**Contents**

**FOREWORD** 前言
  Evan Douglis 埃文·道格拉斯 6
  Zhang Jianlong 张建龙 10

**SELECTED ESSAYS** 论文精选
  BUILDING AND WEAVING  拉尔夫·高彻
  建构与编织 14
  WEAVING AS A RESEARCH TOOL FOR URBAN THINKING  陈宏
  以编织主题作为研究手段的城市设计教学尝试 20
  CREATIVITY AND CHALLENGE  魏伟
  创意与挑战 26
  WEAVING URBAN FORMATIONS  古斯塔夫·克伦贝尔
  交互情感构成 30

**WEAVING SYSTEMS** 编织系统
  Midterm Projects  中期成果 38

**PROJECT PROPOSALS** 设计项目
  Project Brief and Team Clusters  项目简介和团队集群 104
  Cluster Projects  团队成果 116
  Studio Culture  设计文化 284
Building and Weaving
建构与编织

At first glance, fabrics and textiles, and the knots and weaves by which they are made, would seem to have little in common with architecture. Buildings, after all, are erected with rigid members that when fastened, hardened or assembled, produce an immobile and largely inflexible frame. Textiles, on the other hand, are necessarily supple and elastic in order to hang with the forces of gravity, wrap around a piece of furniture, or adjust to a body in motion. Beyond this, the divergence in rigidity between weaves and buildings is joined by the very different sense of duration that they both prompt. Traditionally, and as its root word would suggest, architecture has historically connoted permanence; comprised of elements that endure. Textiles have an altogether different intimation and suggest the fleeting, the ephemeral; comprised of elements that succumb to the vagaries of time. Clothing, curtains, drapery, textile wall coverings, mats, and screens last rarely beyond a generation, if beyond a season. This is all to say that textile and architecture seem fundamentally different. It is then with some surprise that, in the last two

各种布料，纺织制品，以及打结编织的过程，看上去似乎与建筑没有什么关联。当我们把一栋建筑的各个部件加固、硬化和组装起来后，所树立起来的应当是一个不可移动不易变形的坚固整体。而相比之下，纺织的结构则是柔韧富有弹性，可以依赖重力而下垂，包裹家具或者随时根据人体的运动而调整形状。

除此以外，编织与建筑对“不变性”（Rigidity）的理解也因其持久性的差异而不同。无论是从传统角度还是从其词根来看，建筑的含义自古以来一直与永恒相连。建筑的材料也因而多为耐久的材料。而编织则正相反，它总是寿命短暂。衣服、窗帘、帷幔、墙纸、席垫和屏风通常在用过一代后就过时了，有时甚至都用不了一季的时间。总而言之，建筑与编织之间似乎完全是两个不同的概念。因而在过去的两百年中，不断有人试图从类似编织这种看似偏远的视角去研究建筑的起源、目的和使用。这样的现象也就值得探讨了。

从很大程度上来说，戈特弗里德·森佩尔（Gottfried Semper）是通过对建筑和编织的词源及考古的研究建立了现代建筑学中最深刻而隐喻的理论之一。
centuries, a practice so visually and phenomenally distant from building as weaving might be, would emerge as a recurrent trope to explain architecture's origins, purpose and performance.

It was largely on etymological and archaeological parallels between the acts of weaving and architecture that Gottfried Semper would erect what is certainly one of the most penetrating modern architectural metaphors. As is too often neglected, Semper's mid-nineteenth-century theory was not conceived out of whole cloth, but had its basis in the work of the French Romantic architects’ counter-establishment interpretation of the origins of architecture, particularly Henri Labrouste's fascination with the figure of the knot as a symbol for unity. These Romantic architects were captivated by the historical transformation of ephemeral ritualistic forms (sacrificial offerings, graffiti, and vegetal garlands) into “petrified” architectonic elements made of durable materials such as stone or bronze. Semper developed this bit of insight into a comprehensive theory that sought to extract from the architectonic motifs of his present day the primitive forms underlying their historical evolution. Of the four primitive elements cited by Semper, wickerwork (and related forms of weaving) carried the most important spatial consequences. Woven screens and carpets hung upright, Semper explained, were the first spatial enclosures, the first walls.¹

The analytical possibilities the theory afforded were indeed tremendous. Operating as a historical x-ray of sorts, Semper’s theory allowed him to see within the staggered courses of a brick

³

¹ Above, Gottfried Semper, Figure of the Knot, Der Stil in den technischen und tektonischen Künsten, oder praktische Ästhetik (Munich: Fred. Druckemann's Verlag, 1878), 172.

² In this case, Semper was referring to a particular type of building in which the walls were constructed of brick. This type of construction was common in the Romantic period and was often used as a symbol of the connection between architecture and weaving. The weaving and brick were seen as analogous in their use of materials and their structural integrity. By using this analogy, Semper was able to create a new way of thinking about architecture that emphasized the importance of the materials used in its construction and the way in which they were manipulated to create a sense of unity and coherence. This approach to architecture was in contrast to the more traditional approach of the time, which focused on the ornamental details and the use of classical elements. Semper's theories were influential in the development of modern architecture and continue to be studied and debated today.
wall, for instance, the faint historical traces of
the primitive weave of a screen. The procedure
was akin to the work of a biologist (Semper highly
admired French natural historian Georges Cuvier)
trying to understand the organic structures of
living specimens by grasping their transformation
from the earliest fossilized remains.

The historical connection that Semper drew
between textiles and architecture was a way
to rejuvenate the discipline by purging it of two
centuries of idealist academicism. In other words,
there was a subversive agenda behind Semper’s
evocative argument that architectural spatiality
began with the hanging of woven screens. As a
political agitator (Semper had fled from Dresden
due to his participation in the May Uprising in
1849), he was conscious that his theory disrupted
artistic hierarchies by wresting architecture from
the academic fine arts and returning it to the
handicrafts. In fact, the entire thrust of Semper’s
unfinished masterwork Der Stil (Style in the
Technical and Tectonic Arts) lies in uncovering
the tactile and experiential basis behind what
would otherwise be seen as flippantly stylistic or
abstract aesthetic decisions.

Semper’s methodology provides us with a way
into the work gathered in this publication, the
products of a collaboration between architecture
students at Rensselaer Polytechnic Institute
and Tongji University. As noted in many of
the abstracts prefacing the projects, the rich
tradition of craft production in China provided an
effective zone of exploration and an opportunity
to further entrench the buildings into the cultural
imagination of their users. The experiments
in woven and knotted webs and meshes that crowd the pages of this book can thus be seen as genuine attempts at rediscovering a kind of indigenous craft with the potential to connect not only the pre-historical with the contemporary, but also the tactile with the digital, the corporeal with the not-yet material.

While the student projects assembled in this publication pick up on some of the ramifications of Semper’s theory of weaving, they also depart from others. Chief among these variances is the distinction Semper drew between space and structure. Woven screens and textile walls, in Semper’s narrative, were primarily symbolic and spatial enclosures that carried no structural load. Semper's separation of these two elements would have a profound effect on the practice of architecture for well over a century. The idea colored the work of much of the avant-garde, especially that of Mies van der Rohe and Le Corbusier, whose free planning celebrated the freedom of partition walls from the gravitational burdens of the building. Not until the mid-twentieth-century work of Buckminster Fuller, Ann Tyng and Louis Kahn would space and structure be rejoined. The projects here seem to derive their spatial intuition from this latter trajectory. Like Kahn and Tyng’s exuberant tetradral city tower projected for Philadelphia, the designs assembled here see in the geometrical tissue of the weave the possibilities for unitary space-structure construction. The weave here has become a strategy for responding to the exigent complexities of the program, the users, and of the site.

森佩尔在编织与建筑之间所建立的联系正是可以用来摆脱两百多年来对建筑领域理想学院派理论，振兴建筑学的出路。换句话说，森佩尔所指出的“建筑空间始予手工编织”的言论背后有着一种颠覆性的力量。身为一名政治改革家（森佩尔在1849年因曾参与五月起义而被迫逃离德累斯顿Dresden），他清楚地认识到他的理论打破了传统观念上的艺术等级制度，把建筑从美学学院中解放出来，回归到传统手工艺之中。事实上，森佩尔未完成的著作《技术与构造艺术中的风格》（Der Stil Style in the Technical and Tectonic Arts）中全部价值就在于它揭示了编织背后有关能力和实验性的基础，而并非大众所普遍理解的编织仅是随意的样式或是抽象的美学。

森佩尔的理论将带领我们走过这本劳斯勒/柯布联合设计集。其中很多项目在前言中也提到了，中国极为丰富的传统手工艺文化正适合于学生们对这一课题的探索，也方便了在人群中建立建筑与文化印象的联系。本书中的系列有关编织和结构的设计项目都可以看作是上述一系列从传统手工艺文化的尝试。它们不仅将历史与现在联系在了一起，而且也将触觉与数字技术，实体与虚拟相连接。

书中的学生作品是基于森佩尔的学术成果，但也有所不同，不仅仅是关于空间与结构的关系的问题上。在森佩尔的介绍中，编织的屏风和交错的墙仅存在于象征和空间意义上。它们并非承重构件。这种空间与结构分离的看法在其后的一个世纪中一直都有深远的影响。像密斯·凡·德·罗和勒·柯布西耶这样前辈的建筑师十分青睐于去从承重墙中解放出自由隔断墙，并由此去组成自由平面。一直到20世纪中期才发现像巴克敏斯特·福勒
in woven and knotted webs and meshes that crowd the pages of this book can thus be seen as genuine attempts at rediscovering a kind of indigenous craft with the potential to connect not only the prehistorical with the contemporary, but also the tactile with the digital, the corporeal with the not-yet material.

While the student projects assembled in this publication pick up on some of the ramifications of Semper’s theory of weaving, they also depart from others. Chief among these variences is the distinction Semper drew between space and structure. Woven screens and textile walls, in Semper’s narrative, were primarily symbolic and spatial enclosures that carried no structural load. Semper’s separation of these two elements would have a profound effect on the practice of architecture for well over a century. The idea colored the work of much of the avant-garde, especially that of Mies van der Rohe and Le Corbusier, whose free planning celebrated the freedom of partition walls from the gravitational burdens of the building. Not until the mid-twentieth-century work of Buckminster Fuller, Ann Tyng and Louis Kahn would space and structure be rejoined. The projects here seem to derive their spatial intuition from this latter trajectory. Like Kahn and Tyng’s exuberant tetrahedral city tower projected for Philadelphia, the designs assembled here see in the geometrical tissue of the weave the possibilities for unitary space-structure construction. The weave here has become a strategy for responding to the exigent complexities of the program, the users, and of the site.²

森佩尔在编织与建筑之间所建立的联系正是可以用来摆脱两百年来统治建筑领域的理想学院派的理论，振兴建筑学的出路。换句话说，森佩尔所指出的“建筑空间始于手工编织”的言论背后有着一种颠覆性的力量。作为一名政治改革家（森佩尔在1840年因曾参与五月起义而被迫逃离德累斯顿Dresden），他清楚地认识到他的理论打破了传统观念上的艺术等级制度，把建筑从美术学院中解放出来，回归到传统工艺之中。事实上，森佩尔未完成的著作《技术与构造艺术中的风格》(Der Stil Style in the Technical and Tectonic Arts) 中全部价值就在于它揭示了编织背后有关触觉和实验性的基础，而并非大众所普遍理解的编织仅是随意的样式或是抽象的美学。

森佩尔的理论将带领着我们走过这本伦斯勒/阿昌联合设计集。其中很多项目在前言中也提到了，中国极为丰富的传统手工艺文化正适合于学生们对这一课题的探索，也方便了在人群中建立建筑与文化印象的联系。本书中的一系列有关编织和结构的设计项目都可以看作是一系列从新发掘传统手工文化的尝试，它们不仅将历史与现在联系在一起，而且也把触觉与数字技术，实体与虚拟相连接。

本书中的学生作品是基于森佩尔的学术成果，但也有所不同，尤其是在关于空间与结构的关系的问题上不大一致。在森佩尔的介绍中，编织的屏风和交叠的墙仅存在于象征和空间意义上。它们并非承重构件，这种空间与结构分离的看法在其后的一个世纪中一直都有深远的影响。像密斯·凡·德·罗和勒·柯布西耶这样前卫的建筑师十分青睐于去从承重墙中解放出自由隔断，由其去组成自由平面。一直到20世纪中期才出现像巴克敏斯特·福乐
Here too we find a historical thread relevant to our enterprise, for textiles and the computation of complexity have a shared origin in the brilliant programmable loom invented at the dawn of the nineteenth century by French weaver Joseph Marie Jacquard. As many have noted, Jacquard’s loom, which automated thousands of different weaves by preparing specialized wooden punch cards for the task, was among the first machines to translate complex real world patterns into abstract computational vectors. The same operative logic is found in the genius of buildings that emerged at the advent of the era of electronic computation as reactions to modernist functional segregation.

These “mat” projects as they were called (a term coined by the Brutalist architect Alison Smithson), sought to exploit the textile analogy by conceiving of buildings as intricate networks producing complex interactions between otherwise distinct functional programs. The “groundscraper” designed and built by Candilis-Josić-Woods for the Free University in Berlin was undoubtedly the most celebrated mat building: the “groundscraper” designed and built by Candilis-Josić-Woods for the Free University in Berlin was undoubtedly the most celebrated mat building of the postwar era. One is reminded of Jacquard’s loom but also of Candilis-Josić-Woods innovative webs when looking at the exotic nets and weaves cast in this book. As many influential architect have shown throughout the past two centuries, there is something fantastically exploratory in the way that design projects can translate woven fabric into built form. The (Buckminster Fuller), 安妮·唐 (Ann Tyng) 和路易斯·康 (Louis Kahn) 这样希望从新将空间与结构结合的设计师。这里学生们的作品更倾向于后者，在几何形体上把空间与结构统起来，这样手法在一定程度上与安妮·唐和路易斯·康在费城研究所设计的城市大厦有几分类似。学生们在书中的编程项目首要解决的是功能、使用者以及场地的复杂性。（图2）这些“地毯”设计（受野兽派建筑师艾莉森·史密森 (Alison Smithson) 的理念而得名）把建筑理解为复杂网络下产生的复杂交互关系，并以此来探索和类比编织的过程。康迪利斯·约瑟夫·伍兹 (Candilis-Josić-Woods) 在柏林自由大学设计的“拓展型大楼” (Groundscraper) 绝对是战后时期“地毯”设计的代表作。（图3）我们可以从本书不同的编织设计中看到约瑟夫织布机以及康迪利斯·约瑟夫·伍兹的“网络”的影子。二百多年来著名的建筑师们所作的不断尝试一样，今天本设计集中学生们的作品把编织的形式演化到具体的建造形式上的诸多尝试让我们叹为观止。可以预见，无论在微观尺度上还是宏观尺度上，编织和节拍仍将是未来建筑师们设计复杂建筑系统和结构的试验场。
projects in this publication demonstrate that knots and weaves, here thoughtfully investigated at both micro- and macro-scales, continue to be a rich terrain for architects to produce complex architectural systems and structures.
TONGJI FACULTY
Hong Chen 陈宏
Wei Wei 薛薇
Hongwei Liu 刘宏伟

DIGITAL ADVISOR
Ercument Gorgul 郭安健

TONGJI STUDENTS 同济大学学生
Muhan Cui 穆海
Yinjia Gong 玫嘉
Hani Shin 何天
Wenqian Jiang 赵文茜
Jie Xie 谢杰
Bin Long 龙彬
Zimei Shen 沈子彦
Jun Su 苏俊
Ning Wang 王宁
Yifeng Wu 吴锋
Houzhe Xu 徐厚哲
Jialin Yuan 袁佳琳
Aristan Yudhi
Bowen Zhang 张博文
Chi Zhang 章驰
Danjing Zhao 赵丹青

RPI FACULTY 伦斯勒理工学院教师
Gustavo Crembll 协同教师

DIGITAL ADVISOR
Jefferson Ellinger

RPI STUDENTS 伦斯勒理工学院学生
Arthur Adams III
Desiree Edge
Krista Glanville
Seth Hepler
Joseph Hines
Jamie Lee
Travis Lydon
Michael Mancuso
Caitlin McCabe
Anthony Policastro
Anita Rodgers
Justin Rupp
Dana Shin
Matthew Sokol
Michael Stradley
Jason Wang

编著（TJ-CALP 中国 同济大学）
陈宏 薛薇

EDITOR（RPI 美国 伦斯勒理工学院）
Gustavo Crembll 古斯塔夫·克伦贝尔

ISBN 978-7-112-16071-6
(24830)定价：128.00元

网络销售：本社网址 http://www.calp.com.cn
网上书店 http:// www.china-building.com.cn
本社淘宝店 http:// zgjzysybs.tmall.com
书库商城 http:// www.bookiu.com
图书销售分类：建筑设计（A20）