SECOND EDITION

CITY DESIGN

MODERNIST, TRADITIONAL, GREEN AND SYSTEMS PERSPECTIVES




JONATHAN BARNETT

ROUTLEDGE

City Design

City Design describes the history and current practice of the four most widely accepted approaches to city design: the Modernist city of towers and highways that, beginning in the 1920s, has come to dominate urban development worldwide but is criticized as mechanical and soul-less; the Traditional organization of cities as streets and public places, scorned by the modernists, but being revived today for its human scale; Green city design, whose history can be traced back thousands of years in Asia, but is becoming increasingly important everywhere as sustainability and the preservation of the planet are recognized as basic issues; and, finally, Systems city design, which includes infrastructure and development regulation but also includes computer-aided techniques which give designers new tools to manage the complexity of cities.

This new, revised edition of *City Design* includes a larger format and improved interior design, allowing for better image quality. The author has also included wider global coverage and context with more international examples throughout, as well as new coverage on designing for informal settlements and new research conclusions about the immediacy of sea level rise and other climate change issues that affect cities, which sharpen the need for the design measures discussed in the book.

Authoritative yet accessible, this book covers complicated issues of theory and practice, and its approach is objective and inclusive. This comprehensive text is ideal for planners, architects, landscape architects, urban designers, and all those who want to learn how to improve cities.

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Modernist, Traditional, Green and Systems Perspectives

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Three City Design Challenges

Cities in developed countries are spreading out over farms and forests faster than current city designs can keep up; climate change has introduced a dangerous uncertainty into what once appeared to be a stable natural environment; and informal settlements, which lack most of the basic support needed in a modern city, are growing quickly in many parts of the world. These are three of the most important challenges to effective city design today.

The Challenge of Rapid Urbanization

At the beginning of the twentieth century, cities housed only 15 percent of the global population. Today more than half the people in the world live in urban areas, some in traditional cities, some in the kind of decentralized development often criticized as urban sprawl, and some in unplanned informal settlements. Rapid urbanization has been accompanied by exponential population growth. The number of urban dwellers today exceeds the number of people living in the entire world as recently as 1960.[1] While much of the new urbanization is taking place in Asia, Africa, South and Central America, the United States is expected to add more than a hundred million people during the first half of the twenty-first century. Most of that growth is expected to take place within ten multi-city regions in such places as Florida, Southern California, and the Pacific Northwest, while elsewhere rural areas and some older cities lose population or grow slowly. Even where population growth is slow, rapid urbanization continues in response to migration out of older areas and increased demand for housing created by the smaller sizes of individual households. Spreading urbanization is taking place even in European countries with stable or shrinking populations.

At one time, cities could be expected to remain recognizably the same for centuries. Urban change speeded up at the beginning of the nineteenth century with the interaction of railroads, factories, and fast population growth. Even so, about 1910, at the beginning of the worldwide city planning movement, it was possible to believe that traditional street and park design strategies that went back to the Renaissance could bring order and beauty to urban central areas, and what was then the new Garden City concept could evolve to manage urban change in suburbs and new factory towns. This consensus was soon challenged by the modernists, originally a small

radical group, who believed that modern cities should be built on hygienic principles to maximize sunlight and open space, using what were then the new technologies of highways and steel-framed towers to sweep away the accumulation of the past. The modernists rejected the traditional relationships between buildings and streets in favor of a separate grid of traffic ways enclosing large blocks where buildings are located for optimal sun exposure. After the great economic Depression of the 1930s and the horrific disruption of World War II, most city designers switched to a simplified version of modernist design ideology, relying on automobile transportation, tall buildings, and park space as the way to rebuild and expand cities, although some traditionalists objected, and a few visionaries urged much more radical systems technologies.

City designers have had a substantial influence over urban commercial centers, communities for rich people, and mass housing for the poor, but have only been able to change urban development at the margins, as large parts of any city had been constructed over previous generations and regional growth trends include many decisions outside the control of designers.

Now the scale and speed of urbanization and decentralization have turned the management of urban growth and change into an entirely new problem. Urbanization is happening so rapidly in China that city districts can be constructed or rebuilt in a few years, and whole new cities created. By government decree, Shenzhen has grown from a fishing village in 1979 to a metropolis of more than 9,000,000 people. It is routine for planners and designers working in Planning Institutes in China to see their maps and sketches translated into reality at a scale and speed that earlier generations of frustrated visionaries would never have believed possible. The cities of the United Arab Emirates like Dubai, Abu Dhabi, and Doha are also growing fast, acquiring their glittering skylines in little over a decade. Cities like Bangkok, Jakarta, and Mumbai have changed out of all recognition in the past 50 years. In the United States, the pace of new construction has often overwhelmed the official planning and regulation system, particularly where urban growth is taking place in communities with little experience in managing development at anything like the scale at which it is going forward. The US housing industry builds an average of about 1.5 million houses and apartments a year, 2 million a year at market peaks and 1.2 million a year when times are bad for building.[2] Much of this construction takes place in master-planned communities of several thousand units, and all of it requires approvals by the local government. However, very little of this new housing implements a community or regional design, but instead responds to available land and the initiatives of individual builders. In Canada, a country with an economy comparable to the United States, there are stronger policies to make individual developments fit into a larger picture. In the Netherlands, the Scandinavian countries, and Singapore, large areas, if not the whole of each country, can be said to have been constructed according to an overall design. In Korea, the United Kingdom, and most western European nations, there are strong local design controls, national planning concepts, and a new interest in what is called *spatial planning*, another name for regional design. However, as the world speeds towards a population of nine billion people or more by mid-century, the influence of the city designer is still marginal in large parts of both the developed and developing world, even while the built environment is being reconstructed and expanded at a pace and scale that require direction.

Climate Change as a Challenge to City Design

Traditionally city designers had been able to assume that the natural environment was a stable background for their work, its forces understood and controllable through engineering. More recently, the entire trend of urban development is being revealed as unsustainable, not just because of the waste of resources created by spreading urbanization and decentralization, but because the climate of the Earth itself has become far more unpredictable. The destruction of much of New Orleans by Hurricane Katrina in 2005 has become an important indicator of what to expect from global climate change, although this particular tragedy need not have happened. New Orleans had relied on flood walls and levees built by the US Army Corps of Engineers. They should have protected the city from a storm of Katrina's intensity but both the engineering and construction turned out to be defective.[3] The coastal defenses for New Orleans have now been rebuilt to the standard they were supposed to have met in the first place, but the reconstruction of the city's most vulnerable neighborhoods is still far from complete.

Officials in other vulnerable coastal locations like Boston, New York, and Miami have begun to look at what would happen to them if they were hit by a comparable disaster. As a result, New York City was somewhat better prepared than New Orleans when the metropolitan New York regions were hit by Tropical Storm Sandy in the fall of 2012. But despite preparations, flood tides overwhelmed the sandbags and other protections in Lower Manhattan and poured into subway and vehicle tunnels, an electrical sub-station flooded, knocking out power for days in much of Lower Manhattan, and mechanical equipment in many buildings was destroyed by water. There was severe damage along the shore in New York City's outer boroughs and in adjacent areas of the New Jersey and Long Island coast.

Large areas of Miami and Miami Beach are only a few feet above sea level, and are thus exposed to a direct hit by a storm surge, even one less intense than Katrina. Boston is equally at risk in the wrong set of circumstances. Would these cities be written off the way large parts of New Orleans still appear to have been? And what happens to all coastal cities as the world's climate changes?

There is now consensus that climate change induced by human activities is a real and serious problem, and is happening faster than was predicted only a few years ago. Some of the scenarios for what could happen if the average surface temperature of the oceans rises more than 2 degrees Celsius are truly horrifying.[4] Preventing the worst potential climate consequences for industry and urbanization will clearly have to become a city design priority, and this will mean designs with less dependence on automobiles, more preservation of the natural environment, and much more concern about the location and orientation of buildings for energy efficiency.

Adapting cities to the effects of climate change will be another priority. Some ocean temperature increase has already taken place, and more is already inevitable. Sea level rise is a component of climate change that is relatively easy to predict. Sea levels rise because warmer water occupies more volume, and because land-based glaciers are melting. A conservative prediction is a worldwide rise in sea levels of half a meter (a foot and a half) by mid-century and at least a meter (a little more than 3 feet) by 2100. This

amplifies the threat to coastal cities already at risk from storm events. For example, according to this prediction, much of Miami Beach will be below sea level in 2100.[5]

Planning for future sea level rise will change the way designers think about cities. Pudong, the new skyscraper district of Shanghai, was largely freshwater wetland up until 1990. In retrospect, it was not a good place to make such a big urban investment. The low-lying islands being created by dredging off the coast of Dubai do not look like such a good investment decision either.

The Netherlands, where about a quarter of the country is already below sea level, and half of the remaining land is no more than a meter above the sea, is clearly on the front line of climate change, under threat from rising seas and also from increasing amounts of river water coursing through the country because Alpine glaciers are melting. After terrible damage from a storm in 1953, the Dutch created a system of storm-surge barriers that guard the Eastern Scheldt delta and Rotterdam harbor. Television news stories of people flooded out of their homes in New Orleans and other Gulf Coast communities have caused the Dutch to take another look at their fortifications, particularly dikes that might contain construction from hundreds of years ago. They are also looking at ways to accommodate periodic flooding from rivers by channeling the waters into park areas or farmland. The City of Rotterdam has released a plan for making the city climate-proof. These efforts are supported by a national policy to protect the whole country from the worst possible event: the 10,000-year storm. In that context, the idea of paying for whatever is necessary to protect the country from storms has been taken out of politics, giving it a similar status to the military budget in the United States. There may be discussion about the value of specific programs, or the amount of spending in a given year, but the idea of defense is not at issue. The government in Britain funded a storm-surge barrier in the Thames to protect London after a destructive surge from the same 1953 storm that caused such damage in the Netherlands. Design is now under way to raise the Thames Barrier to deal with rising sea levels, as the barrier is expected to become inadequate by 2030. Flood surge barriers have recently gone into operation in St. Petersburg, and barriers are under construction to protect Venice from flooding. Most countries, however, are a long way from a consensus about protecting coastal cities and about how to pay for it. Rebuilding in Gulfport and Biloxi, east of New Orleans, and also hard-hit by Katrina, goes forward without any investment in protective measures beyond what can be done on individual properties.

Climate change is also predicted to increase the duration and severity of drought. Although specific predictions are difficult, places that suffer from drought now, such as Australia and the American Southwest, can expect that the problem will become worse. Making cities sustainable in areas subject to drought will require major changes in city and building design. It is probable that people will look back in amazement at the days when purified drinking water was used to irrigate lawns and flush toilets.

The Challenge of Informal Settlements

In many developing countries, cities or parts of cities are growing with no design in mind at all: Robert Neuwirth estimates that a billion people, perhaps

a third of all urban dwellers, and almost a seventh of the world's population, live in squatter, or informal, settlements where there is very little control over design and development.[6] The number of people moving to cities has overwhelmed the existing supply of housing that newcomers can afford, and attempts by governments to create more places to live have completely failed to keep up with what is needed. What happens instead is that people take over places that appear to be unclaimed, often on steep hillsides or flood plains along rivers which are officially considered unfit for habitation. The settlers build homes for themselves using whatever materials they can obtain. Although the whole settlement is illegal and there are no official property rights or other aspects of the rule of law, a system grows up where the strong protect their own status and weaker families can buy protection. There are no water, sewer, or power systems, but organizations develop to deliver water, and tap into power lines—illegally but effectively. Sanitation and storm drainage are usually big problems, and access is difficult, but the settlements become too entrenched for local governments to interfere, and public employees are often afraid to even enter the area.

Over time, informal settlements can evolve into workable communities, as individual families improve their housing from makeshift shacks to multi-room buildings constructed of permanent materials, but sanitation, protections from floods and landslides, and the absence of police and fire-fighting systems remain major problems.

Informal settlements mobilize the ingenuity and resources of individuals and families to create communities. The challenge is to find a way to channel this valuable energy so that informal settlements can evolve into permanent, desirable districts of the larger urban region.

The Four Approaches to City Design Today

This book starts in the present; and defines cities as urbanized regions that contain cities, suburbs, and separate towns. The history of organized human settlements goes back to villages formed when people first developed agriculture and began to give up a nomadic existence some 12,000 years ago. Archaeological evidence of larger, more complex places, defined as cities, has been dated to 8000 or 9000 years ago. The story of the economic and social forces that created cities and villages, and the ways they have been shaped and reshaped over time according to different design concepts, has been told many times; what concerns us is what this history tells us we should do now.

Today there are four different approaches to city design in use around the world which, in this book, are defined as Modernist, Traditional, Green, and Systems. Each has strong advocates, who frequently find little merit in the other three. In this book, each design approach is described in a separate chapter, which begins with a significant current example, then goes back to show how the particular way of designing began and has developed, and concludes with more current examples of each type of design, selected because they are likely to influence future development. The final chapter (Chapter 6) describes how each design approach will be needed to help meet the challenges facing city design and development today. A new synthesis can bring together the best of each.

Modernist City Design

Modernist concepts, described in Chapter 2, have dominated city design since World War II. Criticisms of modernist city design have grown intense as more and more of it has been built around the world: especially its failure to accommodate historic preservation and conserve existing neighborhoods, its role in promoting social inequity by concentrating poor people in the least desirable areas, the disruption created by highways running through the center of cities—a fundamental city design concept for modernists—and the destruction of the natural environment as urbanization spreads over larger and larger regions. The tall building enabled by modern construction materials is the most significant element of modernism in city design. Modernism advocates free-standing buildings separated from their surrounding urban context. Groups of buildings are related to each other only by proximity, or by an abstract composition of separate buildings organized on a level landscape, plaza or street system. Modernist city design can produce spectacular skylines, but, at ground level, there is seldom much coherence or amenity. This rendering, of the Lujiazui financial district in Shanghai, as seen from the air (1.1), shows how a modernist city design implemented since the early 1990s has transformed rural farmland and freshwater wetlands across the Huangpu River from the central part of Shanghai. The new district includes a cluster of three of the tallest buildings in the world, on the left-hand side, the Shanghai Tower, designed by Gensler Associates, on the right, the Shanghai World Financial Center, designed by Kohn Pedersen Fox, and in between, the Jin Mao Tower, designed by Skidmore, Owings & Merrill. Each of these magnificent, costly buildings stands on its own separate block. While it is possible to walk from one to the other via pedestrian bridges, and—if you are quick on your feet—at street level, there is not much of a relationship among the three buildings, and the rest of this completely new district, where every element is approved as part of an official plan, is designed in the same way: each building separated from its neighbors by streets and landscaping. It is a demonstration of both the power of modern buildings and the weakness of modernist city design.

Traditional City Design

Traditional city design requires that each new building be part of a larger, predetermined design concept, derived ultimately from architectural ensembles first created in Renaissance Europe. This way of thinking about cities, which the modernists derided and set themselves to change, has been making a comeback in historic European cities, for example, the rebuilding of the central parts of Berlin with modernist buildings constrained by traditional guidelines, the precinct around St Paul's Cathedral in London where buildings constructed according to a modernist plan just after World War II have been demolished and replaced with new buildings connected to each other and holding the street walls in the traditional way, and a new low-rise center for Den Haag in the Netherlands of predominantly low-rise buildings in a setting of traditional streets. In North America, starting in the late 1970s, there has been a movement to revive such traditional city design elements as smaller city blocks, connected buildings that hold to the street line, and the organization of public spaces into plazas, avenues, and

esplanades. Notable examples are Battery Park City in Lower Manhattan, the South Beach district in San Francisco, the new Playa Vista neighborhood in Los Angeles, and new districts in Vancouver, Canada, where the modernist towers are part of a continuous setting of low buildings which define the space of streets and waterfront walkways and bicycle paths.

The revival of traditional design principles in cities has been accompanied by a revival of pre-World War II garden suburb design for new developments, notably the Kentlands-Lakelands communities in Gaithersburg, Maryland, near Washington, D.C., designed by Andrés Duany and Elizabeth Plater-Zyberk. The design of these communities not only follows traditional principles of city organization but the buildings follow a brick-walled, neo-classical style reminiscent of early-nineteenth-century buildings, or perhaps the revival of this type of architecture from the early twentieth century.

Some of the proponents of traditional city and suburban design banded together as the Congress for the New Urbanism, founded in 1993 under the leadership of Andrés Duany and like-minded colleagues. What is new about the New Urbanism is the idea that cities took a wrong turn when modernist city design concepts became dominant. New Urbanism is actually a slogan for going back to a past when city design is perceived to have worked better. Traditional city design produced compact places, as much of daily life

1.1
This rendering of the Lujiazui financial district in Shanghai, seen from the air, shows how a modernist city design implemented since the early 1990s has transformed rural farmland and freshwater wetlands across the Huangpu River from the central part of Shanghai. The new district includes a cluster of three of the tallest buildings in the world, on the left-hand side, the Shanghai Tower, designed by Gensler Associates, on the right, the Shanghai World Financial Center, designed by Kohn Pedersen Fox, and in between, the Jin Mao Tower, designed by Skidmore, Owings & Merrill. Each building is separated from its neighbors by streets and landscaping. The plan demonstrates both the power of modern buildings and the weakness of modernist city design.

1.2
While most traditional city designs use pre-modern concepts for streets and public spaces to organize modernist buildings, two new colleges at Yale University, designed by Robert A. M. Stern, do more than look back to the past for principles of design organization. They revive the neo-Gothic used when most of Yale's other residential colleges were built almost a century ago. Robert Stern prepared this heresy against modernist architecture and city design while Dean of the Yale School of Architecture.

before automobiles took place on foot. Sprawling urban development has created a new interest in compact, walkable business centers and neighborhoods, which can be supported by transit and high-speed rail initiatives to counteract uncontrolled urban growth. The search for compact and walkable urban forms is a strong reason why designers are looking back at traditional city design principles. They don't require the kind of traditional architecture in use at the Kentlands, but it is an easy way to follow them.

Two new colleges at Yale University, designed by Robert A. M. Stern, do more than look back to the past for principles of design organization. They revive the neo-Gothic architecture of Oxford and Cambridge colleges used when most of Yale's other residential colleges were built almost a century ago (1.2). In the 1960s, Eero Saarinen designed Yale's two previous new college buildings. He followed traditional building massing and organization, but the architecture followed modernist principles: plain surfaces, no ornament, nothing that could not be explained as functional. Robert Stern prepared his design while Dean of the Yale School of Architecture, so this heresy against modernist architecture and city design could have significant future implications.

In Chapter 3 we will look at a range of traditional city designs. A few also use traditional architecture, some use modern buildings modified by elements derived from pre-industrial masonry architecture, and some use a traditional plan, but the buildings express their construction of steel and glass.

The Green Argument against Modernist City Design

Orienting buildings for optimal exposure to light and air has always been a fundamental part of modernist planning doctrine, but the central modernist method of dealing with the natural environment has been to subdue nature through engineering. Sites can be bulldozed to make them level, wetlands can be filled in, and streams that are in the way of development can be rechanneled into underground culverts. Ian McHarg challenged this way of using technology in his manifesto, *Design with Nature*,[7] first published in 1969, in which he pointed out that failure to work within the constraints of natural systems invited retribution: landslides, floods, subsidence of buildings. McHarg's book helped reinforce earlier ideas about garden cities and suburbs, preserving the natural environment through greenbelts, and site designs that worked with the natural contours of the land. More recently, landscape architects have begun asserting that successful city design should be based on landscape concepts, using terms like Green Urbanism and Environmental Urbanism to describe their philosophy of designing urban areas around landscape concepts rather than forms derived from architecture.

A good example of the potential for green interventions in existing cities is the restoration of the Cheonggyecheon in Seoul, South Korea. A polluted stream which had been decked over, and then became the route of an elevated highway, has been restored as a linear urban park. The highway was deteriorating. Instead of rebuilding it, the highway was torn down and the deck over the stream removed. A new stream-bed section has been created that contains hidden conduits for the stormwater that occasionally used to flood the area. Because of all the engineering changes in the city,

there was no longer enough water for the stream on ordinary days, so the flow is enhanced with water from rooftops, and drainage from the subway system. The design has pathways on both sides of the stream, with occasional places where pedestrians can cross without going back up to the street level. The water is clean, and plantings on both sides have created a new waterside environment which supports species of bird life which had not been seen in the center of the city for many years. Seoul's traffic has adapted to the loss of the highway, with only a slight increase in congestion, while use of the subway system has gone up (1.3).

Green city design also has an important role in creating more sustainable regions. The natural environment has proved to be a much more unstable system than was assumed in McHarg's day, and designing within the constraints of natural systems has become understood as essential for sustainability, both for slowing down or stopping climate change and for adapting to the new situations that climate change produces. Environmental sustainability was perceived at first as a moral issue, keeping the planet safe for future generations. Recent droughts and storms have made it clear that the climate is already changing. Adapting to change and preventing worse consequences in the future are urgent immediate problems.

1.3
The restoration of the Cheonggyecheon in Seoul, South Korea. A stream which had been decked over, and then became the route of an elevated highway, has been restored as a linear urban park. The design has pathways on both sides of the stream, with occasional places where pedestrians can cross without going back up to the street level. The water is clean, and plantings on both sides have created a new waterside environment which supports species of bird life which had not been seen in the center of the city for many years.

While the US Army Corps of Engineers has restored the levees and pumps protecting New Orleans to the condition they should have been before Hurricane Katrina, this is not the long-term answer to the region's challenges from rising sea levels and more frequent storm events. David Waggonner, of the architectural firm of Waggonner & Ball, has led an effort to prepare New Orleans for the future, in *The Greater New Orleans Water Plan*, with local designers and planners working with consultants from the Netherlands who are able to draw on their long national experience in preventing floods. Pumping flood waters out of the city, which happens after every heavy rainstorm, prevents the ground water from being recharged, which causes the land levels of the whole area to subside. Sinking land and rising sea levels are a bad combination, which requires making a plan for the New Orleans urban region to manage the flow of both surface and subsurface water. The proposals have been worked out in substantial detail, neighborhood by neighborhood. This and other examples of green city design are discussed in Chapter 4, along with an explanation of the ways that people have always shaped natural systems, and the ways that green city design concepts have evolved over time.

The Search for a More Systematic Urbanism

The big problem in implementing all city designs is the relationship between the original city designer and the people carrying out the component parts of the design, who may not set to work until many years after the completion of the original concept, and could be following different design philosophies, and operating under changed economic circumstances. City design requires a control system that is strong enough to preserve the original concept and flexible enough to be adaptable as situations change. Some of the control systems, like the location of streets, utilities, and public transportation, are managed by the local government and can be used to support a design concept—if the government policies remain consistent. The management of private investment to support a city design is much more complicated. One of the first systems to do this was a statutory relationship between street width and the height of buildings that has been in force in Paris since the eighteenth century. During the reconstruction of Paris that began in the 1850s, this system was elaborated to include façade controls that produced the congruity of buildings along the great boulevards still admired in Paris today. A version of the Parisian system was used to guide development in Boston's Back Bay, and the relationship between building heights and street widths was built into New York City's first zoning code, adopted in 1916, and from there has influenced many other codes. Zoning itself can be considered a primitive form of systems city design, as it is consistent in a variety of situations that influence the form of the city, although only in a general way.

An even bigger city design problem is created by informal settlements, which grow up without an overall design of any kind, and lack all the usual supporting infrastructure, like power lines, water supplies, and sewers. These problems, as noted earlier, afflict something like a seventh of the world's urban population. Street access is likely to be minimal, making it hard to reach these places with normal city services like police and fire protection, and there is little space available for other city services like libraries and

schools. Obviously in such situations, there is also no effective government regulation of private investment.

City design for existing informal settlements has to be achieved after the basic community has already been established, and retrofitting informal settlements with the systems they need is an urgent task. The Metrocable systems being constructed in Medellín, Colombia, are an important retrofit prototype. 1.4 shows how Metrocable gondolas, or cable cars, can lift passengers over dense, informally developed *barrios* on the steep hillsides at the edge of the city, connecting gondola stations for *barrio* residents to the regular metro system in the city's central valley. The construction of the first two Metrocable transit lines has already become a huge factor in the overall design of the Medellín region, by making it much easier for *barrio* residents to work, shop, and partake in the life of the whole city. These cable cars are part of a worldwide interest in developing megastructural and mechanical systems that could be extended to whole cities and regions. While they have yet to shape an entire new city, these kinds of building systems already influence the design of airport terminals, shopping centers, and multi-use urban centers. Recently research into computer-aided pre-formative design, in which systems are developed as computer scripts, which in turn can create building and city designs, has outlined a promising area of research, although still a long way from implementation. The history and development of all these city design systems are explored in Chapter 5.

1.4
The Metrocable systems being constructed in Medellín, Colombia, are a way to retrofit informal settlements with the transportation system that they need. The gondolas, or cable cars, lift passengers over densely developed informal *barrios* on the steep hillsides at the edge of the city, connecting *barrio* residents to the regular metro and bus systems in the city's central valley.

A New Synthesis for City Design

Clearly none of these four conceptual categories of city design completely excludes the other three. Modern construction methods and systems of urban infrastructure pervade all city designs, and modernist elements like tall buildings and highways are accepted by all but a few traditionalist city designers. Chapter 6, the concluding chapter, addresses how city design can meet the challenges of modern urbanization, as defined by the United Nations, and can help create sustainable cities. It also suggests a way of looking at city design that accepts the existence of a wide range of design theories.

Modernist city design, as first defined by a small group of architects in the 1920s, continues to be the default position for city design around the world. The big new cities that have grown up within the last generation, like Shenzhen in China and Dubai, Qatar, and Abu Dhabi in the Emirates, are almost entirely designed according to modernist principles. Modernism has to be the reference point for considering the future shape of cities, and this is where we begin.

2

Modernist City Design

Modernist city design was invented to challenge the shape and organization of existing cities. The primary force behind it was the Congrès Internationaux d'Architecture Moderne, or CIAM, a series of conferences, founded in Switzerland in 1928 by a small coalition of modernist European architects. Modernist architecture and city design were publicized by an even smaller group of architectural historians, journalists, and educators. Two of the principal organizers were Le Corbusier, the name adopted by a Swiss-born architect practicing in Paris (his original name was Charles-Edouard Jeanneret-Gris), and Sigfried Giedion, a professor of art history in Zurich. Le Corbusier was the most forceful proponent of modernist design in the group, and Giedion, as the Secretary General, organized the meetings, imparted coherence to the published proceedings, and wrote influential books portraying his CIAM colleagues as participants in a new historical direction, while leaving out other developments that didn't fit.

The creators of modernist city design believed, like other artists in the 1920s, that to be modern requires a revolution against the past.[1] They saw their revolution creating a collective society where everyone would have housing that met minimum standards for sanitation, light, and air. The poor would move out of crowded basements, attics, and airless courtyards and join the rest of the social order in blocks of apartments surrounded by green space. New technology—that is, the technology that was new at the time—inevitably would reshape the whole city. Most of the older urban areas would need to be swept away to eliminate slums, open up wide new streets and highways for automobiles, and create green space. Factories should move out into special industrial districts and offices would be in tall downtown towers. New buildings were to be shaped by steel frames and wide expanses of glass. No traditional architectural forms or ornaments would be tolerated. Modernism in city design is as deterministic as Marxism in assuming that past history is a dustbin and future history will prove it to be inevitable.

The CIAM intended to redefine expectations for architecture and city design all over the world. Traditional urbanists were not invited to participate, and modernists whose work was considered too expressionistic or individualistic were also excluded.[2] The technical, social, and economic forces that have spread modernist city design around the world were much more powerful than the small group of architects and planners who made up the CIAM, but these people had a sense of mission. They recognized the

effectiveness of simple, easily replicated city designs and they worked hard to shape them. They knew that the group of government officials, influential journalists, professors, and practitioners they needed to reach was relatively small, and they found ways to reach them. They circulated exhibitions; they published proceedings, reports, and studies. Accounts of the conferences reveal that there were still clashes of personalities, splits along geographic and linguistic lines, disagreements and dissension from what were later to be seen as CIAM positions, and a general naïveté about how both government and private investment decisions are made, but in the end the CIAM has to be considered to have had an astonishing success.

Much of their modernist revolution has now happened. Anywhere you see rows of apartment towers surrounded by green space, or by parking lots, you are seeing modernist city design. Where highways are the main means of travel, with wide and widely separated streets designed for speedy traffic not pedestrians, or where tall office buildings are grouped on a paved platform: this is city design according to modernist principles. Modernism had a formative influence on post-World War II reconstruction in Europe, the former Soviet Union, and Japan. In English-speaking countries, the influence of modernist city design is seen most often in planned housing developments for low-income people, in the design of downtown urban renewal, and in new urban centers on the edge of metropolitan areas, but it has also had a pervasive influence on highway and street planning. Today the official plan for every city in China embodies these design ideas. You see them in Korea in planned new communities, in Thailand, Singapore, and now in Vietnam. Until recently this kind of city design continued to be the norm everywhere in the former Soviet Union, and in the countries within the Soviet sphere of influence in eastern Europe. You can see it in Scandinavia, Central and South America, Africa, Indochina, India, and the Middle East.

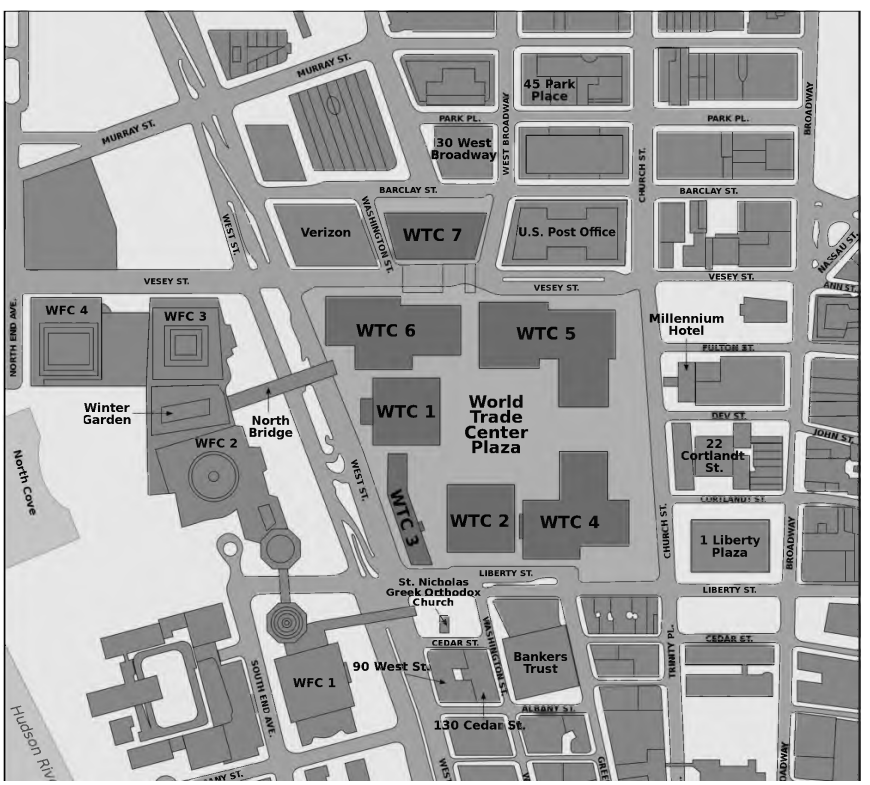
Implicit in most modernist city designs is the belief that the entire existing city should be replaced by a new order in which individual buildings have simple abstract shapes, are far more separate than they had been before, and are placed for optimal orientation regardless of surrounding streets and other structures. It is not surprising that the most usual effect of modern city design concepts has been to fragment development and to set up conflicts between new buildings and the pre-existing city. Groups of subsidized housing have tended to be located in accordance with the tower-in-the-park principle, separating them from the surrounding urban context. Most urban renewal and reconstruction plans have ended up with relatively little design continuity among the buildings, as the placement of each building was usually determined by the way the land was divided, and many years could intervene before the last parcels were developed. Zoning ordinances revised to promote modernist city design principles also enforced separation among new structures by giving open space at ground level primacy over relationships to streets and surrounding buildings.

The CIAM lost its sense of certainty after World War II and had ceased to exist by 1960, but government officials, real-estate developers, practitioners, and many professors of architecture and planning still act as if modernist city design is the obvious choice, although the original ideas about revolutionary mass housing and collectivist planning set forth at CIAM conferences, if they hadn't long been forgotten, would be seen today as no longer relevant in many parts of the world, and not the best answer for the people who need improved living conditions.

Weakness of Modernist City Design Revealed by World Trade Center Rebuilding

Rebuilding after the tragic destruction of the World Trade Center Towers on September 11th, 2001, has turned out to be a powerful demonstration of the limitations of modernist city design.

The original World Trade Center, designed by Minoru Yamasaki, was a characteristic modernist building group, more completely implemented than usual as it was constructed by a government agency that was prepared to wait many years for the buildings to be fully occupied. The site was created by closing a network of small local streets where all the existing buildings were purchased and demolished to make a 16-acre super-block, a decision—as we will see in this chapter—very much in accordance with modernist city design principles. Two deceptively simple, four-square, 110-story office towers, with each floor providing almost an acre of offices, were the most prominent parts of the design and housed almost half of the office space. The tall towers and large floors were needed so that there could be substantial open plazas at ground level, another important modernist principle. Parking, services, connections to transit, and a retail concourse were all placed under the paved, level plaza, a typical modernist design strategy which relegated most pedestrian movement within the center to subterranean concourses. The rest of the office space and a hotel were housed in lower structures arranged around the central plaza in an abstract, asymmetrical composition, again very much in accordance with modernist city design, as shown in the diagrammatic plan (2.1). The complex was completed in 1973, and it was not until the late 1990s that the development had achieved sufficient economic success that it could be marketed to private investors.



2.1
Diagrammatic plan of the original World Trade Center site designed by Minoru Yamasaki, modernist buildings arranged on a platform but grouped to form a central space.

The terrorist attack in September 2001 brought down both of the towers and destroyed the other buildings in the complex, plus two neighboring office towers, while inflicting serious damage on other nearby buildings. Some three thousand people died, including office workers trapped in the buildings, the occupants of the two airplanes which were flown into the towers, people killed by falling debris, and rescue workers caught when the towers collapsed.

Rebuilding after this tragedy took place in an emotionally charged atmosphere. Many people wanted a voice in how the site should be reconstructed, including families of the victims, survivors of the disaster, a diverse group of civic and professional organizations, the city and state agencies involved in the rebuilding, plus Silverstein Properties, which had signed a long-term lease for the World Trade Center Complex just six weeks before the attack and owned the right to rebuild. After a disastrous initial public meeting, the agencies in charge of rebuilding abandoned any official method of involving the public and the important stakeholders in a design and development decision process and announced that they would hold a worldwide architectural design competition. The hope was that someone would produce a design concept so compelling that it would unite all the diverse interests involved.

Almost 500 teams of architects and other design professionals offered their qualifications, and in September, 2002, seven groups of architects, all well known, were chosen to develop sketch designs.[3]

Setting up this competition generated great excitement. It was an inspiring moment for architects, planners, and urban designers to see issues that they cared about discussed on news broadcasts, the front pages of newspapers, and in magazine cover stories.[4] Daniel Libeskind, the winner of the competition, presented a group of buildings of distinctive prismatic shapes in graduated sizes. The tallest, which Libeskind called the Freedom Tower, was to be 1776 feet tall at the top of its mast. Libeskind made much of a retaining wall deep below ground that survived from the original World Trade Center saying that it should be left visible as a reminder of its heroic role keeping back the waters of the Hudson River to the west even after the disruption of the attack. He also explained that at precisely the day and hour at which the terrorists had flown a plane into the first tower, a shaft of sunlight would penetrate between his new towers and illuminate the retaining wall and the space in front of it.

The problem with Libeskind's design was that its coherence depended on the distinctive, geometric shapes he had given to each of the buildings. The best way to implement his proposal would have been for Libeskind to be the architect for all the buildings, unlikely in a development of this scale unless the buildings were to be constructed at once. The development program issued to the competitors was only about preserving the long-term rights to build; it was a serious misunderstanding to assume that 11,000,000 square feet of commercial space were likely to be built immediately. Most of the competition designs that were eliminated relied even more heavily than Libeskind on a single continuous construction program, which made their proposals infeasible.

Larry Silverstein, the developer who would actually implement the World Trade Center Towers, did not choose to follow Libeskind's city design concept. He had his own master designers, Skidmore, Owings & Merrill (SOM), and he had given them clear instructions which were not at all the

same as the winning proposal. There was a brief period in which Libeskind and SOM were said to be collaborating, and the design of the "Freedom Tower" went through a series of iterations, each less and less like the jagged crystalline appearance of Libeskind's original design, until the tower became a much simpler symmetrical shaft. The only remnants of Libeskind's design were the name, Freedom Tower, and the mast height of 1776 feet. The Freedom Tower name has since been discarded. The other office buildings on the site, also being developed by Silverstein Properties, were entrusted to the other famous architects, who also paid no serious attention to Libeskind's concept as design guidance for the whole site. The Port Authority had no interest in sacrificing millions of square feet of sub-grade space in order to leave the retaining wall exposed to a ray of sunlight, and a second competition was held for the memorial open space, with the winning design selected in January of 2004.

The original 16-acre super-block was judged to have been too big an obstruction to traffic, and a main street, Greenwich Street, has been restored to run through the site from north to south, and Fulton Street has been reconnected through the site from east to west. The southwest quadrant has become the memorial section, which includes the former location of the two towers. The development parcels are north of Fulton Street, and east of Greenwich Street. Leaving the original "footprints" of the towers vacant was one of the objectives of many of the victims' families. The design by Michael Arad, which won the competition for the memorial site in 2004, turns the shapes of the original towers into 30-ft-deep waterfalls, a powerful design idea that is not reflected in other parts of the plan—not surprising as the competition for the memorial took place two years after Libeskind's overall plan, which had a much more elaborate design for the memorial area, had supposedly been selected.

The computer simulation in 2.2 shows the official plan devised after the failures of the public participation process and the design competition. The open space follows the design by Michael Arad and Peter Walker. The new office towers keep a respectful distance from the memorial but are not related to its geometry. In between the two memorial waterfalls is the entrance pavilion for an associated memorial museum, designed by Snohetta, which has become a much more prominent part of the overall development than was originally contemplated, and was not part of Arad's competition design. 1 World Trade Center (once to be called the Freedom Tower), designed by Skidmore, Owings & Merrill (SOM) and the structural engineer Cecil Balmond, is on the left of the illustration in the northwest corner of the development, behind it is the rebuilt 7 World Trade Center, also by Skidmore, Owings & Merrill. To the right is 200 Greenwich Street (2 World Trade Center), not yet built. There was originally a design for this site by Foster + Partners, but it has now been replaced by a new proposal by the Bjarke Ingels Group which is designed to look like an irregular stack of separate buildings. Next to it is 175 Greenwich Street (3 World Trade Center) by Rogers Stirck Harbour + Partners, under construction, and then 150 Greenwich Street (4 World Trade Center) by Maki and Associates. Between the Ingels and Rogers buildings is the transportation terminal designed by Santiago Calatrava. Between the SOM and Ingels buildings is the site for a performing arts center yet to be designed. Not visible is the underground portion of the memorial museum, designed by Davis Brody Bond Aedas.

Each of these highly respected design firms has chosen to follow its own distinctive version of modernist architecture. The recent substitution

2.2
Artist's simulation showing the redevelopment of the World Trade Center site as it will look when completed. The new office towers keep a respectful distance from the memorial garden and fountains designed by Michael Arad and Peter Walker which occupy the site of the original twin towers. In between the two memorial waterfalls is the memorial museum, designed by Snohetta. 1 World Trade Center, designed by Skidmore, Owings & Merrill (SOM) is on the left of the illustration in the northwest corner of the development, behind it is the rebuilt 7 World Trade Center, also by Skidmore, Owings & Merrill. To the right is 200 Greenwich Street (2 World Trade Center) not yet built. It was originally to be designed by Foster + Partners, but what is shown is a new design by the Bjarke Ingels Group. Next to it is 175 Greenwich Street (3 World Trade Center) by Rogers Stirck Harbour + Partners, under construction, and then 150 Greenwich Street (4 World Trade Center) by Maki and Associates. Between the Ingels and Rogers buildings is the transportation terminal designed by Santiago Calatrava. Between the SOM and Ingels buildings is the site for a performing arts center, yet to be designed.

of Bjarke Ingels's design for Norman Foster's at 2 World Trade Center has accentuated the differences among the buildings. Foster + Partners had been part of the discussions among the firms when Daniel Libeskind was still involved and writing guidelines. The angled top of the Foster building was actually the aspect of the World Trade Center buildings most like Libeskind's original design. Ingels has now been brought in because the probable prime tenant is a media company that does not want to be confined by the spaces in a conventional office building. To meet this expectation, the Ingels design actively sets itself against convention, producing a building that is meant to look like a campus of separate buildings all stacked atop each other, with set-backs and daringly engineered cantilevers used to convey the separation.

The simple, abstract shapes of early modernist design, such as those of the original World Trade Center complex, could impart some overall coherence to a group of buildings even when their relationship was only that they occupied the same plaza. Buildings today have more complicated forms, enabled by computer-aided technology. Relating such diverse concepts would require an overall organizing concept less specifically architectural than Libeskind's but more powerful than the ad hoc arrangement of diverse buildings and memorials. The completed development is full of powerful design ideas, but the plan doesn't realize the high expectations that were created when rebuilding began.

While some of the problems in creating a unified design for the whole World Trade Center site came from a flawed development process, a more

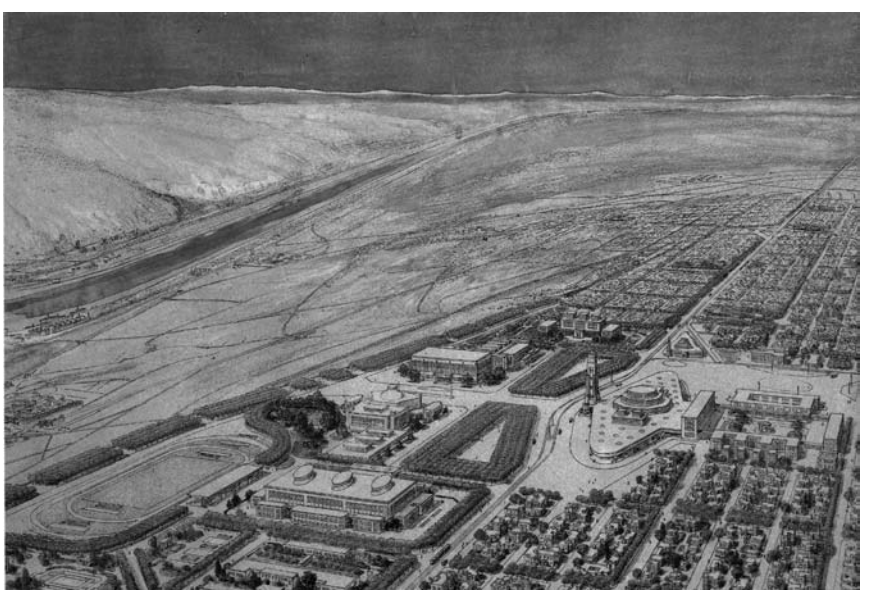
fundamental cause may be the concepts inherent in modernist city design itself, which gives primacy to making each building a revolutionary statement.

Origins of Modernist Architecture and City Design

The CIAM was part of a campaign for a modern architecture that became effective in the 1920s but has its origins earlier. Some historians find the first impulses towards modern architecture in the mid-eighteenth century, when the industrial revolution began and traditional ideas were challenged by new rational and scientific principles. Others trace a genealogy of building and structural innovation through the nineteenth century, including the use of steel frames and large sheets of glass. Some historians see the buildings of US architect Frank Lloyd Wright in the years before World War I as the foundations for modern architecture in the 1920s; others give primacy to innovations in Europe.[5] An early attempt to devise what would in retrospect be considered a modernist city was the Cité Industrielle, by Tony Garnier, a Frenchman who won the Grand Prix de Rome in 1899, and used his time at the Villa Medici to develop a theoretical project for a factory complex and workers' housing rather than studying Roman ruins. The drawings were first exhibited in 1901 and Garnier continued to elaborate the design until the project was published in 1917 (2.3).

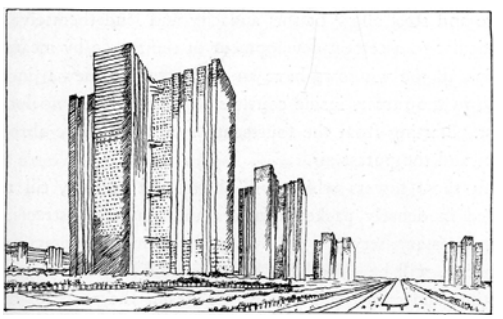
Garnier designed his buildings to be constructed of reinforced concrete and he left out almost all traditional ornament derived from historical forms, particularly in the designs for housing the factory workers. Avoiding references to Gothic or Renaissance architecture—or any other architectural tradition—became a significant distinguishing characteristic of modernist architecture. Garnier's project is also related to the model factory towns that are part of the development of garden cities, discussed in Chapter 4. Garnier, who in the 1920s was an architect in Lyon, was invited to the first CIAM meeting but did not attend.[6]

One impetus towards the creation of the CIAM was the outcome of the 1927 competition to design the League of Nations headquarters in Geneva.



2.3
Aerial perspective of Tony Garnier's Cité Industrielle. Garnier, winner of the Grand Prix de Rome, used his time at the Villa Medici to design a city for contemporary life rather than study classical monuments.

The winning design was a traditional symmetrical and palatial building faced in stone, but several members of the selection committee had favored the entry by Le Corbusier and his cousin Pierre Jeanneret. They proposed an unsymmetrical building complex that expressed its construction of steel, concrete, and glass and would have been the largest and most prominent example of this new approach to architecture, had it been selected. There were other modernist entries, including proposals by Richard Neutra and Hannes Meyer. Among the founders of the CIAM there was a fleeting hope that the result of the League of Nations competition could be reversed, and a determination that big government design decisions would have a different outcome in the future.

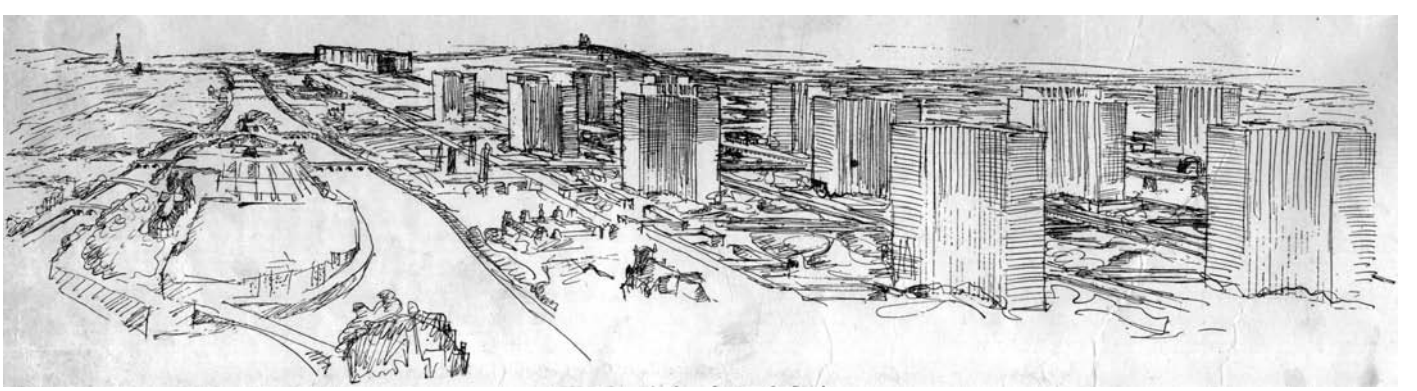


2.4
Le Corbusier's prophetic 1922 drawing of 60-story office towers along an elevated highway. At the time, no such buildings or highways existed anywhere.

The Highway and the Tower

The highway and the free-standing tower are central components of modernist city design. They replace the traditional building and street relationship, derided by modernists as the *rue corridor*, with its frequent intersections and relatively low buildings constructed parallel to front property lines. Instead, blocks must be large, so that traffic has to stop at the minimum number of intersections, and buildings should leave as much open space as possible and need not follow the geometry of the streets. This prophetic sketch of tall towers along an elevated highway (2.4) was made by Le Corbusier in 1922 as part of his polemical exhibit, La Ville Contemporaine. At the time, tall buildings were always part of existing city blocks. No limited access highways existed in 1922 either. Le Corbusier is imagining them by analogy to railways. Le Corbusier drew his towers all the same height and shape, which gives his city design a coherence that has seldom been achieved when the cities of towers he helped inspire were actually built. The developers and architects of the American skyscrapers that Le Corbusier admired were competing to create the tallest and most distinctive buildings. Buildings along highways today are likely to be highly competitive in their design, but the lack of sidewalks and pedestrians is just as foreseen by Le Corbusier.

Le Corbusier exhibited another set of city designs in 1925 (2.5), which shows central Paris entirely demolished and replaced by uniform towers organized along a highway. Notre Dame, the Louvre and a few



2.5
Le Corbusier's famous 1925 proposal to replace the center of Paris with tall towers grouped along an express highway. A few historical buildings like the Louvre and Notre Dame would be permitted to remain.

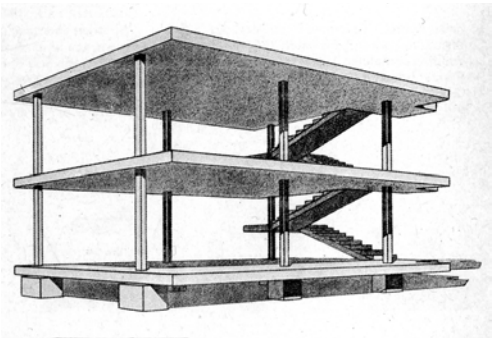
other buildings are described as preserved for what Le Corbusier called sentimental reasons. This drawing demonstrates clearly that modernist city design assumes that existing cities are unsanitary, poorly organized, and impossibly congested and should be demolished and replaced. While central Paris now is still much as it was in 1925, this drawing predicts what was to happen to many urban centers in the furtherance of modernism, including making the highway interchange the central urban experience. Le Corbusier published his concepts of city design under the title *Urbanisme* in 1925. This book was translated by Frederick Etchells and published in London in 1927 as *The City of Tomorrow and Its Planning*.[7] It was also published in German in 1929.

An Architecture of Mass, Surfaces, and Planes

The buildings that appear in Le Corbusier's drawings of future cities follow the principles of modern architecture, which he helped to invent. A defining characteristic of modernity is that the building should not look as if it were built during an earlier historical period, Le Corbusier tried to demonstrate architectural principles that transcend traditional design in his book *Vers une Architecture* of 1923, also translated by Etchells as *Towards a New Architecture* and also first published in English in 1927. A German translation had already appeared in 1926. Le Corbusier exhorted architects to think in terms of mass, surfaces, and planes, and illustrated how these abstract qualities inform designs for such modern constructions as grain elevators and factories, as well as locomotives, automobiles, and ocean liners. While he wasn't saying that buildings should have windows like factories, or that stairs and balconies should have railings like ships, this was the way his gallery of images tended to influence other architects. Le Corbusier was not immune from these influences himself. He also analyzed the proportional systems that informed the design of some famous historical buildings, saying that the proportions could be followed without their original architecture.

Another important design principle of modern architecture is to separate enclosure and support. The demand for bigger and taller buildings in congested nineteenth-century cities, particularly in New York and Chicago, had led to the development of steel and steel-reinforced concrete frames to transcend the limits of traditional construction. The steel "skeleton" permits heights far taller than the tallest masonry cathedrals or church towers, and also can create open interiors, interrupted only by columns. Interior partitions can be placed as needed rather than as required for structural support. The exterior can become a weatherproof skin held in place by the building's supporting frame, which means that windows can be continuous—in contrast to the limited window openings in a wall which is part of the supporting structure for the building. Architects of tall buildings before the 1920s usually hid their new construction techniques behind masonry walls that—while they were really held in place by the frame—looked like traditional masonry. The modernist architect sought to express the new structural freedom, although steel still had to be encased by masonry because it was otherwise vulnerable to fire.

In the margin of *Vers une Architecture* is a sketch (2.6) for what Le Corbusier called a "domino" house, a house or apartment that could be a unit of mass production. Prefabrication follows from the separation of



2.6
Le Corbusier's diagram of the separation of enclosure and support in buildings that have a modern column and floor slab structure. The exterior walls, no longer supporting the building, can become "curtains" of light-weight materials, including large sheets of glass.

enclosure and support. The steel columns and beams come to the building site as component parts that have been manufactured in a steel mill. It was logical to assert that other major building components could be made in factories and delivered to the site as well, although even today prefabrication mostly supplements traditional building rather than replacing it. When the separation of structure and support became modernist doctrine, the design ideas derived from it were also applied to individual houses and other small buildings where the building was not prefabricated and where traditional construction was the most practical alternative, The flat roof follows logically from the separation of enclosure and support, as a frame structure only requires a roof which is similar to the intermediate floors. Only a long-span structure, like an arena or an auditorium, requires a different kind of roof. However, flat or nearly flat roofs are more vulnerable to leaks than a pitched roof which sheds rain and snow. More recently, the separation of enclosure from support has permitted experimental building shapes, created from the enclosing material, with little relation to the much more conventional structure within.

Le Corbusier sometimes added two other elements derived from his ideas about city design to his version of modernist architecture: Omit the ground floor enclosure, so that only the structural supports and the entrance to the building prevent open space from continuing underneath the building, and use the roof to replace the open space lost to the building footprint.

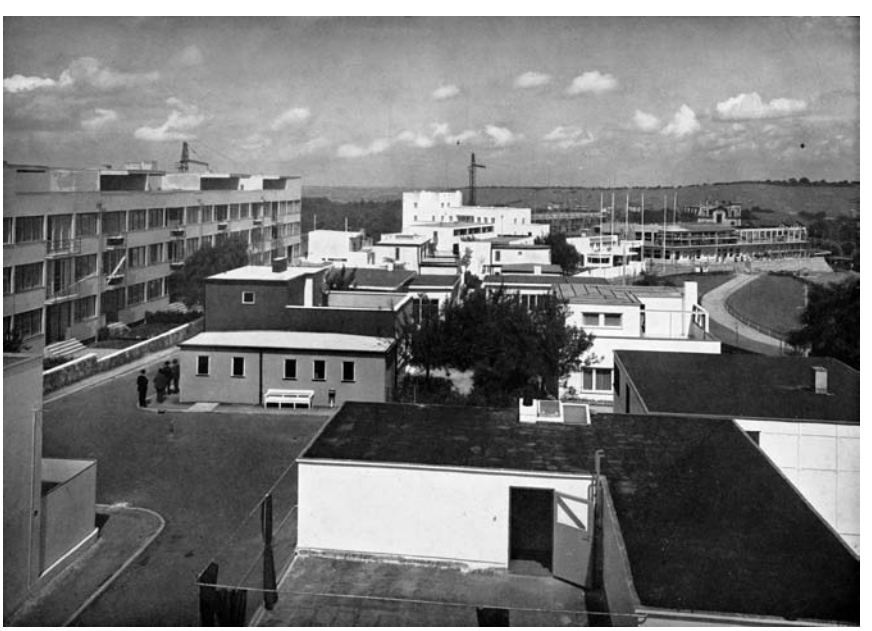
Early Failures of Modernist City Design

Most early modernist buildings were either houses for wealthy patrons or government-sponsored low-income housing. While social housing was built in many European countries after World War I, German government agencies during the 1920s made an exceptional commitment to building subsidized housing for low-income tenants. Most of it was in conventional cottage styles, but some of it was more experimental, employing large windows, flat roofs, and leaving out all historical ornament. The Weissenhof housing project atop a prominent hill in Stuttgart, completed in 1927 as part of a much larger development of pitched-roof, cottage-style housing, was built as a demonstration of modernist architecture and as prototypes ostensibly intended for low-income tenants. Ludwig Mies van der Rohe, one of the important figures in the formulation of modern architecture, was the architect in charge, and mostly got his way in the selection of the other architects. The majority were German; but Mies was able to include such important modernists from other countries as Le Corbusier who lived in Paris but was Swiss, and J. J. P. Oud from the Netherlands. He also left out many well-known German architects, who, in his view, were not modernist enough, as well as the prominent German modernist Erich Mendelsohn, and all the government architects, such as Ernst May, the city architect of Frankfurt, who were actually building housing at the time. Mies assigned the sites and programs to the participating architects,[8] awarding himself the largest building and the most visible location, where he demonstrated the principle of the separation of enclosure and support by providing open-plan apartments that could be subdivided in different ways.

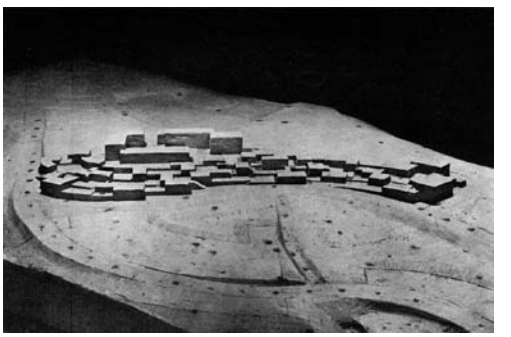
Mies's interest in building was much stronger than his interest in city design. While Weissenhof demonstrated that a group of architects could

work together using a similar set of objective forms with flat roofs, plain wall surfaces, and large areas of glass; it also revealed a lack of any organizing city design principle. Mies's original study model (2.7), which was possibly developed with Hugo Haring, who at the time shared office space with Mies and who was interested in naturalistic and expressionistic forms, shows a vague resemblance to an Italian or Provençal hill town. However, as built, Weissenhof is simply a collection of individual structures on separate building lots along rectangular connecting streets (2.8). Haring had originally been included as an architect but was dropped by Mies after a dispute about control, which may have included the overall plan. Sigfried Giedion excused the result by explaining that the original site design "unfortunately could not be realized for commercial reasons."[9]

During the 1920s, Mies also prepared architectural projects which have become famous for illustrating the design potentials of modern technology, but also reveal the modernist assumption that the existing city could be disregarded, as it soon would be replaced. The photomontage of Mies's project of 1927 for a bank building in Stuttgart shows a simple glass wall that was actually far in advance of the technology that would have been needed to build it (2.9). While the architectural concept may have been inspiring, the montage anticipates the all-too-familiar picture of a modernist building completely unrelated to the existing city context. The stone walls of the building in the foreground belong to the railway station designed by Paul Bonatz, which had just been completed when the photomontage was made. Bonatz was only nine years older than Mies, but the railway station is clearly portrayed as part of a past that can be disregarded. The transparent design by Mies for the Adam Building in the Leipzigerstrasse in Berlin, designed in 1928 (2.10), is also far ahead of the actual building technology of the time, and again totally unconnected to the surrounding city.



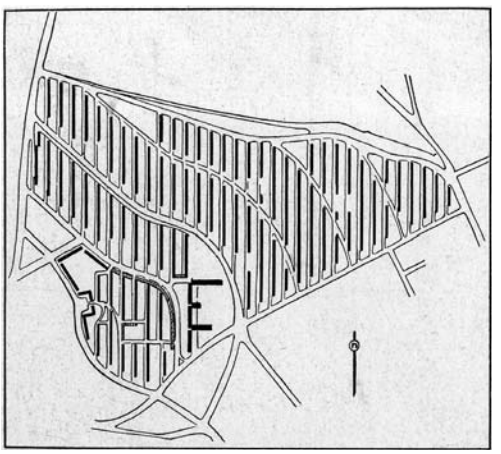
2.8
Weissenhof as built relies for continuity on a shared vocabulary of flat roofs and planar walls, which turned out to be insufficient to create a successful city design.



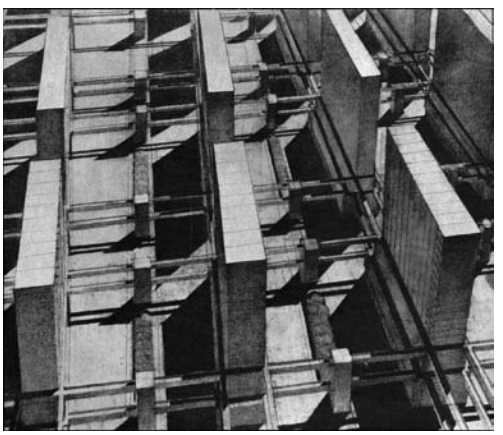
2.7
The original study model for the Weissenhof housing shows a conceptual organization that resembles a Mediterranean hilltop town.

2.9
1927 photomontage by Ludwig Mies van der Rohe, illustrating a proposed bank building in Stuttgart and the now all-too-familiar problem of a new building designed without reference to its existing context.

2.10
This 1928 project by Mies which was far ahead of the building technology of the time, but also totally unconnected to the surrounding city.



2.11
The site plan for Otto Haesler's housing development at Kassel-Rothenberg from 1930–1932 shows the modernist propensity to treat the site as a picture plane and the layout of buildings as an abstract composition.



2.12
Richard Neutra, *Rush City Reformed*, as published in Germany in 1927.

Uniform Orientation as City Design

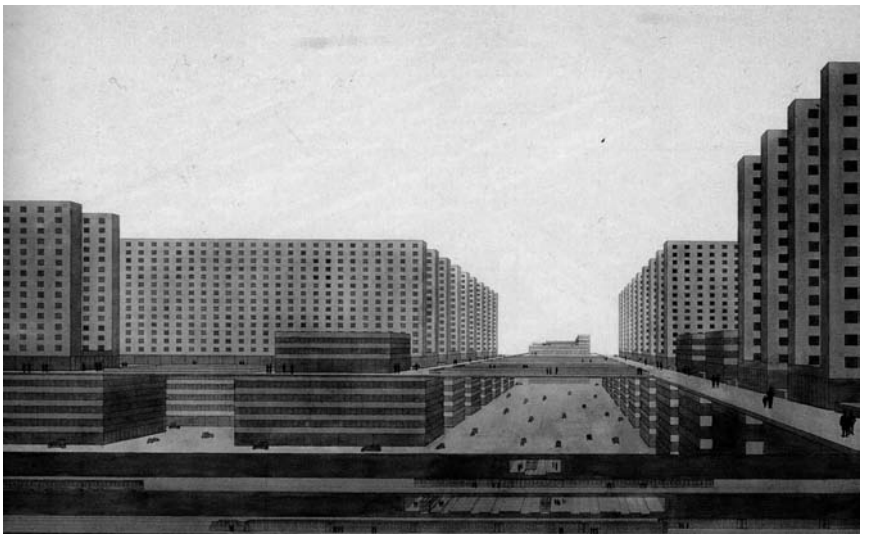
The most significant organizing principle that developed out of the more experimental German housing projects in the 1920s was uniform orientation of buildings in widely spaced parallel rows. This design strategy was a corrective to the dismal courtyard housing where most poor people lived in German cities. Sometimes the parallel rows were placed for optimal orientation of the apartments, but often they were derived from the geometry of the surrounding streets. Modernist ideas about separating pedestrians from traffic and creating widely spaced streets left the placement of the buildings as the dominant feature of city design. Otto Haesler's housing development at Kassel-Rothenberg from 1930–1932 (2.11) takes an objective criterion—optimal orientation—to the point of regimentation. Almost all the walk-up residential buildings face the same way. In keeping with modernist concepts about the separation of people from traffic, all the buildings were originally reached by footpaths. Of course, low-income tenants in 1930 were not expected to own automobiles.

Richard Neutra, an Austrian architect who had worked briefly for Eric Mendelsohn, moved to the United States in 1923 where he worked in a Chicago office, Holabird and Roche, on the construction of actual tall buildings, and then worked for a short time for Frank Lloyd Wright. Neutra then moved to Los Angeles where he designed a famous early-modernist house with a steel frame and large areas of glass for Dr. Philip Lovell, completed in 1929. Neutra also worked on a series of theoretical plans for cities that he called Rush City Reformed. He included fragments of his designs for a city of parallel rows of slab-like buildings with elevated pedestrian walkways and highways for fast-moving cars in his *Wie Baut Amerika?*, which was mostly about American building methods, with much space devoted to construction photos of the Palmer House Hotel in Chicago, which Neutra had worked on for Holabird and Roche. *Wie Baut Amerika?* was published in Germany in 1927 in a relatively large edition for an architectural book, 4400 copies, and it received considerable attention among architects[10] (2.12). It is not clear who influenced who in imagining cities and housing projects of parallel linear buildings, but these ideas were current among the architects who came together in the CIAM. Neutra was invited to the first and second CIAM meetings but did not attend until the third, where his Rush City drawings were on exhibit.

During the 1920s, German architect Ludwig Hilberseimer produced amazingly reductionist architectural projects that looked as if they were drawings of the concrete frames of buildings still under construction. He also applied similar thinking to reducing cities to their essentials, publishing a book about city planning, entitled *Großstadt Architektur*, in 1927 (2.13). Hilberseimer was also interested in parallel rows of buildings as the basis for city design; in 1928, he published a photomontage of parallel buildings applied to the center of Berlin, somewhat in the manner that Le Corbusier had applied his design ideas to the center of Paris.[11]

The Tall Building as Universal Housing

The second CIAM meeting was devoted to the design of the smallest livable housing units and took place in Frankfurt in October 1929 at the invitation



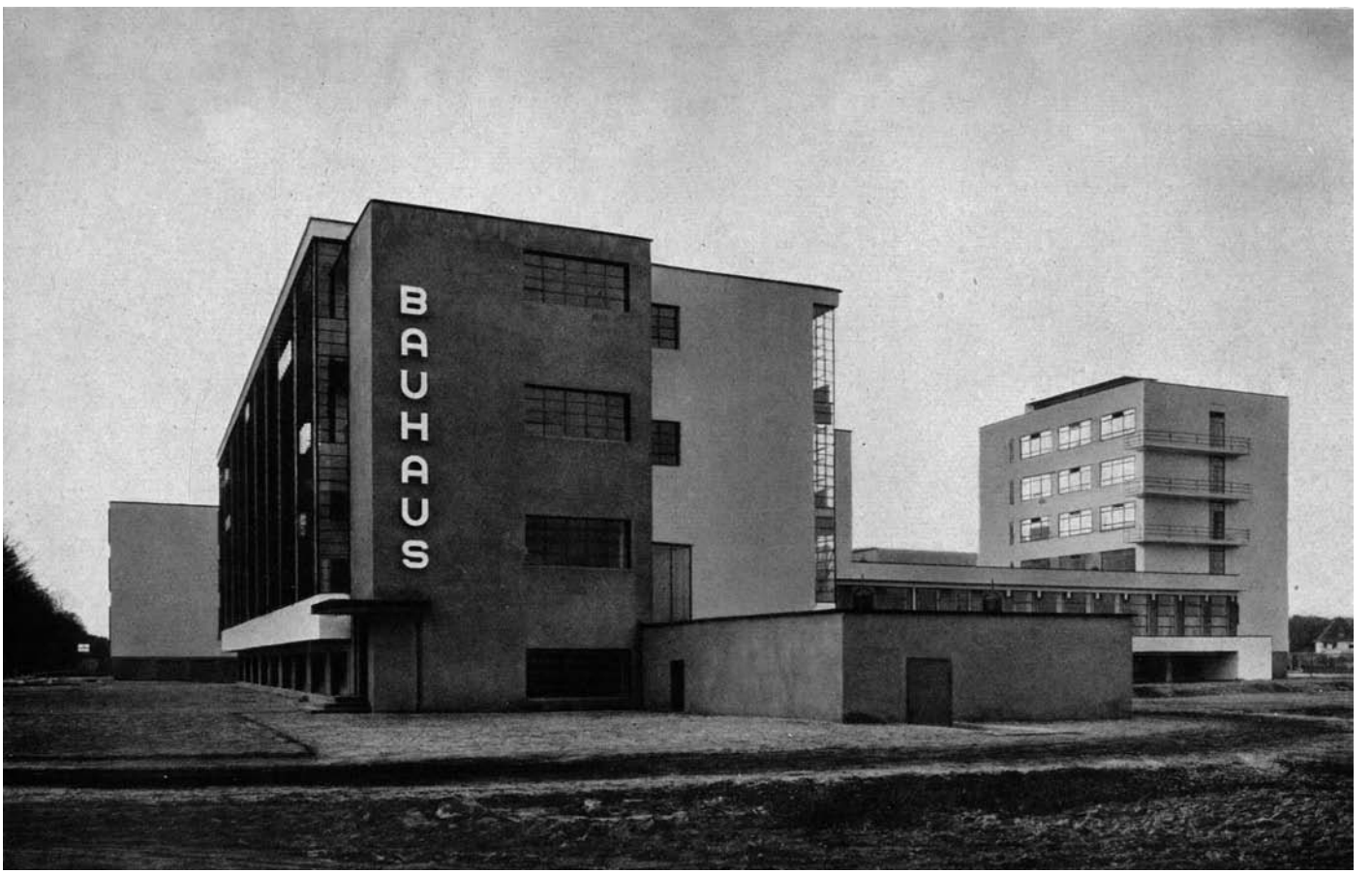
2.13
Ludwig Hilberseimer's proposal for a generic east–west urban street from a book he published in 1927. An impersonal and abstract urban environment is seen as the ideal for a modernist city.

of the city architect, Ernst May, who was in the process of designing and building extensive low-income suburbs for Frankfurt, where simple two- and three-story modernist buildings were organized largely on the Garden City principles. The CIAM meeting happened to start on the same day the New York stock market crashed, beginning the worldwide economic depression that would bring down Germany's Weimar government and open the way to Adolf Hitler's dictatorship. The first day of the conference included a presentation by German architect, Walter Gropius, who was advocating high-rise buildings as housing for all families, including low-income families:

> The large high-rise apartment building will have the biologically important advantages of more sun and light, larger distances between neighboring buildings, and the possibility of providing extensive connected parks and play areas between the blocks … [It is the] building type of the future for large residential populations.[12]

At the time the few existing apartment towers were all designed for people with discretionary income who could afford the cost of the large staff needed to manage such buildings. Le Corbusier's polemical designs for towers were meant to be workplaces like American skyscrapers. The residential buildings in his city designs were mid-rise apartment hotels for the professional class and row houses for workers. None of the many low-income German housing projects developed after World War I had elevators. Ernst May and many others at the conference were strongly opposed to high-rise housing for the poor, but this would ultimately become part of the CIAM legacy, and the cause of many urban problems.

Gropius was a significant managerial figure in the development of modern architecture. He had become known just before World War I when he and Adolph Meyer had designed a factory administration building and an exhibition building, both making use of glass walls suspended from the supporting structure. In 1919, Gropius had become the head of an arts and crafts school in Weimar, renamed the Bauhaus, which he turned into an important center for the development of modern art and industrial design. Gropius moved the school to Dessau in 1925, and the buildings his office



2.14
By Walter Gropius and collaborators, the Bauhaus in Dessau, shown soon after its completion, probably in 1926.

designed for the school were an opportunity to display modernist architectural ideas (2.14), although architecture was not taught at the Bauhaus until 1927 when Gropius brought the Swiss architect Hannes Meyer to Dessau to start an architecture program. At the time of his participation in the second CIAM conference, Gropius had resigned as director of the Bauhaus after disputes with Dessau city officials, had turned over the administration of the Bauhaus to Meyer, and had moved to Berlin. Gropius was to provide crucial support for CIAM activities after he was appointed a professor of architecture at Harvard in 1937, and department chair in 1938. He brought Sigfried Giedion to Harvard in 1938 where Giedion delivered the lectures that became *Space, Time and Architecture*, first published by the Harvard University Press in 1941. Giedion set modern architecture and planning within a CIAM perspective as the culmination of progressive movements in art and technology, and his book was the standard text for many years. It has taken other scholars many more years to separate the partisanship and propaganda in this work from its considerable contributions to the histories of both architectural technology and city planning. Giedion helped elevate Gropius's stature as an architect by downplaying the importance of Gropius's many partners and collaborators. Gropius also let it be understood that he was a refugee from Nazi Germany. In fact, Gropius had worked hard to maintain an architectural practice under the Nazi regime, hoping that modernism would be accepted as the national architecture as it had been in Fascist Italy, but Hitler accepted modernism only for industrial buildings. Even after Gropius moved to England in 1934, he traveled back and forth to Germany several times. He cleared taking the

job at Harvard with Joseph Ministry of Propaganda, explaining that "I … Goebbels's see my mission at Harvard as serving German culture."[13]

Hannes Meyer directed the Bauhaus from Gropius's departure until 1930, shifting its direction from art and industrial design towards architecture and planning. He hired Ludwig Hilberseimer in 1929 to teach city planning. In 1930, Meyer, who was certainly far left in his politics and was probably a member of the Communist Party, was forced out of the Bauhaus by Dessau officials, and he moved to the Soviet Union under the mistaken impression that Stalin would continue to be tolerant of modernism. Ernst May and other left-wing modernist architects also went to the Soviet Union around this time. Ludwig Mies van der Rohe became the director of the Bauhaus and continued until the Dessau City Council was taken over by the Nazis in 1932. Mies tried to keep the Bauhaus going as a private architecture school in Berlin but was soon forced to close by the Nazi regime.[14]

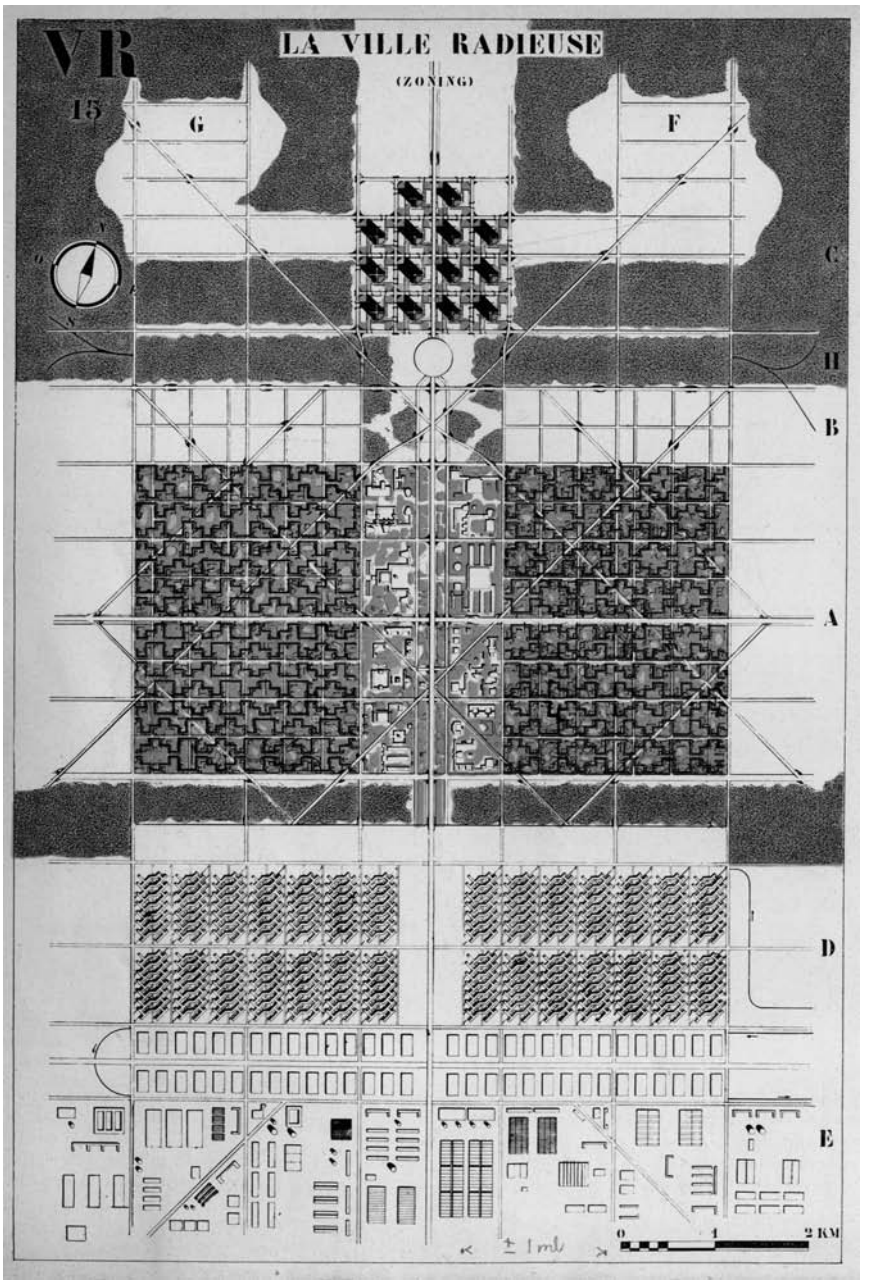
Designing the Modernist City

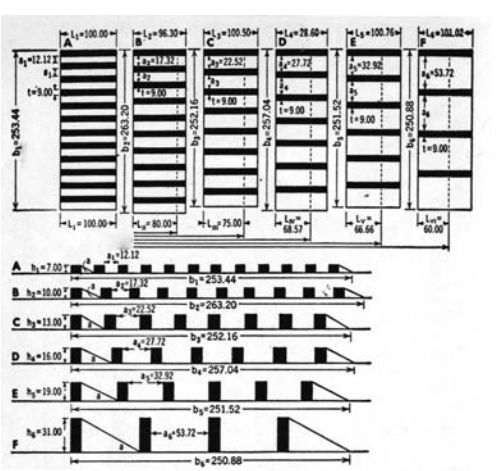
Rationalizing the design of the whole modern city was the subject of the third CIAM conference which took place in Brussels in November, 1930, at the invitation of Victor Bourgeois, designer of La Cité Moderne in Brussels, whose plain buildings and flat roofs may well have made it the first overtly modernist housing district, when it was completed in 1922.

Le Corbusier's designs for *La Ville Radieuse* were displayed and presented at this conference. In 1929, he had made a lecture tour of South America and had sketched plans for transforming Rio de Janeiro, São Paulo, Montevideo, and Buenos Aires. Earlier in 1930, he had also made a trip to Moscow, had seen the plans submitted in a competition for a decentralized garden city, and, at the request of the competition organizers, had made comments on them. His ideas about cities had continued to evolve from his initial Ville Contemporaine of 1922, a symmetrical city with tall office buildings in the center, surrounded by residential districts and then a greenbelt, with the houses of workers and industry located outside the greenbelt and beyond the drawing. In *La Ville Radieuse*, the cross-shaped office towers are clustered at the top of the drawing rather like the head of a human figure. There is a central park-like spine filled with public buildings, with residential districts for all social classes on either side. The workers now live in the central city, not out beyond the greenbelt. Instead parks are used to separate each component of the city. Industrial buildings form the legs and feet. Analogies with the human figure are explicitly made by Le Corbusier when he published his designs for *La Ville Radieuse*, in 1935 (2.15).

The proceedings also included another presentation by Walter Gropius advocating tall buildings for housing, as opposed to contemporary German standards for housing, which favored individual houses, and limited most apartments to three stories, with no more than four in the largest cities. The diagrams he presented (2.16) document his thesis that high-rise buildings provide more access to sunlight and air and can "deconcentrate" the city without "dissolving" it, which, he observes, is the result of relying on individual houses. The walk-up apartment offers "neither the advantages of the house nor those of high-rise apartments." This argument, a direct challenge to the achievements of German three- and four-story social housing during the Weimar Republic, would eventually be widely accepted,

2.15
Le Corbusier reformulated his plan for an ideal city in his *La Ville Radieuse*, published in 1935. He compared this diagram to a human figure, with office buildings for a head, a residential body, and industrial legs and feet.





2.16
Diagrams by Walter Gropius illustrating the advantages of tall residential buildings. Making light and air a dominant criterion for city design continues to be influential, particularly in China, Korea, and Japan.

as seen in the building regulations mandating exposure to sunlight in force in many cities today, particularly in Asia. Gropius's advocacy was based entirely on the physical advantages of living in towers, without any analysis of the social and managerial needs created by high-rise living.[15] Gropius was writing at a time when the household shopping for people of his social class was done by servants. Perhaps this is why it did not occur to him that when you walked out of a building, you needed more than open space for a pleasant stroll or access from your garage to the highway. Interestingly, he saw no reason to revise this presentation when it was republished in 1956.

The modernist city with its streets designed for fast traffic and open spaces planned as large parks was intended for people who toil long hours, six days a week, in factories or offices, with the other day left free for a big

meal, and a family stroll in the green spaces the planners would provide. City dwellers are assumed to have little discretionary time or income for shopping and entertainment, only the most basic education, few cultural interests, and not much energy left over for sports. Nor do you see any provision for religion in modernist city designs. The architects and planners who devised the modernist city understood that they themselves would continue to have dinner parties in their private houses or spacious apartments, would patronize restaurants, shops, and department stores, and spend evenings at movies, plays, and concerts. They would travel on vacation and spend their weekends at country houses. It just did not occur to them to plan for many other people to enjoy this way of life.

Modern Architecture, but Not City Design, Displayed in the United States

Modern architecture received its first important promotion in the United States in 1932: the *Modern Architecture International Exhibition* at the newly formed Museum of Modern Art. The curators were Henry-Russell Hitchcock, who was then 29, and Philip Johnson, who was 25, working for the first director, Alfred Barr, who was only 30 himself. Hitchcock had already published a book, *Modern Architecture: Romanticism and Reintegration*, in which he argued that modernist buildings by Le Corbusier, Mies, and J. J. P. Oud represented the reintegration of architecture into a coherent relationship between design and construction, following a confused period of romanticism marked by the decoration of buildings with ornament derived from earlier historical periods. Philip Johnson met Alfred Barr, who had been teaching at Wellesley College, when Johnson attended his sister's graduation ceremony. Barr persuaded Johnson to make a tour of modern European architecture, including the Weissenhof housing, during the summer of 1929, before he had finished his undergraduate degree at Harvard. The next winter Barr introduced Johnson to Hitchcock, and the two of them made a tour of new European architecture in the summer of 1930, which led to the book that was to become *The International Style*. Over the next winter, the idea of an exhibition of modern architecture took shape and Hitchcock and Johnson went back to gather more information and meet with architects during the summer of 1931.[16]

The Modern Museum Promotes Modernism as a Style without Reference to City Design

Somehow Hitchcock and Johnson, despite their enthusiasm for modernist architecture, managed to miss the origins of modernist city design, which was almost entirely left out of their exhibition and book.

The first CIAM meeting in 1928 had been mostly about organization, and the second and third meetings were not until the fall in 1929 and 1930. Hitchcock, an architectural historian, was more interested in built examples that he could classify, and, as a believer in the theory of style, may well have thought that architectural coherence would by itself solve the problems of city design. Johnson was easily bored and discussions about the optimal

spacing of buildings and the best block sizes to accommodate traffic would have had little interest for him.

Instead of introducing modern architecture as a means of creating modern cities, Hitchcock and Johnson concentrated on Hitchcock's thesis that these new buildings represented the redemption of architecture from a long period of stylistic promiscuity. In the Introduction to their book, *The International Style*, published by the Museum of Modern Art to accompany the exhibition. Alfred Barr wrote that the authors "have proven beyond any reasonable doubt, I believe, that there exists today a modern style as original, as consistent, as logical and as widely distributed as any in the past."[17]

Hitchcock and Johnson themselves said in their opening chapter: "The idea of style, which began to degenerate when the revivals destroyed the disciplines of the Baroque, has become real and fertile again. Today a single new style has come into existence."[18]

The members of the Congrès Internationaux d'Architecture Moderne, if asked, would have preferred a title like *International Architecture*, which Gropius had already used for one of his books, or *Modern Architecture*, a title used by Bruno Taut for a book he published in England in 1929. Hitchcock and Johnson did not include any buildings by Bruno Taut, a modernist architect with significant completed buildings in Germany, perhaps because he had already published a comprehensive book on their subject three years earlier. Taut writes about a new architectural movement which he illustrates with buildings that have become familiar in subsequent histories of modern architecture. However, for Taut, the guiding principles of modern architecture are efficiency, utility, and integration of construction with design; he dismisses style as inherently superficial.

The predictions of singularity and universality that would justify the use of the word "style" were never likely to be fulfilled. Even to make the prediction in 1932, the exhibition had to leave out almost all the modernist work that was being built at the time in Russia, much of the work of prominent German modernists Hans Scharoun and Erich Mendelsohn, and omit the anti-geometric theories of Hugo Haring. Frank Lloyd Wright was given a prominent position in the exhibition, but, to his justified annoyance, Wright was treated as the spiritual ancestor of the new modern style, rather than as a practitioner actively pursuing a different type of design.

The architects who were presented in both the exhibition and the book as leaders of the new style were already going in different directions by 1932. The curving fieldstone wall of a student hostel in Paris that was shown in the exhibition was a clue that Le Corbusier was starting down the road that would lead to his expressive chapel of Notre Dame du Haut at Ronchamp; J. J. P. Oud was to design buildings that we would now call Art Deco; Mies was increasingly influenced by the organizing principles of traditional, monumental architecture, as seen in the Seagram Building (designed, as it turned out, in collaboration with Philip Johnson). By the 1950s, the firm headed by Walter Gropius was using neo-Islamic architectural forms and ornament in proposals for the University of Baghdad.

The exhibition and its catalogue were more inclusive than the book. The initial section of the catalogue is given to Frank Lloyd Wright and is equal to the sections given to Gropius, Le Corbusier, Oud, and Mies, and there are also comparable presentations for four additional American firms: Raymond Hood, Howe & Lescaze, Richard Neutra, and a young Chicago firm, the Bowman Brothers, scouted by Johnson to add more American architects to