文化合作

(1) 研究亚洲建造史的必要性

事实证明，第六届国际建造史大会（6ICCH）对建造史学科的贡献不斐。这次大会不仅是疫情大流行开始前的最后一次真正的线下会议，也是“国际建造史联盟”（IFCH）正式宣布成立的一届会议。国际建造史联盟的成立为该领域的进步带来了新希望，其七名成员国来自英国、西班牙、意大利、美国、法国、德国、葡萄牙，形成研究联盟以提供更坚实的合作基础。（图2）这些对各自所在地区建造的历史有着悠久研究传统的创始成员，主要来自西方国家。换句话说，这些发起者中没有来自东方建筑文化的代表。这一事实可能会引起任何熟悉亚洲建筑伟大历史的学者的思考。考虑到这片大陆独有的建筑成就，建立一个联结亚洲建造史研究的学术基地可能对亚洲社会大

construction process in historical times

- Archaeometric and chemical analyses for studying the composition and characterization of historical materials
- The use of X-ray images and laboratory tests, combined with on-site, meticulous study of work traces to understand the manufacturing/construction process
- Limit analysis and structural calculations, Graphic statics, tensile/shear tests, and 3D scanning to understand the stability of historic buildings
- Archival research, historical survey, and literary study of modern and historical transcripts that shed light on the transformation of construction methods
- Economic and statistical analyses (e.g. price, contract, purchase, etc.) for the study of material supply in historical times
- Evaluation of artistic trend, regulatory frameworks, and socio-economical parameters to understand the public taste or social preferences

(3) Technological “Bias” in the Cultural Aspects of Construction History

The biggest advantage of drawing upon an interdisciplinary approach is that it offers multiple angles for the cognitive understanding of construction in the past, thus presenting significant potential for a global understanding of local construction traditions and cultures. On the other hand, the interdisciplinary nature of Construction History may inevitably make the scope of this field too broad and seemingly lose focus. However, as Professor Tom F. Peters, one of the founding members of the emerging “technological thinking” trend in construction history noted, “Construction” should be regarded as a culture (such as political science or sociology), and thus it has its unique “bias”.⁸ In other words, Peters believes that the history of construction should focus on the advent and progress of a technological culture in

⁴ John N. Summerson, “What is the History of Construction?” *Construction History*, Vol.1, 1985, pp. 1-2.

⁵ The term “construction communities” refers to people/communities (plural: in different periods and places) associated with building construction (e.g. contractors, materials producers and suppliers, engineers, architects, craftsmen, etc.).

⁶ See, Peter Collins, *Changing Ideals in Modern Architecture*, London: Faber & Faber, 1965, p. 16.

⁷ For a fuller definition of matrix thinking, see Tom F. Peters, *Building the Nineteenth Century*, Cambridge: The MIT Press, 1996, p. 106.

⁸ Personal communication, 25-27 November, 2021. Peters believes that “the ‘culture of technological thought’ should be a focus for study because it demonstrates that technological thinking forms the strongest bias and in fact is the basis of our modern society” (personal communication, 12 June, 2018). Peters has shown that human-related factors such as religion, language, and nationality, which seem to have no connection with construction practice, have greatly impacted the emergence and advancement of building technology. For example, see Tom F. Peters, “Technological Thought and Theory: A Culture of Construction,” in *Proceedings of the First International Congress on Construction History*, ed. Santiago Huerta (Madrid: Instituto Juan de Herrera, 2003), pp. 1629-1637.



Fig. 2. 2018 年布鲁塞尔大会（6ICCH）最后一天会议上“国际建造史联盟”（IFCH）成立公告（图片来源：Clara Pimenta do Vale）
Announcement of the foundation of IFCH in the last day of 6ICCH, Brussels, 2018 (Source: Clara Pimenta do Vale)

有裨益。的确，立足亚洲或研究亚洲的亚洲建筑师和建筑工程师，可以通过妥善处理所在地区的文化遗产来拓宽视野——更不用说建筑也是一种文化。更具体而言，研究、记录和转移亚洲历史建筑师和工程师生产、开发和使用建筑知识的行为，可以丰富当今建筑师对建筑问题的看法。

建立一个研究亚洲建造史学术网络的重要性，可以从环境因素、与人相关参数两个不同的角度来看待。

第一类是环境因素，包括地理方面和气候方面。亚洲地震灾害图展示了这样一副图景：阿尔卑斯-喜马拉雅带，从东南亚、中亚，一直延伸至伊朗高原、小亚细亚乃至中欧。它穿过亚洲诸多地区，所带来的大量的活动断层，构成了人类生存的持续威胁。另一方面，亚洲的气候分类图给我们展示了另外一副图景：大多数亚洲地区都伴生着某种严峻的气候条件，无论是骄阳与干旱，季节性的暴雨，巨大的温差波动，甚至台风，亚洲人都需要应对大自然母亲对他们的严苛。这些视角提醒我们：为了应对其土地上恶劣的环境条件，亚洲文明开发了实用的技术，来保护自己免受自然灾害的影响。然而，许多这些历史上的创新技术尚未被研究或其价值尚未被认可。毋庸置疑的是，当

each geographical region or time period. He argues that the mainstream of Construction History should always direct attention to the simultaneous development of technology and human creativity, whereas avoiding the “politicization” of technological discourse or being held hostage by other disciplines. Otherwise, it becomes counterproductive to the development of the discipline of Construction History. As an example, Peters points out to excessive attention to the social aspect of technology that “reduces” the field of Construction History to a social history that only bears the name of construction.

2. Asian Construction History: Calling for a Cross-Cultural Co-operation

(1) The Necessity of Studying Construction History in Asia

The 6ICCH proved to be prolific for the discipline of Construction History; not only was it the last real conference before the start of the Pandemic, but also the official announcement of the foundation of the International Federation of Construction History (IFCH) raised new hopes for the progress of the field by providing a solid ground for better collaboration among its seven members from the United Kingdom, Spain, Italy, USA, France, Germany, Portugal.⁹ (Fig. 2.) These initiating members, which were equipped with a long history of research on the history of construction in their regions, were essentially from Western countries. In other words, there was no representative from Eastern building cultures amongst these initiators. This fact could potentially cause any scholar familiar with the great history of architecture in Asia to think.

Considering the building achievements unique to this continent, the establishment of an academic basis for networking on the history of construction in Asia could be of great benefit for Asian societies. Indeed, Asian architects and building engineers based in Asia or researching on Asia can

今天的建筑师和工程师可以从他们的前辈所采用的这些简单而实用的方法中学到重要课程。（图 3-4）

第二类是与人相关的参数。值得注意的是，高度复杂的城市化文化首先出现在亚洲。这些古老的文明孕育了冶金、数学、代数等不同的科学领域。这些成就对于建造史学家来说将更具有重要意义，当他们考虑到这些学科曾对亚

broaden their perspectives and widen their horizons through properly addressing the cultural heritages of their regions—not to mention that building is also some sort of culture. To be more specific, the act of studying, recording, and transferring the knowledge of building produced, developed, and employed by the historic architects and engineers of Asia can enrich the perspectives of present-day architects towards the matter of construction. The

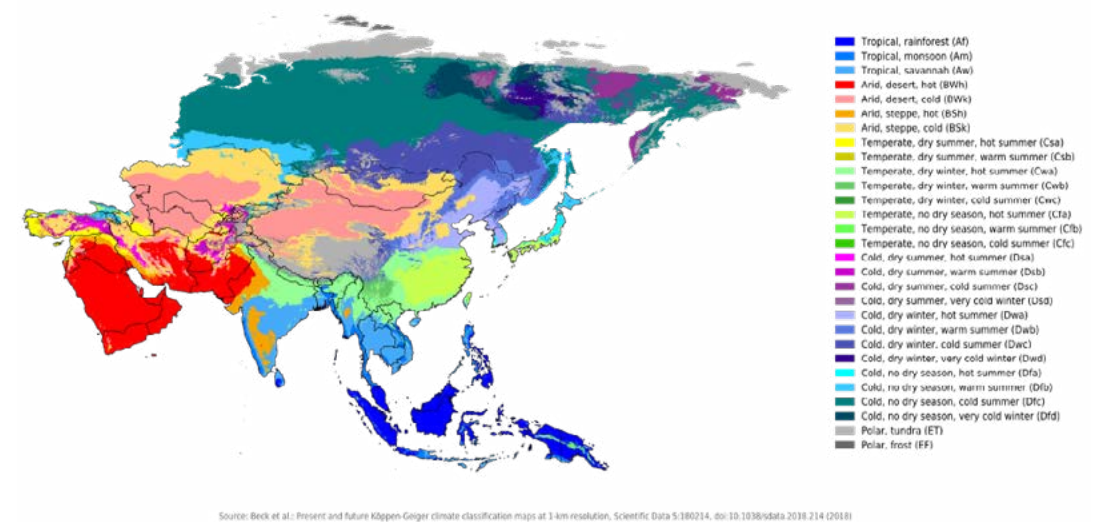


Fig. 3. 阿尔卑斯造山系统范围示意图 a schematic illustration of the extent of the Alpidic orogenic system¹⁰

Fig. 4. 亚洲气候分类图 Climate Classification Map for Asia¹¹

¹⁰ Source: <https://en.wikipedia.org/>

¹¹ Source: Köppen Geiger climate classification

⁹ Construction History Society (UK); Sociedad Española de Historia de la Construcción (Spain); The Construction History Society of America (USA); L'association francophone des historiens de la construction (France); Associazione Edoardo Benvenuto (Italy); Gesellschaft für Bautechnikgeschichte (Germany); Sociedade Portuguesa De História Da Construção (Portugal).

洲建筑杰作的出现, 以及一些伟大现代工程的原型探索所起的作用。然而遗憾的是, 由于(西方)学术界的希腊中心主义取向, 这些独特成就的研究尚未得到鼓励。亚洲不同文明之间所建立的特殊的互相关系, 是评估与人相关参数时需要考虑的另一个重要因素。纵观历史, 亚洲文明断断续续地受到境外入侵的影响。例如: 作为第一个世界帝国的阿契美尼德帝国的形成, 蒙古人的入侵, 奥斯曼帝国的统治, 以及伊斯兰的出现——它后来还被带到了北非和欧洲, 而这里只是略举几例而已。同样地, 我们在亚洲还见证了西方殖民主义, 各个欧洲国家借此探索、征服和开发了这片大陆的

importance of establishing an academic network for researching the history of construction in Asia can be viewed from two different perspectives, including environmental aspects and human-related parameters.

The first category, environmental aspects, includes geography and climate. The seismic hazard map of Asia reveals that the Alpine-Himalayan belt, which stretches from the southeast and central Asia all the way to the Iranian Plateau, Asia Minor, and central Europe, passes through many regions of Asia and its numerous active faults pose a constant life-threatening hazard. On the other hand,



新石器时代后期新月沃土 (约公元前 7500 年)
Fertile crescent Neolithic B (circa 7500 BC)



纳帕拉苏女王雕像
Statue of Queen of Napir Asu
(1300 BC)



汉谟拉比法典
Code of Hammurabi
(1750 BC)



早期华夏文明 (约公元前 5000 年)
Early Chinese civilizations (circa 5000 BC)



三星堆青铜面具
Bronze Mask with Protruding Eyes
of Shanxingdui
(ca. 1600 - 1046 BC)



编钟
Ceremonial bronze bianzhong
bells (musical instruments)
(1046-771 BC)

Fig. 5. 与人相关的参数: 亚洲文明的摇篮 Human-Related Parameters: Asia the Cradle of Civilization¹²



亚历山大帝国 (公元前 4 世纪)
Alexander's Empire (4th Century BC)



大英帝国 (20 世纪早期)
The British Empire (early 20th century)

Fig. 6. 亚洲的西方帝国主义 Western Imperialism in Asia¹³

大片地区。这些入侵, 极大地影响了亚洲人的生活性质和发展方向。这一文化适应过程中的本质和相互作用方面, 以及促成如此巨大变迁的技术传播渠道, 尚未得到充分认识或阐释。在这个新的研究领域, 学术工作需要团队合作。更重要的是, 关于当地社会或地理区域的建筑遗产的知识, 可以在防止亚洲许多地区的建筑中所观察到的自我异化方面发挥重要作用。(图 5-6)

(2) “亚洲建造史网”创办的挑战与经验

2021 年 11 月 2 日, 一群来自亚洲和/或研究亚洲的学者, 热切地相信填补上述知识空白的重要性, 他们在虚拟会议中相聚, 并成立了“亚洲建造史网”(ACHN: Asian Construction History Network)。第一次亚洲建造史虚拟小组会议, 聚集了来自中国、新加坡、伊朗、日本、印度、土耳其、澳大利亚和欧洲的创始成员。他们分享各自的经验、专

the climate classification map for Asia informs us that the majority of Asian territories suffer from some sort of intense climate conditions; whether it is the arid climate and intense sunlight, seasonal downpours, great temperature fluctuations, or even Typhoons, Asians need to cope with Mother Nature which is not so kind to them. These points remind us that: to contend with severe environmental conditions of their territories, Asian civilizations developed practical techniques to protect themselves against natural catastrophes. Many of these novel techniques have not yet been studied or recognized. Not to mention the great lessons that present-day architects and engineers can learn from these simple yet practical methods employed by their predecessors. (Fig. 3-4.)

With respect to the second category, human-related parameters, it is notable that highly sophisticated urbanized cultures appeared first in Asia. These ancient civilizations gave birth to different fields of science such as metallurgy, mathematics, algebra, etc. These achievements would be of greater significance for construction historians when one considers the advent of architectural masterpieces, as well as some precursors of modern engineering achievements in Asia. Unfortunately, due to the Hellenocentric orientation of the academic world, scholars have not yet been encouraged to study these unique achievements. The particular type of relationship established between different civilizations of Asia is yet another important factor that needs to be considered in any assessment of human-related parameters in Asia. Throughout history, Asian civilizations were intermittently influenced by incursions from beyond their borders. For instance, the formation of the Achaemenid Empire as the first World-Empire, the Mongol invasion, the sovereignty of the Ottoman Empire, and particularly the advent of Islam, which was brought also to North Africa and Europe, to name a few. Similarly, we witness Western colonialism

¹² 图片来源 Source: <https://en.wikipedia.org> (经本文作者编辑, edited by the authors of this paper)

¹³ 图片来源 Source: <https://en.wikipedia.org> (经本文作者编辑, edited by the authors of this paper)

业知识，并共同为启动工作献计献策（见下附名单）。在不久的将来，预计会有更多的亚洲学者参与到 ACHN 中来。“你对亚洲建造史网的愿景是什么？”这是发起人以及顾问委员为第一次虚拟会议选择的主题。

附：第一次亚洲建造史虚拟小组会议的参与者完整名单

发起人

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潘一婷副教授 (中国 - 加拿大)

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郑红彬副教授 (中国南部)
李海清教授 (中国东部)
陈云莲副教授 (日本)

Amit Srivastava 副教授 (印度 - 澳大利亚)

顾问委员

James W.P. Campbell 教授 (英国)
Tom F. Peters 教授 (美国 - 瑞士)

第一次虚拟会议的与会者讨论了与 ACHN 平台的建立和运营相关的挑战。一些主要难题包括：

- 确定独特 / 新的研究方向的挑战，尤其是在处理亚洲建造史的新课时
- 在亚洲的大学中，与建造史相关的教育课程或培训研讨会、以及相关出版物（尤其是用当地语言出版的）缺乏
- 缺乏亚洲建造史资源共享的跨国平台
- 建立跨国和跨地区网络联结的难度（在准备研究内容方面，以及创建合作领域方面）
- 学者们常常忙于自己的本职工作而难以分身
- 亚洲不同地区存在不应跨越的各种红线（在社会文化参数、政治等方面）

关注这些问题，可以保证 ACHN 的功能性和运行效果，尽管不同成员背后所意味着不同的地理起源、文化差异和个人利益。(Fig.7)

in Asia, whereby various European nations explored, conquered, and exploited large regions of the continent. These invasions vastly influenced the quality and direction of human lives in Asia. The essence and interactional aspects within this acculturation process, as well as the technological transmission channels that enabled such enormous undertakings, have not yet been fully recognized or articulated. The academic work on this new arena of study needs teamwork. More importantly, the knowledge about architectural heritage of local societies or geographical regions can play an important role in preventing the self-alienation observable in the architecture of many regions of Asia. (Fig. 5-6.)

(2) Challenges and Experience of Initiating the ACHN

Having a fervent belief in the importance of filling the knowledge gap discussed above, a group of scholars based in Asia and/or researching on Asia virtually gathered on 2 November 2021, and founded the Asian Construction History Network (ACHN). The first Asian Construction History Virtual Group meeting gathered the founding members from/based in China, Singapore, Iran, Japan, India, Turkey, Australia, and Europe to share their experience, expertise, and ideas for collectively deciding the start-up work (See the attached list below). In the near future, it is expected that more Asian scholars become involved in the ACHN. The initiators, as well as the advisory board chose “What is your vision of Asian networking on Construction History?” as the theme for the first virtual meeting.

Attached: A comprehensive list of the participants at the first Asian Construction History Virtual Group meeting

Initiators

Assistant Prof. Mahdi Motamedmanesh (Iran)
Associate Prof. Yiting Pan (China-Canada)

Founding Members

Dr. Changxue Shu (China-Belgium)
Associate Prof. Hilal Örmecioglu (Turkey)
Associate Prof. Jiat-Hwee Chang (Singapore)
Associate Prof. Hongbin Zheng (South China)
Prof. Haiqing Li (East China)

考虑到这些担忧，虚拟小组会议对以下发展方向达成共识：

- 研究：关注确定前沿的研究主题 / 方法
- 资源：关注建立和管理资源共享平台（例如更新 ACHN 网页、会议通知、准备关于亚洲建筑技术的出版物书目清单）
- 教育：关注定义建造史教学的最佳实践
- 网络：关注管理新成员和追求创新的网络模式
- 咨询：接受顾问委员们对 ACHN 发展的各方面意见

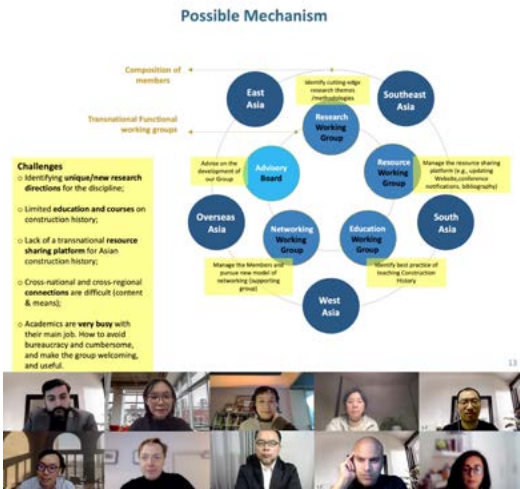


Fig. 7. 亚洲建造史上第一次虚拟会议上关于 ACHN 机制的可能性讨论（来源：作者）
Discussion on the possible mechanism of ACHN, the first virtual meeting of Asian Construction History (Source: Authors)

(3) 亚洲建造史网 (ACHN) 展望

回顾 ACHN 的建立，“恰当时机”的意义就变得清晰起来。事实上，成立一个致力于亚洲建造史研究的小组在 10 年前恐怕还很难实现。从第一届到第三届国际建造史大会（1ICCH-3ICCH），每届只有 5-7 名来自亚洲（或从事亚洲建筑工艺研究）的与会者出席。

Associate Prof. Yunlian Chen (Japan)
Associate Prof. Amit Srivastava (India-Australia)
Advisory Board
Prof. James W.P. Campbell (UK)
Prof. Tom F. Peters (US-Switzerland)

Participants of the first virtual meeting discussed the challenges associated with the establishment and operation of ACHN platform. Some of the main issues comprise:

- The difficulty of identifying unique/new research directions, especially when dealing with Asian construction history
- The existence of limited educational courses or training workshops, as well as publications (particularly in local languages) on construction history at Asian universities
- The lack of a transnational platform for sharing resources on the history of construction in Asia
- The difficulty of building cross-national and cross-regional connections (in terms of preparing research content & creating areas of collaboration)
- The intense occupation of academics with their main job at research centres
- The existence of various red lines (in terms of socio-cultural parameters, politics, etc.) in different regions of Asia that should not be crossed.

Attention to these remarks guarantees the functionality and performance of ACHN, despite geographical origins, cultural differences, and personal interests of the members.

Having these concerns in mind, there is a scholarly consensus on the followings:

- Research: focus on identifying cutting-edge research themes/methodologies
- Resource: focus on establishing and managing a shared platform for resource (e.g. updating the ACHN Webpage, conference notifications, preparing a bibliographical list of publications on the building techniques of Asia)
- Education: focus on defining the best practice of teaching the Construction History
- Networking: focus on managing new members and pursuing innovative models of networking

这种局面的转折点是在巴黎举办的第四届国际建造史大会（4ICCH，2012 年），那次会议吸引了 20 多名关注亚洲相关主题的参与者。2010 年代初也见证了建造史教育面扩大的新机遇。“伊拉斯谟建造史强化暑期夏令营”（2011-3）由剑桥大学（英国）、法语布鲁塞尔自由大学（比利时）、荷语布鲁塞尔自由大学（比利时）、勃兰登堡科技大学科特布斯（德国），和德国联邦国防军大学（德国）联合筹办。这也为亚洲学生提供了积极参与各种建造史培训课程的机会。在此之后，这些学生成为当地社区建造史学科的倡议者。今天，来自亚洲但在西方接受教育的博士生们，已经成长为各自国家学术氛围中的早期学者。他们寻求契机在他们的国家引荐该学科，并针对他们感兴趣的课题开设大学课程。他们在前进的道路上并不孤单，因为他们得到了欧洲和亚洲资深学者的支持。在 ICCH 的后几届大会中，研究建造史的亚洲研究人员数量逐渐增加（图 8）。以上再次证明了，亚洲建造史网的发展必然需要时间才能成熟。

与 ACHN 类似的新团体和协会的发展，证明了团队合作的重要作用以及对可行性规划的依赖，尤其是在早期阶段。这需要一群热心的创始成员紧密合作，携手并进，从而在现有资源的帮助下，推动亚洲建造史学科的知识边界。成员应就核心问题坦诚地分享他们的建设性想法，例如：成员如何能从 ACHN 中受益或 ACHN 如何支持其成员？ACHN 的网络机制是什么？从主题聚焦、活动形式、跨国合作等方面，可以开展什么样的创意活动？ACHN 网页中应包含哪些元素？

关注 ACHN 的未来前景，“身份”是定义该组织的独特角色、话语和使命的关键要素。ACHN 应与 ICCH、CHS、SAH 以及其他类似组织保持密切联系，以获得支持或建议，从而促进对亚洲建造历史的研究。同样，应该努力联合与支持对亚洲建设史的独立研究。研究亚洲独特的建筑贡献应该是关注的焦点；应该强调亚洲建筑师和工程师在建筑技术进步中的

- Advisory: receiving advice on the development of the Group in all aspects

(3) Prospect on the Asian Construction History Network (ACHN)

Looking back at the establishment of ACHN, the significance of proper timing becomes clear. Indeed, the establishment of a group devoted particularly to the history of construction in Asia would not be feasible 10 years ago. From the first to the third rounds of International Congress on Construction History (1ICCH-3ICCH) only 5-7 participants from Asia (or conducting research on the building crafts of Asia) showed up. The number of interested parties increased drastically in the 4ICCHs, as the Paris Congress (2012) attracted more than 20 participants focused on topics related to Asia.

The beginning of the 2010s also witnessed new opportunities for educating construction history on a large scale. “The Erasmus Intensive Summer School in Construction History” (2011-3) was organized jointly by the University of Cambridge (UK), Université Libre de Bruxelles (Belgium), and Vrije Universiteit Brussel (Belgium), Brandenburg University of Technology Cottbus (Germany), and Bundeswehr University (Germany). This provided Asian students with the chance to actively participate in various training courses on Construction History. Later, these students became voice or face of the Construction History discipline at their local communities.

Today, Ph.D. students from Asia but trained in West have grown to early-stage scholars in the academic atmosphere of their respective countries. They seek to introduce the discipline in their countries, as well as establishing university courses to their topic of interest. They are not alone in the path ahead as they receive support from senior scholars both in Europe and Asia. The number of researchers dealing with the history of construction increased gradually in later rounds of ICCH (Fig 8). All the above shows that the development of an Asian network on Construction History inevitably required time to reached its maturity.

The development of new groups and associations similar to ACHN demonstrates

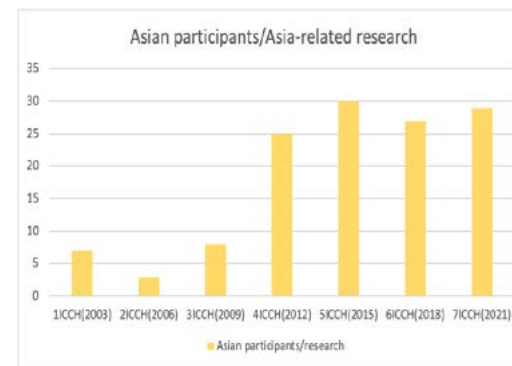


Fig. 8. 对亚洲建造史感兴趣的参与者数量的显著增加。（资料来源：作者根据七届世界建造史大会论文集作者名单所推导出的数据）

The dramatic increase in the number of participants interested in the history of construction in Asia. (Source: Authors, based on the data bank derived from the proceedings of seven rounds of ICCH)

杰出作用，以及他们在世界建造史上的真实地位。然而，毫无疑问，那些不知名的英雄——普通的建筑从业者，以及他们在这些亚洲成就背后的贡献，也不应被遗忘。亚洲是文明的摇篮，古代建筑或建筑技术的杰作首先出现在这一地区。不仅西方主导的学术研究普遍忽视了该地区独有的成就，亚洲建筑师或工程师的现代成就也是如此。（图 1）

该小组在锻造“亚洲建造史”一词时，选择了一个形容词词性的“亚洲”（Asian，而不是 in Asia），用以描述与亚洲相关，或与亚洲人、亚洲文化和亚洲传统相关的，特定类型的“建造史”。因此，这个名称（Asian Construction History）不仅旨在促进对“亚洲的”建造史的研究，用意中也包涵了：使得海外的亚洲人、以及在澳大利亚、欧洲和北美的亚洲移民，研究亚洲建筑师和工程师对海外地区建筑技术进步或成就的影响。总而言之，ACHN 的使命可归结成一句话：在西方主导的国际舞台上推动亚洲建造史研究，并且加强亚洲建造史领域的亚洲网络和学术合作。值得强调的是，虽然建造史是一门蓬勃发展的学科，但学科的丰富性只能通过各个领域的融合来增强。因此，ACHN 确实要支持并鼓励跨学科研究。

the essential role of team work and reliance on an achievable planning in their advancement, particularly at an early stage. This necessitates a team of enthusiastic founding members to work closely and hand in hand, thereby pushing the boundaries of knowledge on the Asian construction history discipline with the help of their existing resources. Members should openly share their constructive ideas regarding central questions such as: How could ACHN potentially benefit from or support its members? What could be the networking mechanism of ACHN? What kind of creative activities can be developed in terms of the focus theme, format, and transnational cooperation? What elements should be included in the ACHN webpage?

Keeping an eye on the future prospects of ACHN, “identity” is a key element that defines the group’s unique role, voice, and mission. ACHN should maintain close links with ICCH, CHS, SAH, as well as other similar societies to receive support or advice, thereby facilitating research on Asian Construction History. Similarly, efforts should be targeted toward the unification and support of isolated research on the history of construction in Asia. The study of unique architectural contributions of Asia should be the focus of attention; the distinguished role of Asian architects and engineers in the advancement of building techniques, as well as their real place in the world history of construction should be highlighted. However, undoubtedly, those anonymous heroes – the ordinary construction practitioners and their contributions behind those Asian achievements should not be forgotten. Asia is the cradle of civilization, and masterpieces of ancient architecture or building techniques appeared first in this region. Not only the Western-led scholarship has commonly ignored the achievements unique to this region, but the same is also true about the modern achievements of Asian architects or engineers. (Fig.1.)

By forging the term “Asian Construction History,” the group makes reference to “Asian” as an adjective to describe a particular type of “Construction History” related to Asia or its people, culture, and

tradition. Hence, not only does it promote research on the history of construction in Asia, but also allows overseas Asians, as well as Asian immigrants in Australia, Europe, and North America to study the influence of Asian architects and engineers on the progress or advancement of building techniques in oversea regions. In conclusion, the mission of ACHN can be described as: promoting research on the history of construction in Asia in the Western-led international scene, as well as enhancing Asian networking and academic cooperation in the sphere of Asian construction history. It should be emphasized that whilst the history of building construction is a thriving and growing discipline, the subject's richness can only be enhanced by the confluence of various fields. Therefore, ACHN supports and indeed encourages interdisciplinary research.



约翰·萨默森爵士 Sir John Summerson

资料来源 This article is inspired by the following sources:

“SUMMERSON, SIR JOHN (1904-1992)” <https://www.english-heritage.org.uk/visit/blue-plaques/john-summerson/>

“John Summerson Biography” <https://www.notablebiographies.com/supp/Supplement-Sp-Z/Summerson-John.html>

“John Newenham Summerson: A Select Bibliography” *Architectural History*, 1997, Vol. 40 (1997), pp. 289-307.

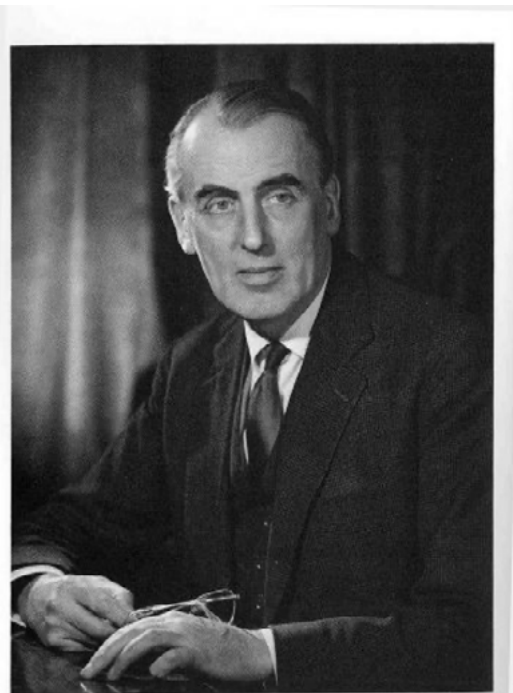
J. B.-J. “Book Review: Georgian London by John Summerson”, *The Town Planning Review*, Summer, 1947, Vol. 19, No. 3/4 (Summer, 1947), pp. 176-179.

约翰·萨默森于1904年11月25日出生在英国东北部的达灵顿。1907年他的父亲去世后，年轻的萨默森与他的母亲在英格兰和欧洲多地辗转和生活过。他对古建筑的迷恋可以追溯到1915至1918年，期间他德比郡马特洛克附近的里伯城堡就读。1918至1922年，萨默森在哈罗公学就读，1922年毕业后，他进入伦敦大学学院巴特利特建筑学院接受建筑训练，随即在吉尔斯·吉尔伯特·斯科特爵士工作室工作。1929-1930年，萨默森在爱丁堡艺术学院任教，期间倡导现代主义。之后，他受雇于“现代建筑研究小组”（MARS），并担任了《建筑师和建筑新闻》（1934-41）的助理编辑。虽然在一段时间内，他倡导并支持现代主义的主张，但最终转向关注传统建筑及其价值。

作为一名历史学家，萨默森的一个重要贡献是引起了公众对历史建筑的关注，为下一代保护了伦敦。1941年，使命感促使萨默森参与并带领“国家建筑记录”工作组，这个属于城镇与乡村规划部下属的研究单位，致力于在二战期间通过拍摄、描述和绘画记录伦敦地标，让它们被德军炸弹摧毁之前得以保存。作为该组织的副主任，萨默森亲自拍摄了许多伦敦地标。

John Summerson was born in Darlington, northeast England on 25 November 1904. After his father passed away in 1907, the young Summerson and his mother traveled to and lived in numerous places in England and Europe. His fascination with ancient architecture dates back to his school days between 1915 and 1918 at Ribe Castle near Matlock, Derbyshire. He attended Harrow School between 1918 and 1922. After graduation from there in 1922, Summerson enrolled at the Bartlett School of Architecture at University College London for architectural training before he worked in the office of Sir Giles Gilbert Scott. In 1929-1930, he taught for a year at the Edinburgh College of Art, during which time he advocated for modernism. He was later employed by the Modern Architectural Research Group (MARS), and served as assistant editor of the *Architect and Building News* (1934-41). Although he continued to support modernism for some time, he eventually turned to believe in traditional architecture and its values.

One of Summerson's important contributions as an architectural historian was that he brought public attention to historic buildings and preserved London for the next generation. In 1941, a sense of mission led Summerson to join and lead

约翰·萨默森爵士 Sir John Summerson¹

“国家建筑记录”今天成为了英格兰历史档案馆。它拥有 1850 年代至今超过一千二百万张照片、图纸、报告和出版物，范围涵盖整个英格兰。

萨默森曾在许多公共机构和委员会任职，包括登录建筑委员会（1944-1966）、皇家美术委员会（1947-54）、皇家历史遗迹委员会（1953-74）和历史建筑委员会（1953-78）。除了在爱丁堡艺术学院任教（1929），他也曾分别在牛津大学（1958）和剑桥大学（1966）任教一年。他还先后在 AA 建筑联盟学院和伦敦大学学院巴特利特建筑学院讲授建筑史多年。

作为一位建筑作家，萨默森非常高产。1997 年的《建筑史》期刊发表的一篇题为《约翰·萨默森：精选出版目录》的专题文章，罗列了他从 1927 至 1995 年期间共发表的 302 项著作，其中有些多次再版和重印，并被翻译成多国语言，例如《建筑的古典语言》。出版于 1945 年的《乔治时代的伦敦》是萨默森最负盛名的著

the “National Architectural Record”, a research unit under the Ministry of Town and Country Planning, dedicated to the documentation of London landmarks through photography, description and drawing, before they were destroyed by German bombs during World War II. As the organization's deputy director, Summerson used camera and photographed many of the London landmarks by himself. The National Architectural Record is today the Historic England Archive. It has over 12 million photographs, drawings, reports and publications spanning the whole of England from the 1850s to the present day.

Summerson served on a number of public bodies and committees, including the Listed Buildings Committee (1944-1966), the Royal Fine Arts Commission (1947-54), the Royal Commission on Historical Monuments (1953-74), and the Historic Buildings Council (1953-78). Besides lecturing at Edinburgh College of Art (1929), He taught for one academic year at University of Oxford (1958) and University of Cambridge (1966) respectively. He also lectured for many years on the history of architecture at the Architectural Association and then at Birkbeck College, the University of London.

As an Architectural writer, Summerson was very productive. A feature article published in Architectural History in 1997 titled “John Newenham Summerson: A Select Bibliography” listed 302 items of his publications between 1927 and 1995, among which some were revised and reprinted many times, and translated into many languages, such as The Classical Language of Architecture. Georgian London is Summerson's best known work, published in 1945. The book originated from a series of lectures prepared for the Courtauld Institute in 1939, but the WWII delayed its publication. A. Lawrence Kocher in his book review on Georgian London noted that Summerson “was feverishly working” during WWII, “to complete his ‘architectural record’, showing the devastating effect of bombing

作。该书起源于 1939 年为考陶德学院准备的一系列讲座，但二战拖延了它的出版。A. 劳伦斯·科赫尔在他对《乔治时代的伦敦》的书评中写道：萨默森在二战期间“忘情地工作”，“以完成他的‘建筑记录’，从而展示轰炸对伦敦的破坏性影响”。科赫尔评价道：“尽管乔治时期伦敦关注的是伦敦过去的历史，然而作者对伦敦历史建筑命运详尽的了解，使这部作品具有特殊的纪实价值。偶尔出现的括号内的‘严重损坏’或‘完全拆除’评论，为记录注入了悲怆的气息。”

萨默森另一个广为人知的身份，是担任约翰·索恩爵士博物馆²馆长近 40 年：从 1945 年被任命直至 1984 年退休。该博物馆的重要收藏主要由索恩爵士（1753-1837）作为乔治时期重要建筑师的成就、及其留给英国公众的私宅、个人艺术和文物组成。经过萨默森对这份宝贵遗产的深入研究和坚定守护，今天，约翰·索恩爵士博物馆的案例可以说是世界上任何建筑史课程中不可分割的一部分。

萨默森于 1958 年被英国女王封为爵士，并于 1987 年被授予荣誉勋章。

on London.” Kocher commented that: “Although Georgian London is concerned with the past history of London, nevertheless, the author's intimate day-to-day knowledge of the fate of London's historic buildings gives the work a special documentary value. A note of pathos is injected into the record by the occasional bracketed comment ‘badly damaged’ or ‘completely demolished.’”

Summerson is best known as the curator of the Sir John Soane's Museum for nearly 40 years: from his appointment in 1945 until his retirement in 1984. The Museum's importance lies in the achievement of Sir John Soane (1753-1837) as an important Georgian architect and his home and personal collection of art and artifacts that he left to the British public. Thanks to Summerson's in-depth research and persistent protection of this precious heritage, the case of Sir John Soane's Museum may have become an integral part of any architectural history curriculum in the world.

Summerson was knighted by the Queen in 1958 and awarded the Medal of Honor in 1987.

1. 2.



1. 约翰·索恩爵士博物馆外观 Exterior of Sir John Soane's Museum

2. 约翰·索恩爵士博物馆内景 Interior of Sir John Soane's Museum

2 Sir John Summerson. “Sir John Soane's Museum” (A talk recorded in 1979, 22 minutes) <https://www.pidgeondigital.com/talks/sir-john-soane-s-museum/>

1 Source: <https://chicagoboyz.net/archives/category/architecture>

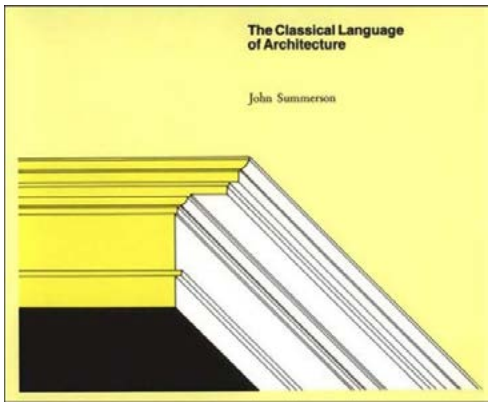
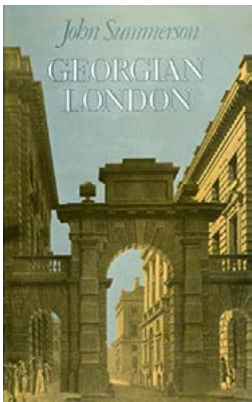
约翰·萨默森爵士代表作
Representative Publications of Sir John Summerson

资料来源 Sources:

“John Newenham Summerson: A Select Bibliography” *Architectural History* , 1997, Vol. 40 (1997), pp. 289-307.

《约翰·纳什：国王乔治四世的建筑师》（首版 1935，修订版 1949）
《乔治时代的伦敦》（首版 1945，重印版 1947，1946，修订版 1962，第二版 1969，第三版 1978，新版 1988）
《天堂宅邸及其他建筑相关论文》（散文集）（1949）
传记《约翰·索恩爵士》（伦敦，1952）
《1530—1830 年的英国建筑》（首版 1953，修订版 1955，1958，1963，1969，1970，1977，1983，1991）
《约翰·索恩爵士博物馆新介》（首版 1955，修订版 1966，第三版 1969）
《建筑的古典语言》（文字和插图用于 1963 年 5 月至 7 月发表的六次 BBC 演讲）。（六篇演讲和插图的出版，伦敦：Methuen 和麻省理工学院出版社，美国，1964 年；修订版，1980 年。翻译版包括：瑞典语（1968 年）、意大利语（1970 年）、西班牙语（1978 年）、法语（1981）、葡萄牙语（1982）、德语（1983）、日语（1989）、中文（1994）。）
《伊尼戈·琼斯》（1965 年）
《维多利亚建筑：四项评估研究》（基于在哥伦比亚大学的演讲，首版 1968，1970，1971）
论文集《不浪漫的城堡》（1990）
《国王们的工程史》（1975 年，1982 年）

1. 2.



1. 萨默森《乔治时代的伦敦》的封面 Book cover of Summerson's Georgian London
2. 萨默森《建筑的古典语言》的封面 Book cover of Summerson's The Classical language of Architecture

什么是建造史？（节选）
What is the history of construction ? (Excerpt)

约翰·萨默森 John Summerson

资料来源 Sources:

John Summerson. “What is the history of construction?” *Construction History* , 1985, Vol. 1 (1985), pp. 1-2.

我认为建造史团体的目的是鼓励对建造历史的研究。这具体意味着什么？它可以指两件事：(a) 结构设计的历史，和 (b) 建筑实践的历史。毫无疑问，该团体对这两方面都在关注，但我认为值得强调之间的差异。

结构设计的历史倾向于将自身分解为研究连续创新及其对实践的影响。例如，你可以研究 17 世纪出现的理性木结构的设计，18 世纪铁结构的出现，以及 19 世纪末钢筋混凝土的运用。这些是涉及理论发展的序曲，从外部找到了进入建筑的途径，它们通常与某种材料有关。

建筑实践的历史是另一回事。它涉及在建筑工地将建筑物造起来的全过程，包括从工人招聘、材料选择、工地现场的材料和设备运输，下至建筑事务所画图材料的供应，营造商和建筑师的支付方法等等一切。这是一个复杂过程的历史，始终处于变化的状态，但历史学家的工作就是调查和阐述。

给我印象深刻的，是编辑名单¹上体现的“建筑世界”的庞大分支及其与社会的独特关系。这种分支赋予建筑史魅力，亦可能赋予其当代价值。这就是为什么我倾向于建议，建造史团体的成立应将视野放在对“建筑世界”的调查，而不仅仅是强化对孤立的变化元素的研究。

你会注意到，我避免使用“建筑工业”这个术语。我真的不知道什么是“建筑工业”，也不知道这种表达是何时开始流行起来的。毫无疑问，它意味着某种彻底的变化，而这正是

I take it that the purpose of a Construction History Group would be to encourage the study of the history of construction. What precisely does this mean? It can mean two things: (a) the history of structural design and (b) the history of building practice. The Group would, no doubt, interest itself in both but I think it worthwhile to emphasise certain differences.

The history of structural design tends to resolve itself into the study of consecutive innovations and their impact on practice. You can study, for instance, the emergence of rational carpentry design in the seventeenth century, the entry of iron construction in the eighteenth or the adoption of reinforced concrete at the end of the nineteenth. These are episodes involving theoretical development which found their way into building from outside. They are usually concerned with one material.

The history of building practice is another thing. It involves the total process of getting a building up on the site, including everything from the recruitment of labour, selection of materials, transport of materials and equipment on the site, down to the supply of drawing materials for the office, the method of payment to builder and architect and so on and so on. It is the history of a complicated process always in a state of change which is the historian's business to investigate and expound.

What impressed me about the editor's list was the tremendous ramification of the 'building world' and its unique relationship to society. This ramification is one of the things which gives building history its fascination and perhaps its contemporary value. That is why I

¹ 翻译者注：这里指英国《建造师》的创始人及主编约瑟夫·汉森 (Joseph Hansom, 1803~1882) 在 1842 年的创刊号中罗列的至少 102 种期刊的潜在读者名单。

一个需要回答的问题。

我的印象是，年轻一代的建筑历史学者正在朝着这类研究的方向前进。在过去的三十五年里，“建筑史”意味着风格、赞助人和理论的历史。我们现在对这些主题已经有了相当的了解。现在有一种趋势是更深入地研究社会、经济和工业的腹地。现在的一种趋势是去探究可称为建筑之“大宗国民产品”，而不是追求冰山一角的上流建筑之风格和赞助人的研究。

我们预期从鼓励这种研究中获得什么样的结果？如果我们看一下汉森的名单，我们就能立即发现一些主题，它们可以成为学术论文的绝佳研究对象，在许多情况下，也可以成为有吸引力的出版著作。这里蕴藏着一个全新的学术研究领域。同时，还有一项任务是确定研究材料的范围和位置，并在必要时确保其保护和可获得性。

（经《建造史》期刊授权，王小木、潘一婷编译）

am inclined to recommend that, in the inauguration of a building history group, the sights should be set to survey the 'building world' and not merely to intensify the study of isolated areas of change.

You will note that I have avoided the term 'building industry'. I do not really know what the 'building industry' is, or when the expression first came into fashion. No doubt it signified a radical change of some kind and that is exactly the sort of question which needs answering.

I have the impression that the younger generation of architectural historians is instinctively moving towards studies of this kind. For the past thirty-five years 'history of architecture' has meant history of style, patronage and theory. We now have a pretty fair command of these subjects. There is a tendency now to look more deeply into the social, economic and industrial hinterland. There is a tendency to look at what one may call the 'gross national product' of building instead of the sophisticated peaks where the play of style and patronage is the rewarding theme.

What sort of results may we anticipate from the encouragement of studies of this kind? If we glance at Hansom's list we can at once identify themes which could make excellent subjects for academic dissertations and, in many cases, attractive published works. Here is a whole new field for academic enquiry. Meanwhile, there is the task of ascertaining the extent and location of material and, where necessary, securing its protection and availability.

(Permission granted by *Construction History*, translated and edited by WANG Xiaomu, PAN Yiting)

实践案例 Case Study

罗马万神庙演变研究：以门廊及其青铜屋顶桁架为例 Investigating the Evolution of the Pantheon in Rome: The Intriguing Case of the Portico and its Bronze Roof Truss

资料来源 This article is inspired by the following sources:

Carroll L. V. Meeks. “Pantheon Paradigm”. *Journal of the Society of Architectural Historians*, Dec., 1960, Vol. 19, No. 4 (Dec., 1960), pp. 135-144.

Mark Wilson Jones. “The Enigma of the Pantheon: The Exterior”, pp.199-212, in *Principles of Roman Architecture*. New Haven: Yale University Press, 2003.

Dorothee Heinzelmänn, Michael Heinzelmänn and Werner Lorenz. “The metal roof truss of the Pantheon’s portico in Rome – 152 tonnes of bronze”. *Construction History*, 2018, Vol. 33, No. 2 (2018), pp. 1-22.

Paul A. Ranogajec. “The Pantheon (Rome)” <https://smarthistory.org/the-pantheon/>

1. 万神庙范式

罗马万神庙可能是世界上最受推崇的古典建筑研究对象之一。虽然我们通常更关注它的内部，但是万神庙的外观同样具有迷人魅力。卡罗尔 L.V. 米克斯在他发表于 1960 年的论文《万神庙范式》中，讨论了文艺复兴时期建筑师及其后来欧洲和美国的新古典主义建筑师对万神庙的广泛“模仿”。米克斯提到帕拉第奥和贝尔尼尼都把万神庙解读为两个基本形体的结合：圆形大厅（一个覆盖穹顶的圆柱体）和门廊。米克斯强调这种“模仿”的指摘是不实的，因为这些建筑师都从未打算“复制”，而是把万神殿看成激发想象力和创新的重要灵感来源。米克斯找到了支撑他论点的佐证：那就是两个时期的建筑师都喜欢改变门廊形式，或增添新的元素。万神庙外观的经典地位及其对后世的巨大深远影响，使得万神庙成了名副其实的设计“范式”。（图 1）

2. 建造沿革

• 公元 27 年，第一座万神殿由罗马皇帝奥古斯都的女婿阿格里帕建造。

1. Pantheon Paradigm

The Pantheon in Rome is one of the most admired and studied classical monuments in the world. Although its interior usually receives the most attention, the exterior of the Pantheon is equally fascinating. In his article titled “Pantheon Paradigm” (1960), Carroll L. V. Meeks discussed the phenomenon of the wide “imitation” of the Pantheon firstly by Renaissance architects and then by Neo-classicist architects in Europe and America. Meeks mentioned that both Palladio and Bernini had interpreted the Pantheon form as the union of two basic forms: a rotunda (a vaulted cylinder) and a portico. Meeks emphasized that the accusation of “imitation” is ungrounded, as these architects never intended to “copy”, but saw the Pantheon as a great source of inspiration for their imagination and innovation. Meeks substantiated this argument by noting that the architects from both periods were keen to change the portico or add new elements. The classic status of the Pantheon's exterior and its subsequent immense, wide-ranging influence has made the Pantheon a veritable design “paradigm”. (Fig.1)

- 公元 110 年，在图拉真皇帝统治期间（公元 98-117 年），第一座万神殿被大火烧毁。
- 公元 111 至 112 年间，由于严重的火灾破坏，图拉真皇帝完成了重建万神殿的规划工作和准备工作。
- 公元 113 年至 114/115 年间，圆形大厅的基础和下部完成。今天，在万神殿的这些部分仍然可以找到印有图拉真统治日期的砖块。
- 在公元 116/117 年，圆形大厅的建造工作仍在继续，而门廊的建造则中断了，这可能是由于埃及为柱廊柱提供的石材出现了供应困难的情况。
- 公元 118-123 年，在哈德良皇帝（公元 118-138 年）的领导下，圆顶和门廊连接部分完工。
- 公元 123-125 年，青铜屋顶结构建造完成。
- 公元 125-127 年，万神殿建造完成并进行了献神仪式。
- 1625 年，青铜屋架被教皇乌尔班八世拆除，因为他想使用青铜材料制作圣天使城堡的大炮。由此这些青铜屋架被木屋架取代（保留至今）。
- 1892 年，法国建筑师乔治·切丹根据砖块上的印制日期，发现万神庙的大部分砖块是在公元 123 年制作并砌筑的。



Fig.1. 万神庙的外观
The exterior of the Pantheon¹

2. Construction Development Outline

- In c.27 AD, the first Pantheon was built by Agrippa, the son-in-law of the Roman Emperor Augustus.
- In 110 AD, during the reign of Emperor Trajan (98-117 AD), the first Pantheon was destroyed by fire.
- Between 111 and 112 AD, due to severe fire damage, Emperor Trajan completed the planning work and preparations for the reconstruction of the Pantheon.
- Between 113 and 114/115 AD, the foundation and the lower parts of the rotunda were completed. Bricks stamped with the date from Trajan's reign can still be found in these parts of the Pantheon.
- In c.116/117 AD, the building work of the rotunda continued, while the construction of the portico was interrupted, probably due to difficulties with stone supply from Egypt for the portico columns.
- In 118-123 AD, under the leadership of Emperor Hadrian (118-138 AD), the dome and the intermediate block were completed.
- In 123-125 AD, the bronze roof structure was constructed.
- In 125-127 AD, the Pantheon was completed and consecrated.
- In 1625, the bronze roof truss was pulled down by Pope Urban VIII for using the bronze to produce canons for the Castel Sant' Angelo. The then it was replaced by the timber roof (still stands today).
- In 1892 the French architect Georges Chedanne (1861-1940) discovered that most of the bricks were made and placed in the Pantheon in 123 A.D., a date stamped on the bricks.

3. 历史难题

因为其中蕴含的许多未解之谜，万神殿一直是建筑史中受到广泛讨论的研究对象。在其中最受关注的问题之一，是入口门廊和圆形大厅之间不协调的交接。另一个问题是青铜屋架的形制与工艺情况，这个屋顶在 1625 年就被拆除了。

3. Historical Questions

The Pantheon has long been a debated problem of Architectural History due to its many mysteries. One of the problems was the inharmonious junction between the portico and the rotunda. Another problem is the form and craftsmanship of the bronze roof truss above the portico, which was pulled down in 1625.

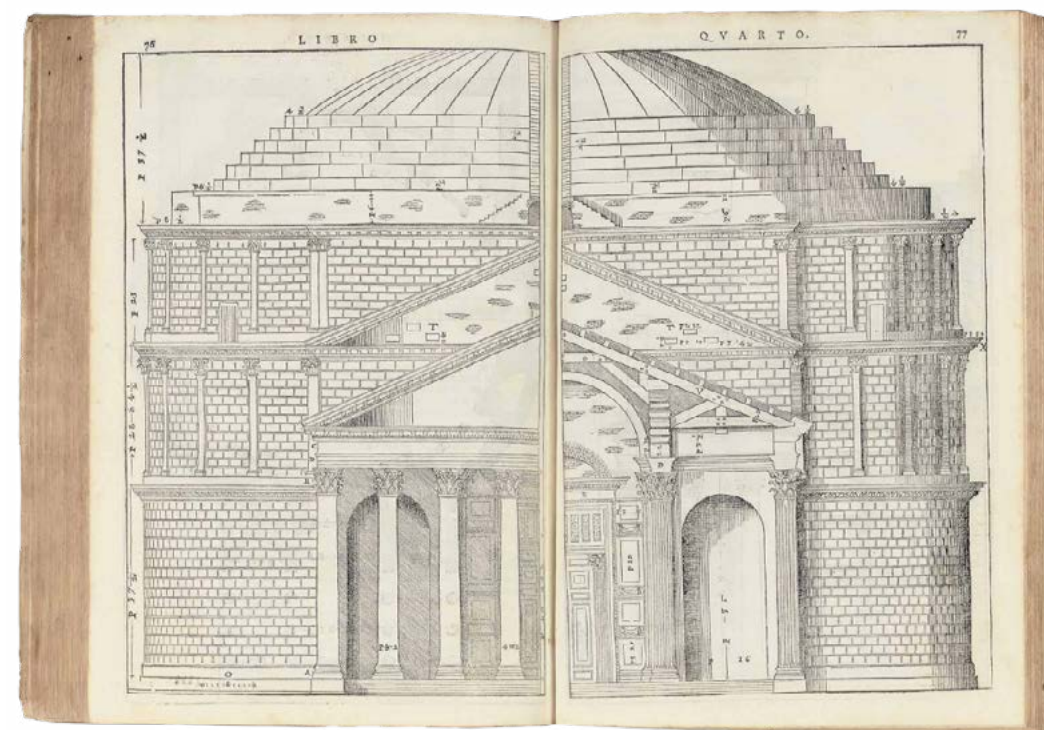


Fig.2. 帕拉第奥《建筑四书》中的万神庙插图，1570 年
The Pantheon in Palladio's Four Books of Architecture in 1570²

3.1 入口门廊双层山花之疑

门廊和圆形大厅的“古怪连接”常常让专家也感到困惑。因为从侧面看，门廊突出的山花之上似乎还有二层山花的痕迹，换句话说，这个比例矮小的门廊的元素似乎无法和圆形大厅的元素相互对齐（图 2）。基于这样的情况，我们提出如下问题：这个门廊是原初的设计吗？如果是，为什么要设计成这样？如果不是，什么原因造成了改建？

3.1 The Question of the Second Pediment for the Portico

The “awkward junction” between the portico and the rotunda often puzzled even the experts. Looking from the side, one would discover that there seem to be traces of a second pediment above the protruding pediment, in other words, the existing portico has stunted proportion and the major elements of the portico do not align with the elements on the rotunda (Fig.2). With the above impressions in

¹ Source: photo by Enzo Abramo, License: CC0 Public Domain

² Source: PALLADIO, Andrea (1518-1580). I quattro libri dell' architettura. Venice: Domenico de' Franceschi, 1570

基于形制分析、文献分析、材料来源分析、以及材料采运研究，英国学者马克·威尔逊·琼斯在他的著作《罗马建筑的原则》(2003) 揭示了造成万神庙入口门廊比例缩小的可能原因。

基于他的研究，琼斯认为万神庙的最初设计方案，是使用 50 尺（罗马尺）高的花岗岩柱，然而最后实际采用的柱子却只有 40 尺高。如果用更高的柱子，门廊和圆形大厅的交接关系会更符合比例逻辑。但在公元 116/117 年，埃及采石场的石材采运出现了困难，导致了圆形大厅继续进行，而门廊建造的中断——原本门廊和圆形大厅应该是同时建造的。最终工地现场获得的花岗岩柱子只有 40 尺高，因此设计只能因地制宜地进行改动，来重新考虑门廊和圆形大厅的连接处理。

琼斯认为最后妥协的结果还是相对成功的。他指出：“无论是哈德良、或是他的建筑师们提出降低门廊高度的方案，其目的都在于让其他人相信改动的结果不会太糟。事实是，圆形大厅和门廊的交接从正面是看不见的，而这肯定是一个重要的论据。”

3.2 世界上最早的全铜屋架？

除了穹顶，万神殿中还包含了另一项古代罗马工程杰作：一个重达 152 吨完全用青铜建造的支撑门廊屋顶的屋架结构。事实上，这座青铜屋架是唯一已知的在工业时代之前建造的全金属屋顶结构的例子。它在 1625 年被熔铸城大炮前，完好无损地屹立了多个世纪。鉴于青铜屋架在工程史和建造史中的重要地位，以及它在巴洛克时期被摧毁的状况，德国一支由 LVR 莱茵兰古迹保护办公室、科隆大学和勃兰登堡技术大学学者组成的研究团队，对当时青铜屋架进行了原形制与原工艺研究。在 2018 年《建造史》上，他们发表的论文《罗马万神庙门廊的金属屋架：152 吨青铜》展示了这项重要研究的成果。

mind, our questions would be: is this porch the original design? If yes, why was it designed this way? If not, what caused the changes?

Based on geometric analysis, archival studies, material source analysis, and material supply research, British scholar Mark Wilson Jones in his book *Principles of Roman Architecture* (2003) revealed the possible reasons for the reduced scale of the Pantheon's portico.

Based on his research, Jones suggested that the original project was meant to use fifty-Roman-foot-high granite columns, while the actual columns that were eventually used were only forty feet high. The original project intended a taller portico with greater proportions, which would also mean a smoother connecting block with the rotunda. However, in 116/117 AD, difficulties in the supply of granite from the quarry in Egypt led to the temporary suspension of the construction of the portico, while the rotunda continued - originally the portico and the rotunda were supposed to be built at the same time. The granite columns obtained on the construction site were only 40 feet high, so the design regarding the junction between the porch and rotunda had to be modified according to new circumstances.

Jones considered that the compromised outcome was relatively successful. He noted: "Whoever proposed the lowered portico, whether Hadrian or his architects, no doubt had to convince others that the result would not be too awful. The fact that the junction between the rotunda and the portico is not visible from a frontal approach must have been an important argument."

3.2 The earliest bronze roof structure in the world ?

In addition to the well-known dome, the Pantheon contains another masterpiece of ancient Roman engineering: a 152-ton roof truss structure built entirely of bronze to support the porch roof. In fact, this bronze truss is the only known example of an all-metal roof structure built before the Industrial Age, and it stood intact for centuries before being pulled down for making canons in 1625. Given the importance of bronze roof truss in the

他们采用的研究方法包括：

- 对万神庙门廊现场深入调查，寻找原结构痕迹；
- 搜集和梳理所有相关的资料和考古发现；
- 对早期建筑师的图纸和著作进行考证；
- 从历史文献中挖掘对青铜屋架重量和形式的记录和描述；
- 对青铜屋架形制进行数字虚拟复原，验证屋架实际重量；
- 对万神庙青铜屋架遗存的唯一一枚铆钉进行 CT 扫描和化学分析；
- 结构实验、对原铸件的复制实验、拉伸 / 剪切测试；
- 在实验室中对一个铆钉节点进行同比例工艺复原实验，进而确定原铆接对工艺流程和技术方法。

（杨启凡、蒋倩、潘一婷编译）

history of engineering and construction, and the fact that it has not existed since the Baroque period, a research team in Germany carried out an in-depth investigation on the original form and manufacturing process of the bronze roof truss.

Their research methods include:

- In-depth on-site survey of the Pantheon's portico, and the analysis of the traces of the original roof structure;
- Collection and sorting out of all relevant sources and findings;
- Examination of the drawings and writings of earlier architects;
- Archival survey of the records and descriptions about the weight and form of the bronze roof truss;
- Digital virtual reconstruction of the form of the bronze roof truss to verify the actual weight of structure;
- CT scan and chemical analysis of the only remaining rivet from the bronze roof truss of the Pantheon;
- Structural calculations, copies of original castings, and tensile/shear tests;
- Laboratory reconstruction of one joint at full size, to verify the original manufacturing process and technical methods.

(translated and edited by
YANG Qifan, JIANG Qian, PAN
Yiting)

活动动态 Latest Events

国际会议聚焦 International Conference Spotlight

第七届国际建造史大会（7ICCH: 7th International Congress on Construction History）¹于2021年7月12日至16日在葡萄牙首都里斯本线下与云端互动举行。此届会议由里斯本大学建筑学院、国际建造史联盟（IFCH）、[葡萄牙]科学技术基金会（FCT）、[葡萄牙]当代史研究所（IHC）、里斯本新大学社会和人文科学学院（NOVAFCSH）、[葡萄牙]建筑与城市规划与设计研究中心（CiAUD）、里斯本大学、葡萄牙建造史研究学会联合承办。

本次大会以“建造文化史”为主旨议题。四个主旨演讲分别是：“古罗马建筑：庞贝城的防御工事”（Marco Fabbri，意大利），“临时工程在中世纪和早期现代建筑工地的作用”（Stefan Holzer，德国-瑞士），“巴西圣保罗的铁路线：对建造文化和地区转型的影响”（Beatriz Mugayar Kühl，巴西），以及“拉斐尔的建筑：建筑 and 材料”（Vitale Zanchettin，意大利）。开放论坛涵盖建造史相关的各类主题，包括：建造史学科，建造从业者，建筑材料，建筑机器、工具和设施，建造过程，建筑设备与技术，结构理论与分析，建造的政治、社会与经济方面，知识传播，以及建造文化转译。

国际建造史大会（ICCH）始于2003年，每4年举办一届，曾分别在西班牙马德里（2003），英国剑桥（2006），德国科特布斯

The 7th International Congress on Construction History (7ICCH) was held in hybrid mode in Lisbon, Portugal, from July 12 to 16, 2021. It was jointly organised by Faculdade de arquitetura (Universidade de Lisboa), International Federation of Construction History (IFCH), Fundação para a Ciência e a Tecnologia (FCT), Instituto de História Contemporânea (IHC), Faculdade de Ciências Sociais e Humanas (Universidade Nova De Lisboa) (NOVAFCSH), Centro de Investigação em Arquitetura, Urbanismo e Design (CiAUD), Universidade de Lisboa, and Sociedade Portuguesa de Estudos de História da construção (spehc).

The core theme of 7ICCH is “History of Construction Cultures”. Four Keynote Speeches include: “Building in Ancient Rome: the fortifications of Pompeii” by Marco Fabbri (Italy), “The role of temporary works on the medieval and early modern construction site” by Stefan Holzer (Germany-Switzerland), “Railways in São Paulo (Brazil): impacts on the constructive culture and on the transformation of the territory” by Beatriz Mugayar Kühl (Brazil), and “Raphael's architecture: buildings and materials” by Vitale Zanchettin (Italy). Open sessions cover a wide variety of topics related to all aspects of Construction History, including: The discipline of Construction History, Building actors, Building materials, Building machines, tools and equipment, Construction processes, Building services and techniques, Structural theory and analysis, Political, social and economic aspects, Knowledge transfer, and Cultural

（2009），法国巴黎（2012），美国芝加哥（2015），比利时布鲁塞尔（2018）举办。下一次会议——第八届国际建造史大会（8ICCH）将在2024年夏季举行，由ETH瑞士苏黎世联邦理工学院承办。

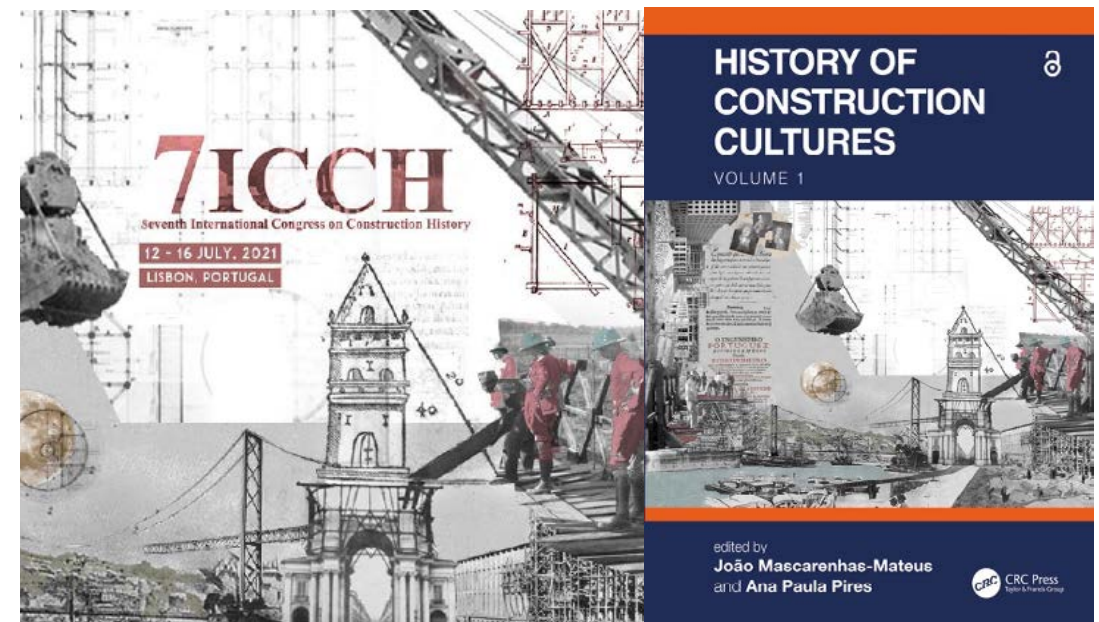
（潘一婷编译）

translation of construction cultures.

This Congress followed on successful congresses held in Madrid (2003), Cambridge UK (2006), Cottbus (2009), Paris (2012), Chicago (2015), and Brussels (2018). The next Congress will be organised by ETH Zurich during the Summer of 2024.

(translated and edited by PAN Yiting)

1.2.



1. 第七届国际建造史大会会议海报，The conference post of 7ICCH²
2. 第七届国际建造史大会会议论文集（2卷），Conference Proceedings of 7ICCH (2 Volumes)

² Source: <https://7icch.org>

¹ 关于开放论坛和主题论坛详情，请见：<https://7icch.org>
More information on the open and thematic sessions can be found on: www.7icch.org

[中国-葡萄牙文化遗产保护科学“一带一路”联合实验室建设与联合研究]
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