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景观再造: 面向新环境现实的新兴景观设计实践与教学

Landscapes Remade: Emerging Landscape Design Practices and Pedagogy for the New Environmental Reality

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摘要: 工业与制造业中心可以被看作更宜居和可持续的大都市工业景观的一部分, 是地方和全球经济不断变化的场所以及解决能源、废弃物、代谢物问题的创造性的环境。重点介绍了“第五次工业革命”——一种当代景观的系统性转型: 它将资源、治理结构、公民社会、人类认同、自然意义的变化与新的加工制造方法在 2 个尺度上相结合。这 2 个尺度包括: 1) 景观规划尺度, 涉及与城市肌理相关的后石油经济工业区; 2) 景观设计尺度, 涉及工业生态、垃圾填埋场、一系列的公共和社区开放空间以及景观中的能源利用。创造性地提出一种方法, 即通过一系列立足于为自然环境和现代建成环境的未来提供多样选择的景观教学法, 来探讨传统和现代的规划、设计、文化以及技术等主题。

关键词: 现代工业景观; 蔚山市; 第五次工业革命; “中国棕”; 研究生设计工作坊

Abstract: The paper reconsiders a prime industrial and manufacturing center as part of a more livable and sustainable metropolitan industrial landscape and a locale of shifting local and global economies and inventive environments addressing energy, waste and metabolism. In particular it introduces the so-named “Fifth Industrial Revolution”, a systematic transformation in contemporary landscapes combining new methods of manufacture and making with changes to resources, governance structures, civil society, human identity and the meaning of nature at two scales of operation – that of the landscape planning of an industrial district for a post-oil economy in relation to the urban fabric and secondly at the landscape design project scale of industrial ecology, landfill land, a range of public and community open space and resource/energy use in the landscape. This offers a creative opportunity to explore topics of traditional and contemporary planning, design, culture and technology through a series of landscape pedagogies addressing alternative futures for both the natural environment and the built modern world.

Keywords: modern industrial landscape; City of Ulsan; 5th Industrial Revolution; “China Brown”; Graduate Design Studio

0 引言

正如安塞尔·亚当斯在 1950 年所写的那样: “我们最珍视物质和精神财富的时候是在即将失去它们时。”我们的时间很短, 未来很长^[1]。

需要强调的是, 亚当斯在书中引言中根据现实环境和机会所提出的未来, 是景观设计的教学者、实践者 (即那些教授、塑造和管理景观的人) 无法回避的。如今是“环境世纪”^①,

同时也是一个新兴时代——现代工业景观时代 (图 1)。在这个时代, 有望真正将景观设计、环境、生态、文化、经济、技术和艺术结合在一起; 同时也需要应对与“国际风景园林教育”相关的现状、挑战和进步。我们应该调整高度现代化的工业生产制造产业, 使之与我们的环境及当代城市景观中不断变化的驱动力相协调, 从而在生态、经济、环境以及文化等方面关注



1 韩国蔚山市现代工业景观
The modern industrial landscape, City of Ulsan, Republic of Korea

并挖掘景观、城市以及城郊地带中心及腹地的多种可能性。笔者将此称为“第五次工业革命”，下文将阐述该术语的定义及其提出过程。需要说明的是，这对笔者之前的大部分研究成果^②提出了挑战，因为在此理念下，后工业城市及其景观被看作是场地演变的过渡阶段，而不是城市发展和生态演变的最终状态。正因如此，笔者坚信风景园林学能够利用工业生态设计的工具引领设计学科。这也是笔者在哈佛大学设计研究生院（GSD）刚开始的一项研究工作^③，有待进一步深入。值得注意的是，它可能会推翻许多以往的固有认知，包括生态在设计中的角色、工厂在城市景观中的位置（例如，在以往的认知中，工厂往往随着制造业作业的消失而消失，并为葱郁的公园和海滨长廊腾出空间），以及风景园林师和规划师的设计理念来源。然而，笔者建议，第五次工业革命应通过劳动、能源和城市形态的理念，对技术、人文、符号之间的相互关系进行直接的关联。这一思路与先进制造业相结合，成为塑造城市景观新形式的重要推动力，或者至少能引起更多关于工业生态学工具的讨论，以及对工业持续作为推动社会发展力量的思考。尽管可持续智慧城市以及“智能汽车”“无人驾驶汽车”和“紧凑型折叠车”发展迅猛，但我们仍然需要制造汽车。那么，谁来制造，在哪里制造，如何制造，以及这能否可持续呢？本研究试图阐明现在定义的工业性作业的性质、未来可能出现的工业性作业的性质，以及城市设计在这种制

造作业的规划和设计中的引领作用。哈佛大学在工业生态学、环境工程学和规划设计学科之间进行了跨学科的思考，并制定了一些举措，笔者将通过2017—2018年哈佛大学GSD研究生设计工作坊^④的教学过程和结果对此进行展示。

本研究包括4个部分，第一、二部分分别是工业景观的简要介绍和第五次工业革命的理念和主题概述。在第三部分，对笔者创建并授课的设计工作坊（蔚山市再造工作坊）和研究生项目进行介绍，其中，研究生项目介绍了第五次工业革命在韩国塑造一种新的景观设计形式和基于遗产景观的生态生活方式中的潜力。最后，在第四部分简要总结工作坊的教育活动和教学计划，及其对景观结构和景观领域相关教学过程中政策制定和设计实践的影响。

1 工业景观介绍

为了在更广泛的景观研究和规划设计实践的背景下介绍工业景观，首先讨论自1998年开始的在GSD的研究和教学工作。在对受污染的工业景观和水道进行初步研究后，提出了一个关键的假设——“制造场地”^⑤，旨在构建一个更具现代性的关于建成景观环境的愿景。随后哈佛大学GSD通过开展国际会议（1998年）、举办展览（1998年）以及出版书籍（2001年）^⑥对该项研究进行展示，引起了国际设计师、工程师、学者和学生的广泛关注。在此基础上，此后的10年里笔者一直致力于后工业景观主题的教学工作并发表相关研究成果，旨在让设计从业者、学者和学生都认识到在这方面进行创造性工作的重要性 and 未来进行专业的、深入的学术研究的途径。自此以后，哈佛大学GSD的大部分研究计划都涉及场地基础设施建设和受污染的土壤及沉积物的再生策略，以探讨环境修复及其与规划设计的关系。例如，大约9年前，笔者在此基础上提出了“中国棕”的假设，以讨论中国的前工业用地和后工业用地。这在某种程度上与笔者和许多中国研究者一直研究的处理工业用地的标准方法相背离。传统方法一是通过执行地方性的命令，对个别场地进

行土壤污染治理和经济再开发；二是通过场地调查和设计实践，以碎片化的方式对某个场地进行再利用，为社区和居民谋利。而“中国棕”将中国的整个地理和背景视为覆盖面极大的一个单独的棕地或“巨型棕地集群”。中国有些地方是从未进行过工业或农业活动的，可以被认为是“原始的”“未受破坏的”自然景观。然而，笔者主张将其看作一个在全国范围内的唯一实体，以便能够根据多方面的情况整体地了解中国，包括辽阔的土地、国家治理、有计划的城市扩张及现代化、基础设施建设，以及随之而来的人口增长和城市地区扩张。这使得我们能够构建棕地的全国图景，避免了因省份、司法管辖区的利益相关者的不同而可能引起的割裂。目前，棕地的“集群”往往出现在资源型城市，例如山西省朔州市，这与资源的集中开采有关。总体而言，目前拥有154万居民的朔州市面临着多重挑战，例如区域环境污染、周边地区城市与矿业发展的矛盾，以及基础材料产业的转型。煤炭开采业也给区域生态系统带来了一系列负面影响，包括大面积的森林砍伐、水资源污染、水土流失和空气中悬浮颗粒物浓度的增加等。然而，采矿废弃地也具有作为生态资源和文化资源的潜力。在中国，早期法律要求通过重新造林或水质控制等方法将所有矿山恢复为可利用的土地，而如今，这些土地正转变为城市和基础设施建设用地。为此，笔者于2014年出版了《棕地再生原则：废弃地的清理·设计·再利用》的中文版^⑦，该书由清华大学郑晓笛副教授翻译并进行补充撰写。由此提出3个问题：

- 1) 如何在工业场地和后工业场地塑造国土景观以及未来的社区、城镇和区域？
- 2) 废弃工厂、废弃矿区、废弃城市滨水区和市中心工厂等场地的再生将如何影响21世纪公众对自然环境的感知和与之的互动？
- 3) 在这种不断变化的科学和美学知识需求下，第五次工业革命将如何塑造全球景观？

2 第五次工业革命的理念和主题

接下来将讨论第五次工业革命。从分散的家庭手工业到使用水力、蒸汽和电力的城市

工厂集群的制造业,工业尤其是纺织业生产方式的转变发生在 18 世纪 80 年代—19 世纪有着工业革命起源地之称的英国大曼彻斯特。第五次工业革命是建立在这些创新和发展浪潮之上的命题。新的制造业形式出现,从而产生了工业区和城市(及纺织品制造、钢铁制造、农具和机器零件制造等)。1911 年,马萨诸塞州的棉纺织工业发展得如火如荼,直至 20 世纪 30 年代众多公司破产并最终于 20 世纪 50 年代关闭。20 世纪下半叶的第三次工业革命受益于由计算机和大量定制化带来的自动化制造过程,包括航运网络和集装箱网络的发展,在规模和组织上都具有全球性。由于机器人和人工智能技术在先进制造业中的广泛运用,在此基础上开展的第四次工业革命为我们带来了更复杂的操作技术和全球的材料和产品供应链。

在哈佛大学设计课的教学期间,笔者创造性地提出了第五次工业革命的概念——指在建成环境和自然环境不断变化的情况下,气候变化、海平面上升、资源枯竭、洪涝灾害以及人口流动等现象与城市、工业、地理、能源、工人和居民等要素之间的相互关系,这种关系会随着时间的推移逐渐获得平衡。第五次工业革命将第四次工业革命结合机器人和人工智能的全球性的工业化制造整合到“本地”,并与建成环境和自然环境的变化情况相结合,将工作、工业、先进制造业、生态和城市化以及所有居民的日常生活整合在一起。

这里简要介绍设计工作坊研究区域的地理和文化背景。韩国蔚山市位于朝鲜半岛东南沿海,通过东海与全球水运航线相接;与日本隔海相望,受其保护而免受东面台风和风暴的影响。蔚山市是韩国的工业之都,拥有世界领先的造船厂、世界最大的汽车装配厂(现代汽车)和世界第二大炼油和能源生产综合体(SK 能源)。蔚山市在第四次工业革命中蓬勃发展,先进制造业的规模巨大且遍布整个城市。然而,气候变化、污染,特别是后石油世界和经济增长的对抗,要求工业区和港口城市对其未来的发展采取更加谨慎和更具弹性的态度。简而言之,该市希望

减少直至消除对进口石油的需求,并在城市尺度上使用城市生态和设计的手段。本学期设计工作坊的工作包括 3 个主题:1) 构成“现代工业城市”的一种或多种形式的推测;2) “工业生态学”的原则和实践;3) 过去 8 年在韩国出现的“备用自然”。

蔚山市经历了多次突然的转变,从沿海村庄,转变为小型工业集群,再到工业城市,最后成为全球工业基地。蔚山市一直以大海为生,最初是一个渔村,随后成为捕鲸镇。20 世纪 30 年代,在日本帝国主义扩张时期,提出了一系列的土地开垦计划,蔚山市的现代化程度也有所提高。朝鲜半岛上的南北双方及其支持他们的外国势力发动了朝鲜战争(1950—1953 年),蔚山市周围的城镇和沿海区域几乎全部被摧毁。战后,所谓的“不完整的蔚山”因其关键的沿海位置而被选为石化和热能的“工业中心”。该计划以及重要的港口基础设施建设始于 20 世纪 60 年代。20 世纪 70 年代,随着现代汽车集团的入驻,蔚山市进行了大规模的集中投资、建设和现代化改造,其对国家的意义也发生了变化。考虑到这一背景,设计工作坊提出了研究问题(即第一个主题):后工业时代中的“现代工业城市”是什么样的(值得注意的是,韩语中“Hyundai”一词本身就是“现代”的意思)?与第五次工业革命相关的“现代工业城市”的含义是什么?

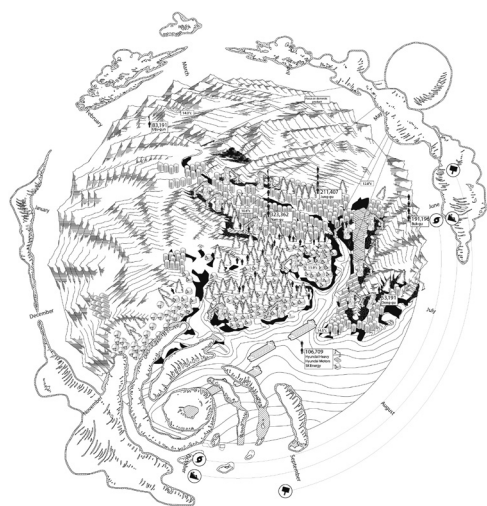
第二个主题是“工业生态学”,即广泛地研究物质和能量在工业系统中的流动。它被用于发明、塑造和管理蔚山市和内陆地区的物质资源、现代科技社会和文化,以及与更多元的当地利益相关者合作,包括北部和西部的半导体、电子和农业产业综合体。在工业生态系统中,能源、水和材料的消耗得到优化,废弃物的产生最小化,一个过程的废弃物可以作为另一个过程的原材料。这与韩国政府正在进行的国家工业生态网络(2005—2019 年 3 期总体规划)相一致,该网络由 8 个工业中心和 46 个园区组成,该工业生态网络受到资源限制、能源成本增加和环境法规的驱动,迫使独立的公司通过合作进行创新。与其他港口城市一样,蔚山市严重依赖国外

的自然资源,尤其是石油资源。但自 2000 年初以来,该市已开始开发新型的当地能源替代品,并鼓励在港口、城市与城郊地区之间开展创造性的工作。该设计工作坊使用环境工程的方法调查了蔚山市当地的资源、能源、废弃物及其转化情况。学生们引入了关于电力、废弃物和能源方面储存和流动的具体场地技术,并在考虑了地理特征、工业生态系统与自然环境之间的相似性以及当地和区域的社会经济福利状况的同时,通过对原型的设计探索了工业综合体内部的干预措施。

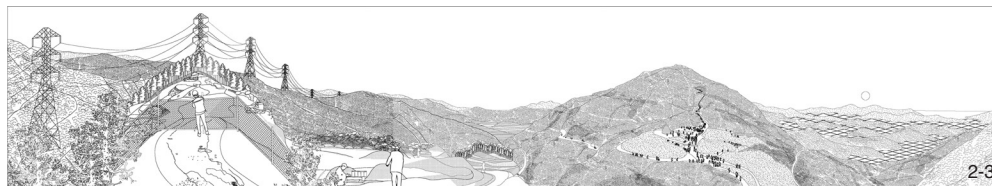
第三个主题是“备用自然”,它面临着非西方与西方观念中“自然”与“自然的”的对立。当地居民可以近距离接触山地、滨海景观等自然美景,特别是岭南阿尔卑斯山和秋日草甸,但这并不是城市中常有的体验。“备用自然”可以通过一些能够唤起自然的体验来定义。这在朝鲜半岛快速发展的城市地区和腹地尤其常见——譬如“点状自然”“远距自然”“自然记忆”与“自然揭示”,这些都可通过对城市近邻和中心地区的可用垃圾填埋场上的基础设施进行升级实现。

3 蔚山市再造工作坊

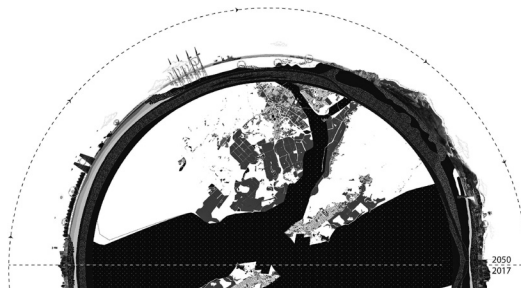
接下来介绍哈佛大学 GSD 的研究生设计工作坊,主题为:蔚山市再造——制造现代工业城市(图 2)^⑧。该工作坊聚焦蔚山市及其腹地,该地区拥有 110 万居民,在未来的几十年里,位于海岸线、山脉和草地的自然环境中的工业区、工业综合体和居民社区都将被重新思考并改造(图 3)。因此,建议将城市基本要素(土地、水、基础设施)与蔚山市工业和市民文化相结合,以此创造一个将公共部门和私人机构不断变化的关注点纳入考虑的现代工业景观。1 000 km² 的初始研究区域以及毗邻的迈普和温山工业区及其腹地处于朝鲜半岛东南角。在前半学期,学生们制定了蔚山市生物动力学重建的整体方法,在战略层面提出了建立当地能源连通和资源流动的景观基础设施的策略。在后半学期,学生们针对技术基础设施以及工业生产和生活场所,在细节层面提出了个人设计方案并绘制了大量图纸。其中,关键的背景图



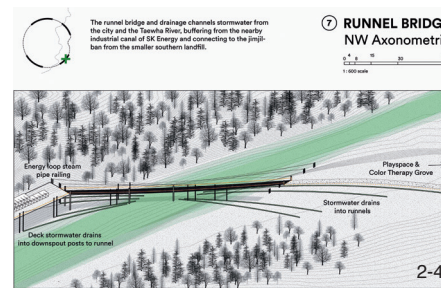
2-1



2-3



2-2



2

2 蔚山市再造 (2017年)

Ulsan Remade 2017

2-1 水、土壤、空气、火：环境危机与关怀

Water, earth, air and fire: environmental risk and concerns

2-2 未来可持续发展目标与管理：能源副产品及交换的编录

Future sustainability goals and governance: inventory of energy byproduct and exchange

2-3 场地剖面概念

Conceptual site section

2-4 西北轴测图：桥

NW axonometric runnel bridge

3 韩国蔚山市海岸线

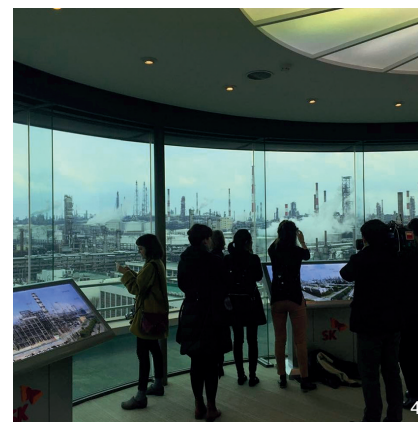
Coastal shoreline, City of Ulsan, Republic of Korea

4 韩国蔚山市 SK 能源综合体

SK Energy complex, City of Ulsan, Republic of Korea



3



4

纸，不仅包括了研究区的基本信息、工业资本及其关键综合体、工业生态系统交换潜力的信息，还涉及韩国其他工业中心的情况。复杂的地理、工业和社会信息，例如，与太华江 (the Tachwa River) 相连的河岸状况以及沿河的城市发展，或者一系列陆地和水上的公共空间以及相应的社会和文化景观，通过组织一系列基于 1960 年杜登图解词典^⑨的图像进行表达。在设计评图和中期评图中，在与校内和校外老师的正式和非正式的会议上，这些材料被介绍和讨论。因为涉及 19 世纪朝鲜半岛和中国大陆地图的边界，在正式出版前材料受到了严格的审查。学生们共同合作，通过讨论、论证和对背景信息的批判性调查，制定了基本的原则和方向。

本研究试图将蔚山市及其周边的设计主题、环境、探索和建议以索引条目形式串联，用以客观地平衡在城市及其环境中发挥作用

的各个方面的作用力和影响因素。这是一种通过分析过去与现在、工业与非工业、自然与发展来解读蔚山市及其工业利益相关者、工人和居民的手段。

第一个条目是 A，代表分析 (Analysis)。以杜登图解词典为指南，对研究区的地理空间、基础设施、生态和文化条件进行初步分析。初步分析包括沿海陆地和海洋各占一半的土地利用，当地的陆地和水上交通系统，地质和土壤的区域背景以及由此产生的山脉、海岸和城市边缘，这一边缘受到城市和工业区的城市化进程的影响。

第二个条目是 E，代表能源 (Energy)。蒸汽、电力、气体和废弃物形式的地上能量流明显存在于城市道路和绿道旁的基础设施中。绘制城市及其腹地的工业综合体分布图，检查已完成的平面图是否能够表达清晰，例如蒸汽管道网络分布图就是要表达在全域尺

度下，共享的蒸汽高速公路是否能够实现提高效率 and 舒适度的景观功能。按照地区、行业类型和行业规模，绘制整个城市在废弃物交换中的能源交换和行业连通。这将蒸汽高速公路与蒸汽街景、蒸汽水疗中心和家庭供暖等文化项目结合在一起。这种散布在蔚山市各处的蒸汽生态形式，在城市肌理中创造了小型热岛潜力，从而提供了潜在的全年可用的当地居民空间。对 3 个国际工业生态项目进行案例研究，比较了中国天津经济技术开发区自上而下的大型项目、丹麦卡伦堡生态工业园的中型城产合作项目以及美国马萨诸塞州德文斯生态工业园的一个小规模合作社。

第三个条目是 F，代表实地考察 (Field Trip)。2017 年 3 月，全体同学前往蔚山市对整个城市及其腹地进行了一次实地考察，包括 SK 能源综合体 (图 4) 等，并花费更多时间调研了现代重工集团以了解造船和大型能

源海上平台。学生的设计项目通常是中小规模的,旨在将其置入现有的城市肌理或环境中,并随着蔚山市重工业核心的变化而在城市演变中逐步可见。

第四个条目是 I,代表“工业岛”(Industrial Island),是研究生尉博翔开展的设计项目主题。韩国是一个三面环海的“岛屿”。南古工业区实际上是城市与海洋生态、风景与旅游设施之间的重要物理屏障。与此同时,工业正面临着困境:气候变化造成的洪水泛滥,海平面上升对全球的破坏,以及在未来 10 年内许多工业综合体改变其基本制造流程而持续提高的生产效率。如果像“工业岛”的概念所呈现的那样,工业可以搬迁到大海上,那么城市就可以将这片土地用于文化和基础设施建设。这个概念是为现代韩国提出的,这个一直渴望更多土地面积的国家。它为蔚山市创造了一个新的工业景观,一个漂浮在海上的平台,形成了与城市肌理分离的自身的系统,并赋予了城市一个独立于工业的新身份,也让工业独立于城市系统。该方案的题目为《海上世界:漂浮的工业景观》,通过土地利用分析图梳理了大海在蔚山市历史发展中的主要作用,从最初的一个渔村和捕鲸镇,到现在的包括造船和海洋服务平台在内的工业与制造业中心。该方案聚焦于如果产业转移,蔚山市还会留下什么,以及如何通过规划和设计重塑这座城市。该方案利用剩余的土地,以及能源生产、轻工业、旅游和毗邻海岸美景的公共绿地空间,为蔚山市创造了一种新的沿海开发模式。这个概念性想法建立在 20 世纪 30 年代末、40 年代和 60 年代蔚山市为了工业进行疏浚和造地的历史基础上。它在未来 10 年为蔚山市提供了一个新的绿地系统,供居民、游客和工业利益相关者使用,共同激发创意产业和创意城市倡议和生态潜力,并增强当前的工业实力。

最后一个条目是 W,代表健康(Wellness or Health)。由 Dana Kash 和 Siobhan Feehan 提出的“路径休息站:健康和工业景观”(Circuit Breaker: Health, Wellness and the Scenic-Industrial Landscape)^⑩构想,呼吁现代工业城市的居民需要将休息作为人类生活的必要组成部分。

该项目同时呼吁现代工业城市的设计师有责任明确创造整体城市生活的各作用要素,包括消费系统、能源的生产方式、废弃物的去向、季节性变化和水循环条件,以及协调所有这些需求的基础设施。路径休息站项目旨在在城市核心区附近建立一个连接休闲和娱乐的“回路”,激活山姆圣垃圾填埋场(the Sam-San landfill)的工业系统和自然系统。该场地南面是 SK 能源石化设施、西面是蔚山市住宅区、东面是陡峭的山坡、北面是太华江,将供水系统、蒸汽系统以及居民和游客的社会系统结合在一起。该路径与 SK 能源的蒸汽辐射热能闭合回路相对应,沿着路径布置了精心修剪的绿植广场、市场桥和城市海滩休闲区。沿 2 km 长的岸线布置桑拿房并处理好边缘的衔接,使其与河流系统发生联系,并唤起公众对防洪设施和工业水道的认识。

以工业成就和创造力而闻名的蔚山市可以通过一个项目和一个公共空间来表征,该公共空间揭示了:相较于自动化和技术,现代社会中的人性应该通过休息和生产力来定义。

4 景观教学和实践总结

最后是总结及后续工作。研究生设计工作坊为期 14 周,成果包括一系列关于第五次工业革命、工业遗产、人文城市以及城市和居民健康等方面的分析和综合研究。主题研讨会^⑪于 2017 年 7 月在蔚山市举办,旨在收集和分享城市发展的信息。在研讨会上,组委会讨论了蔚山市作为模范生态工业城市的可持续发展方案,这也是研究生设计工作坊的成果,离不开蔚山大学(University of Ulsan)和蔚山市发展研究所(Ulsan Development Institute)的持续参与和支持。研讨会上,我们分享了研究生设计工作坊的成果,也探讨了基于工业生态学和自然环境基底的蔚山市及其腹地的发展。回到与工业产地相关的设计理念的来源,这个对景观设计教育来说很重要的议题。一种持久的道德压力影响着当今的设计实践。景观的媒介被认为是“自然的”,因此声称是处于“真理”的道德地位,这让其与城市和建成环境的“文化艺术”以及这些工业用地的场地条件形成对立关系。即

使是对这些场地最粗略的分析,也能够揭示其作为工业与人造表面的属性。设计师的场地设计变成了一种修饰,一种虚构。在这里,通过诉诸“自然”而赋予设计道德优越性需要受到质疑。研究认为,如果通过更敏锐的观察,不对自然环境和建成环境进行过度区分与干涉,我们将可能发现两者之间巨大的重叠,并在此之上建立联系。这为我们应该如何工作提出了一种具有挑战性的新范式,即对复杂有机的人工现实系统的新的关注。

注释:

- ① “环境世纪”一词由俄勒冈州立大学的环境科学家 Jane Lubchenco 博士于 1998 年提出。
- ② 包括 E. F. Spon 出版的 *Manufactured Sites: Rethinking the Post-Industrial Landscape* (2001 年) 和 Island Press 出版的 *Principles of Brownfield Regeneration* (2010 年)。
- ③ 作为哈佛大学风景园林系和作者的研究计划的一部分。
- ④ 蔚山市再造研究生课程由 13 名哈佛大学 GSD 的学生参加。
- ⑤ “制造场地”一词由笔者提出,用来描述通过环境工程和修复实践改造的后工业场地。
- ⑥ *Manufactured Sites: Rethinking the Post-Industrial Landscape* 于 2001 年由 E. F. Spon 出版。
- ⑦ 笔者和贾斯汀·霍兰德(Justin Hollander)以及茱莉亚·高德(Julia Gold)共同撰写的《棕地再生原则:废弃地的清理·设计·再利用》于 2014 年由中国建筑工业出版社出版。
- ⑧ 译者注:详见 <https://www.gsd.harvard.edu/exhibition/ulsan-remade-manufacturing-the-modern-industrial-city/>。
- ⑨ 杜登图解词典通过编号插图识别对象,涉及技术、艺术和科学等广泛的主题。
- ⑩ 译者注:详见 <https://siobhanfeehan.com/Circuit-Breaker>。
- ⑪ 这个活动也是蔚山市大都市区 20 周年纪念活动。

参考文献 (Reference):

- [1] TURNAGE W A. Ansel Adams: Our National Parks[M]. New York: Little, Brown and Company, 1976.

图片来源:

图 1、3、4 由作者拍摄。图 2-1 由 Boxiang Yu、Ho-Ting Liu、Taylor Baer 绘制;图 2-2 由 Johanna Rose Cairns、Ellen E. Epley、Junbo Zhang 绘制;图 2-3 由 Sophie Geller 绘制;图 2-4 由 Dana E. Kash、Shoibhan Elizabeth Feehan 绘制。

(编辑 / 刘玉霞)

Landscapes Remade: Emerging Landscape Design Practices and Pedagogy for the New Environmental Reality

Author: (USA) Niall Kirkwood Translator: FU Quanchuan

0 Introduction

As Ansel Adams wrote in 1950 – “Possessions, both material and spiritual are appreciated most when we find ourselves in danger of losing them”. Our time is short and the future terrifyingly long^[1].

I want to address the future referred to by Adams in the introductory quote through the present conditions of the environment and the realities and opportunities that landscape design educators and practitioners and those who teach, shape and steward the landscape find themselves confronting. Today is in the “century of the environment”^[1] and we are also looking at another emerging age – the age of the Modern Industrial Landscape as shown in Figure 1. It promises to be the true marriage of landscape design, environmental, ecological, cultural, economic, technological and artistic endeavors and I would also propose that it will confront and address the current situation, challenges and advancements related to “International Landscape Architecture Education”.

I want to focus on the possibilities for landscapes, urban and peri-urban centers and their hinterlands to progress ecologically, economically, environmentally and culturally through advancing highly modern industrial manufacturing and production in concert with the environment and the changing forces in the contemporary urban landscape. I am calling this the “Fifth Industrial Revolution” and I will explain the term and its derivation in due course but suffice to say that it sits uncomfortably with and challenges much of my own previous research and publishing^[2] by demanding that the post-industrial city and its landscape be considered an interim step in the evolution of the site rather than a terminal point

both developmentally and ecologically. It is also I believe where the field of landscape architecture can lead the design disciplines through the tools of industrial ecology and design. This is a research effort that I have just started on in the Graduate School of Design at Harvard^[3], it is still in need of intensive research effort and study and it is worth noting that it may overturn many previous positions related to the role of ecology in design, the place of industry in the city landscape (usually swept away along with manufacturing jobs to make room for verdant parks and waterfront promenades), as well as the source of design ideas for landscape designers and planners. However I want to suggest that it looks directly to the interrelationship of the technical, the humanistic and the symbolic through the ideas of work, energy and urban form. It engages with advanced manufacturing as a vital agent in shaping a new form of urban landscape or at least in opening up questions regarding the tools of industrial ecology and industry’s role in continuing to be a force in society. We can urge on behalf of sustainable and smart cities and the development of “smart cars”, “driverless cars” and “compact folding cars” but cars still need to be manufactured and who does it, where and how and can it ever be sustainable? I want to present the nature of industrial work as it is defined now and may emerge in the future and the role of urban design in leading the planning and design implications of this type of manufacturing practice. This addresses initiatives developed at Harvard crossing between the fields of industrial ecology, environmental engineering, and the design and planning disciplines that I will show through the pedagogical processes and results of a graduate design studio carried out at the Harvard Design

School between 2017 and 2018^[4].

The structure of this paper is in four parts: First a brief introduction to the subject of industrial landscapes, and second, an overview to ideas and themes of the Fifth Industrial Revolution. In part three I will give a brief overview of a design studio course that I invented and taught (the Ulsan Remade Studio) and the graduate student projects that introduce the potential of the Fifth Industrial Revolution in South Korea to shape a new form of landscape design and ecological life based on the legacy landscapes. Finally, in part four a short summary of educational activities and teaching initiatives that followed the studio and their potential to influence the development of policy and design practices in the landscape fabric and in educational processes related to the landscape field.

1 Introduction to Industrial Landscapes

To introduce the industrial landscape within the broader context of landscape research and projective planning and design initiatives, I want to initially discuss research and teaching efforts at the GSD starting from 1998. I created during that time a key hypothesis titled “Manufactured Sites”^[5] following my initial research on the topic of polluted industrial landscapes and waterways. This attempted to build a more current vision of this aspect of the built environment in landscape architecture. The research evolved into an international conference, exhibition (both 1998) and book publication (2001)^[6] at Harvard University’s GSD and was well attended by a broad international range of designers, engineers, academics and students. Building on this research over the next decade, I worked in detail on teaching and publishing on the topics of the post-industrial landscape and it was my

intention that design practitioners, academics and students would recognize significant opportunities for creative work and avenues of future professional and further academic research. Most of the research initiatives at the Harvard Design School since then are concerned with the nature of environmental remediation and its relationship to design and planning through strategies of site infrastructure establishment and the regeneration of former polluted soils and sediments. For example, about nine years ago I developed a further hypothesis titled “China Brown” with which to consider the topic of former and post-industrial lands located in China. This in itself was somewhat of a departure from the standard ways of addressing industrial lands that myself and many Chinese researchers have been involved up to that point. This was either through the enforcement of provincial directives covering the treatment of, for example, soil contamination and the future economic redevelopment of individual sites or the investigation of certain design and aesthetic practices to reuse and regenerate land in a fragmented way for the community and citizens benefit. The term “China Brown” denoted a consideration of the entire geography and context of the People’s Republic of China landmass as a single brownfield or “mega-clusters” of brownfield land over significantly large areas. I was aware that there were parts of the Chinese national landscape that were free from any industrial or agricultural activity and may be considered “pristine”, “untouched” and areas of natural unspoiled beauty. However, I wished to present it as a sole entity at the scale of the entire country in order to approach China holistically as appropriate to its vast scale and extent, governance and planned urban expansion and modernization of cities, infrastructure and accompanying population growth and expansion of the urban areas. It also allows us to build a national picture of the subject, without fragmented concerns over stakeholders in different provinces, jurisdictions and with differing approaches. There are also larger “clusters” of land currently related to

resource extraction and resource-based centers such as in the City of Shuozhou. Overall the Shuozhou City region that is currently home to 1.54 million residents faces many challenges such as regional environmental pollution, the conflict between urban and mining development in surrounding areas, and the transformation of the basic-material industry. The coal mining industry has also brought a series of negative impacts on regional ecosystems including large areas of deforestation, water resource pollution, soil erosion and increase of suspended particulate in the air. However, the post-mined sites also provide an opportunity as an ecological and as a cultural resource. In China, early versions of national laws now require the return of all mines to a beneficial post-mine land use whether through reforestation or related to water quality control yet these are changing to engage in urbanization planning and infrastructure development. This has led to the Chinese publication of the brownfield principles book^⑦ in 2014 with additional text by Professor Zheng of Tsinghua University, Beijing. Three questions arise from this and the other research projects:

1) How do industrial and post-industrial sites shape the national landscape and future communities, towns and regions.

2) How does the restoration and redevelopment of sites such as decommissioned manufacturing plants, abandoned mining areas, derelict urban waterfronts and inner-city factories affect how the public will perceive and interact with the natural world in the 21st century.

3) What is the role of the Fifth Industrial Revolution and how will this structure the changing needs of scientific and aesthetic knowledge and in shaping the global landscape?

2 5th Industrial Revolution: Ideas and Themes

The next part of the article addresses the term – the “Fifth Industrial Revolution”. The shift from scattered cottage and craft industries to

manufacturing in urban factory building clusters using waterpower, steam then electricity started in 1780 – 1800’s in Greater Manchester, England, known as the “home” of the industrial revolution and in particular in the textile industry. The fifth industrial revolution is a proposition that builds on these waves of innovation and development. New forms of manufacturing emerged creating industrial regions and cities (manufacturing textiles, steel, farming tools and machine parts). Scenes of workers reloading spindles of cotton thread were repeated throughout Massachusetts in 1911 up until the 1930’s when bankruptcy finally closed the companies in 1950’s. The third industrial revolution in the second half of the 20th century benefitted from automation of manufacturing processes using computing and mass customization including networks of shipping and containerization making it global in both scale and organization. The fourth industrial revolution currently unfolding built on the previous phases brought complex operations and a global chain of materials and products using the combination of advanced robotics and Artificial Intelligence (AI) in all aspects of advanced manufacturing.

During the Studio at Harvard, I presented a definition of the “Fifth Industrial Revolution”, an invention on my part, by bringing the evolving current conditions of the surrounding environment and the natural world- think climate change, sea-level rise, resource depletion, flooding and population dispersal as having a balanced interrelationship with cities, industry, geography, energy and workers/residents over time. The Fifth Industrial Revolution integrates the global aspects of the Fourth Industrial Revolution of Industrialized Manufacturing with Robotics and AI to the “local” allied to the shifting conditions of the surrounding urban environment and the natural world. In doing so, it integrates concerns of work, industry, advancing manufacturing, ecology and urbanism and the daily lives of all citizens.

I want now to introduce the geographic and

cultural context of the Design Studio study area. Ulsan City was located to provide direct access to the global shipping lanes through the East Sea and offered protection from typhoons and storms from the East by the landmass of Japan. The City of Ulsan is South Korea's industrial capital and home to the world's leading shipbuilding yards, as well as the world's largest car assembly plant (both Hyundai) and the world's second largest oil refining and energy production complex (SK Energy). Ulsan thrives on ultra-scaled advanced manufacturing (The 4th Industrial Revolution) dispersed over its entire landscape. Yet climate change, pollution, and particularly confrontations between a post-oil world and economic growth requires the Industry Districts and Port City to advance a more carefully crafted and resilient attitude to its future growth. In short, the city wants to reduce then eliminate its need for imported oil and use the tools of urban ecology and design at an urban scale. Three themes shaped the semester's work – the principles and practices of “Industrial Ecology”, the ideas of “Alternate Nature” that have been emerging in the Korea over the last eight years and speculations on the form or forms of what may constitute “the Modern Industrial City”.

Ulsan evolved through abrupt shifts first as a coastal village, a small industrial cluster, a company town then a worker's city to its current status as a global industrial base. Ulsan always looked outwards to the sea for its livelihood, initially as a fishing village, then whaling town. Early designs for a more modernized Ulsan were first made in the 1930's during the Japanese imperialist expansion period with a series of land reclamation proposals. The Korean War (1950 – 1953) between the forces North and South and those foreign powers supporting them left the town and coastal areas around Ulsan almost completely destroyed. Post-war, the so-called “Incomplete Ulsan” was selected as the location of a petrochemical and thermal power “industrial center” because of its key coastal location. This plan along with significant

port infrastructure was initiated in the 1960's. A change of national significance occurred when concentrated and sizable investment, construction and modernization came to Ulsan in the 1970's with the arrival of the Hyundai Group. With this background in mind – the Harvard Studio posed the questions – What is a modern industrial city in the world of the post-industrial city? (It is worth noting that the Korean word “Hyundai” itself means “modernity” or “modern”) Finally what is the meaning of the “Modern Industrial City” as it relates to the Fifth Industrial Revolution? The second theme is “Industrial Ecology” concerned broadly with the study of material and energy flows through industrial systems. It was used as a means to invent, shape and manage the physical resources, modern technological society and culture of Ulsan and the hinterlands and engage in a more diversified set of local stakeholders that encompasses clusters of semi-conductor, electronics and agricultural industrial complexes to the North and West. In an industrial ecosystem, the consumption of energy, water and materials is optimized, waste generation is minimized, and the effluents from one process serve as the raw material for another as mapped out by the class. This is line with the Korean Government's ongoing development of a national industrial ecological network (Three Stage Master Plan 2005 – 2019) of eight industrial centers with 46 complexes driven by resource limitation, increasing energy costs and environmental regulations that has forced separate companies to think creatively by working together. Like other port-cities, Ulsan is heavily dependent upon foreign natural resources especially oil. But since early 2000's the city has begun to foster new forms of local energy alternatives and is attempting to encourage creative thinking between the port and urban and peri-urban regions. The studio also used tools from environmental engineering to investigate the specific local conditions of Ulsan's resources, energy, waste and their transformation. Detailed site technologies of power, waste and

energy storage and movement were introduced, and students explored interventions within the industrial complex using design pro-typing while accounting for geographic features, proximity between industrial ecosystems and the natural environment and socioeconomic welfare at both local and regional scales. The third theme “Alternate Nature” confronted the non-western/western opposition in the ideas of “nature” and the “natural”. Local inhabitants have close access to mountain and coastal landscapes of great natural beauty particularly the Yeongnam Alps and fall grass meadows but there is often a detachment of this experience in the City. “Alternative Nature” was examined through a number of conditions that evoke the “experience” of Nature. This has been found especially noticeable in the fast-developing urban areas and hinterlands on the Korea peninsula they are – “spot nature” as well as “distancing nature”, “nature memory” and “nature revealed”, all which allow for the advancement of infrastructure space on available waste landfill sites adjacent to and integrated within the City.

3 The Ulsan Remade Studio

Moving onto Part Three: Introducing the Graduate Studio from the Harvard Design School titled – ULSAN REMADE – Manufacturing the Modern Industrial City (Fig. 2). The studio is focused on the City of Ulsan and hinterlands, (population of 1.1 million) where established fabrication zones, industrial complexes and civic neighborhoods are all located within an intense natural setting of coastal shorelines as shown in Figure 3, mountains and meadows and are to be rethought and remade over the next few decades. I want to suggest how the basic elements of the city (land, water and infrastructure) integrate within the Ulsan industrial and civic culture to produce a modern industrial landscape that takes account of the shifting concerns of public and private agencies and companies. The location of the 1,000 km² initial study area and the adjoining Mipo and Onsan

Industrial Districts and hinterlands, located in the S-E corner of the Korean Peninsula. In the first half of the semester the class developed an overall approach to a biodynamic redevelopment of Ulsan. Working together a landscape infrastructure of local energy linkages and resource movement was proposed at a strategic scale. In the second half of semester, students advanced individual design proposals at a level of detail for the technical infrastructure as well as industrial and civic venues. Key background maps were prepared not only illustrating basic information about the study area along with information on the industrial capital and its key complexes and potential for industrial ecological systems and exchanges but outlining the disposition of other industrial centers in Korea. A series of images based on the Duden Pictorial Dictionaries[®] of 1960 were employed to organize the complex geographic, industrial and social information such as examples of river edge conditions that were related to the Taehwa River and the development of the city along its edges or a range of public spaces both on land and water and the corresponding social and cultural landscapes. This material was presented and discussed in informal and formal meetings with internal and external faculty during design pin-ups and mid-reviews. Published materials were critically examined at the beginning as precedents for a 19th century map of the Korean peninsula and Chinese mainland. Class members working together were expected to draw out basic principles and directions through discussion, argument and critical inquiry into background information.

I want to structure the remaining design topics, environments, explorations and proposals in and around the City of Ulsan in this article in the form of an index to balance objectively the various aspects, forces and influences at work in this City and its context. It is one means at hand to decipher the City of Ulsan and its industry stakeholders, workers and residents by involving past and present, industry and non-industry, nature and development.

The first entry is appropriately A for Analysis. Preparatory analysis was carried out on the geospatial, infrastructural, ecological and cultural conditions of the study area using the Duden Pictorial Dictionary as a guide. Examples of this initial research included land-use where the balance of coastal land and sea are 50/50 and the regional context of geology and soils and the resulting mountains, coast and urban edge with a timeline of urbanization of city and industrial zones and local transportation systems on land and water.

Next in the Index is E for Energy. The above ground flows of energy in the form of steam, electrical power, gas and waste are evident already in the infrastructure of the city alongside roads and greenways. A map of the distribution of the Industrial Complexes was prepared both for the City and the hinterlands. Already prepared layouts of, for example, steam networks were examined that speak to the idea of creating a shared network of steam highways at a territorial scale in order to enhance the landscape for manufacturing efficiency as well as human comfort. In waste exchanges a series of energy exchanges and industry connectivity were mapped across the city by district and then by industry type and company at large and complex-scale. This unites the steam highway with cultural programs such as steam streetscapes, steam spa's and domestic heating. This form of steam ecology scattered throughout Ulsan, created the potential of small thermal islands in the city fabric giving the potential of usable local and civic spaces all year round. Case studies of three international industrial ecology projects were carried out comparing a large scale top down case in Tianjin Economic and Technological Development Area, China, a mid-scale city-industry collaboration in Kalundborg Eco-Industrial Park, Denmark, and a small-scale cooperative at Devens Eco-Industrial Park in Massachusetts, USA.

Returning to the Index the next is F for Field Trip. A field trip took place in March where the class of students travelled to the City of Ulsan.

Site visits were carried out throughout the city and hinterlands including the SK Energy complex as shown in Figure 4 and longer visits to Hyundai Heavy Industries to see the shipbuilding and large-scale energy sea platforms. The assembled student design projects are generally mid-scale to small scale and meant to be inserted into the existing City fabric or context and be visible as advances in the evolution of Ulsan as changes occur to its heavy industrial core.

The next index letter "I" stands for "Industrial Island" – the theme of the project carried out by graduate student Boxiang Yu. Korea is an "Island" in the sea surrounded on three sides by the presence of coastal waters. Yet the industrial area of Nam-Ku is actually a significant physical barrier between the City and the ecological, scenic and tourist amenities of the coast. In the meantime, industry is facing its own dilemma: the problems of flooding through climate change and global disruption to sea-level rise and the continued efficiency of industrial complexes as many alter their basic processes of manufacturing in the next ten years. What if conceptually industry can be relocated and moved into the sea, and then the City can reclaim and free up this land for cultural and infrastructural uses. This process is proposed for modern Korea – a country that has always longed for more land-area. It creates a new industry landscape for Ulsan that floats on a sea platform and forms its own system separated from the urban fabric and gives the City a new and separate identity from the Industry and vice versa. Titled – *In the Country of the Sea: the Floating Industry Landscape* this project refers back to the land-use analysis drawing and the major presence and role that is played by the sea in relation to Ulsan's history as first a fishing and whaling village and today serviced by, and serving, major shipping routes with industrial manufacturing processes including shipbuilding and ocean service platforms. The project focuses on what is left in Ulsan if the industry is relocated and how planning and

design can remake the City. This design proposal uses the leftover land to create a new coastal development model for the City of Ulsan using energy production, light industry, tourism and public green space right beside the scenic amenity of the coast and the sea. This conceptual idea builds on the historical fact of dredging and land-making that took place in Ulsan to provide for industry in the late 1930's, 40's and into the 1960's. It provides Ulsan in the coming decade with a new green system for residents, visitors and industrial stakeholders together unlocking the potential for creative industry and creative city initiatives and ecologies as well as enhancing the current Industry.

The final entry in the index is the letter "W" for Wellness or Health. Circuit Breaker: Health, Wellness and the Scenic-Industrial Landscape by Dana Kash and Siobhan Feehan addresses the citizens of the modern industrial city who must reclaim rest as a necessary part of their human experience of work. The project makes a second and related proposition, that designers of the modern industrial city have a responsibility to make clear the forces at work in the creation of a holistic city life. These include systems of consumption, how energy is created, where waste goes – as well as conditions like seasonal change and water cycles and the infrastructure that negotiates between all these needs. The Circuit Breaker Project seeks to build a connective circuit for rest and pleasure near the core of the City. The Circuit Breaker project builds a connective circuit for rest and pleasure that, in its form, daylights industrial and natural systems in the Sam-San landfill. The site is a buffer between SK Energy Petrochemical facility to the south, a residential district of Ulsan to the west, steep hillsides to the east and the Taehwa River to the north and unites a water system, a steam system and a social system of residents and visitors. The circuit path corresponds with a closed loop of radiant heat energy, in the form of steam extracted from SK Energy, and a topiary plaza, market-bridge and city beach are placed along its length. An

indoor/outdoor jim-jil-bang unfolds over the course of the 2-kilometer route and bridges the edge conditions allowing new connections to the river system as well as awareness of flood management infrastructure and industrial water routes.

The City of Ulsan that is known for its industrial triumphs and creativity can be characterized by a project and public space that daylights how, in comparison to automation and technology, humanity in the modern time, should also be defined by rest as well as productivity.

4 Summary in Relationship to Landscape Education and the Field

Following a selection of the student projects, we now come to the Final Section – Summary and Next Steps. There has been the production of a range of analysis and synthesis studies and graduate student projects within the 14 week Graduate Studio. The key ideas have been clustered around themes of the Fifth Industrial Revolution, Industrial heritage, the Humanistic City and the health of both the City and the Residents. In July 2017 a Workshop^⑨, was organized in Ulsan to gather and share knowledge for city development. Throughout the Workshop the Committee discussed solutions for sustainable urban development for Ulsan City as a model eco-industrial city. The event was also held as an outcome of the design studio and the continued engagement of the University of Ulsan and the Ulsan Development Institute. The workshop shared the results of the Design Studio and was also a public venue for the exploration of the development of the City of Ulsan and its hinterlands based on the concerns of industrial ecology and the natural environment. I would like to return to a topic that is of significance to landscape design education – the sources of design ideas as they relate to industrial sites. There is a persistent moral strain, which has continued to inform design practice in present times. The medium of the landscape is considered "natural", and therefore lays claim to a moral status of

"truth" that places it in an oppositional relationship to the "cultural artifice" of the urban and built environments and the condition of these industrial lands. Even the most cursory analysis of these sites reveals industrial and artificial surfaces. The site with which the designer works becomes a rhetorical product – a fiction. Here the moral superiority assigned to design – by appeal to the "natural" needs to be questioned. By looking observantly, without trite moralizing at the natural world as well as the disposable world, we may build at the great overlap between the two. This suggests a challenging new model for how we ought to work – a new quality of attention to the intricate organic and artificial systems of reality.

Notes:

- ① The term – "Century of the Environment" was coined by environmental scientist Dr Jane Lubchenco of Oregon State University in 1998.
- ② Examples include *Manufactured Sites: Rethinking the Post-Industrial Landscape* E.F. Spon (2001) and *Principles of Brownfield Regeneration*, Island Press (2010).
- ③ As part of the Department of Landscape Architecture and the authors research initiatives at Harvard University.
- ④ The graduate course titled "Ulsan Remade" was taken by 13 students at the Graduate School of Design.
- ⑤ "Manufactured Sites" was conceived by the author to describe post-industrial sites that were remade through environmental engineering and remediation practices.
- ⑥ The book publication *Manufactured Sites: Rethinking the Post-Industrial Landscape* was published by E. F. Spon in 2001.
- ⑦ *Principles of Brownfield Regeneration* by the author with Justin Hollander and Julia Gold was published by Chinese Construction & Architecture Press, Beijing in March 2014.
- ⑧ Duden Pictorial Dictionaries identifies objects by means of numbered illustrations and covers a broad range of subjects such as technology, arts and science.
- ⑨ The event commemorated the 20th anniversary of the promotion of Ulsan Metropolitan City.

Sources of Figures:

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(Editor / LIU Yuxia)