

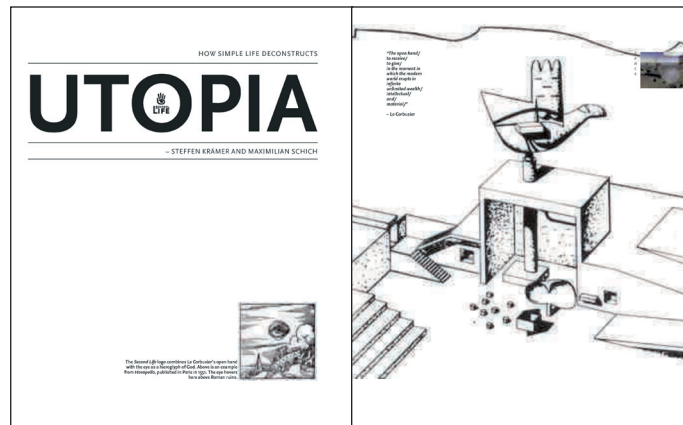


The present article was first published as a book chapter in *Space Between People. How the Virtual Changes Physical Architecture*. (edited by Stephan Doesinger) Prestel, Munich 2008 pp. 30-45 / 156. ISBN: 3-791339-91-5. URL: <http://www.spacebetweenpeople.com>
This postprint presents the text and figure captions of our contribution without alterations. Page numbers refer to the original.
Our thanks go to Stephan Doesinger and Curt Holtz at Prestel for making this postprint possible.
Author contact: maximilian@schich.info

HOW SIMPLE LIFE DECONSTRUCTS

UTOPIA

– STEFFEN KRÄMER AND MAXIMILIAN SCHICH



*"The open hand/
to receive/
to give/
in the moment in
which the modern
world erupts in
infinite
unlimited wealth/
intellectual/
and/
material!"*

– Le Corbusier

The *Second Life* logo combines Le Corbusier's open hand with the eye as a hieroglyph of God. Above is an example from *Horapollo*, published in Paris in 1551. The eye hovers here above Roman ruins.



Giovanni Battista Piranesi: Carceri d'invenzione, Untitled (The Staircase with Trophies) (2nd state), etching, ca. 1750. Disoriented we navigate through the labyrinth of invention. The wide angle of view confirms our imprisonment in the cartesian precision of construction.

Complexity and Convention by Maximilian Schich

Nothing comes out of nothing¹ is how art historian Ernst Gombrich once summed up the notion that in art history there are no developments without antecedents. Second Life is a development of that kind. The roots of this “virtual” world in fact go back to things that are often extraneous to the digital world people so readily describe as a new kind of medium, either to set themselves up as prophets of the new or to find an excuse for ignoring the subject. If you look at Second Life naively as an outsider—which is just what we are doing here—your view may initially be distorted according to your morality.² But if you take a wider view of Second Life or the phenomenon of simulated virtual 3D spaces as a whole, some useful insights can be gained relative to the history of art.³

In the present essay, we explore a number of characteristics of Second Life in pictures and words, convinced that the insights they reveal will be interesting for users as well as from an art-historical point of view. As is pointed out more than once in this book, Second Life is reminiscent of a utopia, i.e. an artificially created or imaginary ideal world. In fact, Second Life is an environment constructed by man. But in contrast to many historical utopias we shall go into in more detail, it is not only ideal or simple. Second Life often looks incomprehensible as well, apparently chaotic and complex. Ultimately, Second Life is both utopia and reality, simple and complex, beautiful and ugly, trivial and interesting.

The complexity of Second Life is easily explained. Instead of being defined by a single author or handful of authors, Second Life is the result of a variable application of the minimal definition of its basic components. Instead of creating a world, users produce individual parts of an environment with the help of a limited vocabulary, the interaction of which produces complexity that, at least superficially, increasingly comes to resemble the real world. As in other systems, for example the metabolism of a cell, traffic in the street or stock-exchange trading, here too global complexity arises as a consequence of activity at a local level.⁴

That is in stark contrast to the classic utopia. Unlike the visions of many an architect, no central idea is imposed on users of Second Life. In fact, as a result of the local activity of so many participants, there is a global dynamic and structure that can be controlled by individuals or a central authority only to a limited extent or not at all. As in a real state, it is necessary to adapt certain rules to actualities.⁵ The actualities cannot be fixed in advance. Universal altruism and omnipresent rationality are for example just as utopian in Second Life as in real life.

Despite the inherent complexity arising from the interaction of the participants, large tracts of Second Life look dead. It never attains the density of the morning rush hour or a really good party, for example. Thinly populated is the normal state of things in Second Life, and there are no exceptions. Time and again, the scene looks like familiar pictures from all sorts of periods—the utopias from Urbino, Piranesi’s prisons or de Chirico’s squares. Like Archigram’s Gallery Project we feel lost in a cacophony of shape and colour.

Why this absence of density? Like any man made thing, Second Life is based on various

conventions, i.e. agreements between the authors that set up a limited frame of reference. Probably Second Life’s most important deviation from real life in this frame of reference derives from the technical infrastructure: With the assistance of a large number of server computers, Second Life simulates the three-dimensional “grid”.⁶ Each server in the group is responsible for an area of 256 m squared, defined as a “sim” (as in simulation). All objects represented in this grid space are made up of pre-defined primary forms, called “prims”. The number of prims per area is currently limited to 15,000. As the representations of users (“avatars”) are likewise treated as prims, these are also subject to this limitation.⁷ There is thus a direct proportionality of the simulated area to the maximum number of objects and also the number of people present at the same time. If the number of people and objects is to be increased, you can get round it to some extent, like the winner in the competition, but ultimately the area needs additional servers to cope.



Reality transcends into the sky: Andrea Pozzo's ceiling fresco in the Church of Sant'Ignazio in Rome. The windows and the arch on the far left are real. The architecture above is as virtual as the painted sky. And there is no gravity for the cloud of St. Ignatius.





Reality escapes from the grid. The Roman city of *Thamugadi* was initially laid out as a grid by the Emperor Trajan and then grew organically outside the walls.

Le Corbusier, *Vers un architecture*, Paris 1923. The modern architect identifies geometric primary bodies as the foundation of Roman Architecture in an ideal view of the ancient city.

Albrecht Dürer, *Nude Figure Design*, c. 1506, Sächsische Landesbibliothek, Dresden. Geometry can be used to idealise the proportions of a body. Deviation from the rule brings the figure to life. Numbers enable us to find the figure among similar ones.

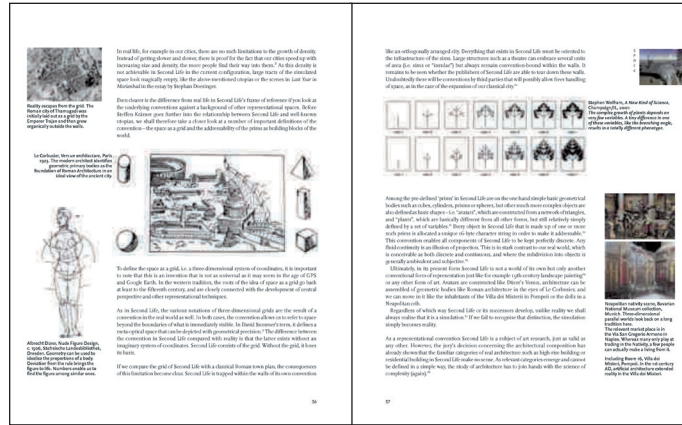
In real life, for example in our cities, there are no such limitations to the growth of density. Instead of getting slower and slower, there is proof for the fact that our cities speed up with increasing size and density, the more people find their way into them.⁸ As this density is not achievable in Second Life in the current configuration, large tracts of the simulated space look magically empty, like the above-mentioned utopias or the scenes in Last Year in Marienbad in the essay by Stephan Doesinger.

Even clearer is the difference from real life in Second Life's frame of reference if you look at the underlying conventions against a background of other representational spaces. Before Steffen Krämer goes further into the relationship between Second Life and well-known utopias, we shall therefore take a closer look at a number of important definitions of the convention – the space as a grid and the addressability of the prims as building blocks of the world.

To define the space as a grid, i.e. a three-dimensional system of coordinates, it is important to note that this is an invention that is not as universal as it may seem in the age of GPS and Google Earth. In the western tradition, the roots of the idea of space as a grid go back at least to the fifteenth century, and are closely connected with the development of central perspective and other representational techniques.

As in Second Life, the various notations of three-dimensional grids are the result of a convention in the real world as well. In both cases, the convention allows us to refer to space beyond the boundaries of what is immediately visible. In David Summer's term, it defines a meta-optical space that can be depicted with geometrical precision.⁹ The difference between the convention in Second Life compared with reality is that the latter exists without an imaginary system of coordinates. Second Life consists of the grid. Without the grid, it loses its basis.

If we compare the grid of Second Life with a classical Roman town plan, the consequences of this limitation become clear. Second Life is trapped within the walls of its own convention



Stephen Wolfram, *A New Kind of Science*, Champaign/IL, 2001: The complex growth of plants depends on very view variables. A tiny difference in one of these variables, like the branching angle, results in a totally different phenotype.

Neapolitan nativity scene, Bavarian National Museum collection, Munich. Three-dimensional parallel worlds look back on a long tradition here.

The relevant market place is in the Via San Gregorio Armeno in Naples. Whereas many only play at trading in the Nativity, a few people can actually make a living from it.

Including Room 16, Villa dei Misteri, Pompeii. In the 1st century AD, artificial architecture extended reality in the Villa dei Misteri.

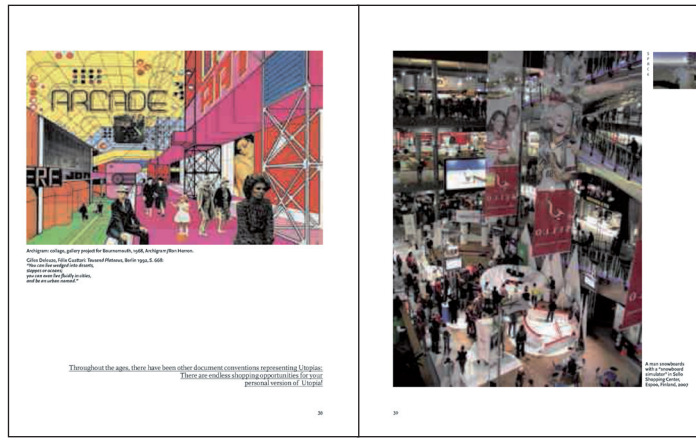
like an orthogonally arranged city. Everything that exists in Second Life must be oriented to the infrastructure of the sims. Large structures such as a theatre can embrace several units of area (i.e. sims or "insulae") but always remain convention-bound within the walls. It remains to be seen whether the publishers of Second Life are able to tear down these walls. Undoubtedly there will be conventions by third parties that will possibly allow freer handling of space, as in the case of the expansion of our classical city.¹⁰

Among the pre-defined 'prims' in Second Life are on the one hand simple basic geometrical bodies such as cubes, cylinders, prisms or spheres, but other much more complex objects are also defined as basic shapes – i.e. "avatars", which are constructed from a network of triangles, and "plants", which are basically different from all other forms, but still relatively simply defined by a set of variables.¹¹ Every object in Second Life that is made up of one or more such prims is allocated a unique 16-byte character string in order to make it addressable.¹² This convention enables all components of Second Life to be kept perfectly discrete. Any fluid continuity is an illusion of projection. This is in stark contrast to our real world, which is conceivable as both discrete and continuous, and where the subdivision into objects is generally ambivalent and subjective.¹³

Ultimately, in its present form Second Life is not a world of its own but only another conventional form of representation just like for example 19th-century landscape painting¹⁴ or any other form of art. Avatars are constructed like Dürer's Venus, architecture can be assembled of geometric bodies like Roman architecture in the eyes of Le Corbusier, and we can move in it like the inhabitants of the Villa dei Misterii in Pompeii or the dolls in a Neapolitan crib.

Regardless of which way Second Life or its successors develop, unlike reality we shall always realise that it is a simulation.¹⁵ If we fail to recognise that distinction, the simulation simply becomes reality.

As a representational convention Second Life is a subject of art research, just as valid as any other. However, the jury's decision concerning the architectural composition has already shown that the familiar categories of real architecture such as high-rise building or residential building in Second Life make no sense. As relevant categories emerge and cannot be defined in a simple way, the study of architecture has to join hands with the science of complexity (again).¹⁶

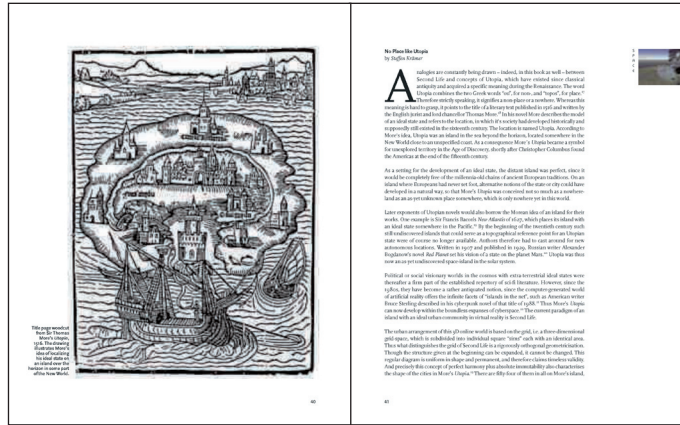


Archigram: collage, gallery project for Bournemouth, 1968, Archigram/Ron Herron.

Gilles Deleuze, Félix Guattari: *Tausend Plateaus*, Berlin 1992, S. 668:
 "You can live wedged into deserts,
 steppes or oceans;
 you can even live fluidly in cities,
 and be an urban nomad."

Throughout the ages, there have been other document conventions representing Utopias:
There are endless shopping opportunities for your
personal version of Utopia!

Title page woodcut from Sir Thomas More's *Utopia*, 1516. The drawing illustrates More's idea of localizing his ideal state on an island over the horizon in some part of the New World.



No Place like Utopia
by Steffen Krämer

Analogies are constantly being drawn – indeed, in this book as well – between Second Life and concepts of Utopia, which have existed since classical antiquity and acquired a specific meaning during the Renaissance. The word Utopia combines the two Greek words “ou”, for non-, and “topos”, for place.¹⁷ Therefore strictly speaking, it signifies a non-place or a nowhere. Whereas this meaning is hard to grasp, it points to the title of a literary text published in 1516 and written by the English jurist and lord chancellor Thomas More.¹⁸ In his novel More describes the model of an ideal state and refers to the location, in which it’s society had developed historically and supposedly still existed in the sixteenth century. The location is named Utopia. According to More’s idea, Utopia was an island in the sea beyond the horizon, located somewhere in the New World close to an unspecified coast. As a consequence More’s Utopia became a symbol for unexplored territory in the Age of Discovery, shortly after Christopher Columbus found the Americas at the end of the fifteenth century.

As a setting for the development of an ideal state, the distant island was perfect, since it would be completely free of the millennia-old chains of ancient European traditions. On an island where Europeans had never set foot, alternative notions of the state or city could have developed in a natural way, so that More’s Utopia was conceived not so much as a nowhere land as an as-yet unknown place somewhere, which is only nowhere yet in this world.

Later exponents of Utopian novels would also borrow the Morean idea of an island for their works. One example is Sir Francis Bacon’s *New Atlantis* of 1627, which places its island with an ideal state somewhere in the Pacific.¹⁹ By the beginning of the twentieth century such still undiscovered islands that could serve as a topographical reference point for an Utopian state were of course no longer available. Authors therefore had to cast around for new autonomous locations. Written in 1907 and published in 1929, Russian writer Alexander Bogdanow’s novel *Red Planet* set his vision of a state on the planet Mars.²⁰ Utopia was thus now an as-yet undiscovered space-island in the solar system.

Political or social visionary worlds in the cosmos with extra-terrestrial ideal states were thereafter a firm part of the established repertory of sci-fi literature. However, since the 1980s, they have become a rather antiquated notion, since the computer-generated world of artificial reality offers the infinite facets of “islands in the net”, such as American writer Bruce Sterling described in his cyberpunk novel of that title of 1988.²¹ Thus More’s Utopia can now develop within the boundless expanses of cyberspace.²² The current paradigm of an island with an ideal urban community in virtual reality is Second Life.

The urban arrangement of this 3D online world is based on the grid, i.e. a three-dimensional grid-space, which is subdivided into individual square “sims” each with an identical area. Thus what distinguishes the grid of Second Life is a rigorously orthogonal geometrisation. Though the structure given at the beginning can be expanded, it cannot be changed. This regular diagram is uniform in shape and permanent, and therefore claims timeless validity. And precisely this concept of perfect harmony plus absolute immutability also characterises the shape of the cities in More’s Utopia.²³ There are fifty-four of them in all on More’s island,



No Place like Utopia
by Steffen Krämer

Analogies are constantly being drawn – indeed, in this book as well – between Second Life and concepts of Utopia, which have existed since classical antiquity and acquired a specific meaning during the Renaissance. The word Utopia combines the two Greek words “ou”, for non-, and “topos”, for place.¹⁷ Therefore strictly speaking, it signifies a non-place or a nowhere. Whereas this meaning is hard to grasp, it points to the title of a literary text published in 1516 and written by the English jurist and lord chancellor Thomas More.¹⁸ In his novel More describes the model of an ideal state and refers to the location, in which it’s society had developed historically and supposedly still existed in the sixteenth century. The location is named Utopia. According to More’s idea, Utopia was an island in the sea beyond the horizon, located somewhere in the New World close to an unspecified coast. As a consequence More’s Utopia became a symbol for unexplored territory in the Age of Discovery, shortly after Christopher Columbus found the Americas at the end of the fifteenth century.

As a setting for the development of an ideal state, the distant island was perfect, since it would be completely free of the millennia-old chains of ancient European traditions. On an island where Europeans had never set foot, alternative notions of the state or city could have developed in a natural way, so that More’s Utopia was conceived not so much as a nowhere land as an as-yet unknown place somewhere, which is only nowhere yet in this world.

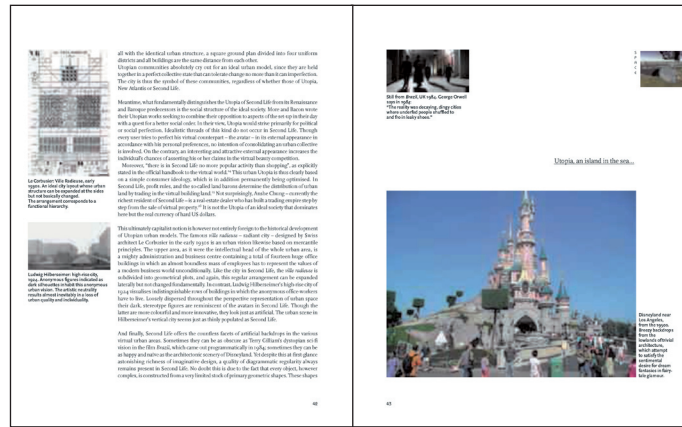
Later exponents of Utopian novels would also borrow the Morean idea of an island for their works. One example is Sir Francis Bacon’s *New Atlantis* of 1627, which places its island with an ideal state somewhere in the Pacific.¹⁹ By the beginning of the twentieth century such still undiscovered islands that could serve as a topographical reference point for an Utopian state were of course no longer available. Authors therefore had to cast around for new autonomous locations. Written in 1907 and published in 1929, Russian writer Alexander Bogdanow’s novel *Red Planet* set his vision of a state on the planet Mars.²⁰ Utopia was thus now an as-yet undiscovered space-island in the solar system.

Political or social visionary worlds in the cosmos with extra-terrestrial ideal states were thereafter a firm part of the established repertory of sci-fi literature. However, since the 1980s, they have become a rather antiquated notion, since the computer-generated world of artificial reality offers the infinite facets of “islands in the net”, such as American writer Bruce Sterling described in his cyberpunk novel of that title of 1988.²¹ Thus More’s Utopia can now develop within the boundless expanses of cyberspace.²² The current paradigm of an island with an ideal urban community in virtual reality is Second Life.

The urban arrangement of this 3D online world is based on the grid, i.e. a three-dimensional grid-space, which is subdivided into individual square “sims” each with an identical area. Thus what distinguishes the grid of Second Life is a rigorously orthogonal geometrisation. Though the structure given at the beginning can be expanded, it cannot be changed. This regular diagram is uniform in shape and permanent, and therefore claims timeless validity. And precisely this concept of perfect harmony plus absolute immutability also characterises the shape of the cities in More’s Utopia.²³ There are fifty-four of them in all on More’s island,

Le Corbusier: Ville Radieuse, early 1930s. An ideal city layout whose urban structure can be expanded at the sides but not basically changed. The arrangement corresponds to a functional hierarchy.

Ludwig Hilberseimer: high-rise city, 1924. Anonymous figures indicated as dark silhouettes inhabit this anonymous urban vision. The artistic neutrality results almost inevitably in a loss of urban quality and individuality.



Still from *Brazil*, UK 1984. George Orwell says in 1984: "The reality was decaying, dingy cities where underfed people shuffled to and fro in leaky shoes."

Disneyland near Los Angeles, from the 1950s. Breezy backdrops from the lowlands of trivial architecture, which attempt to satisfy the sentimental desire for dream fantasies in fairytale glamour.

all with the identical urban structure, a square ground plan divided into four uniform districts and all buildings are the same distance from each other. Utopian communities absolutely cry out for an ideal urban model, since they are held together in a perfect collective state that can tolerate change no more than it can imperfection. The city is thus the symbol of these communities, regardless of whether those of Utopia, New Atlantis or Second Life.

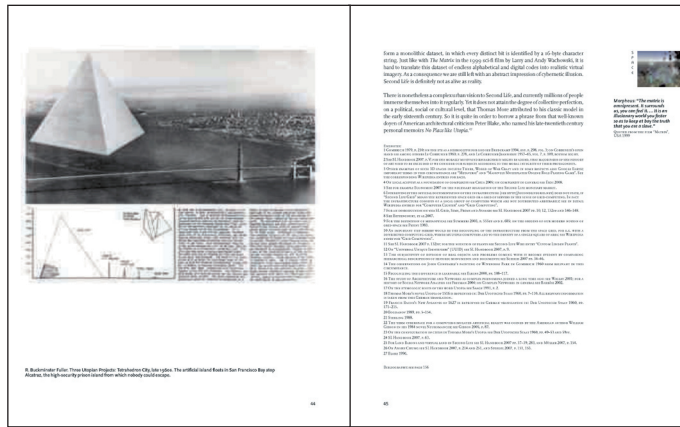
Meantime, what fundamentally distinguishes the Utopia of Second Life from its Renaissance and Baroque predecessors is the social structure of the ideal society. More and Bacon wrote their Utopian works seeking to combine their opposition to aspects of the set-up in their day with a quest for a better social order. In their view, Utopia would strive primarily for political or social perfection. Idealistic threads of this kind do not occur in Second Life. Though every user tries to perfect his virtual counterpart – the avatar – in its external appearance in accordance with his personal preferences, no intention of consolidating an urban collective is involved. On the contrary, an interesting and attractive external appearance increases the individual's chances of asserting his or her claims in the virtual beauty competition.

Moreover, "there is in Second Life no more popular activity than shopping", as explicitly stated in the official handbook to the virtual world.²⁴ This urban Utopia is thus clearly based on a simple consumer ideology, which is in addition permanently being optimised. In Second Life, profit rules, and the so-called land barons determine the distribution of urban land by trading in the virtual building land.²⁵ Not surprisingly, Anshe Chung – currently the richest resident of Second Life – is a real-estate dealer who has built a trading empire step by step from the sale of virtual property.²⁶ It is not the Utopia of an ideal society that dominates here but the real currency of hard US dollars.

This ultimately capitalist notion is however not entirely foreign to the historical development of Utopian urban models. The famous ville radieuse – radiant city – designed by Swiss architect Le Corbusier in the early 1930s is an urban vision likewise based on mercantile principles. The upper area, as it were the intellectual head of the whole urban area, is a mighty administration and business centre containing a total of fourteen huge office buildings in which an almost boundless mass of employees has to represent the values of a modern business world unconditionally. Like the city in Second Life, the ville radieuse is subdivided into geometrical plots, and again, this regular arrangement can be expanded laterally but not changed fundamentally. In contrast, Ludwig Hilberseimer's high-rise city of 1924 visualises indistinguishable rows of buildings in which the anonymous office-workers have to live. Loosely dispersed throughout the perspective representation of urban space their dark, stereotype figures are reminiscent of the avatars in Second Life. Though the latter are more colourful and more innovative, they look just as artificial. The urban scene in Hilberseimer's vertical city seems just as thinly populated as Second Life.

And finally, Second Life offers the countless facets of artificial backdrops in the various virtual urban areas. Sometimes they can be as obscure as Terry Gilliam's dystopian sci-fi vision in the film *Brazil*, which came out programmatically in 1984; sometimes they can be as happy and naïve as the architectonic scenery of Disneyland. Yet despite this at-first-glance astonishing richness of imaginative design, a quality of diagrammatic regularity always remains present in Second Life. No doubt this is due to the fact that every object, however complex, is constructed from a very limited stock of primary geometric shapes. These shapes

Utopia, an island in the sea...



R. Buckminster Fuller. Three Utopian Projects: Tetrahedron City, late 1960s. The artificial island floats in San Francisco Bay atop Alcatraz, the high-security prison island from which nobody could escape.

We find that a tetrahedron city, to house a million people, is both technologically and economically feasible. Such a vertical-tetrahedron city can be constructed with all of its three hundred thousand families each having balconied "outside" apartments of two thousand square feet floor space. All of the machinery necessary to its operation will be housed inside the tetrahedron. It is found that such a one million passenger tetrahedron city is so structurally efficient, and therefore so relatively light, that together with its hollow box sectioned reinforced concrete foundations it can float. Such tetrahedron floating cities would measure two miles to an edge, and can be floated in a triangularly patterned canal. This will make the whole structure earthquake-proof. The whole city can be floated out into the ocean to any point and anchored. The depth of its foundations will go below the turbulence level of the seas so that the floating tetrahedron island will be, in effect, a floating triangular atoll. Its two mile long "boat" foundations will constitute landing strips for jet airplanes. Its interior two mile harbor will provide refuge for the largest and smallest ocean vessels. The total structural and mechanical materials involved in production of a

number of such cities are within feasibility: magnitude of the already operating metals manufacturing capabilities of any one company of the several major industrial nations around the earth. The tetrahedron city may start with a thousand occupants and grow symmetrically to hold millions without changing overall shape though always providing each family with 200 sq. ft. of floor space. Withdrawal of materials from obsolete buildings on the land will permit the production of enough of these floating cities to support frequently spaced floating cities of various sizes around the oceans of the earth. This will permit mid-ocean cargo transferring and therewith an extraordinary increase of efficiency of the inter-distribution of the world's raw and finished products as well as of the passenger traffic. Three quarters of the earth is covered by water. Man is clearly intent on penetrating those world-around ocean waters in every way to work both their ocean bottoms and their marine life and chemistry resources. Such ocean passage shortening habitats of ever transient humanity will permit his individual flying sailing, economic stepping stone travel around the whole Earth in many directions.

From a scientific point, in which every distinct bit is identified by a 16-byte character string, just like with The Matrix in the 1999 sci-fi film by Larry and Andy Wachowski, it is hard to translate this dataset of endless alphabetical and digital codes into realistic virtual imagery. As a consequence we are still left with an abstract impression of cybernetic illusion. Second Life is definitely not as alive as reality.

There is nonetheless a complex urban vision to Second Life, and currently millions of people immerse themselves into it regularly. Yet it does not attain the degree of collective perfection, on a political, social or cultural level, that Thomas More attributed to his classic model in the early sixteenth century. So it is quite in order to borrow a phrase from that well-known doyen of American architectural criticism Peter Blake, who named his late-twentieth century personal memoirs No Place like Utopia.²⁷



Morpheus: "The matrix is omnipresent. It surrounds us, you can feel it. ... It is an illusionary world you foster so as to keep at bay the truth that you are a slave."
 QUOTED FROM THE FILM "MATRIX",
 USA 1999

ENDNOTES:

- 1 GOMBRICH 1979, p. 210; ON THE EYE AS A HIEROGLYPH FOR GOD SEE BREDEKAMP 1994, esp. p. 298, fig. 3; ON CORBUSIER'S OPEN HAND SEE AMONG OTHERS LE CORBUSIER 1960, p. 278, AND LE CORBUSIER JEANNERET 1957-65, vol. 7, p. 109, BOTTOM RIGHT.
- 2 SEE SL HANDBOOK 2007, p. V; FOR THE MORALLY MOTIVATED RESEARCHER IT MIGHT BE ADDED, THAT MAJOR PARTS OF THE HISTORY OF ART NEED TO BE EXCLUDED IF WE CONSIDER OUR SUBJECTS ACCORDING TO THE MORAL INTEGRITY OF THEIR PROTAGONISTS.
- 3 OTHER EXAMPLES OF SUCH 3D SPACES INCLUDE THERE, WORLD OF WAR CRAFT AND IN SOME RESPECTS ALSO GOOGLE EARTH; IMPORTANT TERMS IN THIS CIRCUMSTANCE ARE "METAVERSE" AND "MASSIVELY MULTIPLAYER ONLINE ROLE-PLAYING GAME". SEE THE CORRESPONDING WIKIPEDIA ENTRIES FOR EACH.
- 4 ON LOCAL ACTIVITY AS A FOUNDATION OF COMPLEXITY SEE CHUA 2005; ON COMPLEXITY IN GENERAL SEE ÉRDI 2008.
- 5 SEE FOR EXAMPLE ECONOMIST 2007 ON THE NECESSARY REGULATION OF THE SECOND LIFE MONETARY MARKET.
- 6 INTERESTINGLY THE OFFICIAL DOCUMENTATION OF THE INFRASTRUCTURE (SEE [HTTP://SECONDLIFEGRID.NET](http://secondlifegrid.net)) DOES NOT STATE, IF "SECOND LIFE GRID" MEANS THE REPRESENTED SPACE GRID OR A GRID OF SERVERS IN THE SENSE OF GRID-COMPUTING. IN FACT THE INFRASTRUCTURE CONSISTS OF A LOCAL GROUP OF COMPUTERS WHICH ARE NOT DISTRIBUTED ARBITRARILY; SEE IN DETAIL WIKIPEDIA ENTRIES FOR "COMPUTER CLUSTER" AND "GRID COMPUTING".
- 7 FOR AN INTRODUCTION ON THE SL GRID, SIMS, PRIMS AND AVATARS SEE SL HANDBOOK 2007 PP. 10, 12, 132FF AND 146-148.
- 8 SEE BETTENCOURT, ET AL. 2007.
- 9 FOR THE DEFINITION OF METAOPTICAL SEE SUMMERS 2003, p. 555FF AND P. 685; ON THE ORIGINS OF OUR MODERN NOTION OF GRID-SPACE SEE PEHNT 1983.
- 10 AN IMPORTANT STEP WOULD BE THE DECOUPLING OF THE INFRASTRUCTURE FROM THE SPACE GRID, FOR E.G. WITH A DISTRIBUTED COMPUTING-GRID, WHERE MULTIPLE COMPUTERS ADD TO THE DENSITY OF A SINGLE SQUARE OF AREA; SEE WIKIPEDIA ENTRY FOR "GRID COMPUTING".
- 11 SEE SL HANDBOOK 2007 P. 132FF; FOR THE NOTATION OF PLANTS SEE SECOND LIFE WIKI ENTRY "CUSTOM LINDEN PLANTS".
- 12 ON "UNIVERSAL UNIQUE IDENTIFIERS" (UUID) SEE SL HANDBOOK 2007, p. 9.
- 13 THE SUBJECTIVITY OF DIVISION OF REAL OBJECTS AND PROBLEMS COMING WITH IT BECOME EVIDENT BY COMPARING HIERARCHICAL DESCRIPTIONS OF HISTORIC MONUMENTS AND DOCUMENTS; SEE SCHICH 2007 PP. 34-46.
- 14 THE OBSERVATIONS ON JOHN CONSTABLE'S PAINTING OF WIVENHOE PARK IN GOMBRICH 1960 SEEM RELEVANT IN THIS CIRCUMSTANCE.
- 15 RECOGNIZING THE DIFFERENCE IS LEARNABLE: SEE ELKINS 2000, PP. 108-117.
- 16 THE STUDY OF ARCHITECTURE AND NETWORKS AS COMPLEX PHENOMENA JOINED A LONG TIME AGO: SEE WIGLEY 2001; FOR A HISTORY OF SOCIAL NETWORK ANALYSIS SEE FREEMAN 2004; ON COMPLEX NETWORKS IN GENERAL SEE BARBÁSI 2002.
- 17 ON THE ETYMOLOGIC ROOTS OF THE WORD UTOPIA SEE SAUGE 1991, p. 2.
- 18 THOMAS MORE'S NOVEL UTOPIA OF 1516 IS REPRINTED IN: DER UTOPISCHE STAAT 1960, PP. 7-110. ALL RELEVANT INFORMATION IS TAKEN FROM THIS GERMAN TRANSLATION.
- 19 FRANCIS BACON'S NEW ATLANTIS OF 1627 IS REPRINTED IN GERMAN TRANSLATION IN: DER UTOPISCHE STAAT 1960, PP. 171-215.
- 20 BOGDANOV 1989, PP. 5-154.
- 21 STERLING 1988.
- 22 THE TERM CYBERSPACE FOR A COMPUTER-SIMULATED ARTIFICIAL REALITY WAS COINED BY THE AMERICAN AUTHOR WILLIAM GIBSON IN HIS 1984 NOVEL NEUROMANCER; SEE GIBSON 2005, p. 87.
- 23 ON THE CONFIGURATION OF CITIES IN THOMAS MORE'S UTOPIA SEE DER UTOPISCHE STAAT 1960, PP. 49-53 AND 59FF.
- 24 SL HANDBOOK 2007, p. 63.
- 25 FOR LAND BARONS AND VIRTUAL LAND IN SECOND LIFE SEE SL HANDBOOK 2007 PP. 37-39, 283, AND MÜLLER 2007, p. 154.
- 26 ON ANSHE CHUNG SEE SL HANDBOOK 2007, p. 214 AND 251, AND SPIEGEL 2007, p. 151, 153.
- 27 BLAKE 1996.

BIBLIOGRAPHY: SEE PAGE 156

BIBLIOGRAPHY

PAGES 30–45:

Barabási 2002

Albert-László Barabási. *Linked: The New Science of Networks*. Perseus, Cambridge/MA 2002.

Bettencourt et al. 2007

Luis M. A. Bettencourt, José Lobo, Dirk Helbing, Christian Kühnert, and Geoffrey B. West. 'Growth, innovation, scaling, and the pace of life in cities.' *PNAS*, April 24, 2007; 104 (17): 7301–7306. Published online 2007 April 16. doi: 10.1073/pnas.0610172104

Blake 1996

Peter Blake, *No Place like Utopia. Modern Architecture and the Company We Kept*. Norton, New York/London 1996.

Bogdanow 1989

Aleksandr Bogdanow, *Der rote Planet. Ingenieur Meni. Utopische Romane*. Verlag Volk und Welt, Berlin 1989 (original Russian title of the former: *Krasnaja zvezda*. Leningrad 1929).

Bredenkamp 1994

Horst Bredenkamp: *Albertis Flug- und Flammenauge*. In: *Die Beschwörung des Kosmos: europäische Bronzen der Renaissance*. (ed. Christoph Brockhaus, Bearb.: von Gottlieb Leinz) Exhib. cat. Wilhelm-Lehmbruck-Museum 6.11.1994-15.1.1995. Duisburg 1994. pp. 297ff.

Chua 2005

Leon O. Chua, 'Local Activity is the Origin of Complexity'. *International Journal of Bifurcation and Chaos* 15 (2005) 3435-3456. doi: 10.1142/S0218127405014337

Der utopische Staat 1960

Der utopische Staat. *Morus Utopia*. Campanella Sonnenstaat. Bacon Neu-Atlantis. Ed. by Klaus J. Heinisch. (Philosophie des Humanismus und der Renaissance, vol. 3). Rowohlt, Reinbek bei Hamburg 1960.

Economist 2007

'Trouble in paradise. The banking crisis finds an echo in Second Life.' *The Economist*, August 16th, 2007 URL: http://www.economist.com/finance/displaystory.cfm?story_id=9661900

Elkins 2000

James Elkins, *How to Use Your Eyes*. Routledge, London 2000.

Érdi 2008

Péter Érdi, *Complexity Explained*. Springer, Berlin/Heidelberg/New York 2008.

Freeman 2004

Linton Freeman, *The Development of Social Network Analysis: A Study in the Sociology of Science*. Empirical Press, Vancouver 2004.

Gibson 2005

William Gibson, *Die Neuromancer-Trilogie*. Neuromancer. Biochips. Mona Lisa Overdrive. Heyne, Munich 2005 (original American title: *Neuromancer*. New York 1984)

Gombrich 1960

Ernst H. Gombrich, *Art & Illusion*. Phaidon, London/New York 1960/1977 (reprint 1996).

Gombrich 1979

Ernst H. Gombrich, *The Sense of Order*. Phaidon, London/New York 1979/1984 (reprint 2002).

Le Corbusier Jeanneret 1957-65

Le Corbusier; Pierre Jeanneret: *Oeuvre complète*. (ed. Willy Boesiger. Zurich: Girsberger, 1957-1965 Vol. 7

Le Corbusier 1960

Le Corbusier: *Mein Werk*. Stuttgart: Hatje, 1960

Müller 2007

Markus Müller, *Second Life*. Data Becker, Düsseldorf 2007.

Pehnt 1983

Wolfgang Pehnt: *Rasterpraxis und Proportionslehre*. Raster und Modul im 19. Und frühen 20. Jahrhundert. in: *Der Anfang der Bescheidenheit*. Kritische Aufsätze zur Architektur des 20. Jahrhunderts. München 1983 pp. 19-41

Saage 1991

Richard Saage, *Politische Utopien der Neuzeit*. Wissenschaftliche Buchgesellschaft, Darmstadt 1991.

Schich 2007

Maximilian Schich, 'Rezeption und Tradierung als komplexes Netzwerk. Der CENSUS und visuelle Dokumente zu den Thermen in Rom.' *Diss. Humboldt University, Berlin 2007* (preprint available: <http://www.schich.info>).

Second Life Wiki s.v. Custom Linden Plants

Second Life Wiki contributors, "Custom Linden Plants," *Second Life Wiki*, URL: https://wiki.secondlife.com/w/index.php?title=Custom_Linden_Plants&oldid=16209 (accessed October 17th, 2007).

SL Handbuch 2007

Michael Rymaszezewski, *Second Life*. Das offizielle Handbuch. Trsl. from English by Judith Muhr. WILEY-VCH, Weinheim 2007.

Spiegel 2007

'Alles im Wunderland'. Article from *Spiegel* 8, 2007, 17.02.2007, pp. 150-163.

Sterling 1988

Bruce Sterling, *Islands in the Net*. Arbor House, New York 1988.

Summers 2003

David Summers, *Real Spaces*. *World Art History and the Rise of Western Modernism*. Phaidon, London/New York 2003

Wigley 2001

Mark Wigley, *Network Fever*. Grey Room, summer 2001, no. 04, pp. 82-122, posted online March 13th, 2006. doi: 10.1162/152638101750420825

Wikipedia s.v. Computer Cluster

Wikipedia contributors, "Computer cluster," *Wikipedia, The Free Encyclopedia*, http://en.wikipedia.org/w/index.php?title=Computer_cluster&oldid=164431487 (accessed October 17, 2007).

Wikipedia s.v. Grid-Computing

Wikipedia contributors, "Grid computing," *Wikipedia, The Free Encyclopedia*, http://en.wikipedia.org/w/index.php?title=Grid_computing&oldid=163774507 (accessed October 17, 2007).

Wikipedia s.v. Metaverse

Wikipedia contributors, "Metaverse," *Wikipedia, The Free Encyclopedia*, <http://en.wikipedia.org/w/index.php?title=Metaverse&oldid=165003005> (accessed October 17, 2007).

Wikipedia s.v. MMORPG

Wikipedia contributors, "Massively multiplayer online role-playing game," *Wikipedia, The Free Encyclopedia*, http://en.wikipedia.org/w/index.php?title=Massively_multiplayer_online_role-playing_game&oldid=165081188 (accessed October 17, 2007).

Page 36: Dürer

From: Albrecht Dürer: *Das gesamte graphische Werk 1471 bis 1528*. Handzeichnungen. Verlag Rogner & Bernhard, Munich 1971, vol. 1, ill. 475.

Page 36: Thamugadi

From: Bernard Andreae: *Römische Kunst*. Herder, Freiburg/Basel/Vienna 1973 ill. 836 p. 605.

Page 37: Stephen Wolfram

Photo: Wolfram Media Inc. From: Stephen Wolfram: *A New Kind of Science*. Wolfram Media Inc., Champaign/IL 2001, ill. p. 400.

Page 37: Neapolitan Nativity

Photo: Jörg Hesse. From: Roberto Ubbidiente, Vincenzo De Lucia (eds.): *Paradies der Kontraste: die neapolitanische Krippe*. Exhib. cat.: Staatliche Museen, Berlin 28.11.2003-1.2.2004. Waxmann, Münster 2003, ill. p. 186 top.

Page 37: Pompeii

Photo: Mimmo Jodice, © Banco di Napoli. From: Fausto Zevi (ed.), *Pompeii*. Guida Editori, Naples 1990, p. 233.

Page 38: Archigram/Ron Herron

Collage from Gallery Project for Bournemouth, 1968, p. 337, *Visionen der Moderne – Das Prinzip Konstruktions*, edited by Heinrich Klotz, Prestel, 1986.

Page 39: roxeteer /

Visa Kopu, www.visakopu.net/ Licensed Creative Commons, <http://www.flickr.com/photos/roxeteer/56645184/>

Page 40: Sir Thomas More

Virgilio Vercelloni: *Atlante storico della città ideale*, dell'idea Europea. Editoriale Jaca Book, Milan 1994, pl. 53.

Page 42: Le Corbusier: La Ville Radieuse

Thilo Hilpert (ed.): *Le Corbusiers 'Charta von Athen'*. Texte und Dokumente. Vieweg-Verlag, Braunschweig/Wiesbaden 1988, p. 230f.

Seite 42: Ludwig Hilberseimer

Vittorio Magnago Lampugnani und Romana Schneider (eds.): *Moderne Architektur in Deutschland 1900 bis 1950*. Expressionismus und Neue Sachlichkeit. Exhib. cat., Verlag Gerd Hatje, Stuttgart 1994, ill. p. 189 bottom.

Page 43: Mike Slichenmyer

http://www.flickr.com/photo_zoom.gne?id=117564634&size=0 Creative Commons.

Seite 43: Brazil

Still from Terry Gilliam (director), *Brazil*. UK 1984: Twentieth Century Fox Home Entertainment DVD 2003.

Seite 44: Richard Buckminster-Fuller

James Ward (ed.): *The artifacts of R. Buckminster Fuller: a comprehensive collection of his designs and drawings in 4 vol. Vol. 4: 'The geodesic revolution', Part II. 1960-1983*. Garland, New York 1985. ill. p. 218 top.

IMAGES:

PAGES 30–45:

Page 30: The Second Life Logo

Photo: Linden Research Inc., 2007; Logo siehe <http://static.secondlife.com/downloads/logos.zip>; for info see secondlife.com/s.v. Trademark Usage: http://secondlife.com/corporate/trademark/print_web.php

Page 30: The Eye

Woodcut from Horapollo, Paris 1551. From: Bredenkamp 1994 ill. 3 p. 298.

Page 31: Le Corbusier: The Open Hand

Photo: Lucien Hervé, Paris. From: Le Corbusier; Pierre Jeanneret: *Oeuvre complète*. (ed. by Willy Boesiger). Girsberger, Zurich 1957-1965, vol. 7 p. 109 bottom right.

Page 32: Piranesi

From: Hans Volkmann: *Giovanni Battista Piranesi*. Architekt und Graphiker. Berlin: Verlag Bruno Hessling 1965, ill. 13.

Page 32: City prospect from Urbino

Photo: Susan Tobin. From: Eric M. Zafran: *Fifty Old Master Paintings from the Walters Art Gallery*. Baltimore/Md.: The Walters Art Gallery, 1988. ill. p. 43.

Page 33: De Chirico

Photo: Giuseppe Schiavinotto, Rome. From: Maurizio Calvesi (ed.): *De Chirico: la nuova metafisica*. Exhib. cat., Palazzo die Congressi e delle Esposizioni 27.4.-27.9.1995 San Marino. De Luca, Rome 1995 Dipinti Nr. 5.

Page 34–35: Andrea Pozzo's ceiling fresco in the church of Sant'Ignazio in Rome

Photo by Maximilian Schich, 2007.

Page 36: Le Corbusier, Primärkörper

From: Le Corbusier: *Ausblick auf eine Architektur*. Vieweg-Verlag, Brunswick 1982, p. 123 (original French title: *Vers une Architecture*, Paris 1923).