

**Research and Design of Urban Landscapes: The Delft Approach
Interview with Dr. Steffen Nijhuis, Delft University of Technology**

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城市景观设计与研究之代尔夫特方法 ——荷兰代尔夫特理工大学斯特芬·奈豪斯博士专访

Research and Design of Urban Landscapes: The Delft Approach — Interview with Dr. Steffen Nijhuis, Delft University of Technology

采访: 张博雅 校对: 熊亮

Interviewer: ZHANG Boya Proofreader: XIONG Liang



访谈人物 (Interviewee) :

(荷) 斯特芬·奈豪斯/男/博士/代尔夫特理工大学建筑与建成环境学院风景园林学科研究带头人、欧洲城市学硕士项目主任、副教授/研究方向为可持续城市与景观发展、水敏和社会—生态全纳性城市规划设计 (NLD) Steffen Nijhuis, Ph.D., is the head of Landscape Architecture Research, director of the European Postmaster in Urbanism (EMU) and associate professor of the Faculty of Architecture and the Built Environment, Delft University of Technology. His research focuses on sustainable urban and landscape development, water-sensitive and socio-ecologically inclusive urban planning and design.

采访者简介 (Interviewer) :

张博雅/女/荷兰代尔夫特理工大学风景园林硕士/北京一语一成景观规划设计有限公司设计师/本刊特约记者 ZHANG Boya gained her master degree of landscape architecture in Delft University of Technology. She works as a landscape architect in Beijing Yiyuyicheng Landscape Planning & Design, and is a special correspondent of this journal.

校者简介 (Proofreader) :

熊亮/男/代尔夫特理工大学建筑与建成环境学院城市学在读博士研究生、研究员/研究方向为城市及区域韧性战略和气候变化应对策略、跨时空尺度规划设计理论与方法、跨学科可视化设计工具、水敏性规划设计 XIONG Liang is a researcher and Ph.D. candidate of Urbanism at the Faculty of Architecture and the Built Environment, Delft University of Technology. His research focuses on urban and regional resilient strategy, and climate change adaptation, interscale planning and design theory and method, transdisciplinary visualization design tool, water sensitive planning and design.

本文中的代尔夫特方法特指荷兰代尔夫特理工大学建筑与建成环境学院自1947年以来所发展的一种用于理解和设计城市景观的风景园林学手段(图1~2)。代尔夫特方法受到典型的荷兰地理环境和空间规划传统的影响,将城市景观看作在不同尺度上的连续体,以“针对设计的研究和通过设计的研究”为主要的教学和研究策略,以绘图和图析(mapping)^①作为重要的思考工具。作为荷兰代尔夫特理工大学建筑与建成环境学院风景园林学科研究带头人,奈豪斯博士主要致力于基于景观的城市学、GIS的应用以及视觉景观研究。他曾受邀参与在北京林业大学举行的2019世界风景园林师高峰论坛。《风景园林》杂志有幸邀请到他参与此次专访,向读者介绍代尔夫特方法的背景和原则,并结合实践案例展示其应用方法。

LAJ: 《风景园林》杂志

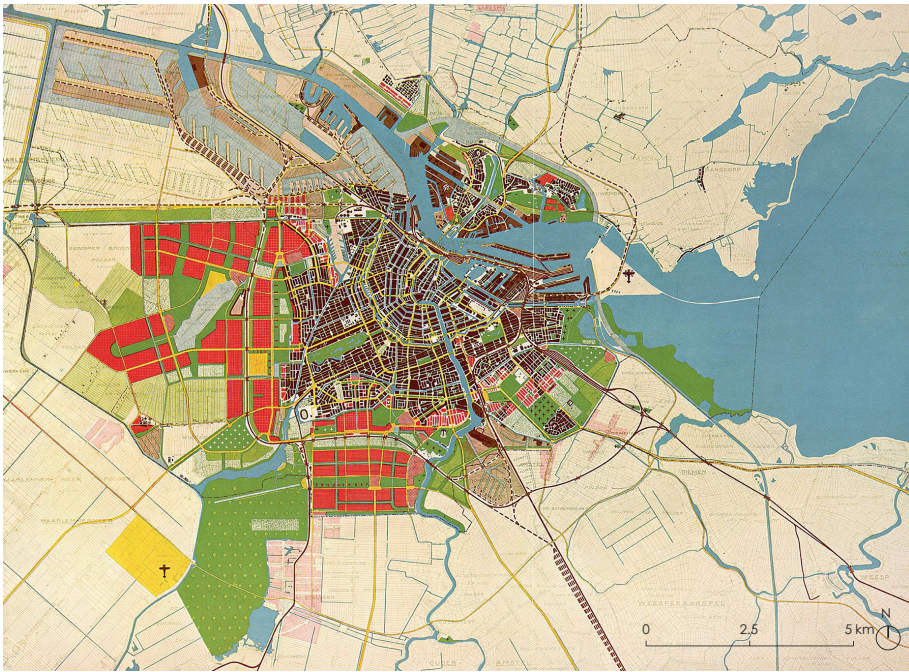
Nijhuis: 斯特芬·奈豪斯

LAJ: 非常感谢您参与这次采访。关于代尔夫特方法,您曾提到,它的诞生受到了形态学研究的影响。那么您能否先为我们简单介绍一下什么是形态学研究,以及它与区域景观的联系呢?

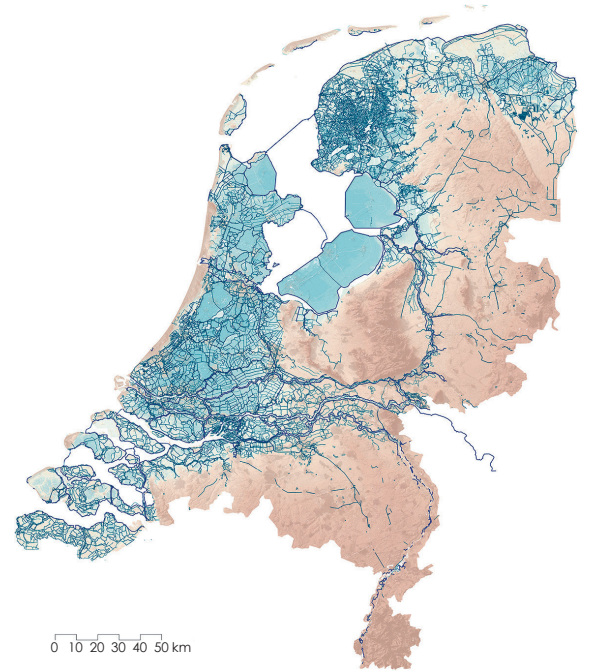
Nijhuis: 在形态学研究的视角下,贯穿各尺度的景观都可被看作一种建筑式的构成。当我们这样去看待景观时,我们或许没法去重构(既有景观背后的)“设计师”的思考,但我们可以学习其构成是如

何运行的,以及它具有怎样的空间品质、生态品质和社会品质。景观是由一系列结构和过程组成的系统。景观的结构,或者说形态,可以作为研究景观的(形成)过程和发展的出发点。这就是形态学研究的课题。

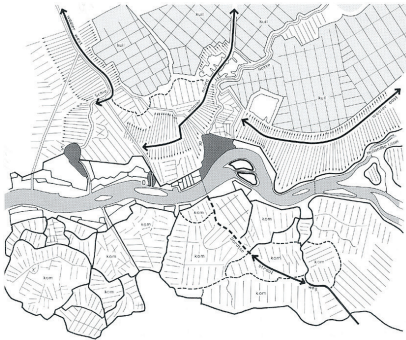
在欧洲,形态学研究自20世纪60年代开始发展。意大利建筑师穆拉托里(Muratori)和移居英国的德国地理学家康泽恩(Conzen)是早期先驱,后来又有来自法国思想学校的卡斯特斯(Castex)等人。在代尔夫特,很多学者受到他们的影响,并给出了自己的诠释^①。早期代表包括帕博(Palmboom)、斯蒂恩伯恩(Steenbergen)、范·德·霍温(Van der Hoeven)、卢沃(Louwe)和范·沃登(Van Voorden,图3)。(在风景园林领域)早期研究者的经验证明,形态学方法对于景观设计研究也是有效的手段,这些先驱包括杰里科(Jellicoe)^②、弗兰克(Franck)^③、卡斯克(Kask)^④和哈兹赫斯特(Hazlehurst)^⑤。代尔夫特风景园林教研组基于对人造景观的精确几何描绘,发展了一种专注景观的建筑学构成的形态分析方法,其中的代表是斯蒂恩伯恩(Steenbergen)及其同僚。这种方法系统分析了景观的4种建筑学类型:基本形态、空间形态、象征形态以及程序形态。基本形态指的是在设计底图上对人工或自然景观本底的地形进行简化、合理化和激活的方式(图4)。空间形态则关注三维景观空间的形态及运行。象征形态指将景观的建筑学结构型形态与图像意象、神话象征和



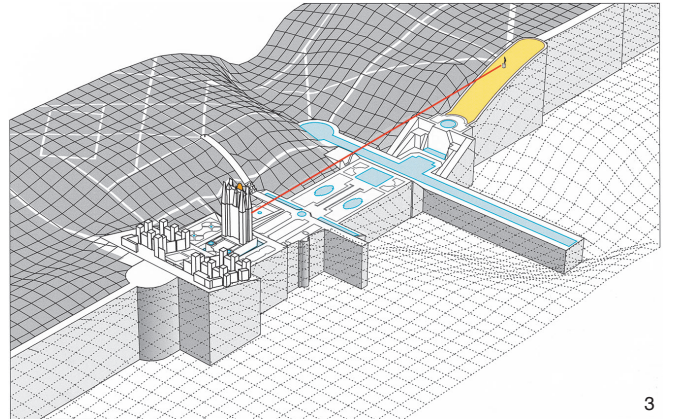
1



4



2



3

1 阿姆斯特丹扩张规划（1834年）是范·伊斯特恩和范·路豪森的作品，他们也是代尔夫特理工大学城市系的联合创始人，是基于自然景观和文化景观进行规划的现代主义城市规划代表人物

The Amsterdam Extension Plan (AUP) 1934 created by Van Eesteren and Van Lohuizen, some of the founding fathers of the Department of Urbanism, is an icon of modernist urban planning and was based on extensive knowledge of the natural and cultural landscape

2 代尔夫特形态学方法案例：城市景观的地形地貌特征分析
An example of the Delft morphological approach analysing the territorial and topographical qualities of the urban landscape

3 代尔夫特风景园林教研组的典型分析图解：法国梅伦沃勒贡特府邸对称轴线形态分析
A typical drawing from the Delft Landscape Architecture group. Morphological analysis of the axis of symmetry at Vaux-le-Vicomte, Melun (France)

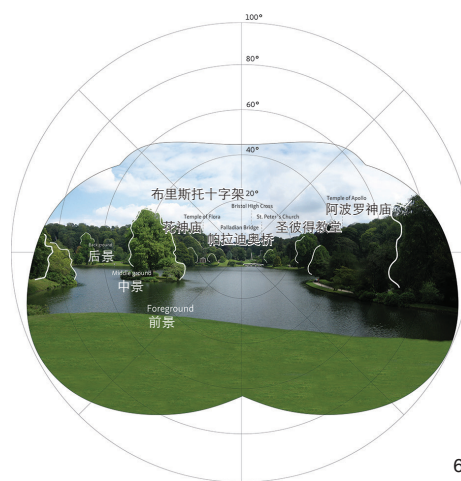
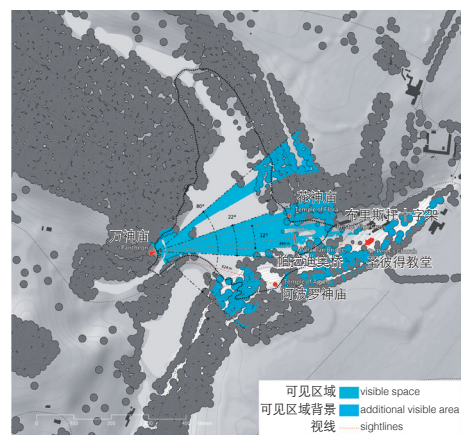
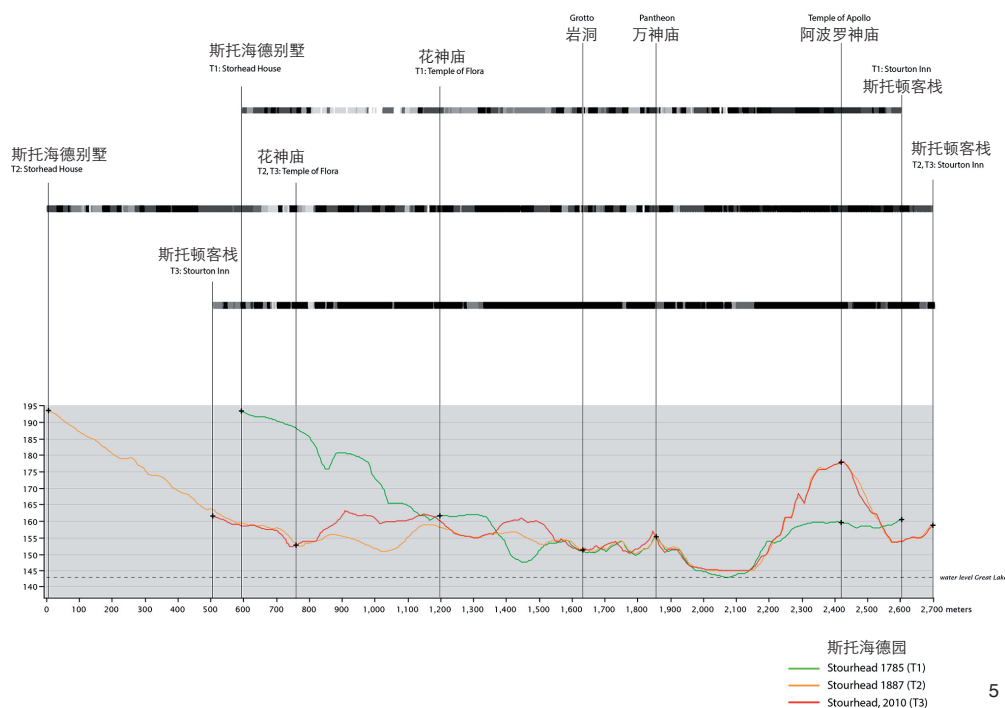
4 这张荷兰圩田地图反映人工水利景观的模式与地表海拔高度紧密相关。蓝色区域是低于海平面的国土，棕黄色区域是高于海平面的国土，深蓝色的线代表堤坝
Polder map of the Netherlands. The pattern of this manmade hydraulic landscape corresponds closely with the elevation. Blue areas are below sea-level, brown areas are above sea-level. The dark blue lines represent dikes

自然元素相关联的方式。最后是程序形态，它产生了功能分区或与人、物流相关的空间布局，以及其他运动的功能性形态。这些类型系统地诠释了景观的建筑学形态与人的感知之间的复杂关系。它不仅仅是对形态的分析和描述，也是对功能和构建方式的解读。诸如《建

筑与景观》(Architecture and Landscape)、《景观构建》(Composing Landscapes)、《荷兰圩田地图集》(The Polder Atlas of Netherlands) 等著作均是基于此方法的著名代表。

LAJ: 能在不同尺度应用同一方法还挺有趣的。

Nijhuis: 是的，这个方法将景观视为尺度连续体。这首先根植于荷兰的地理环境，我们有大片低于海平面的人造陆地。由于土壤条件和水文条件都比较苛刻，我们必须根据水土条件精心规划建筑和城市。这样，建筑、城市和景观便自然而然地紧密相连。当划定



5 英国威尔特郡斯托海德园主要游览路线沿线的海拔高度与空间明暗体验的对应关系

Analysing the experience of light and shade and the relationship with the height gradient along the main routes at Stourhead landscape garden, Wiltshire (UK)

6 英国威尔特郡斯托海德园特定视点的三维视域分析与实际景物的对应关系

Three-dimensional visibility analysis, and corresponding field of view, of a famous view point at Stourhead landscape garden, Wiltshire (UK)

新设计中的骨架时，我们可以对其所在的更大尺度的景观本底进行分析，并从中获得启示。

另外，就算是不同区域景观是基于相同的原则建造的，它们的形态表达也受到环境的影响。以电影为例，在成千上万的电影中，只有大概 7~8 种制作电影的方式。我们荷兰西部和北部的低地圩田景观也是一样（图 5）。如果你戴上“X 光眼镜”去看，你会发现不同圩田治水的原则、为农业生产创造条件的方法，都大同小异，但最终的空间形态却千差万别。但居住在不同地区的人们拥有不同的社会文化、政治传统和治理方式。这些环境要素让景观变得不同。比如，世界各地都有圩田景观，日本北部的八郎濇圩田的建造即受到了荷兰东北圩田的启发。在区域尺度上，他们乍看起来极其相似。放大看时，你会发现日本的圩田用于种植水稻，这意味着水会阶段性地淹没土地。而在荷兰，圩田水管理致力于维持水位稳定。这就是（在不同尺

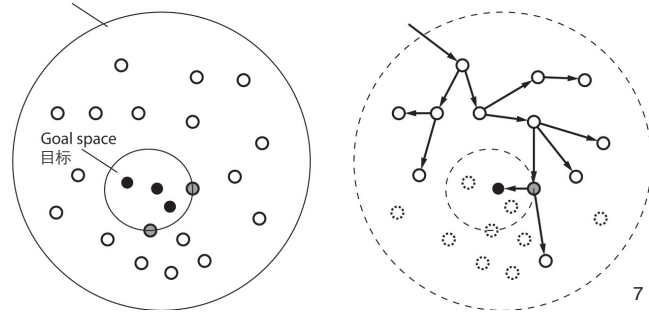
度看问题的）有趣之处，（虽然在大尺度上应用）同一原则，（但在中小尺度有）不同的文化表达。所以，我们训练学生跨越不同尺度看问题，这样他们才能够发现不同尺度上的异同。

LAJ: 在不同情况下应用代尔夫特方法，是否会根据情况相应调整？

Nijhuis: 随着时间推移，这一方法也在进化。比如，对这一方法的批判主要集中在它缺乏对空间感官体验的关注。具体来说，是指客观物理现实（欧几里得空间）和其视觉表现（主观体验的空间）的不同，以及运动在空间体验中扮演的角色。此外，仅就物理空间而言，同一空间的空间构成如何随着时间变化，也未经挖掘。这些批判可以作为改进分析框架的线索，也可以作为修正和丰富最早的几种景观的建筑学类型的基础。我和我的同事们在这方面有了一些进展，试图理解如何更好地解决这些问题。比如说，德·维特 (De Wit) 的近期研究发展了这个分析框架，

表明了感官体验可以在景观构成分析中扮演重要角色，这也是代尔夫特方法发展的代表。GIS 等数字技术也为分析景观空间的三维体验提供了有趣的线索（图 6）。当你在地图上看到类似贝姆斯特圩田的景观时，你可能会认为你（在空间中）会感受到方格网，但当你实地体验时，你永远也感受不到方格网，因为你是水平视角去体验的。换句话说，测绘到的景观和人们感知到的景观是两回事。有了像 GIS 一样的工具，你可以建立相当细致的三维模型，把空间分析得很透彻。你可以在水平视角上模拟人的空间感知。这也正是我在研究中去探索的^[6]。比如，我对斯托海德园的分析表明，在 GIS 工具的帮助下，即使是面对老生常谈的研究对象，也可得出新的洞见。GIS 工具让我们不仅能在静态视角下去研究观者的体验，也可研究特定路径上的动态体验（图 7）。我对（斯托海德园的）不同历史时段进行分析，这要求我对其历史发展

Solution space 可能的解决方案

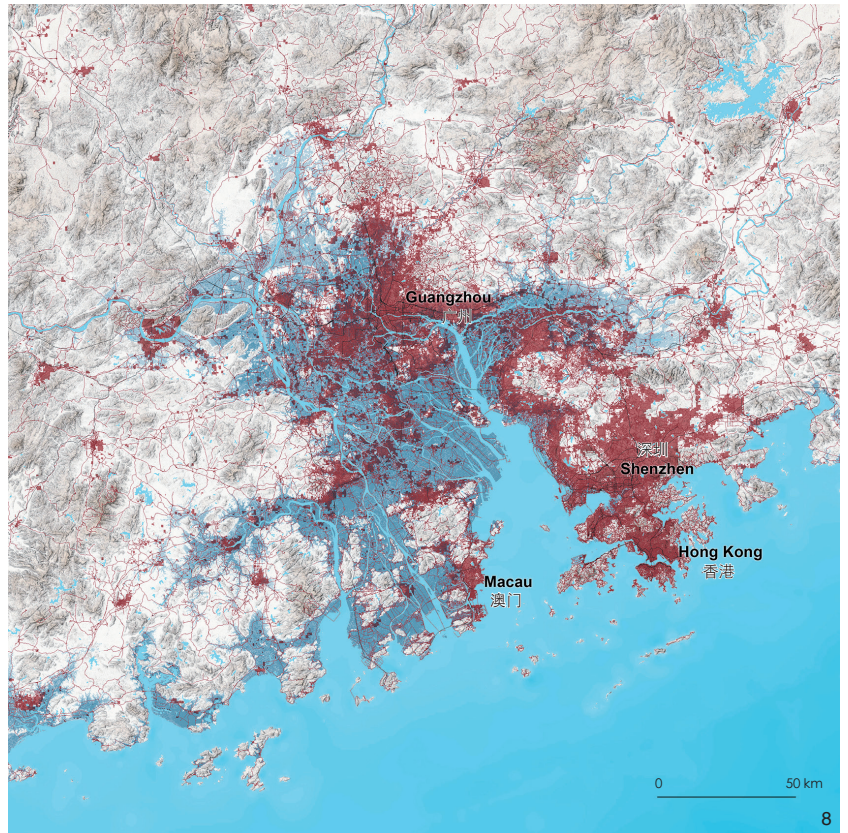


7 通过设计的研究并不仅仅是设计，也是对设计问题的有效解、高效解的系统探索。在这个探索过程中，按照溯因逻辑原则，问题和目标都有可能被修正或是改写

Research through design does not consist purely of design, but also of a systematic search for the most effective and efficient solution to the problem that has been posed. During this search, following principles of abductive logic, both the problem and the objective can be refined or changed

8 珠江三角洲是世界上城市化速度最快的三角洲。红色的区域是已经城市化的地区。大多数城市化发生在低地区域（海拔 10 m 的区域，图中蓝灰色的范围），这一区域更容易遭受洪水侵袭

The Pearl River Delta is the fastest urbanizing delta in the world. The red zones indicate urbanization. Most of the urbanization (in red) takes place in the flood prone lowlands (+10 meter zone, in dark blue), the zone with increased flood risk



过程进行精确的数字化重建。通过比较分析结果，我们可以了解它的空间构成具体是如何随着时间变化的，这些信息可帮助该园进行管理维护方面的决策。只要你开始使用 GIS 工具进行分析，你就可以得出有趣的新结论。比如我所发现的，游园路径上的大多数视点都遵循一个特定规则，那就是它们的主要构图都在大约 30° 的水平视角范围内。如果你懂视觉光学的话，你会知道这是一个你刚好（不需转头）能一眼看清视野内事物的角度。如果你分析那些根据克劳德·洛林（Claude Lorrain）等的绘画而创作的景观，你会发现特定视点的景观的主要内容也在 30° 视角的范围内。这意味着这个花园的确是根据画家的观看方式去设计的。虽然这样的说法一直存在，但通过这样的分析我们才能确信它是真的。

LAJ: 您经常强调将研究和设计进行结合，能否深入介绍一下？

Nijhuis: 在代尔夫特，我们认为设计和研究紧密联系，而不是互相割裂的。因此，我们常使用“设计研究”（design research）和

“通过设计进行研究”（research through design）这样的术语。前者指的是为进行设计而获取知识，通过对项目语境和既有案例的分析得出设计原则。后者指的是设计过程本身是一种将空间问题可视化的工具，（可用于）探索可能性并产生新的解决方案，即“通过设计进行研究”。如需深入了解，可参见我和同事专门发表的开源论文^[7]（图 8）。

LAJ: 如果人们想要尝试应用这一方法，您能否推荐一些工具？

Nijhuis: 草图（sketches）、绘画（drawing）和图析的确是很有用的思考工具。通过这些工具，设计师可以分析、评估现状、设计方案和既有案例，以及产生新的设计。图析的作用尤其强大。如果你想要理解某处景观，我想地图可能是绕不开的。问题是，你如何使用地图？你可以去书店买一本印刷精美的地图集，但你真的理解你看到的内容吗？这就引入了图析的概念。

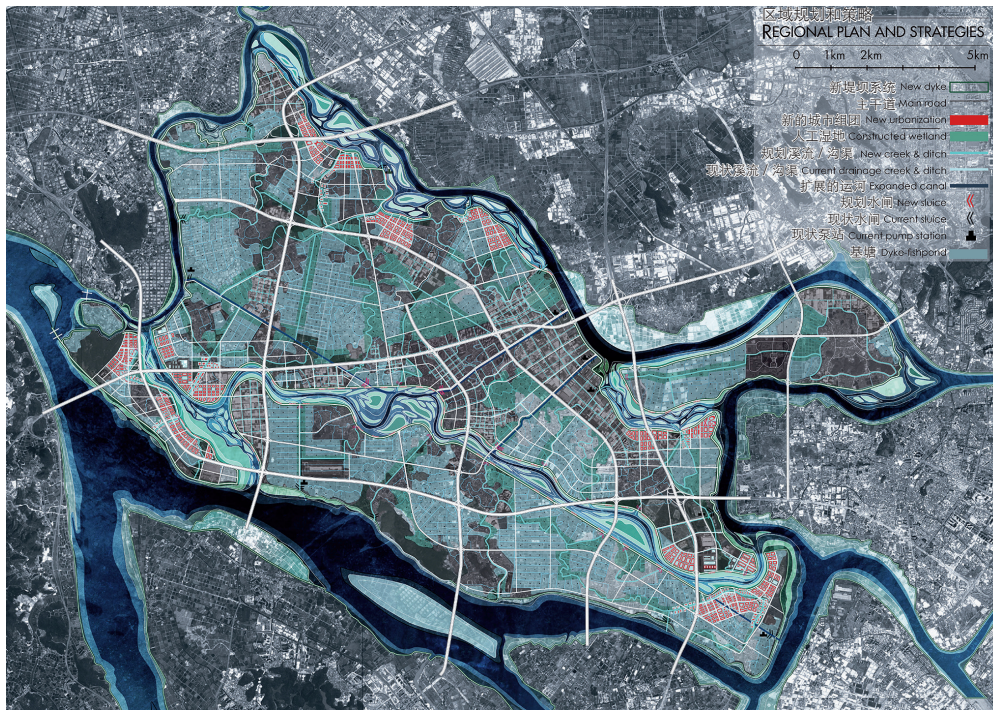
图析的一个典型操作是“地图拆解”（map dissection），意思是你只选取地图上的几种要

素，然后去理解它们的模式和背后的意义。这不是在开关图层，而是真的去读懂这条线和那条线的意味及其之间的关系。你可以说他是一个选择和消化的过程。为了理解（地图），你需要有这个过程。另一个典型操作是比较，比如说比较不同的情境、模式或者历史时期。你还可以尝试把空间信息和非空间信息进行并置，我把这种手段称为“交叉参照”（cross-reference mapping）。

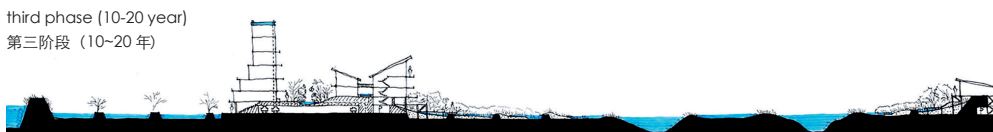
此外，我还想强调视觉化思考和视觉沟通的区别。我常看到人们为了让别人理解（自己的想法），更关注用这些工具进行视觉沟通，却很少把它们用于视觉化思考。一张用于思考的草图可能非常潦草。在视觉化思考的过程中，你通过和媒介互动获得新的理解，也就是“见所未见”。当你理解了以后，下一步才是如何把你的理解用一种漂亮的方式传递给他人。

LAJ: 您能否以一个项目为例，介绍区域景观的设计及研究？

Nijhuis: 在基于景观的区域设计或城市



9-1



9-2

9 顺德某地区的设计研究：新的区域规划整合了水管理系统、基础设施、生态系统、农业和住房建设的发展。这些剖面图展示了水敏地区区域景观发展的不同阶段
Research through design for a region near Shunde. A new integrated regional plan that takes the sustainable development of the water system, new infrastructure, ecosystem, agriculture, and housing into consideration. The sections show the different phases of the water-sensitive landscape development

规划设计中，设计和研究密不可分。我们把这一方法用于为政府和私人业主进行的研究中，项目遍及欧洲、美国和中国。比如我们

近期启动了中国国家自然科学基金委员会（NSFC）、荷兰研究理事会（NWO）、英国工程与自然科学研究理事会（EPSRC）的联合

研究项目：适应性城市更新（Adaptive Urban Transformation, AUT）——珠江三角洲区域的区域治理、空间战略以及城市景观动态变化。这一项目由华南理工大学的孙一民教授、英国谢菲尔德大学的埃卡特·兰格（Eckart Lange）教授和我牵头。AUT应用了基于景观的区域设计策略作为一种综合的、多尺度的设计和规划方法（图9）。这样做可以整合各部门规划，推进城市景观和乡村景观的转型过程，形成协调的可持续发展。基于景观的区域设计方法把景观本底作为建立可持续的城市化三角洲地区的基本条件，这被看作是塑造区域的物质空间形态的重要策略。它也使得通过空间规划和空间设计塑造长期可持续的城市景观成为可能。总之，区域设计需要跨学科的合作，这不仅能保证连贯的、可持续发展的地区发展，也能引导社会经济发展和环境变化的方向，并建立基于区域特质的独特的地区身份。我在《风景园林》杂志发表的另一篇文章详述了具体的研究^[9]。

以顺德为例，桑基鱼塘系统这里是重要的景观特征。如今，这些结构特征大多被城市化进程所掩盖，（很多工程）直接填平了场地并在上方进行建设。这造成了在蓄水功能、地区生态和房屋基础等方面一系列的问题。因此，我们提出了基于景观的区域设计策略，它将水系统和景观结构视为基础，产生兼具水敏感性和地域性的城市发展模式，在这种模式中，智慧交通概念占据着重要位置。

LAJ：非常感谢您接受这次采访。这些年来，您曾经多次来过中国，您也在世界各地参与合作过研究项目。最后想请您谈谈，在您看来，中国的区域景观研究和设计有无特殊之处？

Nijhuis：在中国，你们有很好的分析城市、文化景观与其所在自然环境的的关系的研究传统。中国很多高校的知名学者都有这方面的著作。你们在建设新城和新的区域景观上也展现了极大的雄心。我认为，通过从成功案例中获得的经验和设计原则，具有极大的潜力来应对目前气候变化和城市化带来的挑战。我想基于景观的区域设计策略也可助力于中国的新城建设和城市更新。这一策略

尊重规律，将景观本底视为城市化发展的基础。它跨越各尺度、连接多学科，并且以科学知识为依据。这一策略充分利用了规划概念和设计师知识之间的互动，来解决城市景观的复杂问题，使其面向未来、繁荣昌盛。非常感谢你们的采访，我很期待更多的知识交流和互相启发。

注释 (Notes):

① 为方便理解，笔者将“Mapping”译为图析。也有学者将其译为“地图术”。

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(编辑 / 王一兰)

Research and Design of Urban Landscapes: The Delft Approach — Interview with Dr. Steffen Nijhuis, Delft University of Technology

Interviewer: ZHANG Boya Proofreader: XIONG Liang

In this essay, the Delft Approach refers to a particular landscape architecture approach to understand and design urban landscapes, which is developed in the Faculty of Architecture and Built Environment at Delft University of Technology (the Netherlands) since 1947 (Fig. 1-2). The Delft approach focusses on urban landscapes as a scale continuum, employs design research and research through design as important teaching and research strategies, and regards mapping and drawing as important tools for thinking. The typical Dutch geographic context and spatial planning traditions are the foundation for this approach. As head of research of Landscape Architecture in the Faculty of Architecture and Built Environment at Delft University of Technology (the Netherlands), Dr. Nijhuis has expertise in landscape-based urbanism, GIS applications and visual landscape research. He was invited to participate in the 2019 International Landscape Architecture Symposium held at Beijing Forestry University. *Landscape Architecture Journal* is honored to invite him to this inclusive interview to introduce the background and principles of this approach, and illustrate the application of this method with projects.

LAJ: *Landscape Architecture Journal*

Nijhuis: Steffen Nijhuis

LAJ: Thank you very much for joining this interview. As you mentioned, the birth of Delft Approach was influenced by morphological studies. So, could you please start with briefing us the term of morphological study, and how it relates to regional landscapes?

Nijhuis: In the perspective of morphological studies, landscapes throughout the scales can be understood as architectural compositions. By interpreting the landscape in such a way you may not be able to reconstruct the thoughts of the ‘designer’, but you can learn how the composition functions and what the spatial, ecological and social qualities are. The landscape is a system that constitutes of structures and processes. The structures or forms can be taken as a starting point to understand the development over time and the involved processes. This is the subject of morphological study.

In the European context morphological studies evolved from 1960s onwards, with Italian architect Muratori and British geographer Conzen as front runners. Later, there was Castex et al. from French schools of thought. In Delft many scholars were influenced by them, and gave it their own interpretation^[1]. Early representatives include Palmboom, Steenbergen, Van der Hoeven, Louwe and Van Voorden (Fig. 3). Morphology studies have proven very useful in landscape design research as exemplified by protagonists of this approach such as Shepherd and Jellicoe^[2], Franck^[3], Kask^[4] and Hazlehurst^[5]. In Delft the landscape architecture group developed a particular approach that is focused on the formal analysis of landscape architectonic compositions as exemplified by Steenbergen and associates, and is grounded in the notion of precise geometric delineation of designed landscapes. The method consists of the systematic analysis of four landscape architectonic categories: the basic form, the spatial form, the symbolic form and the programmatic form. The basic form is the way in which the topography of the natural

landscape or the man-made landscape is reduced, rationalized and activated in the ground plan of the design (Fig. 4). The spatial form is about the form and functioning of three-dimensional landscape space. The symbolic form refers to the way in which iconographic and mythological images and architectonic structural forms are connected with one another and with elements from nature. And finally: the programmatic form leads to a functional zoning or layout in relation to logistics and functional patterns of movement. These categories systematically lay out the relationship between the various aspects of the landscape architectonic form and its perception. It is not only about analysis and description of its form, but also its function and the way it has been made. Publications like *Architecture and Landscape*, *Composing Landscapes* and *The Polder Atlas of Netherlands* are some well-known examples of this approach.

LAJ: It's interesting that the same method can be applied through different scales.

Nijhuis: Yes, this approach focuses the landscape as a scale continuum. Firstly it roots in Dutch geographic context that we have vast man-made lands below sea level. Due to the particular soil and hydrological conditions, the buildings and cities had to be carefully arranged according to the conditions. Thus the buildings, cities and the landscape are inherently connected. When develop the structural elements of new designs, lessons can be drawn from analysis of the landscape on a bigger scale.

Also, even when the landscapes are built employing similar principles, the expression of form makes it contextual. It's like the movies. We have thousands of movies, but there's probably seven or eight ways on how to make a movie. That's the same with lowland landscapes or polder landscape we have in the west and north of the Netherlands (Fig. 5). So when you look at different polders with "X-ray glasses" you'll see that we have similar principles on how to deal with water, how to create conditions for agricultural practice, but result in very different spatial expressions. The people living there are very

different in social terms, in political terms and in governance terms. That makes landscape particular. For instance: polder landscapes can be found all over the world. The Hachirogata Polder in the north of Japan is inspired by the Noordoostpolder in the Netherlands. At a first glance, at the regional scale, they look quite similar, but when you look more in detail you see different land use like rice paddies with a fundamental different water system focused on temporal flooding. Whereas in the Dutch case the water system is focused on stable water tables. It's like a kind of cultural twist to the principle, which makes it very interesting. Therefore we train our students to look through scales, being able to see differences and similarities at different scale levels.

LAJ: When we use Delft approach, is there maybe any adaption in different circumstances?

Nijhuis: Well, it's evolving over time. For instance critique on the approach focused on the lack of attention to sensorial aspects of the composition. More specific, and relevant to formal analysis, is that the role of movement and the fundamental difference between the physical, metric reality (Euclidean space) and its visual appearance (perceived space) is neglected. The morphogenetic aspect, the development of the composition through time, also remains underdeveloped. These critiques can be considered clues for the development of the analytical framework and served as a basis to redefine and enrich the initial landscape architectonic categories for analysis. Over time my colleagues and myself started to get into that, and try to understand how these aspects can be addressed better. For instance, development of the framework is exemplified in the recent work of De Wit, where sensorial aspects play a crucial role in the analysis of landscape architecture compositions. Also the use of digital technology like GIS provides interesting clues to analyze on the three-dimensional experience of landscape (Fig. 6). When you see a landscape like the Beemster polder on a map, you'll probably think you will experience it as a grid, but when you

go there you'll never experience the grid because it's from the horizontal point of view. In other words, the measured landscape is very different from the perceived landscape. With tools like GIS, you can build a highly detailed three-dimensional model, and analyze the landscape from inside out. You can mimic the human perception from a horizontal perspective. That's exactly what I do in my research^[6]. For instance my study on Stourhead landscape garden exemplifies how GIS can help to derive new insights from a landscape design that is studied exhaustively. With the use of GIS we were able to uncover fascinating aspects of the three-dimensional composition from an observers point of view, from static viewpoints, but also from routes (Fig. 7). We did this for different time periods, which required precise reconstruction of the park over time. By comparing the analytical results insight was gained in the development of the composition over time, which in turn can inform management decisions for the park. When you start to analyzing these things with GIS, you can draw very interesting new conclusions. Like what I discovered, most views along the route obey a certain law, that their compositions are constructed within an visual horizontal angle of about 30 degrees. If you know optics, 30 degrees is the angle where you can recognize things in a glance. When you analyze these views, inspired by the paintings of e.g. Claude Lorrain, you will see that the most important compositional elements are also within this 30 degrees. So that means this garden was indeed designed by the eye of a painter. It's often said to be so, and now you can really underpin it by this kind of analytical operations.

LAJ: You often address the importance of connecting research and design, can you elaborate on this a little bit?

Nijhuis: Yes, in Delft we regard research and design to be closely related and not as two separate worlds. Therefore we often use the terms "design research" and "research through design". The first is focused on gaining knowledge for the design and

entails contextual analysis and precedent or case study to find design principles. Next to this form the design process itself is employed as a vehicle to frame spatial problems visually, explore possibilities and to generate solutions; research through design^[7] (Fig. 8).

LAJ: For people who would like to try this approach, what tools would you recommend for them?

Nijhuis: Sketching, drawing and mapping are really powerful tools for thinking in design. With these tools, designers can analyze and evaluate situations, plans or precedents, and generate designs. Mapping is especially a powerful tool. When you want to understand the landscape, I think maps are inevitable. The question is, how do you use a map? You can go to the bookstore and buy a really nice atlas, but do you understand what you are looking at? Here the idea of mapping comes in.

A typical analytical operation is map dissection, which means you only select a few elements from the map, and then you start to understand what kind of patterns they are, and what their meaning is. It's not like clicking one layer on and off, but really to understand the meaning of this line and that line, and what is the relationship in between. It's a procedure of selecting and digestion you can say. So, you need to do it in order to understand it. Another possibility is comparing, like comparing different situations, patterns, or different time periods. You can also do what I called cross-reference mapping, which means juxtapose spatial and non-spatial information.

And I'd like to make a distinction between visual thinking and visual communication. What I often see is that people are focused on visual communication with these tools, in order to get the idea across to others, but they hardly use them for visual thinking. However, a sketch for thinking can be very illegible. In this process you interact with the medium in order to gain new insight: seeing the unseen. After you gain the understanding, the next step is to convey the gained knowledge in a pretty way that you can get it across to others.

LAJ: Could you please show me an integrated research & design project which is about regional landscapes?

Nijhuis: Research and design comes together in landscape-based regional design or landscape-based urbanism. We apply this approach in research we do for governments and other stakeholders in Europe, USA and China. For example in recent years we started a NSFC, NWO, and the EPSRC Joint Research Project: "Adaptive Urban Transformation (AUT) – Territorial governance, spatial strategy and urban landscape dynamics in the Pearl River Delta", A collaboration between TU Delft (Dr. Steffen Nijhuis), South China University of Technology (Dr. Sun Yimin) and The University of Sheffield (Dr. Eckart Lange). AUT employs landscape-based regional design methods as an integrative and multiscale design and planning approach (Fig. 9). Doing so can steer urban and rural transformative processes through a combination of sector activities aimed towards more coordinated sustainable outcomes. Landscape-based regional design is considered to be an important strategy that shapes the physical form of regions by using landscape as the basic condition to generate sustainable urbanized deltas. It also provides ways for long-term sustainable urban landscape development through both spatial planning and design. In summary, regional design is a transdisciplinary effort that not only safeguards sustainable and coherent development, but also guides and shapes changes that are brought about by socio-economic and environmental processes, while establishing local identity through tangible relationships to a region. More info can be found in "Towards a Landscape-based Regional Design Approach for Adaptive Transformation in Urbanizing Deltas"^[8].

For instance in the Shunde district the mulberry-fishpond system is an important feature of the landscape. Nowadays many of these structures are superimposed with urbanization, just filling the site and built on it. As a result problems occur with water storage, ecology and the foundations

of the housing. Therefore we propose a landscape-based approach that takes the water system and landscape structures as a basis for water sensitive and contextual urbanization model in which smart mobility concepts play also a crucial role.

LAJ : Thank you very much for joining this interview. Last but not least, you've come to China many times these years and you've experienced many joint research projects around the world, in your perspective, is there maybe any particularity in the research & design of regional landscapes in China?

Nijhuis: In China you have great traditions in analyzing cities and cultural landscapes and their relationship with the natural environment as exemplified by the work of renowned colleagues from universities across China. You also show great vigor in building new cities and landscapes.

I think by applying the lessons learned, and design principles that can be drawn from the proven practices of before have a great potential to be utilized for the contemporary challenges related to urbanization and climate change. I think also the planning and design of new urban landscapes and transformation of existing ones in Chinese context will benefit from a landscape-based regional design approach. This approach takes the landscape as the basis for urbanization, goes through the scales, is interdisciplinary and knowledge-based. Such an approach exploits the interaction between planning concepts and designerly knowledge as a means to deal with the complexities of creating future proof and thriving urban landscapes. Thank you very much and I am looking forward to learn more and exchange knowledge and inspiration.

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(Editor / WANG Yilan)