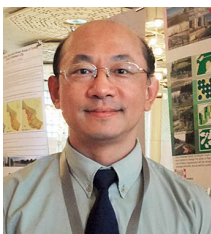


健康的城市生态与健康的人

CONNECTING HEALTHY URBAN ECOLOGY WITH HUMAN HEALTH



张俊彦
台湾大学园艺暨景观学系教授

Chun-Yen CHANG
Professor, Department of Horticulture and Landscape Architecture, Taiwan University



唐宜君
台湾大学园艺暨景观学系博士后

I-Chun TANG
Postdoctoral Fellow, Department of Horticulture and Landscape Architecture, Taiwan University

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摘要

我们的城市建设已将人类隔离于生态世界之外。然而，近期实验证据表明，自然环境是影响人类健康，尤其是城市居民健康的一个重要因素。在本文中，我们提出了“健康的城市生态与健康的人”的概念框架，倡导健康的城市生态可以支撑健康城市生活的观点，通过对生态及人类健康两个方面的综合考虑，我们可以形成健康城市发展的可行途径。我们建议以实证为基础的疗愈性景观设计。创造一个健康的城市需要考虑城市居民的身心健康，同时也需要考虑生态建设，包括综合考虑空间解决方案、自然格局和生态流，以及文化和环境的社会经济条件。也就是说，建立一个健康的城市必须同时考虑人类健康与生态建设，发展两者兼备的城市环境。虽然我们不能创造一个具有这两方面所有品质的城市绿地空间，但至少应采取行动，寻找机会，在城市环境开发中至少满足这些目标的某些方面。我们应为了人与自然世界的和谐寻求机会以创造健康城市环境。借由所提出的框架，我们建议城市规划和景观设计师利用所介绍的理论和环境因子来创造出健康城市。这一目标的实现对个人和城市都将带来有利影响。

关键词

健康城市；生态福祉；人类健康；绿色空间

ABSTRACT

Our cities have been created to isolate humans from the ecological world. However, recent empirical evidence shows that the natural environment is a crucial determinant of human health, especially for urban dwellers. In the current article, we propose a conceptual framework of “healthy urban ecology and healthy people” to advocate the idea that healthy urban ecology can support healthy urban living, and by considering both aspects, we might reach a feasible approach to developing healthy cities. We suggest an evidence-based therapeutic landscape design. Creating a healthy city requires spatial development that considers both the physiological and psychological health and wellbeing of urban dwellers. A healthy city also needs ecological construction that considers a spatial solution, natural patterns and ecological flows, and the culture and socioeconomics of the environment. Moreover, the creation of a healthy city must include the idea of ecological construction with human health to develop an urban environment that includes both features. Although we cannot create a green space that has all of these qualities in both features, actions should be taken to find opportunities to fulfill at least some aspects of these goals in the development of urban environments. We should make every attempt to create a healthy city for humans and the natural world. With the proposed framework, we suggest city planners and landscape architects to use the introduced theories and environmental factors to create healthy cities. Achieving this goal will benefit both individuals and cities.

KEY WORDS

Healthy City; Ecological Well-being; Human Health; Green Space

译 刘姝 涂先明

TRANSLATED BY Shu LIU Xianming TU

引言

我们的城市建设使人类隔离于生态世界之外。正如大多数城市居民都经历过的那样，现代城市的构筑方式在人类居住地和自然世界之间构成了一道物理和心理屏障。然而，近期实验证据表明，自然环境是影响人类健康，尤其是城市居民健康的一个重要因素。重新与自然世界建立联系，并保持健康的生活方式，对大多数生活在城市中的人群来说是一个具有挑战性的问题，这对于生活在如上海、北京、广州这些世界上27个特大城市的数亿人口来说尤为如此。

我们需要创造健康城市。最近的实验性证据让我们看到我们应如何做到这一点。研究表明，置身绿色空间能有效地缓解紧张的城市生活造成对健康的负面影响。在一项有关居住区绿地的研究中，研究人员发现，相较于在3km半径范围内缺乏绿地的居民，能够在此半径范围内享受到大量绿地的城市居民在经历一个紧张的生活事件后受到的负面影响较低^[1]。另一项研究从公共健康的角度表明，在能够享有更多绿地的人群中，不同的收入水平对健康状况的影响较小。由于置身于自然环境能够以相对较低的成本有效地促进城市居民的心理和身体健康，所以，创造足够的优质绿色空间可能是一个有效且可负担的健康促进手段，从而将人类与自然世界重新联系起来，并营造一个健康的城市（图1，2）。

正如亨利·梭罗所说，“自然是健康的别名”^[2]，绿地的疗愈效果已被证据所证实。下一个问题可能是：城市规划者和管理者应当如何秉持健康城市理念来营建绿色空间？一个健康的城市应该在健康环境的概念下提供优质的绿色空间，促进城市居民的身



心健康和福祉。一个健康的城市应该提供可开展身体锻炼活动的绿色空间或基础设施，以助于城市居民减少肥胖、疼痛、焦虑和疾病。此外，一个健康的城市也应该提供绿地或基础设施来确保城市居民的精神福祉，如提供专注力恢复、缓解压力或心流体验机会。为探讨健康城市的理念，我们在本文中提出了“健康的城市生态和健康的人”的概念框架。

“健康的城市生态和健康的人”——健康城市的概念框架

在“健康的城市生态和健康的人”的框架中，我们倡导健康的城市生态支持健康城市生活的理念，这两个方向的推展将可能为健康城市提供一个可行的途径。在此框架下，城市规划者和管理者应将人类健康与生态福祉的理念结合起来，并最终构建服务于这两个目标的城市景观（图3）。有多个著名理论都强调这一理论的两个方向缺一不可，这为健康城市的实践建立了理论网络。

此外，虽然我们明白自然景观对人们具有心理和生理裨益，但是“自然”并不是一个容易被定义、度量或检测的简单概念。

1.2. 绿色空间是一种有效的、可负担的提升城市健康的措施。

1.2. Green space as an effective and affordable health-promotion intervention in cities.

什么样的自然景观可以被定义为“健康景观”？不同类型的自然环境能否带来不同程度的健康裨益？哪些因素可以用来衡量自然景观的健康品质？城市环境中绿地应当拥有怎样的比例或格局？疗愈性景观领域的研究者必须找到这些问题的答案，如此，设计师们才能将理论应用到实际的设计工作中。在目前的“健康的城市生态和健康的人”框架中，我们也试图更进一步以环境因子来定义健康城市。

健康城市的目标——健康的人类

我们建议以实证为基础的疗愈性景观设计来建设健康城市。当一处景观为人类提供疗愈效果时，就可以被定义为一个健康景观。依循此概念，当一个城市为居民提供健康福祉时，这个城市就是将健康城市的概念付诸于实践。因此，为人类提供疗愈效益也就成为健康城市的最终目标。

数十年来，人们一直在研究如何设计能为人类提供疗愈效益的景观。注意力恢复理论（ART）^[4]、减压理论^[5]和理智人模型



（RPM）^[6]等都是这类方向的有力支持。通过这些理论，某些环境特质已被认为能够促进健康，包括ART理论中的远离性、魅力性、延展性、兼容性，以及RPM中的连贯性、易读性、复杂性和神秘性。当自然环境中至少包含部分能够被使用者所感知的特性因素时，这种环境便能够促进健康（图4）。下文将会对这两类环境特性因素进行介绍。

恢复性环境

在斯蒂芬·卡普兰著名的注意力恢复理论中，其认为人们常常感到精神疲劳，并寻求自然环境作为恢复他们专注力的场所^[4]。环境的某些形态特征能够缓解精神疲劳，并帮助人恢复注意力。那些能够温和地抓住我们注意力的地方（例如，眺望有着树木和草的绿色空间，身处公园，欣赏水面）能使人们从精神疲劳中恢复过来。自然环境看似能够毫不费力地吸引我们的注意力，让我们不须耗费注意力地身处其中，并恢复我们集中精神的能力。

有4种环境特点能够促进专注力恢复：1）远离性，从固定的思绪和压力中远离的感觉；2）魅力性，毫不费力的注意力状态；3）延展性，进入超乎自身的境界——完全是另外一个世界；4）兼容性，周遭与自己的活动和目的兼容的感觉。当一个人在一种环境中经历部分或所有这些品质时，很可能产生专注力的恢复。有助于产生专注力恢复的环境即为恢复性环境。

支持性环境

当环境支持人们的基本信息需求时，人们会更加理智。在理智人模型中，斯蒂芬和雷切尔·卡普兰认为，人们希望理解正在发

生的事情，并对困扰有强烈的厌恶感^[6]。在大量对室外环境偏好的研究中，发现了两个内容独立的预测因素。一个是理解，即理解环境信息。另一个是探索，即获取新的环境信息^[7]。人们偏好于可以支持理解和探索的环境。

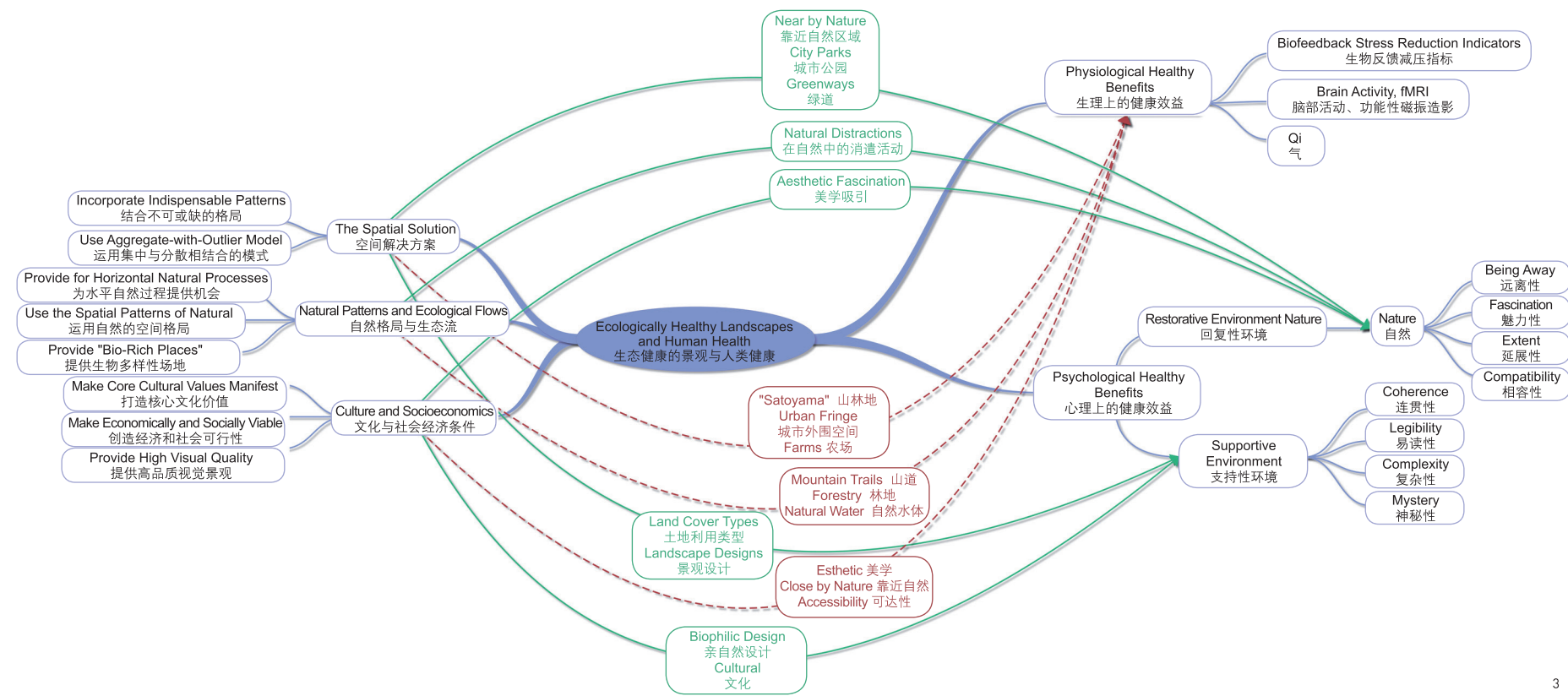
有两个环境特性可以促进理解：连贯性（是指有着清晰的次序感来帮助人们理解环境）和易读性（是指在头脑中对更大的环境建立地图的可能性，这有助于理解环境和辨识方向）。此外，还有两个促进探索的环境特性：复杂性（是指场景的纷杂性和丰富性）和神秘性（是指在环境中激发人们探索环境，并获得有关场景的进一步知识的任何事物）。综合起来，这4个因素定义了人类的支持性环境。

生理证据

除了心理佐证，诸如脑电波、肌张力、心速、血流量和皮质醇水平等生理指标也能显示出自然环境带来的减压效果^[9]。近年来，神经科学领域的飞速发展和功能性磁共振造影（fMRI）的应用为理解景观对大脑活动的影响提供了机会。此外，东方传统文化中的“气”的概念强调景观元素及其构成对人体健康的影响（图5）。从人的巅峰体验的角度来说，在参与自然环境中的活动时，“气”和心流体验之间存在的联系已被证实。所有这些因素都提出了强有力的证据，以帮助景观规划师和设计师开发有益于人类健康的绿色空间。

健康城市的基础——健康城市生态

健康的城市生态是这个框架的另一部分。因为我们面临着严重的环境危机，所以



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在建立一个健康的城市时必须考虑城市的生态健康，以实现城市的可持续发展。我们相信，如果没有健康的城市生态，我们就很难为人类创造一个健康的城市。由于与大自然的接触是治愈效果的源泉，所以健康的城市生态环境是人类健康的基础与支撑。这两个方面结合起来会为健康城市提供一个可行的方法。

景观生态学的三个维度

在描述丰富的景观格局、生态意义和自然景观的生态层次方面，景观生态学理论提供了一个可靠的视角。除了使用如物种丰富度、平衡性和多样性来描述景观的自然水平外，我们还可以通过以下由理查德·T·T·福尔曼提出的三个维度来应对生态建设：1) 空间的解决方案，2) 自然格局和生态流，以及3) 文化和环境的社会经济条件。

正如福尔曼所描述的，空间的解决方

案提供了对任何土地和人来说都具有良好生态意义的空间格局^[9]。规划师和设计师应结合不可或缺的格局，并使用集中与分散相结合的模式进行空间规划。在第二个维度上，自然的过程和格局可以加强短期和长期的生态结构。规划师和设计师应为水平自然过程提供机会，利用自然的空间格局，并设计具有丰富生态性的场所，以实现这些目标（图6）。在第三个维度上，聚焦于文化和社会经济将为社会提供短期和长期的解决方案。规划师和设计师应确保核心文化价值，使该计划具有经济和社会可行性，并使设计区域具有极高的视觉品质。

结论

在此框架下，我们的目标是为人类和自然世界创造一个健康城市。健康城市的创建需要将生态建设理念以及对人类健康的考虑相连接，并发展具有这两种品质的城市环

境。虽然我们不能创造能满足这两个方面所有品质的绿色空间，但我们应采取行动，以寻找机会在城市环境开发中至少满足这些目标的某些方面。借由提出的这个框架，我们建议城市规划师和景观设计师利用本文中所介绍的理论和环境因素创造健康城市。

我们要创造充足且优质的绿地空间，从而建造一座健康城市。我们需要投入更多努力将人们带回到自然的环境，并在人们生活、工作或上学的区域创建更多的自然景观。我们建议城市规划师、学校人员和公司管理者寻求方法，以为接触到健康的城市生态贡献他们的力量。在增加与自然的接触频率和提升与自然接触的品质方面仍有许多工作要做。这可能包括提高居住区附近绿地空间的可达性和地理分布，或审视自然活动的内容，以确保环境不会引起某些人群的恐惧。这样做对于个人和城市都大有裨益。LAF

CONNECTING HEALTHY URBAN ECOLOGY WITH HUMAN HEALTH



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Introduction

Our cities have been created to isolate humans from the ecological world. As most urban dwellers have experienced, modern cityscapes create physical and psychological divisions between human habitats and the natural world. However, recent empirical evidence has shown that the natural environment is a crucial determinant of human health especially for urban dwellers. Reconnecting with the natural world and maintaining a healthy lifestyle is a challenging issue for the majority of the people who live in cities. It is especially challenging for hundreds of millions of individuals who live in the world's 27 mega-cities, such as Shanghai, Beijing, and Guangzhou.

We need to create healthy cities. Recent empirical evidence provides a

glimpse into how we might achieve this. Researches have shown that exposure to green space can effectively attenuate negative health impacts caused by stressful urban life events. In a study on the appearance of green space in neighborhoods, researchers found that urban dwellers with a high amount of green space within a 3 km radius in their neighborhood were less affected when experiencing a stressful life event than urban dwellers with a low amount of green space in this radius^[1]. From the perspective of public health, another study showed that income-related inequality in health was less pronounced in populations with greater exposure to green spaces^[2]. Since exposure to the natural environment effectively promotes both the mental and physical health of urban dwellers at a relatively low cost,

creating sufficient and quality green space could therefore be an effective and affordable health-promotion intervention to reconnect humans with the natural world, and consequently, to create a healthy city (Fig. 1, 2).

As Henry Thoreau argued, "nature is but another name for health"^[3], the therapeutic benefit of green space has been recognized through empirical evidences. The next question might be: how do city planners and managers approach green spaces with regard to the idea of a healthy city? A healthy city should promote both the physical and psychological health and well-being of urban dwellers by providing quality green spaces in the context of a healthy environment. A healthy city should provide green spaces or infrastructures to support physical

- “健康的城市生态和健康人”概念框架
- 拥有疗愈功能的花园
- Conceptual framework of "healthy urban ecology and healthy people" for healthy cities.
- Garden with therapeutic qualities

activities that consequently help reduce obesity, pain, anxiety, and illnesses among urban dwellers. Moreover, a healthy city should also provide green spaces or infrastructures to maintain the psychological well-being of urban dwellers, such as opportunities for attention restoration, stress reduction, or flow experience. In order to approach the idea of healthy cities, we propose a conceptual framework of “healthy urban ecology and healthy people” in the current article.

“Healthy Urban Ecology and Healthy People” as Conceptual Framework for Healthy Cities

Within the framework of “healthy urban ecology and healthy people,” we would like to advocate the idea that healthy urban ecology can support healthy urban living, and that together, these two aspects may offer a feasible approach to healthy cities. Under this framework, city planners and managers could link human health with the idea of ecological well-being to eventually constructing urban landscapes that serve both purposes (Fig. 3). Several well-known theories that emphasize both aspects are organized in this framework establish a theoretical network for the practical development of a healthy city.

Besides, while we understand that natural landscapes benefit users both

psychologically and physiologically, “nature” is not an easy concept to define, measure, or test. What kind of natural landscapes can be defined as “healthy landscapes”? Do different types of natural environments offer different levels of health benefits? What factors could be used to describe the healthy qualities of natural landscapes? What proportion or pattern of green space should be present in our city environments? Researchers in the field of therapeutic landscape must find out answers to these questions before landscape designers can apply theories to the design work. Within the current framework of “healthy urban ecology



5. 自然环境中“气”的运用
5. Qi practicing in nature

and healthy people”, we also try to go a step further to define healthy city with environmental factors.

Healthy People as the Goal of a Healthy City

We suggest an evidence-based therapeutic landscape design to the practical establishment of a healthy city. When a landscape provides human with therapeutic benefits, the landscape can be defined as a healthy landscape. Following this concept, when a city provides dwellers with healthy benefits, the city is putting the concept of healthy city into practice. Providing therapeutic benefits to human beings, therefore, is proposed to be the ultimate goal of a healthy city.

Designing a landscape that provides therapeutic benefits to human beings is a subject that has been studied for decades. Outcomes that support this kind of approach include theories such as the attention restoration theory (ART)^[4], the stress reduction theory^[5], and the reasonable person model (RPM)^[6]. Through utilizing these theories, certain environmental qualities have been recognized as health promoting, including the being away, fascination, extent, compatibility of ART and the coherence, legibility, complexity, and mystery of RPM. When a natural setting contains at least some of these configurations, which can be sensed by viewers, the setting is

health promoting (Fig. 4). The two sets of environmental factors are introduced in the following paragraph.

Restorative Environment

In his famous attention restoration theory, Stephen Kaplan indicated that humans often experience mental fatigue and seek natural settings as sites to restore their attentional resources^[4]. Some configurations of settings have the capacity to alleviate mental fatigue and help restore a person’s capacity to pay attention. Places that gently hold our attention (for example, a view of green space with trees and grass, being in a park, watching water) allow individuals to recover from mental fatigue. Natural settings seem to effortlessly engage our attention, allowing us to be in such settings without focusing attention, thus restoring our capacity to pay attention.

There are four environmental characteristics that promote attention recovery. These include the sense of: 1) being away, a sense of being away from typical thoughts and pressures; 2) fascination, a state of effortless attention; 3) extent, a feeling of being engaged in something larger than yourself — in a whole other world; and 4) compatibility, a sense that your surroundings fit your activities and purposes. When a person experiences some or all of these qualities in a setting, the outcome is likely to result in attention recovery.

The environment that supports the occurrence of attention recovery is restorative environment.

Supportive Environment

People are more reasonable when the environment supports their basic informational needs. In the reasonable person model, Stephen and Rachel Kaplan indicated that people want to make sense of what is going on and have a strong aversion to being confused^[6]. Across numerous studies on preference for outdoor environments, two content-independent predictors were found. One is called understanding, to make sense of environmental information, and the other is called exploration, to acquire new environmental information^[7]. Environments that support understanding and exploration are the environments that people prefer.

There are two environmental characteristics that promote understanding. Coherence refers to an immediate sense of order that contributes to one’s ability to understand a setting. Legibility refers to the possibility of building a mental map of the larger environment which assists understanding and way-finding. Moreover, there are two environmental characteristics that promote exploration. Complexity refers to the intricacy and richness of the scene. Mystery refers to anything in the settings that encourages one to explore

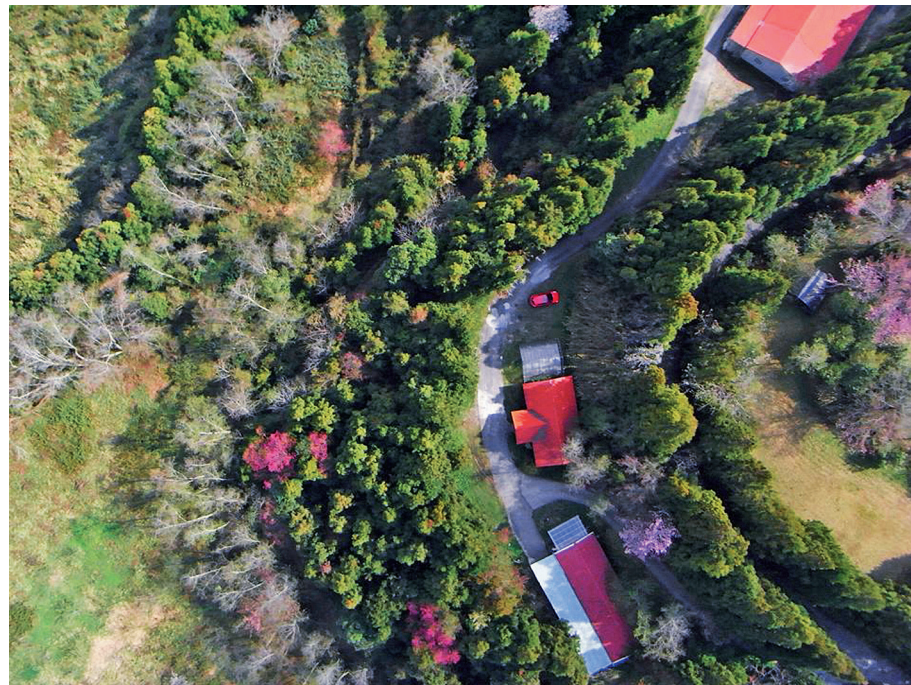
the setting and gain further knowledge about the scene. Together, these four factors define a supportive environment for human beings.

Physiological Evidence

In addition to the psychological evidence, physiological indicators such as brain waves, muscle tension, heart rate, blood volume pulse, and cortisol levels have been shown to detect the effects of stress reduction by natural environments^[5]. In recent years, rapid developments in the field of neuroscience and the use of functional magnetic resonance imaging (fMRI) have provided opportunities to understand the effect of landscapes on brain activities. In addition, the traditional Eastern Qi concept emphasizes the influence of landscape components and configurations on human health (Fig. 5). It has been proven that a relationship exists between Qi and the flow experience in regard to people's peak experiences while engaging in activities in a natural environment. All of these factors present strong evidence to help landscape planners and designers develop green space that will provide benefits to human health.

Healthy Urban Ecology as the Base of a Healthy City

Healthy urban ecology is the other part of this framework. Because we face



severe environmental crises, we suggest that the creation of a healthy city must consider the ecological well-being of the city in order to fulfill urban sustainability. We believe that without healthy urban ecology, we would difficultly create a healthy city only for human beings. Since contact with nature is the source of therapeutic benefits, healthy urban ecology is the base and support of human health. Together, these two aspects may offer a feasible approach to healthy cities.

Three Dimensions of Landscape Ecology

Theories in landscape ecology provide a sound perspective in describing the structure of various landscape patterns, ecological meanings, and ecological levels of the natural landscape. Besides using indicators such as species richness, balance, and diversity to describe the natural level of a landscape, we can approach ecological construction by the following three dimensions as

6. 规划师和设计师应利用自然的空间格局设计出具有生物多样性的场所。
6. Planners and designers should use the spatial patterns of nature to provide bio-rich places.

proposed by Richard T. T. Forman: 1) a spatial solution, 2) natural patterns and ecological flows, and 3) the culture and socio-economics of the environment.

As Forman has described, a spatial solution provides spatial patterns that make good ecological sense for any land and people^[8]. Planners and designers should incorporate indispensable patterns and use an aggregate-with-outlier model to plan their spaces. In the second dimension, natural processes and patterns can strengthen the ecological fabric in both the short and long term. Planners and designers should provide opportunities for horizontal natural processes, use the spatial patterns of nature, and provide bio-rich places to reach these goals (Fig. 6). In the third dimension, the cultural and socioeconomic focus would provide short- and long-term solutions for the society. Planners and designers should ensure core cultural values are evident, the plans are economically and socially viable, and the designed area provides high visual quality.

Conclusion

Under this framework, our goal is to create a healthy city both for humans and for the natural world. The creation of a healthy city needs to concurrently link the idea of ecological construction with the consideration of human health

and to develop an urban environment with both features. Although we cannot create green spaces with all required qualities in both features, actions should be taken to find opportunities to fulfill at least some of these goals in the development of healthy urban environments. With the proposed framework, we suggest city planners and landscape architects to apply the introduced theories and environmental factors to create healthy cities.

We need to create sufficient and quality green spaces in order to build a healthy city. More effort is also needed to bring people back to natural environments and to develop more natural settings in areas where people live, work, or go to school. We suggest that urban planners, school officials, and office managers look for ways to put their constituents in contact with healthy urban ecology. Further actions are needed to discover ways to increase the frequency of and to improve the quality of natural contacts. This may include improving the accessibility and geographic distribution of green areas near residential areas, or examining the content of natural activities to ensure that the settings do not provoke fear in some individuals. The consequences of doing so will likely be good for individuals as well as for cities. **LAF**

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