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A THEORY OF ARCHITECTURE

Chapter 9.

GEOMETRICAL FUNDAMENTALISM
(WITH MICHAEL W. MEHAFFY)

"Geometrical fundamentalism" aims to impose simple geometrical solids such as cubes, pyramids, and rectangular slabs on the built environment. This defines a characteristic of twentieth-century architecture and planning. The more complex connective geometry found in pre-twentieth-century architecture and in the architecture of traditional cultures is replaced. Geometrical fundamentalism may be in part responsible for the resentment the rest of the world feels against the industrialized western nations, because it replaces traditional buildings and cities with structures that are perceived as inhuman. A philosophy about geometrical shapes thus has an enormous socio-economic impact, by generating forces against globalization. The modernist movement promised a radical new utopian society based on a fundamentalist belief in pure abstractions. The extremely influential twentieth-century architect and urbanist Le Corbusier was entranced by the reductionist machine geometry of his time, and imposed it upon buildings and cities around the world. This misapplication of elementary abstractions constitutes a gross cognitive error, and fails to create satisfying human environments — the core purpose of architecture and the building arts. It parallels other totalitarian abstractions of the twentieth century, and this point will be discussed here. P 172

Chapter 10.

DARWINIAN PROCESSES AND MEMES IN ARCHITECTURE: A MEMETIC THEORY OF MODERNISM (WITH TERRY M. MIKITEN)

The process of design in architecture parallels generative processes in biology and the natural sciences. This Chapter examines how the ideas of Darwinian selection might apply to architecture. Design selects from among randomly-generated options in the mind of the architect. Multiple stages of selection generate a design that reflects the set of selection criteria used. The goal of traditional architecture is to adapt a design to human physical and psychological needs. At the same time, however, any particular style of architecture (adaptive or not) constitutes a group of visual memes that are copied for as long as that style remains in favor. Darwinian selection also explains why non-adaptive minimalist forms have been so successful at proliferating. The reason is because they act like simple biological entities such as viruses, which replicate much faster than do more complex life forms. Simple visual memes thus parasitize the ordered complexity of the built environment. P 195

Chapter Nine

GEOMETRICAL FUNDAMENTALISM.

By Michael W. Mehaffy and Nikos A. Salingaros

1. INTRODUCTION.

Twentieth-century architecture and planning professionals have adopted a design philosophy about geometrical shapes that can be viewed as dogmatic. Post-industrial designers purposely applied geometrical abstractions to the built environment, which have effectively erased the design and building traditions of the past, and with them the vital web of urban culture in society. Introducing such abstractions at the beginning of the twentieth century had catastrophic consequences for our cities' urban fabrics, and for the human qualities of individual buildings. By identifying the mathematical core of those beliefs, it is possible to understand the full extent of the damage done, and lay the groundwork for a richer architecture of the future.

Geometrical fundamentalism is defined as the misappropriation of geometrically simple forms as an essential typology for the built environment. It influences not just the large scale (as for example the urban plan and overall building volumes), but determines the details of our everyday environment to an incredible degree. Huge skyscrapers, irrespective of their form, are expressions of *geometrical fundamentalism* because of their inhuman scale. This is most problematic because it usually eliminates the smallest scales.

We argue that the order and beauty attached to geometrical oversimplification is of an artificial and isolating nature, and generates a form of environmental alienation for our communities. Everyday people intuitively perceive contemporary architecture and urbanism to be disconnected from and opposed to traditional human values that they hold sacred. In the Industrialized World, inner-city degradation provided an opportunity to replace traditional urban fabric with abstract geometric (i.e. modernist) blocks. The reaction to despoiling the urban fabric leads to introversion, asocial lifestyles, and further retreat to the suburbs. In the Developing World, it leads to a seething resentment (whose root cause is not necessarily recognized) against the countries that are seen as champions of this destructive process, and which may be perceived as an assault by the industrialized nations against traditional cultures.

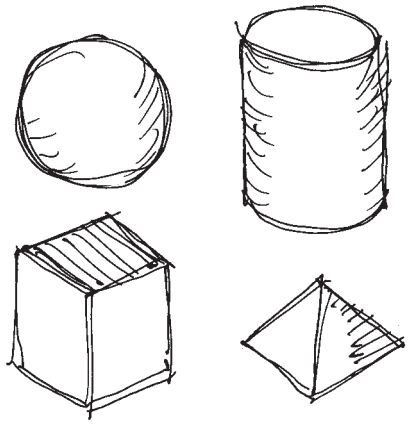


Figure (9.1)
Elementary solids are neither sculptural nor architectural models.

The simplest volumes are the sphere, cylinder, cone, pyramid, cube, while the rectangular slab or square column is preferred for skyscrapers (see Figure 9.1). One often hears such structures described as "sculptural", but that is misleading. Turn-of-the-century designers, in their pursuit of a "machine-age" form, copied sleek, smooth machines, which were themselves an expression of a sleek, smooth aesthetic popular in some art circles of that time. This in turn influenced more industrial forms, which then fed back into architectural design, and so on. A self-referential feedback between industrial design, architecture, and art ties the "machine aesthetic" of the 1920s to modernist forms. This has little to do with sculpture as a source of positive, human emotions, applying only to those sculptures that already satisfy this aesthetic. Buildings that mimic simple solids can be considered as "sculpture" only within the narrow aesthetic that they themselves define.

Moreover, sculptures are fine art structures that are created to engage a viewer. This conception of viewed or "apprehended" form is only one aspect of architecture, but it is an aspect that has come to have a stranglehold on the creation of buildings. Largely lost in the aesthetization of utilitarian ideas is the primacy of architecture as a vessel of life, accommodating the needs of human beings to connect with one another and with nature in a complex pattern. Philosophers and psychologists point out that our experience of the built environment depends upon interacting with deeper aspects of life than conscious experience alone. Yet architecture in our time is reduced to a kind of giant minimalist sculpture in which human beings must unwittingly live.

Surface quality makes a profound impact in the way people perceive and interact with buildings and the urban environment. A fascination with smooth and sleek geometries cuts us off from our surroundings by making it impossible for us to connect to them with our senses. Meaning is removed from the built environment by eliminating information encoded in surface design, which historically served to connect an individual to a structure through mental associations. One of the principal means by which human beings relate to their world is undone (see Figure 9.2).

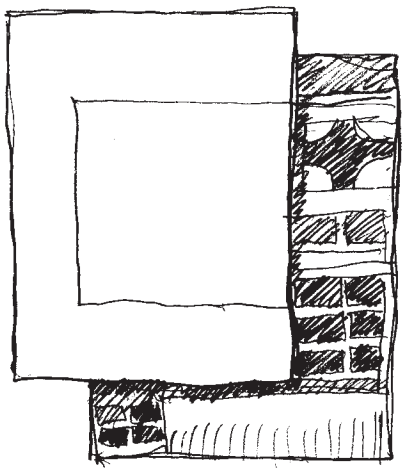


Figure (9.2)
Empty abstractions replace complex structure.

2. RELIGIOUS COMPETITION.

Such practices present an affront to many religions, by denying their architectural expression (not only on religious buildings, but by denying organized complexity from the entire built environment). They oppose the basic principle of connecting an individual to the universe — hence to God — through color, design, sculpture, and calligraphy. *Geometrical fundamentalism* denies sensory connections. With its insistence on homogeneous surfaces showing minimal information, it questions the continued validity of architectural masterpieces that are also powerful symbols of faith. For example, temples, mosques, and churches conveying meaning via polychrome sculptures, tile work, reliefs, frescoes, and mosaics are all rejected. In Le Corbusier's words: "Decoration is of a sensorial and elementary order, as is color, and is suited to simple races, peasants and savages" (Le Corbusier, 1927: page 143). He appears not to know that the buildings on the Athenian Acropolis, which he professed to admire so much, were originally painted with bright contrasting colors.

Geometrical fundamentalism also forbids the word of God (and God's name) from being used in an architectural setting. Classical Islamic calligraphy constitutes a major art form that has always played a central role in architecture. Arabic script, with rich variation in each stroke, lends itself even more than Latin or Greek letters to visual connectivity using internal scaling. The informational meaning of ornamental Islamic calligraphy on architectural surfaces escapes most non-Muslims. People who understand the language and respect its content connect instantly with a building through the message of the text, which establishes a deeply emotional link to an individual. Those who cannot read the script can only imagine the powerful meaning it endows on a built structure. All of us can observe the incredible degree to which the calligraphy achieves meaning just in design terms. This is also true for Chinese and Japanese calligraphy.

As *geometrical fundamentalism* competes head-on with religious expression through built structures and the informational content of surfaces, it qualifies as a substitute religious movement on those terms alone. It certainly possesses its own moral precepts, admitting freely that Brutalism (the use of raw concrete surfaces) is founded on *ethical* rather than aesthetic concepts. Its dogma insists that "honest" architecture should not hide its structure: architectural "honesty", however, is never defined, nor are any reasons given for why Brutalism has any value. Instead, we are offered arguments only in terms of other parts of the dogma. Even those of the early modernists who were sincere in their attempts to better society through a new architecture didn't notice the negative consequences.

Traditional cultures have a far stronger religious sense than the industrialized western nations do today, and they are frightened by the idolatry implicit in *geometrical fundamentalism*. Contemporary architects worship their geometrical abstractions, and are ready to defend them with their professional lives (in their attempts to share their vision, they impose these ideals on those buildings' occupants). Although this topic is hardly ever discussed, architects' near-fanatical support of geometrical abstractions represents a belief in something far beyond architectural style. Non-architects might think that this is simply a question of efficient building methods, the pressures of the new economy, or the manifestation of new tastes

in a global population; the truth is closer to a competition for survival among basic beliefs (see Figure 9.3). Religion is expressed in the form of the built environment through organized complexity, but *geometrical fundamentalism* does not allow any expression other than its own.

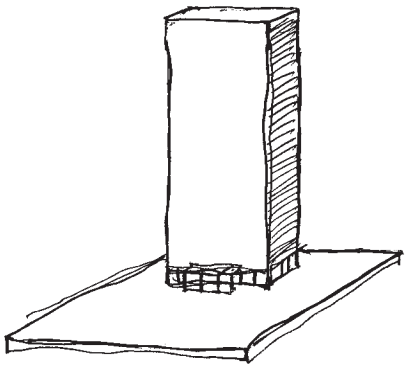
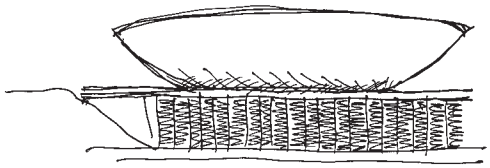


Figure (9.3)
More a symbol for cult worship than anything else.

The British architectural historian James M. Richards betrays the religious aspirations of the early modernists through his choice of words: "The gospel the Nazis had tried to suppress now had prophets on both sides of the Atlantic, and the United States suddenly became a place of remarkable architectural energy." (Norwich, 1987: page 233). In unjustly criticizing postwar Italian architects, he juxtaposes the social concern that all religions (genuine or phony) rely upon for their appeal, with an intolerance for apostasy that characterizes fanatical cults and the worst eras of organized religion: "Then, as in recent times, however, Italian architecture suffered, when compared with that in other European countries, from Italy's failure to give building programs much relationship to social priorities. There was also a tendency towards willful departures from orthodoxy." (Norwich, 1987: page 242).

Many architects believe that a simplified geometric form has the power to improve the population's social and moral well-being. They believe this precept so deeply that they will tolerate no questioning of it. Architectural students are often not taught to explore the hypotheses at the basis of any design theory. Nor can they test their hypotheses about the world and design on the real scale. A simple set of beliefs, founded in media-driven architectural authority, drives design. Since the final user's reactions cannot even be anticipated, they consequently assume only minor importance in contemporary design. Based upon strict geometrical dictates, this methodology is akin to religious fiction, whose criterion is its own existential validity. A fiction is an invented principle that is justified solely by its effects. Society is held together by such fictions, which try to counter the human realities of selfishness, greed, violence, etc. It is a mistake, however, to think that geometry — and, in particular, a geometry of disconnectedness — could provide this cohesion (see Figure 9.4).

Figure (9.4)
Another architectural totem for worshipping the geometrical cult.



One indication of how close *geometrical fundamentalism* is to religious fundamentalism is how it reacts to its observed mistakes. Perpetrators of *geometrical fundamentalism* cannot avoid seeing the disastrous effects that its imposition has on human society, in the way people are alienated from the built environment and are cut off from their traditions. Nevertheless, the programmed reaction is for architects to lament that: "we have not been pure enough; our architectural failures come about because we strayed from the true path". Indoctrination has implanted the only possible direction in thought as always towards the core fundamentalist belief of pure geometrical forms and surfaces.

3. ASSAULT ON TRADITIONAL CULTURES.

The western industrial nations held out to the world a postwar vision of modernity, combining industrial prosperity with a supposedly rational utopia of art and science. In some cases, their influence was so strong as to force modernity onto more traditional cultures, destroying the traditions of centuries. We now know that this vision of modernity was deeply flawed. As a result, we have to deal with an emotional backlash around the world. Though the reaction is a valid one, it often becomes a misguided retreat into various forms of fundamentalism and tribalism. It remains for us to rescue and renew the most precious accomplishments of our civilization: the spirit of pluralism and democracy, and the open and self-correcting institutions of science and learning.

Geometrical fundamentalism is perceived as destructive by many humanist architects and urbanists. No amount of theorizing by architectural gurus can camouflage its implications. The USA, Europe, and Japan identified with the *Bauhaus* style after the Second World War, as did so many other countries wishing to project a "progressive" image to the rest of the world. Their idea of progress was to mimic the sleek and smooth forms of "Tomorrowland" from Disney World. Russia chose its own models of a vastly overscaled and dehumanizing architecture. People in the industrialized world who realized that their heritage was being destroyed were placated by the (erroneous) justification that they were paying the price for technological progress and economic prosperity. The only exception is our youth — before they are numbed by their environment. People in the developing world, however, do not accept the official propaganda: they see themselves losing their age-old attachments without getting any benefits.

Just as religious fundamentalism is perceived by the West as a threat to our democratic way of government, open society, and the respect for human rights, so *geometrical fundamentalism* is perceived by the developing world as a threat to traditional civilization. Ordinary persons the world over don't see *geometrical fundamentalism* as an abstract philosophical idea — an intellectual game played among

academic architects and the media — but interpret it according to its direct consequences on their society. People perceive it as being synonymous with enormous economic and military power, so that contemporary architecture and planning is seen as a mechanized assault on the fabric of their cities, their network of human connections, and the tightly-knit social network defining their way of life.

Corporate America — and its extension into the global business-industrial complex — has identified itself with *geometrical fundamentalism*. We do not intend to critique economic globalization, but to focus instead on the perceived effects of tying global business to a philosophy of intolerance towards more traditional forms. People around the world have seen their architectural and socio-urban traditions classified as abstractions (i.e., non-essential practices), then dismissed as primitive, backward, unmodern, and as impediments to progress. Many of those who welcome progress are thus turned against their own civilization, whereas others learn to hate the countries which promote this philosophy. The assault is not only directed on the urban fabric and built surroundings, but more alarmingly, on the fabric of culture itself.

Ways of thought that evolved along with humanity, inseparable from the network of socio-urban interactions defining a particular culture, are erased by *geometrical fundamentalism*. This is painfully obvious in the wholescale destruction of traditional housing patterns as "urban renewal". Residents of the developing world are severed from their cultural roots and forced into high-rise buildings. At the same time, their governments are seduced into building (and paying for) the latest architectural extravaganza — often but not always belonging to *geometrical fundamentalism* — in order to "catch up" with the industrialized nations. People see alien forms imposed on their cities, often to replace beloved architectural landmarks. Building without regard has desecrated sites of incalculable cultural and archaeological value. Western education has succeeded in turning a country's governing and architectural elite against its native artistic and architectural traditions.

Architecture today has lost a sense of accountability. The completion of a megalomaniac highly-publicized contemporary building in the developing world is celebrated as a victory by architectural academics. It is featured in the glossy architectural magazines, where erudite commentators heap praise upon its architect (often a Westerner). The "star architects" gloat after placing yet another symbol of their omnipotence into the world. The other side is far darker: for many, it represents a call to arms against a symbolic invasion of traditional culture. Groups of sensitive persons most likely resent this affront to their sensibilities, and prepare themselves to fight against even worse things to come. Architects, complacent in their dream world, simply have no conception of the consequences of their actions on others whose values and beliefs are culturally situated. They fail to see a Western expression of dominance encoded in contemporary architectural forms, and would not even consider the reality of this effect.

4. GEOMETRICAL SIMPLIFICATION VERSUS CONNECTIVITY.

Science can throw a bright spotlight on what is going on, providing some critical insights that will help to hasten the inevitable crisis of the current paradigm, and point the way to a new and more advanced one. The crisis is certainly well under way, as cultures around the world instinctively recoil from modernism in all its forms. Not understanding how to effectively counter the dehumanizing nature of *geometrical fundamentalism*, people turn to reactions which are focused in many different, random directions. Fortunately, there is a rich alternative to this, combining the best of science with the best of traditional art. We have no choice but to build a new kind of society — a society that is postmodern, yes, but one that articulates new "connectivist" principles, combining the wisdom of history and of traditional cultures with the latest insights of science and mathematics.

The central idea of connectivity — which opposes geometrical oversimplification — is a defining trait of good structure and good architecture. This ties in to the idea of a network, a connective structure that is the antithesis of simple abstractions. Connectivity is the result of new geometrical insights into fractal structure, iterative processes, emergent properties, etc. Natural and biological structures arise from the complex interaction of many elements on different scales (both smaller and larger). Organisms, the unselfconscious creations of human beings, and our past's greatest architectural achievements are all fractal, complex, and internally connected to an incredible degree (see Chapters 5 and 6 in this book).

Such structures exhibit many of the connective properties of natural structure that have only recently been described by mathematical analysis. These include: the iterative generation of complex form using simple rule-based processes and patterns, the fractal repetition of forms and textures at distinct yet related scales, the varied adaptation of many elements to a complex biological pattern, the emergence of an overall pattern of coherence, and beauty from relatively autonomous elements operating in simple and direct response to their environment.

Look at the geometry of a building or a city analytically, as pure mathematical structure. The connective relationships, the possible number of pathways between units and to the public realm define the "life" in the built structure. Living environments — those we experience with our senses and on a deeply emotional level to "be alive", and in which we ourselves feel more "alive" — exhibit the classic structural characteristics of a network (Salingaros, 2005). Surfaces connect directly to the user, and to each other via innumerable mathematical symmetries and similarities. Buildings are physically connected in the visual sense through an iterative process that produces intense variety with a remarkably limited palette of materials and forms. The entire structure is richly connective on many levels of scale.

The difference with what we build nowadays is striking. Images tend to be generated by a grand abstraction imposed on the site — the ultimate act of *geometrical fundamentalism*. Each building's exterior geometry is similarly stiff and absolute — conforming rigidly to relatively simple concepts of line, grid, and plane. The con-

nective relationships are again severely constrained by the simple, fundamental (and quite alien) geometries that are imposed, left over from early modernism. The driving assumption of the twentieth century was its belief that geometrically simplistic structure is actually more sophisticated and "modern" than anything built previously. We now know that the converse is true. Technological prodigy is not to be confused with cultural advancement. It remains for us to use these insights to create (or recreate for our own time) a more connective architecture.

5. ARCHITECTURE FOR THE NEW MILLENNIUM.

The death of modernism has been loudly proclaimed by many leading architects and urbanists in recent years. Yet today most of the "star architects" do not seem to have progressed beyond early twentieth-century primitivism, even in their supposedly avant-garde fashions. While they claim to eschew simplicity by dabbling in complexity theory, they are still playing the same disconnected abstract sculptural game, using only a superficial and flawed understanding of complexity. In the end, this process doesn't concern itself with human life. It is a game that uses the egos of developers and the fashion whims of the public as so much art supply. The new designers still live by geometrical disconnectedness. There is no real concern for nourishing human sensory experience, for making connections to daily life, for any kind of profound daily interactions of users in these places. If there were, it would of course be revealed in an appropriate complexity in the geometry.

Why, then, do so many architects still have such a powerful affection for the antiquated principles and aesthetics of emptiness? Why do they perceive geometrically lifeless buildings as beautiful? We suggest an explanation from cognitive science. The order sought by architects is determined by images in their own minds, and has nothing to do with mathematical symmetries of real, complex, connected places. Such internal references can be quite compelling and beautiful — in the abstract realm. Designers manipulate geometries in their own minds, and become quite taken by them. Since mental images are de-contextualized, designers don't have to deal with the multiple effects that actually influence the human experience of forms. When such images are executed in reality, the designers still see only the simple, pure mental forms. The rest of us see something else altogether: a natural context that has been imposed upon, often severed and damaged.

The heavy dominance of primitive geometries in design is a product of what the philosopher Alfred North Whitehead called "the fallacy of misplaced concreteness". These include not only such simple abstract shapes as straight lines, grids, boxes, cones, pyramids and cylinders, but also an underlying geometry that depends upon its elements existing in isolation. The history of twentieth-century mathematics and science, by contrast, is a series of revelations that the structure of nature is characterized by patterns of network, overlapping connections, complex interaction of many elements, and fractal repetition at many levels of scale.

Geometrical fundamentalism is a philosophy operating under the firm belief that the ideas themselves are total and complete. This is a seductive thought. We may think that our ideas are quite perfect as long as they are inside our own minds; but

they utterly fail the test of what makes a good human environment. Once built, they sever delicate relationships, destroying the vitality of place. And yet, many have come to believe that purity is all that matters. There is no place for adaptation, no linking of scales. Architects lost the distinction between an abstract idea and physical structure. They believed that the idea *is* the thing, and the thing *is* the idea. This is the essence of what might best be described as modernist conceit — the ignorance of organized complexity, coming from the dangerous idolatry of abstractions — which survives in all subsequent architectural trends that are derived from modernism.

The legacy of *geometrical fundamentalism* is part of a broader legacy, a historic trend toward greater levels of abstract manipulation, manifesting itself variously as disconnected economic process, meaningless fashion, and the increasing superficiality and "dumbing down" of culture. As Whitehead said: "Mankind is distinguished from animal life by its use of abstractions ... The degeneracy of Mankind is distinguished from its uprise by the dominance of chill abstractions, divorced from aesthetic content." Or, we would add for emphasis — divorced from natural aesthetic content, and increasingly bewitched by the detached aesthetic qualities of the abstractions themselves. The task of bringing to an end a fundamental misuse of geometry must take place within the broader framework of ending an era of mistaken design philosophy.

6. ABSTRACTION AND THE LOSS OF THE SMALLER SCALES.

A complex hierarchical system is composed of components and processes occurring on many different scales. All of the scales interact to create a whole from interdependent parts. From the theory of complex systems, all the higher scales are dependent upon the lower scales. Hierarchical coherence is the result of connecting different scales to create a complex system (see Chapters 3 and 7). As with pathologies in a biological system, all the higher scales in the hierarchy depend on the smallest scales working well. A microbe kills a plant or animal by attacking its cells, which are the smaller scales of the organism. Using *geometrical fundamentalism* to remove connectivity on the smaller scales in the environment works in a similarly destructive manner (see Figure 9.5). This guarantees that we will never connect to this type of built environment, regardless of what the larger scale looks like.

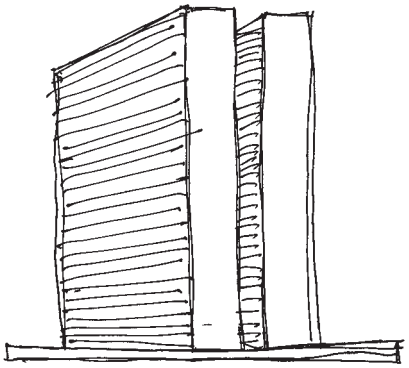


Figure (9.5)
Geometrical fundamentalism erases the human scales.

In opposing complex systems, *geometrical fundamentalism* loses the hierarchy of interconnected scales, eliminating all but the largest scale. Abstractions focus on a single scale — usually the largest one — and eliminate from consideration all the other scales that would normally cooperate to create a complex interacting system. This is the danger of reductive abstractions: the loss of system coherence through a failure to understand that living systems cannot exist on one level alone. This mathematical result invalidates assertions to the contrary, and contradicts practices implemented by disciplines such as architecture and urbanism.

In a social system, geometrical oversimplification focuses on a group of people as a (non-interacting) unit, ignoring their differences, needs, and uniqueness. It eliminates the individual from consideration, which we will explain later is an extremely dangerous form of abstraction. In an architectural system, the same mathematical error eliminates the smaller scales of structure, and concentrates only on the largest scale. Abstraction of this type is driven by a need for "purity" of structure, which leads to oversimplification and destroys a complex system, whether it is a society, a building, or a living city.

The negative consequences of "urban renewal" programs have been well-documented. At the height of modernist dominance in the post-World-War-II years, it was standard practice to bulldoze poor neighborhoods and to build a concrete utopia of high-rise apartment blocks on the site. An alternative was to move the poor people far away and use the vacated land for more commercially lucrative ends. This process presupposes a series of abstractions. The first is that people are a "class" whose dwellings can be destroyed without any consideration, and who can be relocated, again as a "class", to another location chosen by the planner. In order to do this without pangs of conscience, the class of people must be treated as an abstract set — individual human beings cease to exist in this abstraction; people become a class and thus lose their identity. Nothing has changed today.

How can we justify forcing a class of people into a high-rise tower? Because *it is good for them*, according to architectural beliefs (i.e., residents would benefit from the geometric idea we impose on them). Never mind that environmental psychologists have discredited this assumption with extensive experimental data. This urban typology reflects the use of another abstraction (buildings) to justify the uprooting and displacement of the first abstraction (people). Planners considered high-rise buildings as ideal residences or workplaces for people who can be treated as abstract classes: the poor and the blue-collar working class should inhabit towers of apartments, while the middle and upper classes should work in towers of offices. Despite the usual justification of economic efficiency, this flawed idea follows simple geometrical abstractions that ignore the principles of urban form (Salingaros, 2005).

We have identified and will focus on the mindset that invents and supports such abstractions. This thinking is part of fundamentalism in its most narrow application, and is not restricted to either architecture, or urbanism. To explain the most obvious aspects of the built environment in the twentieth century, therefore, we will refer to totalitarian philosophy, religious extremism, and the forces behind the Holocaust. Inevitably, some readers will object to making such comparisons. Nevertheless, we are convinced of the important philosophical connection between these mindsets.

7. LE CORBUSIER'S GEOMETRICAL FUNDAMENTALISM.

In the history of architectural theory, one text stands out as a polemic advocating *geometrical fundamentalism*: Le Corbusier's 1923 work *Towards a New Architecture* (Le Corbusier, 1927). This is where the geometry of modernism was best articulated, and where the plan to create sprawl, implemented so obligingly in the postwar years, originated. Here, in detailed drawings and impassioned arguments, are the wide freeways, sprawling office "parks", concrete shoebox towers, and boxy retail centers set far back from the street.

Towards a New Architecture is undeniably a landmark document of twentieth-century architecture and planning. While this book is used in almost every university as a textbook on architectural theory, we propose reading it not as a serious text, but rather as a propaganda manual for destroying architectural and urban coherence. In the same way, Adolf Hitler's book *Mein Kampf* is widely read at universities, not as a rational reference on politics and government, but (putting aside one's reaction of disgust) in order to understand how its author was able to manipulate a nation so as to destroy Europe and implement the Holocaust.

Le Corbusier's *Plan Voisin* (labeled *A City of Towers* in his book) shows the center of Paris destroyed and replaced with enormous high-rise buildings. The imposition of a simple, powerful, almost authoritarian abstract idea (towers, ostensibly to remove one from noise, smells, and dust) severs the urban relationships, the web of interconnections that weave the urban fabric of a city and make it part of human life. While the intention of cleaning up dark and unhealthy alleys was good, these radical changes were totally untested. Yet a vast experiment was tried (in many other cities) on thousands of lives without any controls. The proposed monolithic geometry, when applied, erased an intricate connective network and replaced it with a grandly simple non-hierarchy. In so doing, it destroyed both complexity and life.

The Swiss architectural anthropologist Nold Egenter aptly summarizes our own assessment: "Imagine Paris today with Le Corbusier's plan realized! A deadly desert. No tourists come to Paris anymore". Coincidentally, Hitler, also a master propagandist with architectural pretensions, wished to destroy Paris in 1944.

This grand abstraction (which precipitates disconnection) is the essential idea of modernism, and its ultimate flaw. It exists at all levels, from the urban plan to a building plan, all the way down in scale to individual ornament and detail. Under this regime, the complex organic relationships of life and the world are totally severed. In 1923 Le Corbusier was a man clearly taken by the simplistic, totalitarian philosophies then taking root in society. He succumbed to simple abstract geometries that he saw in the reductionist machines around him, saying: *"The Engineer's Aesthetic and Architecture are two things that march together and follow one from the other: the one being now at its full height, the other in an unhappy state of retrogression ... The Engineer, inspired by the law of Economy and governed by mathematical calculation, puts us in accord with universal law. He achieves harmony."* (Le Corbusier, 1927: page 11).

Le Corbusier's words at first glance might appear to support the point of view of this book; but what he proposed for architecture and urbanism does the opposite. Following the tactics of all great propagandists, he said things that sound plausible and even attractive in order to promote an agenda. A crude, primitive geometry captured him: certainly not even as sophisticated as mathematics and science were at the beginning of civilization. He confused the superficial appearance of technical solutions with progress. *Geometrical fundamentalism* is not an enlightened advance, as some imagined, but a reactionary embrace of the pure geometrical abstractions of Euclid, Pythagoras, and the ancient Egyptians: *"Gothic architecture is not, fundamentally, based on spheres, cones and cylinders. Only the nave is an expression of a simple form, but of a complex geometry of the second order (intersecting arches). It is for that reason that a cathedral is not very beautiful and that we search in it for compensations of a subjective kind outside plastic art. A cathedral interests us as the ingenious solution of a difficult problem, but a problem of which the postulates have been badly stated because they do not proceed from the great primary forms."* (Le Corbusier, 1927: page 30).

So a cathedral is not very beautiful? Then what is beautiful? Le Corbusier explains: *"Thus we have the American grain elevators and factories, the magnificent FIRST FRUITS of the new age. THE AMERICAN ENGINEERS OVERWHELM WITH THEIR CALCULATIONS OUR EXPIRING ARCHITECTURE."* (Le Corbusier, 1927: page 31).

This is the "Grand Idea" sweeping away all detritus and preparing for the new age: the age of the machine. Of course the detritus happens to encompass all the greatest creations of humankind spanning the entire globe and built over millennia. These were to be replaced by buildings mimicking American grain elevators (see Figure 9.6). It is obvious to us today that the machines of the 1920s Le Corbusier praises and illustrates in his book are quite crude by any later standard. But Le Corbusier is completely, utterly taken by them, so much so that he considers them actually superior to the realities they crudely reflect. This is a striking and rather extreme example of the phenomenon Whitehead called "the fallacy of misplaced concreteness" — an idolatry of abstractions to the point where one loses connection to the richer and more complex concrete reality they represent. The abstractions replace the reality.

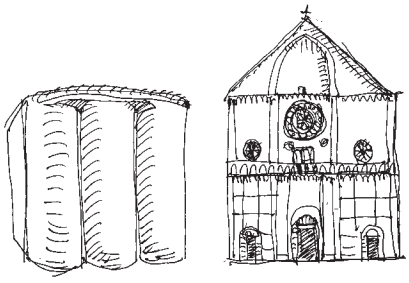


Figure (9.6)
Ordered substructure makes building on the right more alive.

It is easy to be captured by such simple, strong, bewitching abstractions. Let us boldly go forward, Le Corbusier says, into this program of imposing these simple abstractions on the world on a massive scale. His proposal for Paris shows no mercy for the rich nuances and complexities of human life; only contempt. According to him, cities should be bulldozed and rebuilt — this time with enlarged children's

blocks on a huge, totalitarian scale. Le Corbusier was a master at providing totally crude abstractions that ignored deeper and subtler relationships. Obsessed and seduced by his own grand abstractions, he either misses or deliberately ignores the richness and subtlety of traditional buildings, the kind of subtle organic relationships that his crystalline mechanical architecture could never create.

In hindsight, it is astonishing the degree to which Le Corbusier's program was so successfully implemented on a vast, global scale. How did this happen? Who was Le Corbusier, anyway? Charles-Edouard Jeanneret-Gris was an unknown Swiss architect working in Paris, making a living mostly by selling commercial advertisements in his journal *L'Esprit Nouveau*. He wrote and published whatever he wanted in it, and later collected these unrefereed articles into his books. After he adopted the pseudonym "Le Corbusier", people began to pay more attention to his architectural and urban ideas. He came along at the precise moment when the western world hungered desperately for a utopian "new world". His ideas served the brutal new industrialism. Le Corbusier and the other modernist pioneers were happy to oblige the revolutionary fervor of the times, encouraging it to sweep away all vestiges of the past.

8. CLASSICAL ARCHITECTURE.

Classicism also incorporates geometrically simple forms, but does so in a carefully adaptive way (making them more accessible to human sensibilities), with archetypes developed over centuries. This crucial distinction is equally true for vernacular design. In any rich traditional design, as in nature, there are connections and reflections at all levels of scale. Geometrically simple abstractions exist in abundance; but they are subordinated to an interlocking hierarchy of structures, and are not masters of the overall design. Many subtle and complex pathways link up the structure within itself and with the surrounding environment. Classical buildings were exquisitely tuned to their site and to surrounding buildings so as to create urban space (and a satisfying urban space is something that modernists were rarely if ever able to achieve).

Le Corbusier scored a clever propaganda coup by filling his book (Le Corbusier, 1927) with photos and sketches of the Parthenon. He was a master propagandist, and a pioneer in applying techniques of visual persuasion to create the paid advertisements published in his journal *L'Esprit Nouveau*. He misleadingly claims to extract his *geometrical fundamentalism* (and even the machine aesthetic) from the buildings on the Acropolis. This is achieved by careful selective cropping of photos. Le Corbusier's hagiographers are fond of showing him pictured against the Acropolis, using publicity photos that he himself had carefully prepared. The forced misappropriation of Classical architecture by Le Corbusier amounts to the old confidence trick of inventing a fictitious relation to figures of authority in order to acquire credibility.

In the end, neither Le Corbusier's architecture nor his urbanism bear any relation to Classical solutions. The buildings Le Corbusier fostered might as well have been razor blades, slicing the world to shreds. Though many critics have attacked them as ugly, their fundamental fault is not an aesthetic poverty so much as a structural poverty: a lack of organized complexity, a toxic disconnectedness. Our civilization's task of replacing its architecture and urbanism of disconnectedness with a

newly adaptive architecture of connectivity cannot even begin before Le Corbusier's pervasive influence ceases.

There are those who argue that contemporary architecture and urban planning have since moved on to new — and even more horrific — typologies. In fact, Le Corbusier's legacy, and that of other early modernists, is everywhere still today. Architectural academia deified him, and continues to present him to impressionable architecture students as a supreme role model: an architectural legend. His ideas have spread into our society's collective mind, distorting and confusing the message of Classical architecture. He bears the responsibility of initiating an inhuman approach to the built environment, where adaptation and responsiveness are unnecessary, even contemptible. That provided the fertile ground for present-day architectural and urban insanities.

9. FUNDAMENTALISM AS A DEFINING FORCE IN TWENTIETH-CENTURY ARCHITECTURE.

The distinguishing characteristic of fundamentalism is that it relies too narrowly on a simple set of principles. While there is nothing inherently wrong with that, extremists find it easy to hijack those principles. They turn them into abstractions that promote an insular mind-set condoning destruction of any perceived "impurity". They express intolerance towards competing ideas, and channel the energy of followers against those ideas. A fundamentalist belief that is taken over by fanatics is antithetical to the principles of a plural and democratic open society — or indeed, of any open, evolving and self-correcting system, including the institution of science itself.

Fundamentalism in architecture is no different from religious fundamentalism. One might associate the drive to a fundamentalist belief with the need to establish an identity in the face of complexities of human culture. Those who have difficulty coping with urban complexities — as, for example, Le Corbusier — would prefer to eradicate them. His horror of and hysterical aversion to the hustle and bustle of lively street life are well documented. He was single-mindedly obsessed with erasing the lively Parisian street, which he pathologically despised.

We interpret this abhorrence of complexity as the manifestation of a basic insecurity. It represents a profound lack of confidence in oneself, which would otherwise anchor a normal person's psyche to human society. Without such confidence, one feels lost unless there is something else to which one can attach. Insecure persons need something stable to cope with uncertainties in their own identity. A simplistic ideal — particularly if it is of a utopian nature — offers a readily recognized alternative to the complexity of real life. One identifies a (frequently fictitious) true state, and is supposed to dedicate one's life to the constant search for purity. As has been stated by religious leaders of all denominations, however, that is the opposite of achieving wisdom through personal equilibrium in a constantly changing and complex world.

The danger of adopting an overly simplistic world-view is that, when it is combined with intolerance, it is used to justify destruction. A turning inward, and a

ruthless comparison with impossibly pure ideals prevents pluralism and the evolution of new complexities.

Geometrical fundamentalism started with a call to destroy the smallest scale: ornament was identified as a criminal activity, and was banished from architecture in the early years of the twentieth century. It took some time for this interdiction to take affect, but it did so almost universally after the Second World War. As explained by the Austrian artist/architect Friedrich Hundertwasser: "The Austrian Adolf Loos brought this atrocity into the world. In 1908, with his manifesto aptly entitled 'Ornament and Crime'. No doubt he meant well. Adolf Hitler meant well, too. But Adolf Loos was incapable of thinking fifty years ahead. The world will never be rid of the evil he invoked".

This war against ornament and decoration actually hides an ideological failure in modernist architecture: the lack of a cultural basis. That should not be surprising, since those who turned against ornament deliberately sought to destroy all ties (and reminiscences) of historical architectures. More than any other group of architects, those trained in the anti-ornamental school showed no respect for preserving architectural masterpieces of the past. True to their fundamentalist beliefs, traditional buildings held no value for them. Older buildings continue to pose a danger for empty assertions praising architectural abstractions, since ordinary people can maintain their own sense of reality by connecting emotionally to the built surfaces of more traditional buildings. As in other fanatical movements, it is essential to erase any examples that contradict official dogma.

Chapter 5 of this book showed that an infinite variety of non-traditional architectures remain to be explored. Yet, those early modernists who practiced *geometrical fundamentalism* immediately used their newly-acquired status and power to marginalize or discredit other, much more innovative architects. As I argue further in Chapter 10, *Darwinian Processes and Memes in Architecture: A Memetic Theory of Modernism*, the Art Nouveau, Expressionist, and Art Deco form languages were dealt a fatal blow not from more traditional Classical architects, but from their modernist brethren. Those styles were condemned as supposedly "not pure enough".

The German architect Walter Gropius set an example of architectural assassination by supporting the demolition of New York's Pennsylvania Station, built by McKim, Mead, and White in 1911. He is on record as calling it: "a monument to a particularly insignificant period in American architectural history ... a 'slip-cover civilization' ... a case of pseudotradition". The British architectural historian David Watkin, on the other hand considers it: "one of the great masterpieces of twentieth-century New York. Pennsylvania Station has probably never been equaled as a triumph of engineering and organization in which the Classical language was used to ennoble a mundane activity. Its shameful demolition in 1963-1965 marked the nadir in American architectural life."

Architecture has been accompanied by a vast amount of text (misleadingly called "architectural theory") supporting and justifying this architectural dogma. The sheer weight of all those arguments about modularity, functionality, efficiency, technology, the "spirit of the age", the "machine aesthetic", etc. says something

very revealing about a basic insecurity. A living culture of building has no need to justify itself to anyone — it is automatically and intuitively perceived as serving human needs. It doesn't need convoluted arguments or propaganda to prove its worth. The problem is that, whenever twentieth-century architecture has been assessed on intuitive grounds, it has invariably been rejected by the general public: hence the need for theoretical posturing and indoctrination.

Players of this abstract game must constantly remind themselves of the rules, which, unlike generative rules, are actually rules for *eliminating* structure. Architecture students are taught what *not* to do: a design must not even remotely look like anything traditional, or pre-modernist. Students remain ignorant about techniques for generating coherence. Learning is based on looking at contemporary buildings and trying to reproduce the same unnatural feeling or similar sensation in one's design. This way of learning internalizes an aesthetic without understanding its basis, training the architect by rote memorization of visual examples, rather than any intellectual explanation. This is a standard technique of psychological conditioning; for getting people to do something without question, often against their natural instincts. It is the method of indoctrination used by fundamentalist sects.

10. MODULARITY AND HOMOGENIZATION.

The most abused material in twentieth-century architecture is concrete. Empty rectangular panels of raw concrete abolish surface richness, losing the texture normally found in natural materials such as stone and wood. Concrete has an unfriendly surface, but great plastic properties. Architects have gone to great lengths to produce large square panels out of concrete that are then used as modules in construction. This practice makes little sense for a material that is quintessentially versatile. Concrete can be cast into any shape and size required, on or off the building site, so why make it first into modules? And why strictly flat, rectangular ones? The reason is that an image of large square panels is imprinted into the collective memory of twentieth-century architects, who appear to reproduce them unthinkingly.

It is here, in the deliberate intent to deny human beings any sensory connection to architectural surfaces, that *geometrical fundamentalism* most clearly reveals its goals. Removing color and texture from the environment by leaving brutal surfaces of raw exposed concrete (following Le Corbusier) denies two of the human senses: color vision, and touch. Two more senses, hearing and smell, are assaulted when concrete is used in interior walls. Since concrete is acoustically "hard", it produces an unpleasant echo compared to the more pleasing echo from acoustically softer materials such as wood and lime plaster. In addition, raw concrete surfaces tend to give off powder with time that not only has a unpleasant smell, but also poses a respiratory health hazard. The Romans, who first used concrete extensively as a building material, never let it show in large exposed surfaces.

This insistence on surfaces without any informational meaning is misleadingly tied into other ideas such as modularity. Modular design coupled with homogenization has become the visual expression of *geometrical fundamentalism* in our times (see Chapter 8). None of this has anything to do with the commercial bene-

fits of modular production, however. Modular construction that employs empty rectangular panels is simply conforming to a visual design template. A profound and far-reaching shift occurred when architects went from using complex modules within a free system of design (i.e., a method not tied to any rigid geometry or specific dimensions), to fitting empty components into a rectangular modular grid. This shift represents the transition from the traditional use of modular components, to an implementation of simplistic geometries.

Beautiful buildings were created in the past using richly complex and detailed architectural modules. A thousand years of Islamic architecture relied on glazed ceramic tiles for its most glorious effects. Modules such as polychrome tiles and wicker-like brick patterns in relief are themselves internally complex, and serve to generate ordered complexity over a large region. The nineteenth century saw the mass-production of intricate decorative panels and architectural elements, such as those used by the French architect Hector Guimard for the components of the Paris Metro station entrances. Louis Sullivan's buildings are unthinkable without the mass-produced and richly-ornamental metal and terracotta panels he employed. The "International Style", however, sought surface purity. Its architects insisted on using large, visually empty modules, which eliminate internal structure and information. To do this, the larger the module is, the better (see Chapter 8).

Homogenization creates a plain, continuous surface perceived as a single unit. It achieves this by disguising a module's edge as much as possible, so as to blend one module into the next. With bricks, this effect is obtained by minimizing the mortar's exposed width, and choosing its color and consistency so as to blend in with the brick material. The result is bonded brickwork preferred throughout the late twentieth century. A brick wall is made to resemble a single sheet of the same material. Erecting an obsessively smooth, homogeneous wall out of bricks denies the creative freedom inherent in using such a small unit. Homogeneity is the opposite of the deliberate contrast in color between bricks and mortar in older, traditional brickwork, where also the thickness of the mortar is in a scaled relationship to the width of the brick itself (Figure 2.8).

In stonework, a homogeneous effect is achieved by having no discernible transition between one stone and another. Smooth rectangular stones are arranged on a plane surface with their edges touching, without any connective material showing. This produces one continuous surface of stone, since the joint is visible only at arm's length. A similar effect is obtained with glass panels. Unlike stone slabs, glass as a building material has to be supported by its edges and not by its inner surface. Even so, we see glass panels made as large as possible according to their freestanding strength, with as minimal a frame support as is practical. The desired fundamentalist effect is a continuous wall of glass. Other materials are treated in the same way to remove information. In more recent buildings, such as the Guggenheim museum in Bilbao, the curved surface was originally conceived as a continuous metal surface.

11. GEOMETRICAL FUNDAMENTALISM VERSUS MONUMENTALITY.

Our colleagues have asked: "does *geometrical fundamentalism* encompass the work of the architects Etienne-Louis Boullée, Karl Friedrich Schinkel, and the ancient Egyptians?" Boullée had visionary schemes for megalomaniac buildings in elementary geometrical shapes, and so would appear to qualify as prefiguring Le Corbusier's fundamentalism. As Boullée's designs were never built, however, the question remains an academic one. Schinkel, on the other hand, built a number of great buildings — well connected on all scales, and paying attention to the user. Yes, they are grand, yet they are also composed of connective elements. They satisfy the criterion of great humane architecture by connecting the individual through a sequence of increasing scales to a very large and coherent overall scale.

The ancient Egyptians created one typology that intentionally disconnects: the pyramid. It was a Royal Tomb, after all, and was not meant to be entered; on the contrary, its form was carefully chosen to send a clear message for mortals to stay away. The ancient Egyptians were also masters at erecting humane monumental architecture, and though much of it was funerary, it is all marvelously connective through a complete hierarchy of scales (with the exception of the pyramid's original austere exterior). Early modernists often confused *geometrical fundamentalism* with monumentality. This is surprising, since those architects studied monumental Greek and Roman civil architecture on the one hand, and ancient defensive installations on the other. There is where one learns the crucial difference between the two typologies.

Other styles crossed the line from monumentality into *geometrical fundamentalism* by making buildings and urban dimensions too large; by removing visual and geometrical structure on the human scale that individuals can relate to; or simply by making the urban environment so sterile that pedestrians cannot enjoy it. The Fascists distorted and stripped ancient Egyptian, Greek, and Roman architectures to create a pompous style that is as fundamentalist as it is monumental (Mussolini's and Marcello Piacentini's EUR — the "Third Rome"; Hitler's and Albert Speer's unrealized "Grand Axis" for Berlin). Contrary to what is frequently but misleadingly asserted, there is nothing particularly "Classical" about this monstrous, oversize architecture other than a very superficial resemblance — it is instead a pure expression of totalitarian power. This power resonates through the authority of simple geometry. Albert Speer's greatest achievement was his "Cathedral of Light" (1934) created for the Nuremberg rallies: a very modern architectural conception based entirely on technology.

For sheer size, however, we have to look to recent times for the most harmful examples: rectangular megatowers; vast, hard, unusable (supposedly "pedestrian") plazas; enormous treeless parking lots; etc. A textbook example of this faceless megalomania is realized in La Défense on the outskirts of Paris, a triumph of the will of French President François Mitterrand.

The problem we face is an assault on the mathematical properties of life, which leads to the elimination of living structure. People confuse organizational principles creating large-scale symmetry on the one hand, with imposed ideal forms on

the other, even though the two have an entirely different origin (Salingaros, 2005). Organizational principles connect processes and elements occurring on a smaller scale, in a process that itself generates ordering on the larger scale. By contrast, imposed ideal forms ignore what is happening on the smaller scale, and arbitrarily force a geometrical straitjacket onto the ensemble, commonly disrupting what was occurring there originally (or could possibly take place in the future). Organization connects and coordinates processes; whereas imposition from above may eliminate them (Salingaros, 2005). This is precisely the difference between a monumental architectural or urban statement and *geometrical fundamentalism*.

Postmodernist architects fanatically avoid organization (connectivity on the large scale). This is, of course, the other side of the same coin: if one cannot impose a simplistic form on structure, then at least one can destroy the overall coherence by using disconnected, unrelated components. It's still *geometrical fundamentalism*, valuing simplistic geometrical games above the adaptivity of buildings to their users, and dictating that we should avoid anything reminiscent of living structure. This mindset permeates the profession, and belittles efforts towards a new vernacular or traditional architecture for our time. Its origins are traceable to Le Corbusier's stubborn refusal to align structural elements on some of his buildings, going out of his way to prevent the harmonious matching of articulations. Again, he showed us the way to avoid life by introducing randomness into design (see Figure 9.7).

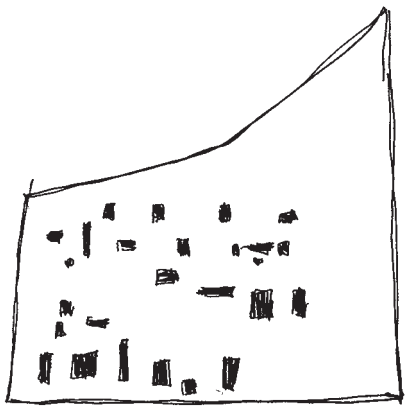


Figure (9.7)
Le Corbusier's randomization of windows expresses nihilism.

Often, the simplest, most natural organization of individual components generates an overall symmetric form. Especially on the urban scale, linearization results from the organization of movement. When small-scale connective processes are understood and respected, they can be aligned (though not necessarily in a straight line) to reinforce processes occurring on the large scale. Geometrical abstractions are a necessary prerequisite for any design project, yet adaptation requires bending any abstract ideals to serve human needs and satisfy structural constraints. If an abstraction becomes so powerfully embedded in our minds that it takes over, then it turns into fundamentalism. The abstraction of ideals from their realities should never become dogmatic or arbitrary.

12. ABSTRACTIONS IN CREATING AND DESTROYING BUILDINGS.

The abstract conceptions linked to architecture encompass a wide range of ideas. We focus here on three of them: "pure geometry", "giant scale", and "monofunctional use". Although strictly speaking these are separate concepts, they are linked abstractions that are almost invariably applied together. The same mindset that uses a high degree of abstraction is required both to define enormous structures, and to destroy them. Both acts (creation and destruction) presuppose that the buildings' inhabitants are not individuals, but can be identified as an abstract class. Let us first discuss the reductionist acts of conceptualizing and planning the giant building.

Ordinarily, human beings don't like to be isolated in order to do only one thing: we crave variety in actions to be performed, and joy in our visual surroundings. Anyone sitting in his or her office needs to take a break now and then, and the best refreshment is a total change in action and surroundings. That is not possible in a monofunctional environment. People still like to work in cities, despite the high cost in commuting and parking inconveniences, precisely because they can at least spend some fleeting time in a stimulating environment. (Unfortunately, this does nothing for the life of the city after business hours — that depends on the continuous presence of local residents).

Any large monofunctional building is conceived to house a very large number of people doing more or less the same thing. This is a function of an industrial philosophy that reduces tasks to interchangeable elements. Yet there is excellent evidence that the giant monofunctional building goes against basic human needs. Hundreds or even thousands of lives are here subordinated to a geometrical abstraction. Such a building exists only because of its geometry — its function is to house an abstract class of people, and in doing so it disregards the needs of the individual. The shape is most often a formal geometrical statement having nothing to do with the persons inside it. Such a building could just as well be empty. We have to *imagine* it full of people, because there is no geometrical indication that it was intended for people to spend a major part of their lives in it or around it.

Abstraction creates a dangerous dehumanization. This point was previously made by Eric Darton in his prescient book on the World Trade Center (Darton, 2000). Darton raised the frightening prospect that the creation of giant tower buildings is related to the mindset of those who would wish to destroy them (Darton, 2000). His reasoning is as follows. It is impossible to contemplate killing thousands of people in a single building unless those people are viewed simply as an abstract class. They must not be considered as having any separate existence apart from the building's geometry, which is itself defined abstractly. The geometry of huge, monumental, monofunctional office towers makes it difficult to imagine that they are full of people, hence it becomes possible and even rational for someone who thinks only in abstractions to contemplate their destruction (Darton, 2000).

13. POLITICAL ROOTS OF DEHUMANIZING ABSTRACTIONS IN ARCHITECTURE.

A principal root of modernist design lies in Fascist Italy. The Futurist manifestoes declared total war on the architecture (and society) of the past. Sharing the German National Socialist beliefs in a "new society" that subordinates the individual to more lofty political and social goals, Benito Mussolini's regime sponsored some of the most characteristic examples of modernist architecture. Giuseppe Terragni, Luigi Moretti, Adalberto Libera, and many other Italian architects built "pure" modernist buildings. Their blatant association with Fascism makes architectural historians uncomfortable, forcing some into an unprofessional expedient of ignoring those buildings altogether (or, like Sigfried Giedion, intentionally mislabeling Terragni's "House of Fascism" as "House of the People"). Unlike in Germany, modernism was promoted by Fascist Italy, and its architectural aspirations were in harmony with the regime's totalitarian philosophy about the future.

Dehumanizing abstraction was embraced by architects in early twentieth-century Germany. That era in Germany is well-recognized as a time of rejection of the individual, and a belief that a new machine architecture should serve the needs of the worker class. The Nazis later adopted this socialist worker spirit as their own, along with an early modernist style of architecture. Gropius (who served as director of the *Bauhaus* from 1919 to 1928) originated the curtain walls and ribbon windows of the "International Style". Ludwig Mies van der Rohe (who headed the *Bauhaus* from 1930 to 1933), proudly proclaimed that: "the individual is losing significance; his destiny is no longer what interests us". In 1921, he came up with designs for glass skyscrapers. For such structures to be inhabited, the normal wishes of individuals have to be subordinated to the idea of a building as an abstraction.

Although both Gropius and Mies van der Rohe later emigrated to the US and became respected world-famous architects, they first offered their services to Hitler. Having strong architectural preferences himself, Hitler refused because he despised modernism as a style. He also mistrusted the *Bauhaus* architects politically, since they all had some association with the socialist movement in Germany. Gropius had designed the monument to the "March Heroes" who started the 1848 revolution (1921), and Mies van der Rohe had designed a monument (1926) to the communist politicians Rosa Luxemburg and Karl Liebknecht, both of whom had been murdered by the proto-Nazi *Freikorps*. The Swiss architect Hannes Meyer (who headed the *Bauhaus* from 1928 to 1930) had introduced obligatory courses on Marx and Lenin. While the Nazis embraced the same ideals: industrial production tied to dehumanizing architecture and urbanism (preferring a style more Art Deco than Classical), they found the original Bauhaus teachers politically unacceptable.

Neither their damning overtures to the Nazis, nor the real reason why some of the Bauhaus teachers left Germany — because they could get no major commissions — are mentioned in History of Architecture courses. Instead, we are told that those architects were "good" because they fled Hitler. The point is that their architecture, far from being the reaction to National Socialism that it later claimed, was in fact its philosophical sibling. It is only by historical accident that the two were separated. Fritz

Ertl, a Bauhaus graduate, was one of the architects of Auschwitz-Birkenau. According to Jan Maciag: "It is a terrible, modern, rational city as a machine for death".

A few initial works by early modernist architects were either commissioned by wealthy individuals who championed the artistic avant-garde; or by European cities run by politically radical local governments that promoted collectivism. It was these two types of client that bought into the architects' bold promises that their geometrically singular style of architecture was able to transform society. Other governments sincerely wished to provide a better environment for their citizens, but this promise appealed directly to totalitarian regimes either on the right or the left. The possibility of social engineering via geometry was seductive to those in power. Having designed the Centrosoyuz building (1929-1934) and unsuccessfully competed to build the Palace of the Soviets (1931) in Moscow, Le Corbusier urged France's successive governments (including the collaborationist one) to implement his plan for destroying Algiers. It was tragically carried out after the War by a different government.

14. THE NEED FOR ABSTRACTION IN DESTROYING CLASSES OF SOCIETY.

Authors such as Zygmunt Bauman insist that an abstractive process lies at the root of the Holocaust (Bauman, 2000). Human beings can carry out acts of organized mass-murder on a systematic scale only if the victims are dehumanized — redefined as an abstract class dissociated from humanity. Whereas individual murder involves emotion, and is driven by passions and forces, mass murder on an industrial scale has to be carried out dispassionately. For this to take place, the victim class must be identified in the most abstract terms. It is essential to sever any human connection between the victims and the perpetrators of the crime. This cutting of connections was very carefully thought out by the Nazis, who maximized the isolating abstraction of the Jewish people as a class separate from other Germans.

An enormous effort was expended by the Nazis to segregate their victims socially and geographically. People were uprooted and relocated to ghettos, and their legal identity and citizenship was taken away in helping create this abstraction. The desired result was the redefinition of a large segment of the population as an abstract, alien class, defined geometrically by residence in the ghetto, with no legal or social connection to the rest of the German nation. Once that stage (the definition of an abstract class) was achieved, it was only a technical step to physically destroy the class. Note how the other aspects of dehumanization much beloved by architects such as mass-production, mechanization, efficiency, modularity, and functionality played a major role in implementing the "final solution" (Bauman, 2000).

Albert Speer, a practitioner of *geometrical fundamentalism* especially in his urban projects, shows how an architecture of megalomania is related to the Holocaust. Before being appointed Minister of Armaments, from which position he directed industrial production that used slave laborers, Speer was in charge of building the "Grand Axis" in Berlin. This vast urban project required the demolition of existing buildings. Tens of thousands of apartments were evacuated on his orders: their non-Jewish residents were resettled elsewhere, but Jewish owners were deported to the camps. (This

was not known at the time of the Nuremberg trials, and became public only after his death). Speer was intelligent enough not to apply *geometrical fundamentalism* to his interior architecture, however. The interior of the New Chancellery (1938) was built in an ostentatiously Neo-Baroque style (not Classical) — imagine a vastly magnified Barcelona Pavilion stuffed with heavy furniture and hanging antique tapestries — to create an opulent working environment for his beloved Führer.

Now that historians of the Holocaust have identified abstraction as a necessary precondition for genocide, the phenomenon is easy to recognize in other atrocities. In almost every case that one cares to study, before and since the Second World War, the prelude to mass slaughter is an abstraction of the victim group as a class stripped of its humanity and declared to be foreign to the perpetrators. If the atrocities are state-directed, as is so often the case, then an official propaganda campaign is aimed at removing any possible traces of individual existence from the class; it is forbidden to mention individual human beings, but only the victim class as a whole. Only via this abstraction can the rest of the perpetrator population be turned into accomplices for the horrible deeds.

From these conclusions, we gain a better insight of the dichotomy between reductive abstractions on the one hand, and a respect for complex systems on the other. The first is the enemy of the second. Any philosophy that eliminates the individual human being from consideration merits an automatic commonality with destructive events such as the Holocaust. This is a mathematical similarity: when the smaller scales of a complex system are eliminated, the system is destroyed. We have argued at great length in this Chapter that *geometrical fundamentalism* in architecture belongs to this type of essentially destructive ideology.

15. CONCLUSION.

A *geometrical fundamentalism* lies at the core of post-industrial planning and design. We are convinced that this has destroyed our cities and has made even ordinary buildings less human. We suggested that *geometrical fundamentalism* plays a role in creating the resentment the rest of the world feels against the industrialized western nations. Such is its commercial success and its continued sway upon the building arts, however, that an understanding of its philosophical basis is needed before any change can be implemented. We must understand the weaknesses of twentieth-century design in the light of new insights into the rich connective structure of nature, a structure also seen in pre-modern design and urbanism around the world. Only then can we do what all great designers throughout history have done: learn from the past, borrow liberally from it, and synthesize those lessons for our own time and place. Today we possess new mathematical tools that can energize us while instilling a new humility about the complexities of nature and of vernacular design. We believe that a new connective architecture for our time is possible. Contrary to the early modernists' quixotic hope, we have not arrived at the end of architecture.