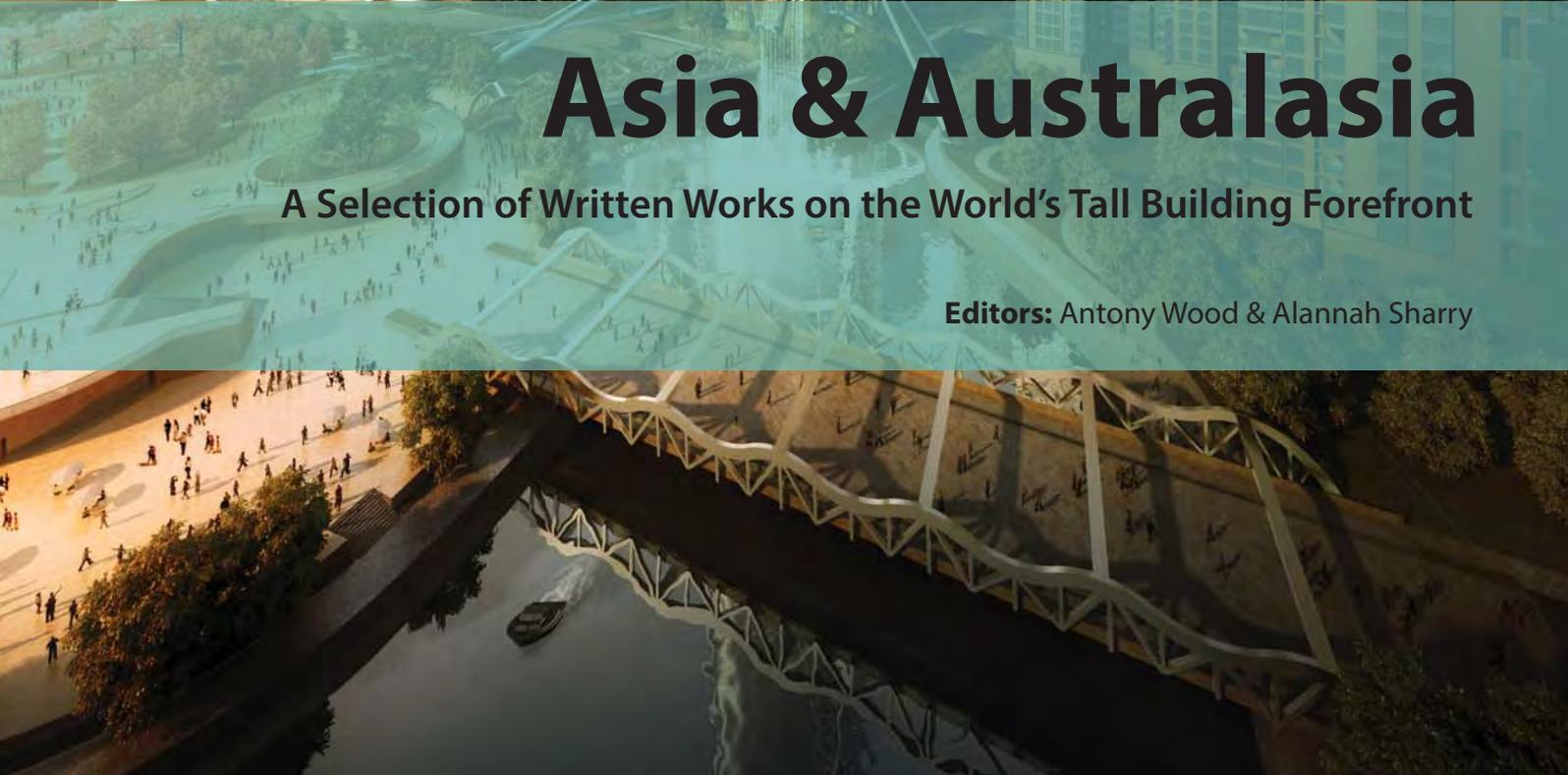




Asia & Australasia

A Selection of Written Works on the World's Tall Building Forefront

Editors: Antony Wood & Alannah Sharry





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Front Cover: Guizhou Culture Plaza Tower, Guiyang. Source: Skidmore, Owing & Merrill

Back Cover (Top to Bottom): Australia 108, source: Floodslicer; Guiyang World Trade Center, source: Skidmore, Owing & Merrill; Guiyang Central Business District, source: Skidmore, Owings & Merrill; Haeundae Udong Hyundail I'Park, source: Hyundai Development Company; Sky Habitat, source: Safdie Architects; Subtropical loggia, source: Architectus

Contents

About the CTBUH	4
About the Editors	5
Introduction	6
1. Guizhou Culture Plaza Tower	10
1.1 Mediating Scale, Performance and Iconicity: A 21st Century Supertall Tower for Guiyang	12
1.2 High-Density, Mixed-Use Developments and the Guiyang Riverside Theatre Project	24
1.3 Macro-Policy to Micro-Implementation: Responses to China's Inward Migration in Guiyang's City Center	34
2. Technical Advances	44
2.1 Guiyang World Trade Center: An Essay on the Concrete Tube Structure	46
2.2 Shanghai Tower: Building a Green, Vertical City in the Heart of Shanghai	56
2.3 Designing a Non-coplanar Exoskeleton Supertall Tower that Transforms the Skyline of Chengdu	64
2.4 Logistical and Structural Design Challenges of the World's Tallest Statue	72
3. Responding to Cultural Context	86
3.1 Dense Urbanism: The High-Rise Tower as a Building Block for the Public Realm	88
3.2 Petronas Towers and KLCC: Urban Catalyst	100
3.3 The Inevitability of Global Adaptation: Eastern and Western Developers Practicing Internationally	108
4. Developments in East Asia	120
4.1 Developing Tall Buildings and Urban Places, in Japan and Elsewhere	122
4.2 From New York to Busan: Reflecting Culture in Urban Design	132
4.3 SKYSCRAPER Driven From Inside Out Towards Nature	144
5. Developments in Australia	152
5.1 Skyscraper Citymaker	154
5.2 Sydney 2050: A Sustainable City Vision for Greater Height, Public Benefit & Tall Building Resurgence	164
5.3 Beyond the Podium: Urban Spaces for Tall Buildings in a Subtropical City	172
6. References	184
6.1 About the Contributors	186
6.2 100 Tallest Buildings in Asia & Australasia	192
6.3 CTBUH Organization & Members	198

Introduction

The Asia/Australasia region leads the way for the most rapid rate of tall building development in the world. These regions' cities are changing more rapidly than any others on the planet, and their building projects are pushing the boundaries of what's possible, setting the bar for development elsewhere. One can look to the skyscrapers of this region as one would look to the future to see the trends, technologies, and strategies in urban development that are now spilling over into other parts of the world, and will likely continue to do so.

Three prominent factors in Asia in particular help explain this incredible surge in skyscraper construction: unprecedented economic growth, population growth, and rapid urbanization. Economic growth in the second half of the 20th century has propelled East Asia forward by leaps and bounds, making it the highest performing zone in the global economy. China, the world's second-largest economy, still leads in growth numbers for 2015. With regards to population, Asia currently has the highest growth rate, with its population having nearly quadrupled during the 20th century. A final factor to consider is the rapid urbanization of Asia in recent decades. According to the World Bank, almost 200 million people moved to urban areas in East Asia from 2000–2010. Most of East Asia's population is still non-urban, meaning the region will likely face decades of further urbanization in order to "catch up" with countries that have been industrialized and urbanized longer.

This specific context of soaring economic growth and a rapidly increasing urban population – along with the energy demands that accompany it – must be considered in order to understand the pressing need to build upwards in Asia. As a result of the required urban density, the region is driving tall-building innovation and construction, and shifting the dialogue around urban planning and place-making. The building and urban design trends witnessed in Asia and Australasia also encapsulate shifts occurring globally.

Given the rapid development opportunities present in the region, a host of structural technologies have recently been explored that address the unique aspects of building in this area, that are changing the way tall buildings impact the environment and the way people inhabit them. The Guiyang World Trade Center utilizes an unconventional structural concrete skin that could mark a shift in building design away from all-glass towers towards more sustainable opaque façades. The Shanghai Tower, on the other hand, features a signature double façade that amplifies urban greenery in new ways, by creating sky lobbies that are filled with lush vegetation, offering the potential for rest and recreation high above the ground level. In Chengdu, a distinctive strategy being implemented for the Chengdu Greenland Tower will employ a non-coplanar exoskeleton structure, which also serves to define the tower's crystalline form. Unique solutions are also being explored in building statues of unprecedented height, as with the Statue of Unity in Gujarat. All of these projects are covered in this publication.

The realities of building in this region demand special considerations of cultural and environmental contexts. Many designers, architects, and urban planners feel that thoughtfully planned dense urbanism is the key to addressing housing needs, while still providing meaningful public spaces; thus, new approaches to planning must be explored to resolve the relationship of the tall building with its urban habitat. In Kuala Lumpur, the developers behind the Petronas Towers and local authorities cooperated in the creation of a thoughtful master plan to ensure that the construction of the iconic twin towers – that have transformed the physical landscape of the city – fit within a scheme that would benefit the growing urban landscape. Many new developments in Asia present novel challenges, as well as opportunities, due to the complex collaborative relationships between Eastern and Western developers, teams of architects, and local authorities.

The particular circumstances of building in East Asia have engendered unique building typologies. In Japan, Mori Building Co. has pioneered the "Vertical Garden City" concept which opens up existing space in urban environments by building vertically, both into the sky and into the ground. By replacing numerous low-rise structures with high-density towers that encompass diverse functions, much greater efficiency in terms of time and space can be achieved. In the bustling coastal city of Busan, South Korea, the Haeundae Udong Hyundai l'Park complex takes its design cues from the spectacular natural landscape of mountains, rivers, and



Mediating Scale, Performance and Iconicity: A 21st Century Supertall Tower for Guiyang

Yuping Luo, Chairman, *Zhongtian Urban Development Group Co., Ltd*; **Charles Besjak**, Director of Structural Engineering, **Daniel Cashen**, Senior Designer & **Colin Koop**, Design Director, *Skidmore, Owings & Merrill*

A series of challenging site constraints prompted an innovative structural solution for the Guizhou Culture Plaza Tower (GCP), through which a new performance-based expression was created for Guiyang's skyline. A design solution that values performance, iconicity, and the public realm with equal weight was a result of an integrated and collaborative process. By leveraging technology, the GCP Tower is an example of an emerging new design language that is reshaping supertall tower design; an integrated workflow that is based on solving performance-based criteria as its primary focus.

Guiyang – A City in Flux

Located in China's lush and mountainous Guizhou province, Guiyang is a city that is experiencing explosive growth. Currently ranked as a second-tier city by Chinese national standards (Explore and Compare China, 2015), Guiyang's economic and development potential make it a premier provincial capital, booming with intra-China ecotourism amidst good air quality and a rich ecological, cultural, and historic setting (Air Quality Index China, 2015). It has a population of approximately four

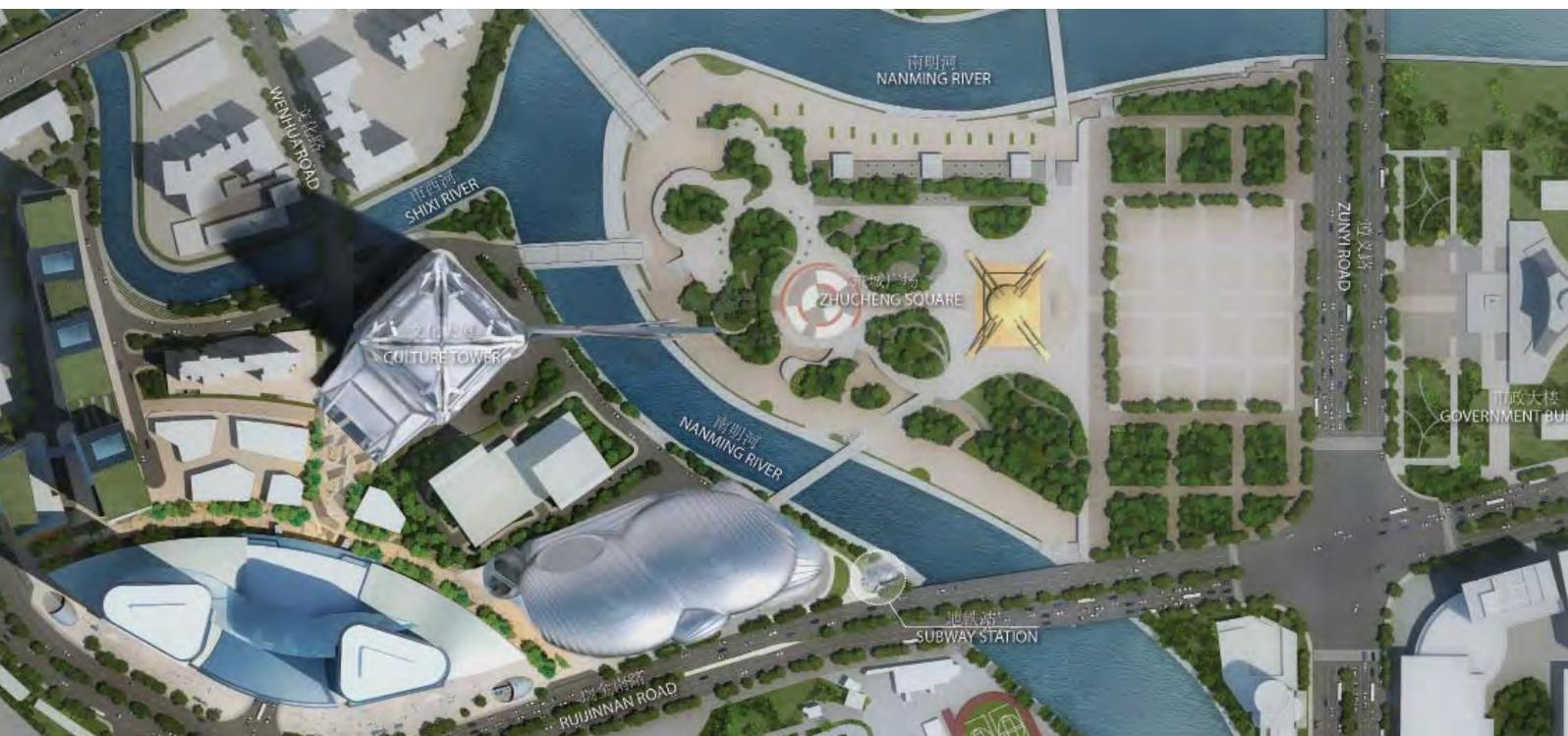
million people, a figure which is projected to double within the next 15 years, as a result of the economic shift from rural to commercial. To meet the projected demand, rapid growth, and development is occurring across the metropolitan landscape, a place characterized by the imposing presence of mountains and giant limestone karsts. The constantly changing ground-plane impacts the scale and morphology of new development and creates challenging conditions for new construction. In contrast to this topographic condition, a handful of key environmental conditions make Guiyang an ideal location for building vertically: mild weather, favorable soil conditions, diffuse-light conditions, low wind patterns and great air quality.

A Tower for Guiyang's Future

The Guizhou Culture Plaza Tower's site is located at the intersection of Guiyang's cultural and commercial axis, a strategic position where it can anchor and catalyze future development. The tower will be the tallest in Guiyang and is bordered to the West by the central retail area of the GCP Master Plan, and to the East by the Nanming River and the Shixi River. The site is planned as a

node in the larger network of Transportation Oriented Development that will link regional and local transportation networks. The larger vision for the historic city center includes renewing key transportation arteries and leveraging existing city assets to increase both land value and public wellness. The Guizhou Culture Plaza Master Plan calls for a total area of 1.4 million m² and includes the GCP Tower (mixed-use, office, and hotel), a performing arts center, two SOHO (live-work prototypes) towers, a retail mall, and several residential towers. One of the primary goals of this project is to create a rich network of open space along the Nanming River, renewing the existing river walk and interconnecting the existing assets with the new development. To achieve this, an emphasis was placed on enriching the public realm with high-quality open space that activates the ground plane and creates meaningful relationships with the city's existing assets.

Programmatically, the project brief called for the following mix of uses in a single, 521 meter-tall tower: 60% office, 37% hotel, and 3% observation deck (height until the last occupied floor: 450 m).



Favorable Conditions for Supertall Design

There are several natural factors which make Guiyang an optimal location for a supertall tower, including the following:

1. Guiyang has a temperate climate (China National Tourism Office, 2015), generally lacking direct sunlight. Most days are brightly lit with neutral, diffused light. These solar conditions also remove the need for intensive solar shading strategies, and negates the potential use of solar power collection technology.
2. The wind speeds are relatively calm throughout the year, with average speeds around 2.4 m/s (China Weather Institute, 2015). This precludes the integration of wind-harvesting technologies, but also reduces the potential impact of high lateral forces.
3. Good air quality favors Guiyang throughout most of the calendar year. Averages range between "moderate" to "satisfactory" (China National Tourism Office,



Opposite: Site plan of the Guizhou Culture Plaza development in central Guiyang. Source: Zhongtian Urban Development Group Co., Ltd

Top: View of the Nanming River, Zhucheng Square, and the GCP Tower. Source: Zhongtian Urban Development Group Co., Ltd

Project Data: Guizhou Culture Plaza Tower

Location: Guiyang, China

Height:

Architectural: 521 meters (1,709 feet)

To Tip: 521 meters (1,709 feet)

Occupied: 447 meters (1,467 feet)

Floors Above Ground: 109

Area: 1,470,000 m² (15,822,948 ft²)

Use: Hotel / Office

Proposed: 2010

Owner/Developer: Zhongtian Urban Development Group Co., Ltd

Architect: Skidmore, Owings & Merrill LLP (design); CAPOL (architect of record)

Structural Engineer: Skidmore, Owings & Merrill LLP (design); Architectural Design and Research Institute of South China University of Technology (engineer of record)

Other Consultants: FAST Fire Safety Performance Evaluation (fire); Guiyang Architectural Survey Design Ltd. (geotechnical); MVA Transportation, Planning & Management Consultants (traffic); Arup (vertical transportation)

Dense Urbanism: The High-Rise Tower as a Building Block for the Public Realm

Moshe Safdie, Founder & Jaron Lubin, Principal, *Safdie Architects*

Though the skyscraper has been with us for a century, we are yet to discover how to deploy it as an effective building block for contemporary urbanism. Before the age of towers, we could take for granted that buildings aggregated to create boulevards, streets, squares and crescents—wholesome places for the public realm. Today, the dominant typology of towers is a singular, autonomous structure—experienced as a sculptural object. Alternatively, and becoming more common, are clusters of mixed-use towers atop a podium, predominantly designed as self contained, introverted, and privatized environments. Planning, zoning, and urban design have not provided the tools to accommodate and regulate the great inter-dependency of towers in the city, the impact on light and view on each other and their surroundings. The challenge going forward is to recognize that towers are highly interdependent and require new planning tools to resolve their relationship.

As the dominant building type of the city is the high-rise tower, if it continues to follow its current course, life's sustaining

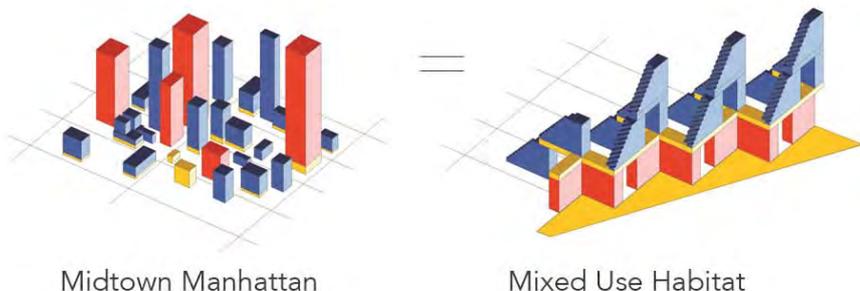
elements are threatened: light, air, a sense of identity, contact with nature, privacy, as well as community. Neither the privacy of a house nor the community of a village is possible now without major new inventions which transcend individual buildings. They demand a new urban vision.

As a case study, the Habitat of the Future Project came about in 2011 as part of an in-house Research Fellowship program. The research revisited the concept of the original Habitat '67 project in Montreal, almost a half century after it came to prominence as a new model for prefabricated housing. Habitat '67 was, above all, based on the theme "For everyone, a garden," which is a metaphor for making an apartment in a high-rise structure into what connotes "house," a dwelling with its own identity, openness in a variety of orientations, and adjacent personal garden space set within a community. One of the charms of Habitat was that it maintained the feeling of an agglomeration of houses, not of high-rise apartment living. The individual identity of the house is maintained – its autonomy within the whole, its abutting garden

open to the sky, its multiple orientations transcending the decades-old malaise associated with apartment living.

The lessons from Habitat '67 were the starting point for investigation. These speculations focused on typological exploration of lifestyle, social interaction, construction technologies, and real estate economies for further application in dense urban environments.

The research queried how to rethink a very dense city block; in this case it looked at stacking, linking, and bridging functions within a 3D "matrix" of space. The research team evaluated the density of a midtown Manhattan city block, a floor area ratio (FAR) of 12, and reshuffled the program into a series of stepped, tall building blocks that stack together both horizontally and vertically. The individual slab buildings – which are sometimes rectangular, sometimes stepped to form roof terraces – are stacked corner to corner and can accommodate offices, hotels, or residences. As these slabs are stacked vertically, trusses allow for the slabs to span from core to core, forming large-scale windows that are 50 meters



Left: Habitat of the future comparative diagram. Source: Safdie Architects

Opposite: Raffles City, Chongqing, China, an example of mixed-use integration in dense urbanism. Source: Safdie Architects

commercial
residential
retail
program



wide by 80 meters high. The resulting mass is exceedingly porous, framing views of city and sky and providing open views from within. The extraordinary achievement here is the reliance on completely traditional, vertically stacked slab towers, with the exception of the trusses that enable them to span from core to core. The building economics of such a proposal are familiar and predictable, yet the level of amenity offered greatly exceeds that of traditional mixed-use complexes of similar densities. Compared to the amenities of the original Habitat '67, this scheme undoubtedly does not provide as consistent, as generous, or as private of accommodations. On the other hand, it promises to be much more affordable and capable of application to a great variety of urban development sites today.

What was important here was not only the formal aggregation of residential units as in Habitat, but also a further diversification of program. Mixed-use integration into the three dimensional order was essential to create a long-term and sustainable model for the future, activating designated levels with community and recreational opportunities day and night at ground level and in the sky. From this research, the study concluded that a stacked, mixed-use scheme has numerous advantages over the predominant single tower scheme, allowing street life to expand vertically into the building, provide porosity, and enable connections to be made between towers. What has emerged from this realization is the concept that the public realm could be elevated from an isolated podium level experience, and knit together in three dimensions.

Based on the Habitat of the Future fellowship as first principles, and using recent building projects as benchmarks, this paper further explores three themes that inform the application of the skyscraper as a building block for mitigating excessive urban density:

- Stepping façade strategies, including fractalization, to break down the building mass and create opportunities for terraces and gardens.
- Bridging and connecting towers at multiple levels to increase connectivity and create new community amenities.
- Expanding the public realm at the urban scale by diversifying and

From New York to Busan: Reflecting Culture in Urban Design

Daniel Libeskind, Founder/ Principal Architect & Carla Swickerath, CEO/Principal, *Studio Libeskind*

Overpopulation, climate change, aging infrastructure: the threats facing tomorrow's cities are, in many ways, design problems. The challenges of today's world have to be solved with creativity that supports the development of an inspired, innovative, and diverse society for the future. As we look to create vibrant, global cities, the biggest challenge is how to build tall without losing the culture, history, and spirit of these rapidly changing places. Design solutions have to embrace the values of humanism in architecture that is forward-looking, sustainable, and bold. Cities have to respond to the dynamic nature of urban living, with new patterns of planning that can adapt as freely and quickly to the ever-changing world to be successful, desirable, and lasting. How

do we build tall while enhancing the human scale of neighborhoods and street life?

It is particularly important to re-assert humanism in architecture by answering today's challenges with an optimism that supports the development of an open and inspired society for the future.

Contemplating future cities involves historical reflection. Cities are mirrors of the complex realities that went into their making. Precisely because cities are both producers and consumers of new ideas, they shatter tradition and continuity through their own progress. The city seems to have both a historical order and at the same time be a victim of unpredictable chaos.

Daedalus was famous for two great achievements: he invented the labyrinth, and constructed the wings that took his son Icarus disastrously close to the sun. Cities seem to oscillate between these twin archetypes. They are either labyrinths whose center is unreachable or they spawn utopian fantasies.

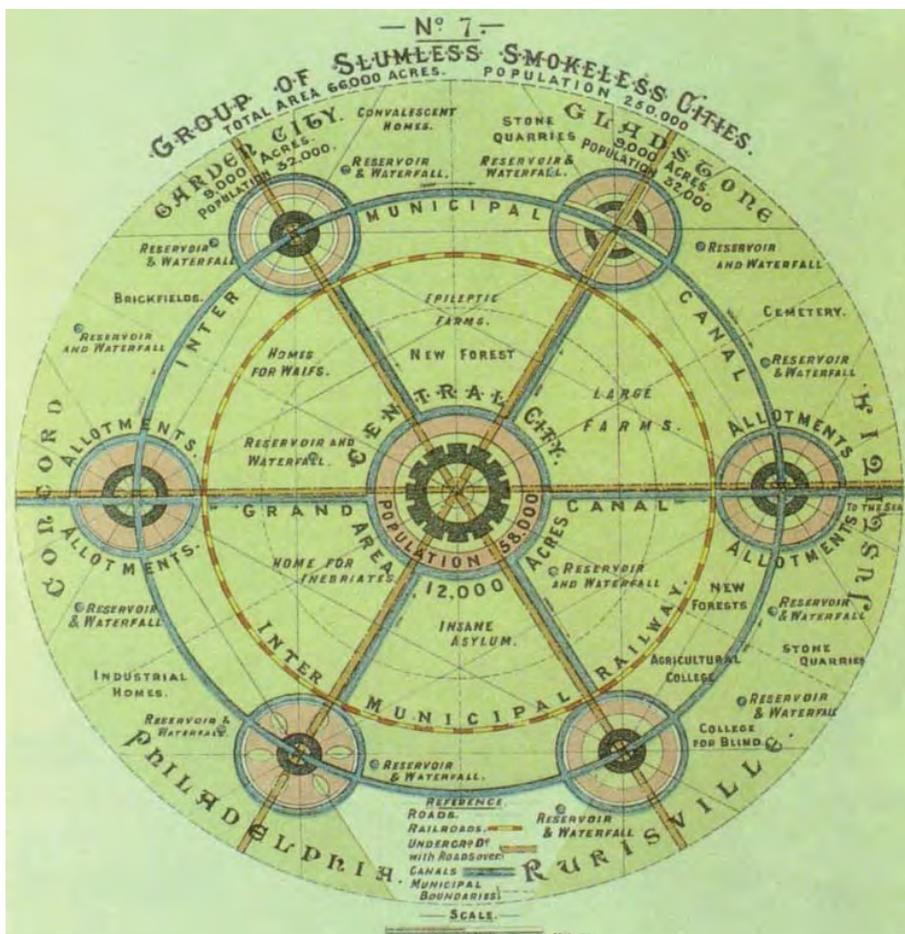
In the modernist era, one has the perfect Garden City of Ebenezer Howard; the Cartesian Radiant City of Le Corbusier; the techno-mechanical Spaceship Earth of Buckminster Fuller; the dystopian scenarios of William Gibson and J. G. Ballard; or Steven Hawking's pessimistic belief that the human race will eventually have to relocate to other planets in order to survive. The city of the future is a mirage in which utopian fantasies and advancements in technology subvert each other to produce a new, complex whole.

Culture and Community in Modern Cities

Great cities develop over time and become a reflection of the dreams of its citizens. Architecture must look to the future with bold and innovative design that embraces a cultural approach to development. Celebrating creativity, community, sustainability and diversity, will create vibrant, meaningful and enduring places.

Architecture itself is communicative. Yet banality can plague many contemporary urban centers. It is the duty of the architect to build in a way that reflects who we are. Major metropolitan centers are in a global competition, what made a great city 50 years ago is no longer relevant today. Contemporary design can inspire breakthroughs in innovation and architecture, shedding old notions of planning, creating new neighborhoods and iconic spaces for the future that will revitalize cities around the world.

The lines must be blurred between commerce and culture, popular and sophisticated, high





and low. As much as cultural institutions need to be profitable in order to flourish, commercial enterprises need to have a cultural conscience in order to succeed. This intertwining of public and private needs a positive articulation in the city structure.

It is critical that architecture have a local identity that creates a singular place and unique character. If rooted in the history of the place and the culture of its people, architecture and urban design can create sincere and unique human experiences, robust economies, ecosystems, and communities integrated into the existing fabric of the city.

The Common City: Architecture and Public Space

The shift has moved away from the individual – the 21st century is about democracy, diversity, and multiple voices. We need our cities to give us more than ever before.

Studies of cities seldom take into account the ineffable and unquantifiable human desire. Surely cities depend more on their citizens than on their walls. Aristotle noted that a city

cannot be larger than the ability of the mayor to know all its citizens. Today's metropolitan city is vulnerable in its very structure, since democratic participation seems unable to steer development equitably after the city reaches a certain scale.

Future cities need to develop passionate democratic participation in order to create the kind of public space and environment that allows everyone to pursue their own dreams. This is not a utopian ideal even at the scale of 21st century city. The empowerment of citizens to participate directly in the design of their own environment is a requirement of a meaningful future.

Fifty-four percent of the world's population lives in urban areas, a proportion that is expected to increase to 66 percent by 2050 (United Nations, July 2014). Coupled with the transformation of city centers from nine-to-five business districts to 24-hour neighborhoods, there is a great demand on space. Creating both density and open space – with streets that weave a social fabric that binds people together – is essential in the development of the cities.

Opposite: Diagram of Ebenezer Howard's Garden City. (cc-by-sa) Wikimedia

Top: Buckminster Fuller's Montreal Biosphere is a bold and innovative design that has been preserved, and continues to be celebrated in the city. (cc-by-sa) Idej Elixé



The Asia/Australasia region leads the way for the rate of tall building development in the world. These regions' cities are changing more rapidly than any others on the planet, and their building projects are pushing the boundaries of what's possible, setting the bar for development elsewhere. One may look to the skyscrapers of this region as one would look to the future to see the trends, technologies, and strategies in urban development that are now spilling over into other parts of the world.

Asia and Australasia is a collection of 16 written works, covering a range of topics on tall building and urban design, from leading developers and architects that are affecting dramatic change to the landscape of this region. Developments in Asia and Australasia demonstrate that the population spikes in the world's fastest-growing cities must be met with carefully planned mixed-use developments that advance dense urban living. The tall building and urban development trends include: blending multiple programmatic functions into a large complex that is maximally efficient and enjoyable for users; shifts in thinking about urban design and planning, with special emphasis on integrating with public transportation and enhancing connectivity with the urban realm; and amplifying green space and urban gardens, while taking maximum advantage of the site's existing environmental features.

The Guizhou Culture Plaza (GCP) Master Plan, the opening case study in this book, aptly exemplifies many of these trends in skyscraper construction. When completed, this 521-meter tower will be the tallest in Guiyang, a city in China's mountainous Guizhou province currently experiencing an explosion of economic development and an influx of immigrants from other parts of the country. The project establishes ties between the demands of a modern urban lifestyle and embracing the natural habitat of Guizhou.

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