

100XN

ARCHITECTURAL SHAPE AND SKIN

建筑造型与表皮 下册

杨 锋 主编

PICTOGRAPHIC SHAPE OPEN SHAPE DIGITAL SHAPE ECOLOGICAL SHAPE NEGATIVE SHAPE
HEAVY SKIN LIGHT SKIN MULTIMEDIA SKIN ENERGY SKIN DIGITAL SKIN
TRANSPARENT SKIN ECOLOGICAL SKIN

象形造型 开放式造型 数字造型 生态造型 负造型
重表皮 轻表皮 多媒体表皮 节能表皮 数字表皮 透明表皮 生态表皮



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南阳理工学院

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杨 锋 主 编



PREFACE 序言

FORM, SPACE, AND SKIN

Form and space are the two basic elements that create architecture. Form has a reciprocally dependent relationship with space, it organizes space as it is organized by space. Form is also the most direct expression of what architects create, for architecture has a sculptural presence. Yet architecture must also – beyond pure expression – respond to its given site context, and to intelligently reflect its choice of materials. Architectural form exists within a zeitgeist (the spirit of the times) that influences its creation.

On the other hand, architectural space is organized to satisfy a required use and program. Bruno Zevi, the Italian architectural historian, wrote that the history of architecture is the history of excellent architectural space. When Vitruvius mentioned *venustas* (delight) as one of the three key values in architecture, he indicated that this delight derives from spatial experiences more than formal ones.

In this respect, the most important goal for architecture is the resolution between form and space at its highest level. And this resolution is mostly achieved via the layer dividing the interior and exterior realms – the building skin. Recent architecture has freed the skin of the building from issues of both space and form, treating it as a large two-dimensional and abstract element, independent of context and interior. In contrast to this tendency, I believe that the skin of the building must play an active role in the resolution of form and space to take on real meaning.

The Annenberg Public Policy Center (APPC) at the University of Pennsylvania and the new Media Lab complex at MIT both use their skins to resolve issues of context, program, and technology. Both buildings are sited on university campuses with their primary function housing research groups.

In the case of the Media Lab, in order to maximize transparency from the outside and to interior spaces, and satisfy the energy requirements of the Cambridge building code, we introduced horizontal aluminum louver screens over the curtain walls. During the day,

the louvers create a diffuse light effect throughout the building while significantly lowering the energy loading. In the evening, the louvers recede from view, revealing the excitement generated by the lab's researchers through the translucent glass facades. With its restrained white and aluminum material palette, the building exudes a "cool transparency", part of its interior spatial quality and its exterior form.

In the case of the APPC, the users wanted natural light, operable windows, and increasing control over the environment in each individual space while still having the building perform significantly above the baseline of energy requirement. In this case, a curtain wall incorporating operable windows is backed by another layer of fixed glass, opaque sliding wood panels, and roll shades. Together, these layers create a double-skin, insulating the building from its entire perimeter and allowing each user to finely control light, air, temperature, and sound. The overlapping of wood and glass seen from the exterior establish a "warm transparency" that ties the building closely to its historic masonry context – creating a skin that performs formally and technically.

For each project, substantial mock-ups of the exterior skins were built prior to actual construction to test their appropriateness for three-dimensional assemblies, integrally linked to exterior context and interior use. This commitment to building skin, and its impact on overall building form, is a long-standing theme in our projects, just as it has been throughout the modern architectural history. Though building skins have taken on increasingly complex roles in recent projects, they never stray – no matter how intricate – from their original function as primary mediators of architectural form and space, and as a primary locus of architectural invention in the early 21st century.

Fumihiko Maki

Principal, Maki and Associates
Tokyo, Japan

造型·空间·表皮

造型与空间是建筑创作的两大基本要素，二者相互依存而共生。一方面，建筑造型组织空间，同时又被空间组织。建筑物造型本身就是雕塑作品，因此造型就成为展现建筑师构想的最直接表达方式。然而，建筑必须超越纯粹表达的层面——它不仅要与既定的场所环境相呼应，还要明智地反映其选材。建筑造型存在于时代精神（zeitgeist）当中，时代精神反过来又影响建筑的创作。

另一方面，建筑空间由建筑师来构建，以满足既定项目及其用途的要求。意大利建筑历史学家布鲁诺·赛维（Bruno Zevi）认为，建筑的历史就是精彩的建筑空间的历史。维楚维斯（Vitruvius）著名的建筑三要素中的美观要素，指的也是来自空间的美观体验，而非来自外型的美观感受。

从这个角度考虑，建筑设计的最主要目标就是达到造型与空间的高度和谐。这种和谐大部分通过区分内部与外部范围的层——建筑表皮——来实现。最近的建筑已经把表皮从造型和空间中独立出来，当成一个独立于外部环境和室内设计的大型二维抽象元素。然而我却坚信，要追求造型跟空间的和谐，就必须让建筑表皮扮演一个积极的角色，体现其真实的意义。

宾夕法尼亚大学安尼伯格公共策略研究中心（APPC）和麻省理工学院（MIT）新建的媒体实验综合楼都是用建筑表皮来解决环境、项目和技术方面的问题。这两幢建筑都坐落于大学校园，其基本功能都是给科研人员提供场所。

在MIT媒体实验综合楼的案例中，为了使建筑内外的通透性达到最大化，同时满足当地建筑的能源要求，我们将水平式铝百叶窗屏覆盖于幕墙之上。白

天，整幢建筑都沐浴在从百叶窗射进来的柔和光芒中，有了百叶窗反射部分阳光，进来的热量就少了。夜晚，收起百叶窗，实验室里研发人员的工作热忱透过建筑半透明的玻璃立面，清晰可见。通过使用一定量的白色铝质调色板，建筑给人一种透明和冷峻的感觉，这也是建筑内外所应有的一部分。

在安尼伯格公共策略研究中心（APPC）案例中，用户想要自然采光和手推窗，不断加强对单个空间的环境控制，同时对整幢建筑的表现的要求又明显高于对能源基线的要求。因此，在该案例中，包含手推窗的幕墙被置于固定玻璃、不透光木质滑动板和遮阳帘的组合之后。如此构成的双重表皮，达到了建筑与周边的隔热效果，允许每一个用户对采光、空气、温度和声音进行很好的控制。从外部看来，木料与玻璃的交叠建立了一种“温暖的透明感”，将建筑与周边的历史石造建筑环境紧密联系在一起。最终我们创造了在形式上和技术上都能发挥良好作用的建筑表皮。

这两个项目在实际投入建设之前，都设计了大量的表皮模型应用于立体组装，并结合外部环境和内部装修一起测试哪种表皮最为合适。对建筑表皮的重视，以及表皮对建筑整体造型的影响，是我们项目的长期主题。表皮在最近的项目中正在扮演越来越复杂的角色。无论表皮主要功能是作为建筑造型与空间的基本媒介，还是21世纪初作为建筑创造的主要场所，虽然复杂，但它本身的角色从未变过。

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槇総合計画事務所
日本东京

PREFACE II 序 II

"Reality doesn't create us, we create reality"

In the moment architecture is thought, it becomes future.

Architecture always means standing at the threshold. At the threshold from unconsciousness to consciousness, from imagination to built dimensionality. By crossing this border the dream of an everlasting life – which we believe to dream by the buildings outliving us – turns into here and now.

Architecture, the buildings and our cities, are the three-dimensional language of our culture. We could talk about applied culture, but I think it is not reality that creates us, and instead it is us who creates reality. It is up to our level of perception to first identify upcoming realities, and then form them.

According to our vision we design buildings that are readable and writable. I think nowadays, in this digital age – when images are received and just kept in a short term memory – it is important and essential to create identifiable buildings. We have to point out directions and send signals in order not to be anonymous. We have to create signs that are visually and emotionally touching, and make sure that people must seize these signs and create identity within the white noise of media structures.

Enabling these possibilities with architecture is the intention of our work.

Elemental figures of architectural form are used as architectural signs to express the commitment to art in our High School for the Visual and Performing Arts. Like chess figures charged with "moves" both formally and programmatically, these platonic solids re-define spatially and energetically the otherwise orthogonal arrangement of the master plan. A tower on top of a pyramidal theater is the sign for art, a truncated cone the library, and a crystal the lobby. Windows appear in the form of large round shapes and cubic protrusions act as light wells. Together the figures establish a skyline, which links the school to the urban context of the downtown in Los Angeles as well as the modern architecture and its history in this city.

"Sustainability" – I hope the word sustainability will be erased from the architectural language. Sustainability in German means Nachhaltigkeit. It is a conservative term and comes from a capitalistic topic. It was invented in the wood economy and says that you have to save property in order to get more money out of it.

I think there are much better expressions for sustainability: social design, political design and climate design.

One of the topics in our office is of course climate design.

There are numerous possibilities of using sustainable technologies in architecture, for example simply by placing buildings in the correct angle to the sun and creating a wind catcher on top of a building, it is possible to use the sun to heat the building in winter and the wind to cool it in summer.

With specially designed roofs, solar energy can also be used for cooling. Facades are not only environmental envelopes but also can be used for transforming energy and designed for shading the building and guiding wind so that there is a natural ventilation in the building.

Houses – their roofs and their facades – can be powerplants. It's imaginable that the remaining energy will be exported in the energy grid of the city.

When we achieve the next step – establishing these principles in city planning – it will be a revolution in masterplanning because the urban grid will no longer follow the building lines but it will follow the energy lines, and so create a new urban grid.

It's quite clear that in this moment architecture becomes a political issue and only when we architects can invent a new aesthetic coming from the concern of energy design this architecture will be successful.



Wolf D. Prix

“不是现实创造我们，而是我们创造现实”

建筑在化作思想的瞬间，变成未来。

建筑即意味着永远处于转变之际，如从无意识到有意识的转变，从想象到建筑实体的转变等。越过这道边界，人类的永生之梦即转化为此情此景——远比人类的生命周期长久的建筑因此成为永恒之梦的载体。

建筑、房屋和城市，三者都是文化的三维立体语言。我们可以谈论文化在现实中的应用，但我相信不是现实创造我们，而是我们创造现实。何时能察觉即将到来的现实，并将其转化为现实，则取决于人类洞察力的高低了。

我们凭自己的想象设计被理解和接受的建筑。在当今数字化的年代——一个图像仅由瞬间记忆所接收的年代——创造高识别度的建筑是至关重要且势在必行的。我们的建筑不仅要成为地标，从芸芸众生中脱颖而出，还要成为视觉和感情上都能触动人群的符号，并确保大众能捕捉这些表征，借此在数码图像的白色噪音中确立自己的身份。

将上述可能性在建筑中实现是我们工作的目标。

以视觉和艺术表演中学项目为例，我们以建筑造型的主要形体为建筑符号向艺术致敬。这些理想化的形体在空间和能源两个层面重新定义了总体规划的矩形布局，如同下国际象棋时每一步走法中棋子所承担的职责，既具形式意义，又具程序意义。立于形如金字塔的剧院顶端的塔代表艺术，削去顶端的圆锥代表图书馆，晶体则代表大厅。窗户的造型有两种，一种为巨大的圆形，另一种为承担天井作用的立方突出。所有这些造型一起勾勒出建筑的空中

轮廓线，巧妙地将学校和洛杉矶市中心的城市环境连接起来，同时成功地将学校建筑融入了现代建筑及这座城市的现代建筑史。

可持续性——我非常希望该词能从建筑语言中消失。可持续性这个词在德语中为“Nachhaltigkeit”，本是一个非常保守的资本主义词汇，仅在木材经济中出现，意指积蓄财产以从中获取更多的收入。

我认为其他说法可以更好地表达出可持续的意思，比如社会设计、政治设计和气候设计。

我们事务所关注的课题之一是气候设计。

建筑设计中存在无数运用可持续技术的可能。举个简单的例子，处理好建筑朝向与日照的关系，并在建筑顶部设计一个风斗，这样冬天就可借日供暖，夏天则又能取风降温。

如果运用经过特殊设计的屋顶，太阳能也可用于降温。立面不仅是环境表皮，还能用于转化能源，以及遮阳和引导风向，实现建筑的天然通风。

房屋——包括顶面和立面——可以用做发电装置。将剩余的电力输出到城市电网也不是天方夜谭。

如果我们完成这个任务——在城市规划中建立起这些原则——就会引发一场总体规划的革命，城市脉络将不再依循建筑，而是依循能源，进而形成新的城市脉络。

建筑设计成为社会性的问题是当下一个明显的趋势。设计师唯有从能源设计角度出发，创造出新的审美取向，其建筑作品才称得上是成功的。

蓝天组 Wolf D. Prix

PREFACE III 序 III

Walter Benjamin said: "Many art forms have come into being and passed away. But the human need for shelter is permanent. Architecture has never had fallow periods. Its history is longer than that of any other art. It has always been one of the primary tasks of art to create a demand whose hour of full satisfaction has not yet come. The history of every art form has critical periods in which the particular form strains after effects which can be easily achieved only with a changed technical standard, that is to say, in a new art form."

Liang Sicheng, the architectural historian, wrote that architecture is the carrier of science as well as art. Taking what Benjamin and Liang Sicheng have said into consideration, we may find in the architectural history that the development of architecture has always been accompanied by technical innovation and art novelty.

Both building form and building skin are a form of architectural art. No matter how big or small it is a sculptural presence. When appreciating a building, people will be, the most directly, impressed by its form and its skin. On the other hand, the form and the skin have always developed with the advancement and innovation of materials, technology, design philosophy and so on.

The process of building form and building skin design is information-intensive. It involves the analysis of materials, energy cost, structural and environmental requirements, durability, maintenance, and aesthetics. Meanwhile, the needs of the clients and the local building codes have to be well met. Therefore, the design of building form and building skin challenges the architects' expertise and their ability of controlling the very much information. In order to accomplish such tough tasks, architects have to depend on their own experience, or others' experience, to strengthen their reasoning process, and to guide them to transform the images into reality in fixed context or condition.

With the rapid economic development in China, the domestic real estate has become increasingly better and larger. The real estate business and real estate projects blossom everywhere in China, which contributes to the

shortage of architects in the domestic design market. The businessmen want the fastest operation of the estate, and some of them care about the profit only, which both cause the termination of the architects' advanced conception at the beginning of the estate project. The requirement of quantity consequently generates the decline of quality. Most architects have neither adequate energy nor time to study the subject academically and deeply, and hence it is not rare to find fraud in this field. In order to promote the design communication and raise the domestic level of design, we choose outstanding cases after the painstaking study and investigation, and compile this creative and practical reference book. Our book is reader-friendly, introducing the form and the skin in different types. The building forms are classified into Pictographic Shape, Negative Shape, Open Shape, Digital Shape, and Ecological Shape. The building skin types include Heavy Skin, Light Skin, Digital Skin, Transparent Skin, Energy Skin, Ecology Skin, and Multimedia Skin. Each project is elaborated with detailed analysis and accurate illustration. A building form or skin may present characteristics of different types, but we only choose the representative features of each one.

The book introduces 100 latest projects on the form and the skin around the world, representing the trend of the international design, and the frontier design concept and technology. We hope it will inspire more architects and refresh this realm.

Hong Kong Architecture Science Press
Editorial board

瓦尔特·本雅明认为，由于人类对居室的永恒需求，因此建筑艺术——不像其他那些在人类历史长河中昙花一现、转瞬即逝的艺术形式——从未退出过艺术历史的舞台。艺术的主要任务之一就是建筑要创造一种未曾有过的需求。每一种艺术形式的发展史都有一些关键阶段，在这些关键阶段中，艺术形式就追求着那些只有在技术标准发生变化或新艺术形式诞生时才会产生的效应。

建筑史学家梁思成一直强调建筑是科学与艺术的载体。虽然听起来像老生常谈，然而结合瓦尔特·本雅明所言，反观由技术迅猛发展所引领的建筑科学的飞跃，以及伴随着技术进步而不断推陈出新的建筑艺术形式，我们不难发现，技术进步和艺术创新是建筑发展的两大重要因素，缺一不可。

建筑艺术的形式之一就是建筑造型和表皮。无论体量大小，建筑物本身就如同雕塑一般，而建筑造型和表皮则是影响人们对这种“雕塑艺术”审美的最直接因素。同时，建筑造型和表皮的发展，又离不开材料、技术、理念等各方面的进步与革新。

建筑造型和表皮设计都涉及大量参数分析。设计师要考虑材料、能耗、结构要求、环境要求、耐久性、养护和美学等诸多因素，同时还要满足业主的需求和各项建筑规章标准，因此建筑造型和表皮设计是对设计师专业知识储备和信息掌握程度的挑战。要应对这样的挑战，设计师必须依靠自身或他人的经验来梳理设计思维，并指导如何将设计理念在既定条件或环境中一步步实现。

随着国家经济的飞速发展，国内地产方兴未艾。地产商和地产项目在中国遍地开花，致使国内建筑设计市场供不应求。地产商为迅速完成地产项目的开盘和运营，加之许多地产商纯粹以赢利为目的，从项目定位开始就扼杀了设计师的先进理念。有的要求设计师快速完成设计，这样多数设计师没有足够的时间和精力进行更深入的学术研究，致使抄袭之作屡见不鲜。为促进建筑设计交流，提高国内建筑设计水平，我们遴选世界各地的成功案例，进行全面精心的调研分析，力争为建筑设计师们提供一本新颖、实用的建筑工具书。为了方便读者阅读，我们将建筑的造型和表皮按不同类型分块介绍，其中建筑造型分为象形造型、负造型、开放式造型、数字造型和生态造型；建筑表皮方面，除了我们所熟知的轻表皮与重表皮之外，另有数字表皮、透明表皮、生态表皮、节能表皮以及多媒体表皮。每个项目都有详细的分析，可谓深入浅出，简单明了。建筑的造型和表皮从不同的层面又可归入不同的分类，分类重叠在所难免，因此本书仅偏重每一个项目最突出的造型或表皮类别进行介绍。

本书收录了100个全球最新建筑项目的造型与表皮，代表了目前以及未来一段时间内国际建筑设计的趋势与潮流，展示了最前沿的造型和表皮设计理念及建筑技术。希望本书能带给设计师更多的灵感，能为建筑设计领域带来一缕清风。

香港建筑科学出版社编委会

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