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The Artificial Mountain: a New Form of “Artialization” of Nature?

Claire Portal

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Introduction

- 1 Creating mountains is not a new phenomenon: first represented by Chinese etchings and then reconstituted in archaeological landforms (stupas, hillocks, ziggurats, tells, and pyramids), they constitute ancient artefacts whose spiritual symbolism is reflected by the mythology of the Tower of Babel (Jakob, 2011). For the landscape historian, the contemporary artificial mountain is inspired by these ancient mountains but the technical, social and cultural evolutions have transformed it. Today, the artificial mountain is “expandable and insurmountable”, “scalable and unscalable” even if it has an aesthetic sense that recalls the codes of the natural mountain (*ibid.*). It constitutes a component of the nature-artifact, both the artificialization and the artialization of nature (Bertrand and Bertrand, 2014), developed by an artistic initiative mainly led by architects. Thus, these “mountain makers” (Debarbieux and Rudaz, 2010) refer to landscape models associated with the “natural” mountain so that their creations are qualified as “mountains”.
- 2 However, what are these models to which these contemporary artificial mountains refer? Are artificial mountains, literally “made by art¹”, integral reproductions of natural mountains, or are these models adapted and transformed? More widely, this article analyzes the references to mountain landscape models and the place of nature and landscape aesthetics in the realizations of artificial mountains. The term “natural” is widened because landscape models contain elements associated with architecture, practices and representations. Thus, it is more a question of a “model mountain” than a “natural mountain”². The disciplinary field of research can be extremely vast (social sciences, art and landscape history, architecture, engineering) and this exploratory study proposes to approach these contemporary artificial mountains as architectural,

real and virtual structures. In this context, architecture is defined as a process of constructing landscapes and particularly artificial topographies, real and imaginary (Allen and McQuade, 2011) and whose realizations are mostly situated in urban areas. First, the landscape models associated with natural mountains will be briefly recalled, and a definition of the artificial mountain as an element of the "nature-artifact" (Bertrand and Bertrand, 2014) will be put forward. Then, the corpus of about forty artificial mountains on which the analysis is based will be presented and analyzed. Various artificial mountains will be studied according to three gradations of artificiality: hybridization, imitation and the suggestion of the natural mountain in relation to the landscape models with which they are associated. These models are transformed by the places of construction of mountains and especially by the future evolutions of urban spaces: the artificial mountain is becoming an element of renaturalizing contemporary cities, inspired by the classic landscape models associated with the natural mountain but going beyond and reinventing them.

Becoming a mountain: from natural to artificial

The landscape models of the "natural" mountain

- 3 "To a large extent, then, a mountain is a mountain because of the part it plays in popular imagination. It may be hardly more than a hill; but if it has distinct individuality, or plays a more or less symbolic role to the people, it is likely to be rated a mountain by those who live about its base" (Peattie, 1936). This is one of the main paradoxes of the notion of a mountain: "if it seems impossible to define according to logical and systematic rules, it seems very natural to most of us. Ask a child to draw a mountain and he will do it without much hesitation" (Debarbieux and Rudaz, 2010). A natural mountain is difficult to measure (where it begins, where it ends); Its formation is uncontrolled and its evolution only partly controlled (Corcuff, 2007). It is not the altitude that makes the mountain but the landscapes that constitute it (Flatrès, 1980). These built the mountain landscape models whose aspects have been widely studied and which will only be summarized here.
- 4 Since the end of the 17th century, the alpine mountain has been considered in Europe as "the prototype of the aesthetic landscape. Its pictorial and plastic interpretation involves all the aesthetic codes of perception, sometimes pastoral, georgic, or exotic, sometimes sublime or picturesque, with every vision not being exclusive one of another" (Walter, 2005). In the middle of the 18th century and in parallel with the Alpine and Pyrenean models (Briffaud, 1994), new models were developed thanks to the promotion of regional specificities: the Scottish mountains incorporate the romantic and picturesque landscape where the wilderness is tamed; in France, the Breton and Norman hills – the "Alpes mancelles" and the "Suisse normande" – are identified as mountains without exceeding 417 m. The Mediterranean model refers to the Southern Alps; the dry and desert mountains recall the continental mountains and the tropical mountains are recognized as specific entities (Frolova, 2001). In North America, the representation of mountains, particularly in national parks, is based on "the formalization of a landscape mythology motivated by the promotion of the idea of a Wonderland [...]". The Mountain is presented as a primordial territory of the United States [...] an untamed, even hostile nature (...)" (Depraz and Héritier, 2012).

The artificial mountain: an element of the "nature-artifact"

- 5 To be qualified as a "mountain", the artificial mountain has to satisfy the same criteria as the natural mountain, whatever its scale or height. A reconstituted mountain is a mountain insofar as its attributes refer to the representations with which it is associated. The artificial mountain is an artifact (*artis factum*) made by art and by the human technique, and not by nature (Jouty and Odier, 2009; Bavoux and Chapelon, 2014). According to the definition of the nature-artifact proposed by Claude and Georges Bertrand (2014), the artificial mountain is part of its components and has a double meaning:
 - the first one takes into account the degree of anthropization, that is to say the material impact of man on nature. The artificial mountain can be considered one of the highest degrees of anthropization because it can be totally non-natural: the anthropogenic action places man as the orogenic event, which replaces the tectonics; raw materials of human origin (rubble, waste, concrete, metal) or stemming from human activities (extractions) are a substitute for geology.
 - the second meaning concerns the artialization process, defined as "the whole transformation- metamorphosis of nature by all the representations of the mind and human sensitivity, the arts, feelings, dreams" (*ibid.*). In this context, the artialization of Alain Roger (1997) goes beyond the meaning given by the landscape painters, who limited it to paintings and gardens. The artificial mountain is often the product of an artistic creativity, real or imaginary and meaningful (Jakob, 2011). Integrated into the landscape, the artificial mountain is designed through an aesthetic approach whereas the natural mountain is not conceived as such: it has become it. More widely, the idea of the mountain deals with perceptions: it is the geo-symbol of J. Bonnemaïson (1981) or the "geogram" of A. Berque (2006).
- 6 The artificial mountain is an anthropogenic landform, a mound planned to reach a height going from a few centimeters to several hundred meters and whose realization, from Antiquity to today, has often required significant expenditure and technical achievements. Whatever its height, it must be identified by society as a "mountain". This recognition depends on an aesthetic and cultural appropriation, which refers to landscape models associated with the "natural" mountain.
- 7 Questioning the artificial mountain as a feature inspired by the natural mountain, and more particularly by its landscape aesthetics, means studying the transposition processes of these models. Are they entirely recreated or only suggested? In other words, by creating man-made mountains, are we searching for a representation consistent with the various mountain landscape models or do we go beyond these models to create new ones?

Hybridizing, imitating and suggesting the mountain: building a corpus of artificial mountains

- 8 Any artificial hillock can potentially be qualified as a "mountain". The typology thus constituted would be infinite and would include features from diverse origins that are hardly comparable (archaeological - tumuli, hillocks, pyramids, ziggurats; industrial - coal tips, waste heaps; war - heaps of rubble resulting from bombing; artistic - land art

works, painting, drawing; architectural - landform buildings, skyscrapers). The proposed corpus focuses on real and imaginary contemporary realizations, which explicitly refer to the idea of the mountain. The search on the web using the keywords "artificial mountain" guided the corpus toward architectural creations of mountains, in particular large buildings (landform buildings) which, in the 1980s, the Italian architect Aldo Rossi³ related to geology, "hard and persistent, yet capable of accommodating change over time" (Allen and McQuade, 2011). The relationship between the architect, the artist, the building, and the topography is reappraised and the city becomes a privileged study space. The corpus thus consists of forty artificial, real or imaginary mountains for which the idea of creating a mountain is explicit, either in the designation of the structure or in the associated speech. The typology of these contemporary mountains is based on keys of interpretation corresponding to the artificialized mountain landscape models. It is built according to the degree of artificiality, which is based on three increasing gradations of artificialization: 1) the transformation of a natural mountain or the hybridization of natural and artificial mountains by a landscape or architecture project; 2) the imitation by the complete reproduction of a natural, nearby, symbolic or imaginary mountain; 3) the suggestion of a natural mountain, which is only an inspiration whereas the artificial mountain goes beyond the classic aesthetic models. References to landscape models associated with the natural mountains will be specifically studied as well as the places favored by architects and landscape architects.

Typology and staging of mountains

Transforming / hybridizing

- 9 The hybridization or transformation of a mountain means that a part of the natural mountain is preserved and another part is artificialized. This artificialization can take several forms, from integration in the landscape to enhance the aesthetics to an almost total hybridization with the original mountain. Previously, in the 19th century, the landscape architect Frederick Law Olmsted staged the Mount Royal Park (Montreal) and the rocky topography of Central Park (New York). With the urban architect Daniel Hudson Burnham, he participated in the preservation of the hills of San Francisco, initiating a reflection about the American city, which, beyond the technical aspect, combines functional, health and reformist considerations and requires an innovative aesthetic commitment (Debarbieux, 2012). Graphic works were also produced by the American architect Frank Lloyd Wright, including the Gordon Strong Automobile Objective that inspired the Solomon R. Guggenheim museum in New York. Originally, this was a project of G. Strong, a businessman who wanted to build the structure on Sugarloaf Mountain, a 391-m high monadnock in Maryland (pl. 1/1). The integration of hills and the raising of small mountains symbolize the aesthetic recognition of topographic forms in urban areas. They appeal to the picturesque and accessible aspect of a gardenized and welcoming mountain, standing out from the landscape.
- 10 Other contemporary projects aim to hybridize artifice and nature so that the mountain becomes "just one". In Dénia (Alicante province, Spain), the Guallart firm suggests creating a cultural area whose architecture would be inspired by the geological logic of the original mountain and would fill the excavation created by a former quarry. The

architect refers to the representations of the geological studies led by Eugène Viollet-le-Duc on the Mont Blanc massif (1876). Then he analyses "the surface of Mediterranean mountains, characterized by very little soil and a great quantity of loose rocks and an abundance of low scrub and brushwood". The architect also analyzed the internal structure of the limestones: "the regeneration of the mountain would have to emerge through its re-crystallization, reproducing the characteristic rhombohedral structure of the limestone crystals". This is a clear reference to the aesthetics of the Mediterranean mountain and the nature/artifice hybridization is taken to extremes by reproducing the mineralogy of the ground, to the limit of imitation (pl. 1/2).

PI 1/1. Perspective for the *Gordon Strong Automobile Objective*. Office of Frank Lloyd Wright, 1925, (USA)



Source: The Frank Lloyd Wright Foundation, Scottsdale, Arizona, <https://www.loc.gov/exhibits/flw/flw02.html>

PI 1/2. The *Denia Mountain*, Guallart Architects, 2002, (Alicante, Spain)



Source: <http://www.guallart.com/projects/denia-mountain>

Imitating

- 11 The imitation of a natural mountain implies the reproduction of this mountain – or some of its components – inspired by landscape reference models. These kinds of artificial mountain are created from nothing and are closer to the picturesque model of the New York and San Francisco hills: low but sloping, covered in greenery and gardened. There are many examples: in Berlin, the Klamott mounts⁴ are 78 m (the Big Bunker Hillock) and 48 m (the Little Bunker Hillock) in height in the Volkspark Friedrichshain (pl. 2/1: archive document of the Klamott of Volkspark Rehberge (1929) shown in the Berlin subway); in Grunewald (west of Berlin), the Teufelsberg (the “Devil’s Mountain”) reaches 114 m (pl. 2/2: the plateau of Aussichts, another mountain of rubble, seen from the Teufelsberg). In northern France, the “Coal Tips Range” consists of 1,200 artificial mounts covered in vegetation. The highest tip is 188 m (pl. 2/3)⁵.
- 12 In this context of imitation, the most impressive artificial mountains are in leisure parks and particularly in Disney Parks. In California, Disneyland has four artificial mountains, three of which refer explicitly to specific mountain models associated with the building of the American nation: the Matterhorn Bobsleds inevitably recall the European alpine model (pl. 2/4); the Big Thunder Mountain Railroad immerses the visitor in the Gold Rush period by reconstituting a legendary mountain (pl. 2/5); while the rapids of the Grizzly Bear River Run show the “steep granitic landscape of the Grizzly Bear Peak”, representative of the foothills of the Sierra Nevada (pl. 2/6).
- 13 The “great rocks” of the zoos of Hamburg (1907), Budapest (1909, pl. 2/7) and Vincennes (1931, pl. 2/8) deserve to be mentioned for their completely mineral

appearance, which reflects either the very high Alps or the dry inselbergs. These rocks are between 40 and 70 m in height and were first designed as a scenography for exhibiting animals to the public (Pinon, 2008) before becoming landscape emblems.

- 14 Artists and architects also stage imaginary artificial mountains in post-industrial urban contexts: with the set of images "Stockorama (Detroit)" (2010-2011, pl. 2/9), Stéphane Degoutin and Gwenola Wagon refer to a rather alpine representation of the mountain by rethinking the Disney representations. Lastly, among the imaginary mountains imitating the "natural" mountain, The Berg (Berlin, pl. 2/10) and Mountain! in the Netherlands (pl. 2/11) are almost archetypal recreations of the alpine mountain.

Pl. 2/1. The Klamott in the Volkspark Rehberge, old postcard, 1929, displayed in the Berlin metropolitan (Germany)



Source: C. Portal, 2015

Pl. 2/2. The Aussichts plateau from the Teufelsberg (114 m) (Grunwald, Germany)



Source: C. Portal, 2015

Pl. 2/3. The heap 14 (Auchel, France)



Source: Hubert Bouvet, région Nord-Pas-de-Calais, 2012. <http://www.bassinminier-patrimoine-mondial.org/les-terrils/>

Pl. 2/4. The *Matterhorn Bobsleds*, 1959, Disneyland Resort, (California, USA)



Source: <https://disney Parks.disney.go.com/blog/2011/12/things-you-might-not-know-about-the-matterhorn-at-disneyland-resort/>

Pl. 2/5. The *Big Thunder Mountain Railroad*, 1980, Magic Kingdom, Walt Disney World, (Florida, USA)



Source: <https://disneyworld.disney.go.com/fr-ca/attractions/magic-kingdom/big-thunder-mountain-railroad/>

Pl. 2/6. The *Grizzly River Run*, 2001, Disney California Adventure, Disneyland Resort, (California, USA)



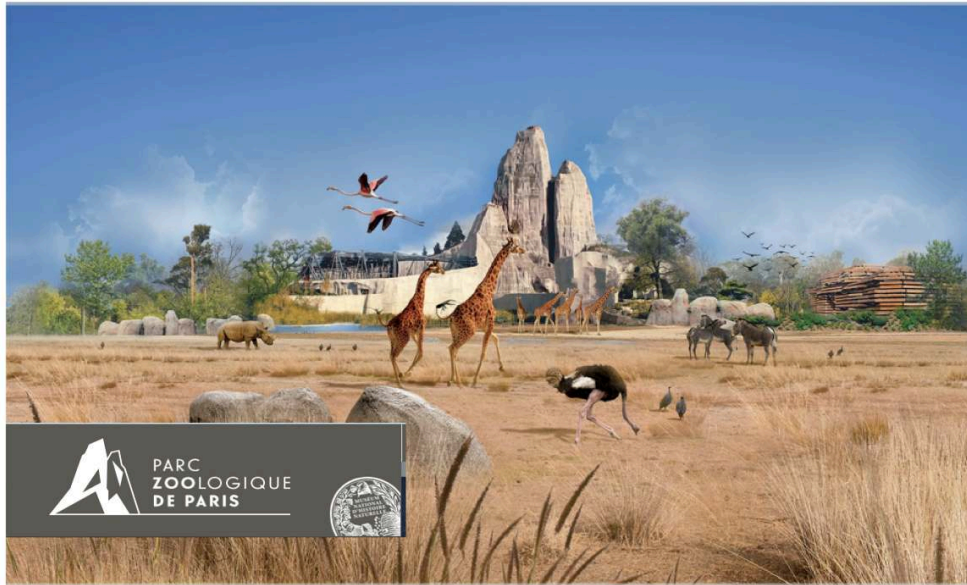
Source: <http://www.wdwinfo.com/disneyland/photos/grizzly-peak/pages/Grizzly%20River%20Run%208.htm>

Pl. 2/7. The "great rock", Budapest Zoological Park, first construction, 1909. Atelier Peter Kis model for the reconstruction, (Hungary)



Source: <http://www.plant.co.hu/en/cards/view/68>

Pl. 2/8. The "great rock", Paris Zoological Parc, first construction in 1931, latest restoration 2014, (France)



Source: <https://www.parczoologiqueparis.fr/fr>

Pl. 2/9. Data Centers in Detroit, Stéphane Degoutin and Gwenola Wagon, "Stockorama", 2010-2011, (Detroit, USA)



Source: <http://www.nogovoyages.com/stockorama.html>

Pl. 2/10. *The Berg*, Belin, by Jakob Tigges architect, 2009, (Germany)



Source: <http://www.the-berg.de/#>

Pl. 2/11. *Mountain I*, by Dave Hoffers et Xander Krüger, 2011, (Netherlands)



Source: <http://www.spiegel.de/international/zeitgeist/peak-of-insanity-dutch-dream-of-building-artificial-mountain-a-784085.html>

Suggesting

- 15 The last degree of artificialization concerns the suggestion of a natural mountain, which is only an inspiration, involving the invention of new features. These mountains often concern mega-structures and the architects have imagined a typology built according to various categories of forms relating to natural mountains (peaks, hills, and ranges, Allen and McQuade, 2011):
- "Single peaks" are symbolized by the Great Pyramid of Egypt and by various creations such as the Triangle Project (Herzog and De Meuron, pl. 3/1). Skyscrapers are represented in this category: the highest tower in the world is 828 m (the Burj Khalifa in Dubai, pl. 3/2) but the completion of the Jeddah Tower (Saudi Arabia) planned in 2020 will take the artificial peak to more than one kilometer high.
 - "Stepped hills" are represented by the tower of Babel (Pieter Brueghel the Elder, 1563), the Highrise of Homes (SITE, 1981, pl. 3/3) and The Mountain (B.I.G., pl. 3/4).
 - "Mountain ranges" are identified via projects such as Fake Hill (MAD, pl. 3/5) or Marina Baie-des-Anges (André Minangoy, pl. 3/6). Already in 1941, C. Levy-Strauss compared the New York skyline to the Himalayan mountain range.
- 16 Apart from a few exceptions, these artificial mountains are hollow and are intended to accommodate permanent or temporary residents (i.e. visitors and hotels). These architectural mega-structures do not refer to any mountain landscape models, even though for some of them the speeches of the designers mention nearby mountains or components that symbolize them. For example, the Taipei art museum recalls the surroundings mountains (pl. 3/7); the Lace Hill of Yerevan represents Mount Ararat, sacred but difficult to reach for Armenians (pl. 3/8); in Tokyo, the X-Seed 4000 (pl. 3/9) and, to a lesser extent, the mega-pyramid of Shimizu (pl. 3/10) evoke Mount Fuji; in Chong Qing, the architect Cobe proposes the Magic Mountains, "a new skyline composed of densely inhabited mountains while the valleys between them are vast green open spaces" (pl. 3/11); the Hipercatalunya Project recalls the Mediterranean mountains of the region (pl. 3/12) and lastly, the Asian Cairns of Shenzhen evoke the stony hillocks on the mountains surrounding the city (pl. 3/13).

Pl. 3/1. The *Triangle tower*, HERZOG & DE MEURON ARCHITECTS, 2008, (PARIS, FRANCE)



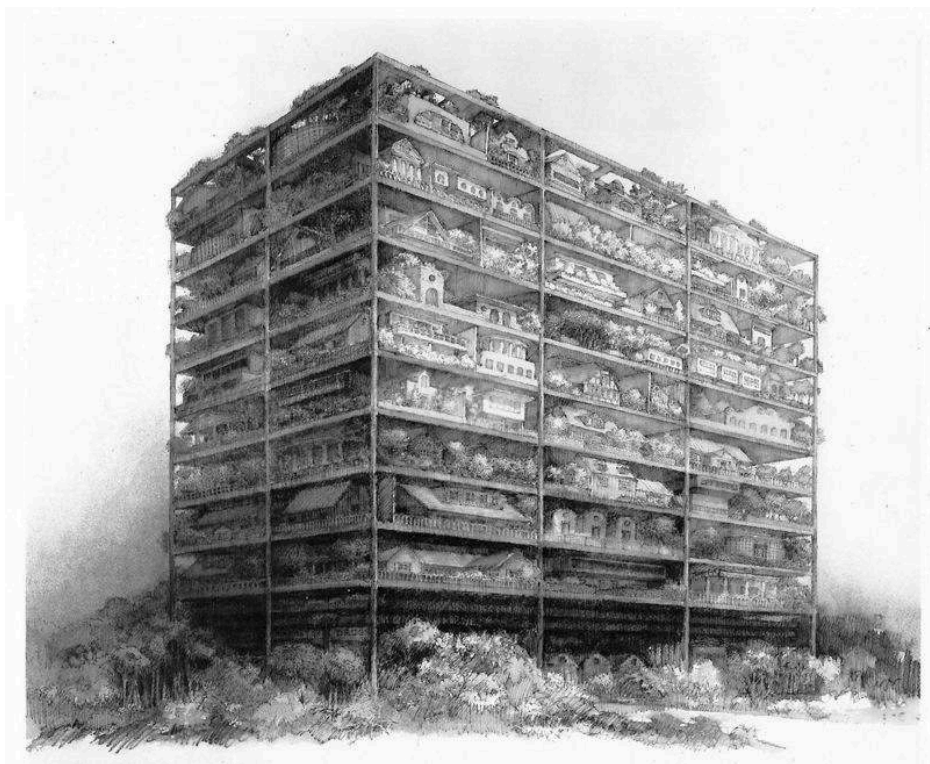
Source: <http://tour-triangle.com/>

Pl. 3/2. The *Burj Khalifa*, Adrian Smith Architect, 2009, (Dubai, United Arab Emirates)



Source: https://en.wikipedia.org/wiki/Burj_Khalifa, Donaldytong (wikicommons)

Pl. 3/3. *The Highrise of Homes*, 1981, James Wines and SITE, Theoretical proposal for USA cities



Source: <https://stuckeman.psu.edu/faculty/james-wines>

Pl. 3/4. *The Mountain*, Julien De Smedt, Bjarke Ingels, JDS architects, 2008, (Copenhaguen, Denmark)



Source: <http://jdsa.eu/mtn/>

Pl. 3/5. *Fake Hill*, MAD, 2015, (Beihai, Chine)



Source: <http://www.i-mad.com/work/fake-hills/?cid=4>

Pl. 3/6. *Marina Baie des Anges*, André MINANGOY, 1993 (Villeneuve-Loubet, France)



Source: <http://www.culturecommunication.gouv.fr/Regions/Drac-Paca/Politique-et-actions-culturelles/Patrimoine-du-XXe-siecle/Le-label/Les-edifices-labellises/Label-patrimoine-du-XXe-Alpes-Maritimes/Villeneuve-Loubet/Villeneuve-Loubet-Marina-Baie-des-Anges/>

Pl. 3/7. Taipei City Museum of Art, Kengo Kuma and Associates, 2011 (Taiwan)



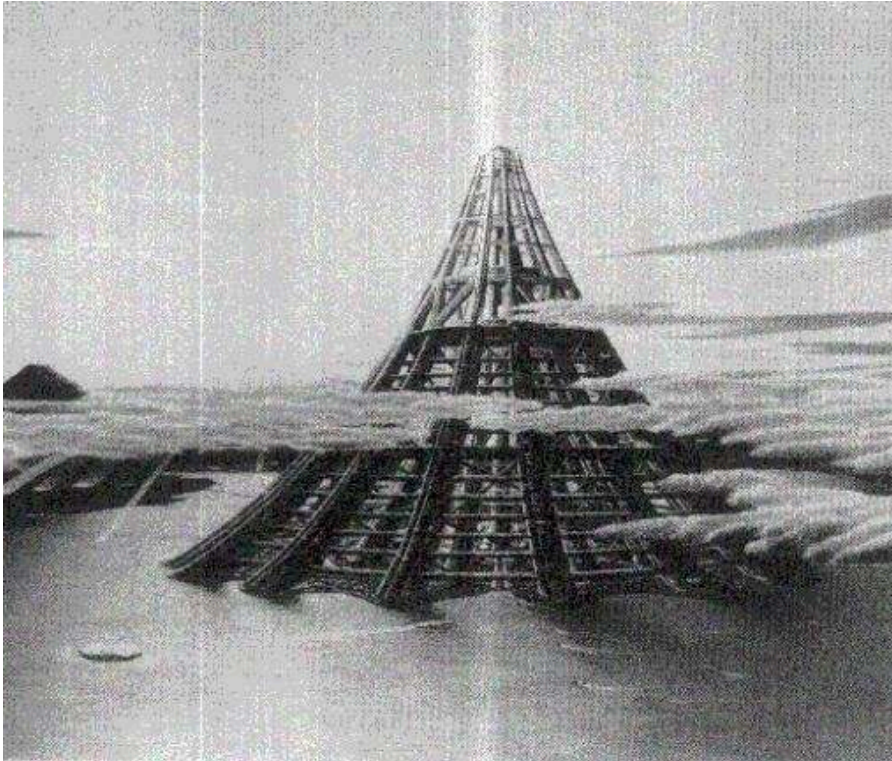
Source: <http://www.archiscene.net/museum/taipei-museum-art-kengo-kuma/>

Pl. 3/8. *Lace Hill*, Forrest Fulton Architecture, 2010, (Yerevan, Armenia)



Source: <http://www.archdaily.com/58797/lace-hill-forrest-fulton-architecture>

Pl. 3/9. The *X-Seed 4000*, mid-1990, Taisei Corporation, (Tokyo, Japan)



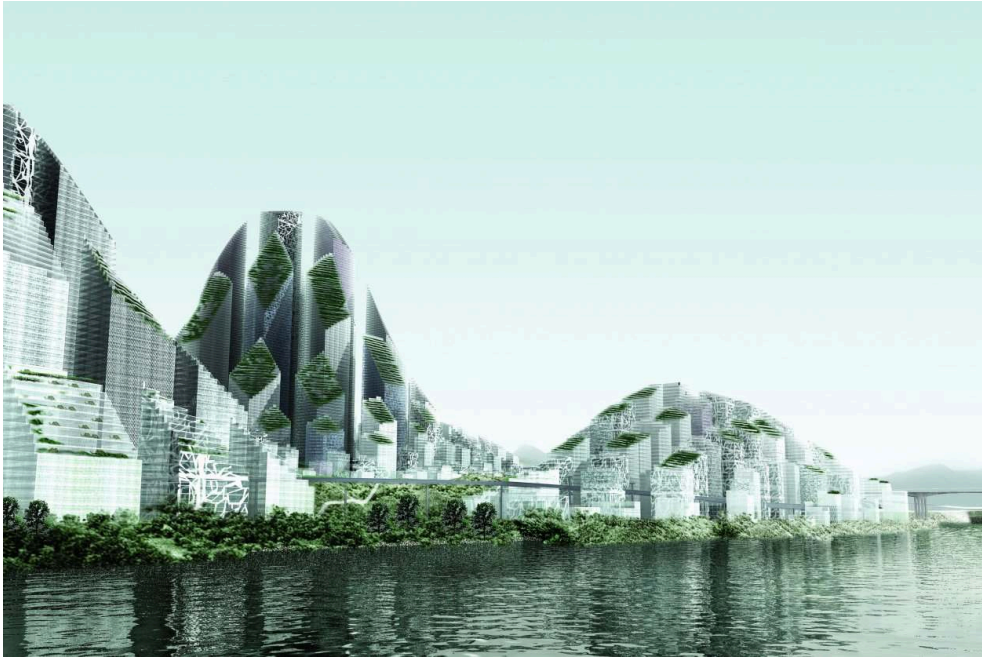
Source: <https://www.citylab.com/design/2012/07/behold-worlds-tallest-concept-building-course-was-never-built/2649/>

Pl. 3/10. The *Shimizu Mega-City Pyramid*, Shimizu Corporation, 2004, (Tokyo, Japan)



Source: <http://www.dailymail.co.uk/sciencetech/article-1354540/Tree-towers-Taiwan-mega-pyramid-Tokyo-Cities-future-here.html>

Pl. 3/11. *The Magic Mountains*, Cobe, 2006, (Chongqing, Chine)



Source: <http://www.cobe.dk/project/magic-mountains>

Pl. 3/12. *Hypercatalunya*, Guallart Architects, 2003, (Barcelona, Spain)



Source: <http://www.guallart.com/projects/hipercatalunya>

Pl. 3/13. *Asian Cairns*, Vincent Callebaut Architecture, 2013, (Shenzhen, Chine)



Source: http://vincent.callebaut.org/object/130104_asiancairns/asiancairns/projects

Building mountains: toward new aesthetic models?

Urban parks, favored places to dream of the natural mountain

- 17 Parks and gardens are favored places for the creation of archetypal landscapes, which resonate with picturesque landscapes (urban parks) or draw on the alpine aspect and its height (leisure parks). Artificial mountains are major components of these ornamental landscapes. In a large number of urban parks, the green mount is the favored pattern: in France, at the heart of the "Coal Tips Range", the urban natural reserve of the Islands of Drocourt spreads over two coal tips covered in vegetation; in the Volkspark Friedrichshain and the Volkspark Rehberge, the Berlin Klamotts appear as small urban forests.
- 18 These examples systematically associate the mounts with a lake, incorporating these artificial mountains into the landscape models reminiscent of the picturesque English countryside of William Gilpin. The same greening operation, spontaneous or managed, took place in Tel Aviv with the regeneration of the mount Hiriya in an ornamental park in 2010 (pl. 4/1). In leisure parks, the mountain recreates an emotionally powerful scenery, whether it is reconstituted (Disneyland) or just evoked via a painting as in the Wunderland Kalkar (Germany), where the nuclear power plant was closed in 1991 and the central smokestack was converted into climbing walls and painted with snowy summits (pl. 4/2).
- 19 These parks and picturesque or alpine gardens also concern the heights of great buildings: mount Samson imagined in 1900 envisaged covering the Eiffel Tower (pl. 4/3); in 1976, Roger C. Ferri designed a project for Madison Square Park in which a

building is transformed into a mountain (Schuyt *et al.*, 1980, pl. 4/4); in Brussels, the Finance Tower is part of the 15 stepped gardens proposed by the architect Luc Schuiten and where "the whole composition largely evokes the landscape of mountains" (pl. 4/5). In zoos, as in other parks, visitors have to be immersed in an artificial world, which reminds them of the gentleness of picturesque mounts, or the frightening aspect of heights or natural environments, staged by the architecture of "great rocks" and the presence of animals. Finally, the virtual mountains of the Berg (Berlin) and Mountain! (Netherlands), which entirely reproduce the alpine model, are designed to be parks in themselves (pl. 2/10-11).

Pl. 4/1. *Hiri*, *The Hiriya Landfill*, Latz and Partner, 2010, (Tel Aviv, Israël)



Source: <http://www.latzundpartner.de/en/projekte/postindustrielle-landschaften/hiriya-tel-aviv-il/>

Pl. 4/2. Kalkar cooling tower (1973), Wunderland Kalkar, 1995, (Kalkar, Germany)



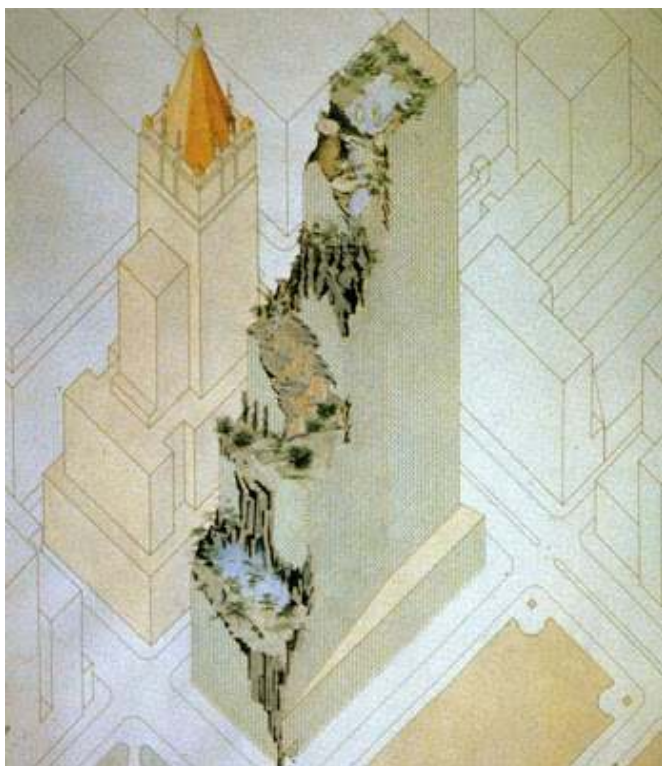
Source: https://commons.wikimedia.org/wiki/File:Koeltoren_als_klimwand_in_Wunderland_Kalkar.jpg

Pl. 4/3. *The Mont Samson*, Jost Samson, 1900, (Paris, France)



Source: <http://villa-morel.com/tag/jost-samson/>

Pl. 4/4. Corporate Skyscraper for Madison Square, Roger C. Ferri, 1976, (New-York City, USA)



Source: <http://arqueologiadelfuturo.blogspot.fr/2011/12/perversiones-naturales-1976-corporate.html>

Pl. 4/5. *Tour des Finances*, Luc Schuiten, 1995, (Brussels, Belgium)



Source: <http://www.vegetalcity.net/en/topics/jardins-verticaux/>

The artificial mountain, a multi-form cultural heritage

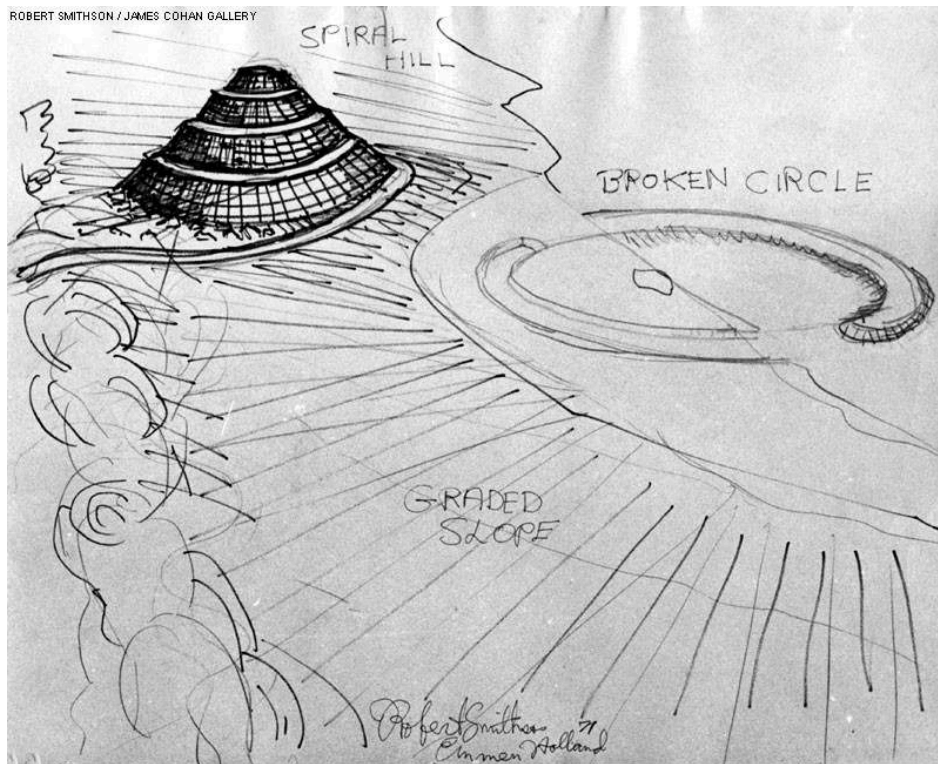
- 20 Landform building architects highlight the predetermined functions of artificial mountains (ornamental, place of residence, museum, cultural center, shopping mall), contrary to natural mountains, which are multifunctional. Artificial mountains are hollow and their functions and aesthetics are defined for both indoors and outdoors, connected with the urban environment. For the architect Mirko Zardini, landform buildings are not strictly speaking architecture, and cannot be seen as independent buildings; they are connected to the city and the landscape and the inhabitants have to feel this experience. Their construction creates new places associated with movement, urban dynamics and architectural aesthetics (in Allen and McQuade, 2011).
- 21 In this context, the artificial mountain is integrated into the urban network as an architectural or historic monument. This heritage approach is achieved in various ways: sometimes, it is a question of imitating or suggesting a nearby natural mountain that already has a heritage status (Lace Hill for Mount Ararat, pl. 3/8, X-Seed 4000 for Mount Fuji, pl. 3/9). In other cases, these artificial mounts already have heritage recognition, such as the coal tips in the Nord-Pas-de-Calais (France) classified as a world heritage site by UNESCO in 2012, or the Berlin Klamotts, also called "the mothers of the city": the landscape architect Reinhold Lingner who designed the parks after the Second World War indicated that the hills were built by the Berlin women who brought the rubble in the 1950s (Dobmeier and Striegnitz, 2013).
- 22 More widely, these urban artificial mountains are references that identify the city and distinguish it from others, like cities with natural mountains (Debarbieux, 2012), whether they are real or imaginary. The Berg has become an icon of Berlin, reaching 1,071 virtual meters: on its web site, it is illustrated on tourist products (T-shirts, mugs, electronic postcards), and displayed in bars and restaurants as if it was an urban monument or a symbolic natural mountain.
- 23 The Berg is a real artistic project, also presented as a picture in an art gallery. In this way, artificial mountains often have a link with museographic artistic projects (the Taipei art museum, pl. 3/7; the inside of the Budapest zoo great rock is a cultural area hosting exhibitions, pl. 2/7). Outside, they can host artistic activities associated with land art and are also a specific dimension of urban art: the Teufelsberg, an American-British spy station abandoned in 1992, has hosted resident street artists since 2005. While artificial aesthetics are in line with "natural" mountains, the various features of artificial mountains lead to rethinking the urban environment and reinterpreting their role as a "nature-artifact".

The artificial mountain and the post-modern city: recycling, renaturalization and utopias

- 24 The post-industrial and abandoned areas are often not appreciated but they are undergoing a landscape revival associated, in certain cases, with the building of artificial mountains. The beginning of this trend coincided with the land reclamation initiated in the 1970s by some land artists (Tiberghien, 1995): in 1971, Robert Smithson produced Broken Circle and Spiral Hill in an old sandpit (pl. 5/1). With her Sky Mount, Nancy Holt (Meadowland, New Jersey, 1985, pl. 5/2) redesigned an old waste disposal

- site, located a quarter of an hour from Manhattan, where the fermentation fuels a part of New York city with gas. Mount Hiriya (pl. 4/1) uses the same process for Tel-Aviv.
- 25 Artists and architects make artificial mountains part of abandoned industrial cities: the mountains of "Stockorama" (pl. 2/9) display "servers and data storage units which become visitable follies, transformed into false mountains to make forgotten areas attractive" of Detroit; the artist Giacomo Costa uses the mountain as a natural symbol in a "recycled" landscape where it becomes the only natural component (Metaballs, 2010, Fusione, 2007 and Ground, 2013, pl. 5/3) (de Poli, 2016). The mountain appears essential for the renaturalization of urban space, a feature condemning overconsumption and waste.
 - 26 The artificial mountain is part of the ecological art of the 21st century: in architecture, it has become impossible today not to refer to at least one component of nature ("all that is green is good", Gissen, 2003). The Coal Tips Range are integrated into the Green Infrastructure of the coal mining area (Raes and Bosteels, 2006); the association of Teufelsberg promotes the development of the hill as an ecological and sustainable cultural monument on its 75 million cubic meters of rubble (Endlicher, 2011; Zalasiewicz and Zalasiewicz, 2015); the hills of San Francisco were recreated on the planted roof of the California Academy of Sciences in 2008 (pl. 5/4); covered with roses and honeysuckle, the thermal power plant of Ames (Iowa) has become the Magic Mountain (Amid.Cero9, 2002, pl. 5/5).
 - 27 The nature of the mountain is also recreated by the reconstruction of false rocks or by recycled geology (tailings, urban waste, rubble). Dénia Mountain (pl. 1/2) hybridizes natural lithology with the geometrical reconstruction of limestones. The architects are inspired here by the fractal geometry to act "as nature does in the case of certain animals, which are capable of regenerating a limb after amputation". This imitation also takes the form of a termite mound, an animal mountain, in the case of the Ultima Tower in San Francisco (pl. 5/6).
 - 28 Finally, thanks to digital technology, it is possible to invent and represent indefinitely what will or will not exist in 10, 20 or 100 years (Guallart, 2009). Architects are often inspired by impracticable creations when designing futuristic cities (Feireiss, 2011) which mix nature, architecture, cities and imagination (e.g. James Wines, Robert Schuiten, Luc Schuiten and François Schuiten, pl. 3/3 and 4/5). Overall, the artificial mountain offers solutions to one of the contemporary urban problems: absorbing a great population density by limiting the urban sprawl while enabling a (re)connection with nature: the Sky City of Tokyo (1000 m in height and 400 m of floorspace) was imagined in 1989 when real estate prices exploded in Japan. It can accommodate more than 130,000 people (permanent residents, hotels) (pl. 5/7); the pyramid of Shimizu could accommodate 750,000 people (pl. 3/10) and the X-Seed 4000, 1 million people (pl. 3/9).

Pl. 5/1. *Spiral Hill and Broken Circle*, Robert Smithson, 1971, (Emmen, Netherlands)



Source: © 2001 Holt-Smithson Foundation, Licensed by VAGA, New York. Courtesy of James Cohan Gallery, New York/Shanghai. http://www.robertsmithson.com/drawings/spiral_hill_broken_circle_300.htm

Pl. 5/2. *Sky Mound*, Nancy Holt, 1991, (Hackensack, USA)



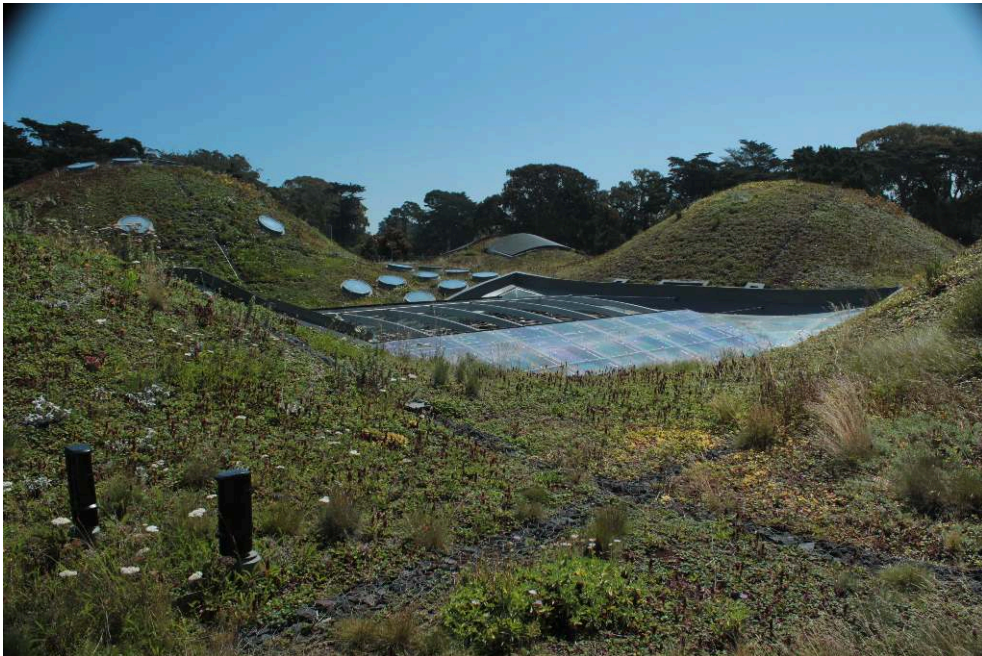
Source: © John Weber Gallery. <http://www.greenmuseum.org/c/aen/Images/Ecology/sky.php>

Pl. 5/3. *Ground (1)*, Giacomo Costa, 2013



Source: <http://www.giacomocosta.com/full/>

Pl. 5/4. The green and hilly roof of the California Academy of Sciences, Renzo Piano, 2008, (San Francisco, USA)



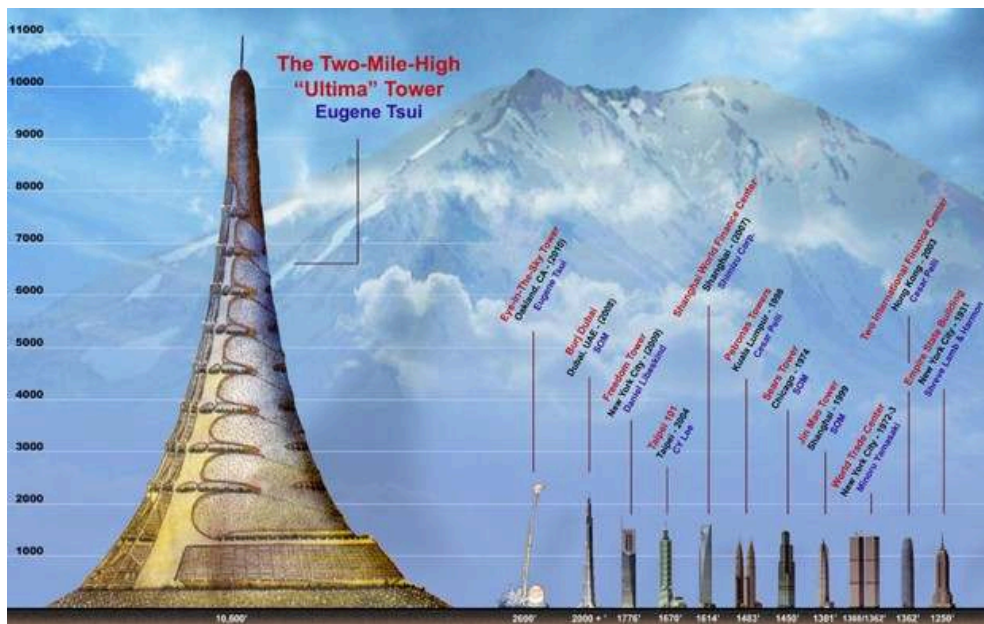
Source: C. Portal (2012)

Pl. 5/5. The *Magic Mountain*, Amid.cero.9, 2002, (Ames, USA)



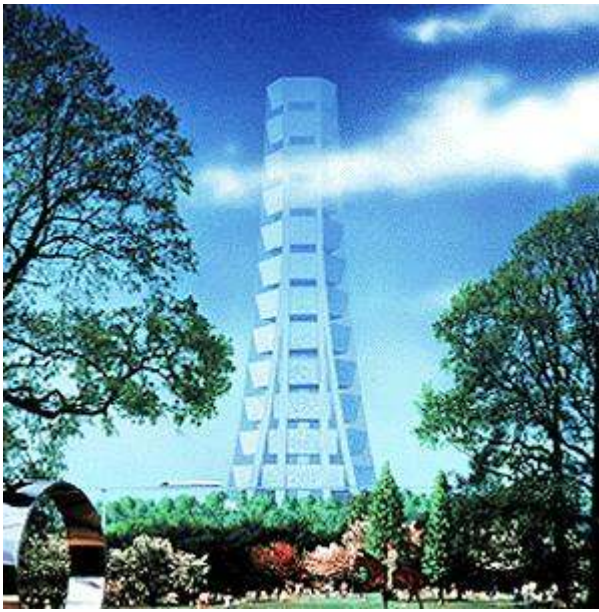
Source: <http://www.cero9.com/project/the-magic-mountain-ecosystem-mask-for-ames-thermal-power-station/>

Pl. 5/6. The *Ultima Tower*, Eugene Tsui, 1991, (San Francisco, USA)



Source: <https://www.citylab.com/design/2015/10/the-visionary-mega-tower-that-san-francisco-never-built/412135/>

Pl. 5/7 The Sky City 1000, Takebaka Corporation, 1989, (Tokyo, Japon)



Source: https://en.wikipedia.org/wiki/Sky_City_1000

Conclusion

- 29 “Welcome to Mountain. You are Mountain. You are God”⁶: in 2014, the artist David O’Reilly imagined a mountain simulator, “Mountain”, which invites the player “to become” the mountain, to watch things growing up and dying like in the “real” nature. In urban areas, this nature is artificially recreated. The artificial mountain can be a trick of nature, for enjoyment, but can also hide anthropogenic damages (land reclamation). Hybridized, imitated or transformed, artificial mountains are integrated into different landscape models and recreate a mountain naturalness, which architects sometimes push beyond what we conceive as “nature”. The artificial mountain is integrated into the “subnature” of D. Gissen (2009) but also into the “third space” of Jean Viard (2012) between city and countryside, at the same time protected, visited, and enhanced with a strong ecological value. For the architects of AmidCero9, it symbolizes the “third nature” and “renews the pact between society, technology and nature, producing new signifieds and materialities still unknown” (Moreno and Grinda, 2014). The contemporary artificial mountain is a component of the nature-artifact, whose models are changing, reinventing the designs of nature in urban areas. Its contemporary expression opposes it the Broadacre City of F.L. Wright, vast and sparsely populated, while maintaining the symbiotic relationship between city and nature. The vertical artificial mountain creates a wide, spacious and open indoor area, providing good quality air in contrast to an urban, dense, fragmented and polluted outside.
- 30 As designed and imagined by architects of the 21st century, the urban artificial mountain is derived from the “arcology”⁷ of Paolo Soleri (Soleri, 1980) which Maria Fujita and Matthieu Soules took up in their “EcoMetropolitanism” (2010) by giving it a “wilder” dimension (Debarbieux 2012). The artificial mountain thus keeps its alternative and avant-garde aspect, which characterizes the natural mountain

(Debarbieux, 2001) and which projects regularly fuel, continuing to push back the boundaries of the nature-artifact: while the United Arab Emirates imagine creating rain thanks to an artificial mountain, the New York Horizon Project (2016, pl. 5/8) reshuffles the cards of verticality. By hollowing out the sedimentary geological layers that cover the mountains of Central Park of which the current outcrops are the summits, the park would be enlarged and under the surface of vertical Manhattan. The new park would be contained within a perimeter of reflective glass, giving the impression of a mountainous landscape that stretches to infinity.

Annex: websites

31 Architecture and artificial mountains websites

- www.archiscene.net
- www.archdaily.com
- www.designboom.com
- <http://www.archigram.net/about.html>
- <http://projets-architecte-urbanisme.fr>
- www.e-architect.co.uk
- www.citylab.com

32 E-Links toward real artificial mountains

- **A short illustrated story of false mountains (Stéphane Degoutin)**
<http://www.nogoland.com/wordpress/2009/09/fausses-montagnes/>
- **Big Thunder Mountain Railroad (Disneyland)**
<https://disneyland.disney.go.com/attractions/disneyland/big-thunder-mountain-railroad/>
- **Burj Khalifa - Skidmore, Owings and Merrill**
<http://www.burjkhalifa.ae/en/index.aspx>
- **Fake Hill - MAD**
<http://www.i-mad.com/work/fake-hills/?cid=4>
- **Budapest Zoo: the Great Rock - Atelier Péter Kis**
<http://www.plant.co.hu/en/cards/view/69>
- **Vincennes Zoo : the Great rock - Charles Letrosne (Bernard Tschumi renovation (BtuA))**
<https://www.parczoologiqueparis.fr/fr>
- **Grizzly River Run (Disneyland)**
<https://disneyland.disney.go.com/attractions/disney-california-adventure/grizzly-river-run/>
- **Marina Baie-des-Anges - André MINANGOY**
<http://www.culturecommunication.gouv.fr/Regions/Drac-Paca/Politique-et-actions-culturelles/Patrimoine-du-XXe-siecle/Le-label/Les-edifices-labellises/Label-patrimoine-du-XXe-Alpes-Maritimes/Villeneuve-Loubet/Villeneuve-Loubet-Marina-Baie-des-Anges>
- **Matterhorn Bobsleds (Disneyland)**
<https://disneyland.disney.go.com/attractions/disneyland/matterhorn-bobsleds/>
- **Mount Hiriya - Latz Und Partner**
<http://www.hiriya.co.il/en/apage/73293.php>
<http://www.latzundpartner.de/en/projekte/postindustrielle-landschaften/hiriya-tel-aviv-il/>
<http://www.s-aronson.co.il/project/competitions-project3/>

- **Pyramids**

Nemrut Dağ

<http://whc.unesco.org/fr/list/448/>

Pyramide de Cholula

<http://www.courrierinternational.com/article/mexique-puebla-une-pyramide-en-pleine-ville>

- **Sky Mound – Nancy Holt**

<http://www.greenmuseum.org/c/aen/Images/Ecology/sky.php>

- **Spiral Hill and Broken Circle – Robert Smithson**

http://www.robertsmithson.com/drawings/spiral_hill_broken_circle_300.htm

- **The “Coal Tips Range”/ Word Heritage, UNESCO**

<http://www.bassinminier-patrimoinemondial.org/les-terrils/>

- **Loisinord**

<http://www.lavoixdunord.fr/region/noeux-les-mines-l-incroyable-aventure-du-terril-42-ia30b53960n3520502>

- **The Mountain - Bjarke Ingels Group (BIG)**

<http://www.big.dk/#projects-mtn>

- **Wunderland Kalkar**

<https://www.wunderlandkalkar.eu/en>

33 E-Links toward imaginary artificial mountains

- **Asian Cairns – Vincent Callebaut**

<http://vincent.callebaut.org/page1-img-asiancairns.html>

- **Vegetal cities – Luc Schuiten**

<http://www.vegetalcity.net/topics/jardins-verticaux/>

<http://www.vegetalcity.net/topics/urbacanyon/>

- **Corporate Skyscraper for Madison Square (Roger C. Ferri)**

<http://arqueologiadelfuturo.blogspot.fr/2011/12/perversiones-naturales-1976-corporate.html>

- **Claude Parent**

[http://www.frac-centre.fr/index-des-auteurs/rub/rubprojets-64.html?](http://www.frac-centre.fr/index-des-auteurs/rub/rubprojets-64.html?authID=143&ensembleID=790&oeuvreID=7250)

[authID=143&ensembleID=790&oeuvreID=7250](http://www.frac-centre.fr/index-des-auteurs/rub/rubprojets-64.html?authID=143&ensembleID=790&oeuvreID=7250)

- **Crystal Island Tower– Foster and Partners Architects**

<http://www.fosterandpartners.com/news/archive/2007/12/foster-partners-presents-a-new-mixed-use-destination-for-moscow/>

- **Denia Mountain – Gualart Architects**

<http://www.gualart.com/projects/denia-mountain>

- **United Arab Emirates – Montagne qui fait la pluie...**

http://www.huffingtonpost.fr/2016/05/03/montagne-artificielle-emirats-arabes-unis-pluie_n_9828618.html

- **Gordon Strong Automobile Objective – Frank Lloyd Wright**

<https://www.loc.gov/exhibits/flw/flw02.html>

- **Ground n° 1 – Giacomo Costa**

<http://www.giacomocosta.com/full/>

- **High-Rise of Homes – James Wines**

<http://sitewebnewyork.com/content/high-rise-homes>

- **Hipercatalunya**

<http://www.gualart.com/projects/hipercatalunya>

- **Lace Hill over Yerevan – Forrest Fulton Architecture**
<http://forrestfulton.com/lace-hill-over-yerevan/>
- **Magic Mountains – COBE**
<http://www.cobe.dk/project/magic-mountains>
- **Mont Samson – Jost R. Samson**
<http://villa-morel.com/tag/jost-samson/>
- **Mountain ! - Dave Hoffers and Xander Krüger**
<http://www.spiegel.de/international/zeitgeist/peak-of-insanity-dutch-dream-of-building-artificial-mountain-a-784085.html>
- **Mountain Game – David O'Reilly**
<http://mountain-game.com/>
- **Taipei Art Museum**
 Kengo Kuma : <http://www.archiscene.net/museum/taipei-museum-art-kengo-kuma/>
- **New York Horizon**
<http://www.evolo.us/competition/new-york-horizon/>
- **Shimizu Pyramid – Shimizu Corporation**
<http://www.dailymail.co.uk/sciencetech/article-1354540/Tree-towers-Taiwan-mega-pyramid-Tokyo-Cities-future-here.html>
- **Sky City 1000 – Takenaka Corporation**
<http://www.takenaka.co.jp/index.html>
https://en.wikipedia.org/wiki/Sky_City_1000
- **Stockorama – Stéphane Degoutin, Gwenola Wagon**
<http://www.nogovoyages.com/stockorama.html>
- **The Berg – Jakob Tigges**
<http://www.the-berg.de/index.html#>
- **The Magic Mountain – Amid.Cero9**
<http://www.cero9.com/project/the-magic-mountain-ecosystem-mask-for-ames-thermal-power-station/>
- **Babel Tower(Pieter Brueghel le Vieux, 1563)**
<http://www.photo.rmnm.fr/C.aspx?VP3=SearchResult&VBID=2C05PCD8N1UEG&SMLS=1&RW=1606&RH=1027>
- **Triangle Tower– Herzog et De Meuron**
<http://tour-triangle.com/>
- **Ultima Tower – Eugene Tsui**
<http://www.citylab.com/design/2015/10/the-visionary-mega-tower-that-san-francisco-never-built/412135/>
- **Vertical City – Luca Curci Architects**
<http://www.lucacurci.com/portfolio/vertical-city.html>
- **X-SEED 4000 – Taisei Construction Corporation**
<http://www.citylab.com/design/2012/07/behold-worlds-tallest-concept-building-course-was-never-built/2649/>

34 Abandoned artificial mountains in leisure parks

- <http://www.topito.com/top-photos-parcs-attraction-abandonnes-les-plus-flippants-attention-clowns-mechants>

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NOTES

1. Artificial, from the Latin *artificium: ars/artis* - art and *facere* - to make
2. For a better understanding, and because this article is specifically interested in the non-anthropropic dimension of the "natural" mountain, we shall use the term "natural".
3. In 1991, Aldo Rossi and Xavier Fabre designed the International Center of Art and Landscape at Vassivière Island (Limousin, France) by staging a "lighthouse" that

overlooks an artificial lake. The Center celebrated its 25th anniversary in 2016 and presented a retrospective exhibition on Aldo Rossi.

4. The Klamotts are piles of rubble from bunkers of the two World Wars. The term is translated in English by "junk".

5. In 1996, coal tip 42 of Nœux-les-Mines opened the first ski run "Loisinord". The picture became an icon of French secondary school textbooks about the conversion of industrial and mining landscapes (Lusso, 2013).

6. <http://mountain-game.com/>

7. Arcology: a harmonious alliance between architecture and ecology in cities where the use of the third dimension (vertical line) reaches maximal efficiency, in particular by maximizing the surface of terraces and gardens exposed to the sun by creating roofs covered with plants, for example.

ABSTRACTS

Artificial mountains are artefacts, real or imaginary, whose identification is based on landscape models associated with natural mountains: whatever its origin, the mountain symbolizes duration and constitutes an unmovable and unchanging element. Following the social, cultural and technical evolutions, artificial mountains have attained new landscape values associated with the emergence of innovative concepts of the environment, particularly in urban areas. Having first been an ornamental element of urban parks, the artificial mountain has now become a full living space, at the heart of the reorganization of the post-industrial, vertical, green and recycled city. From a corpus of about forty realizations, real and imaginary, this paper studies how the designers of artificial mountains, mainly architects, are inspired by landscape models to introduce this mountainous nature into cities, but also how they are reinventing the idea of "the mountain", by introducing new aesthetics and new features into renewed urban contexts.

INDEX

Keywords: artificial mountain, architecture, landscape model, nature, urban morphology

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