and development. The aim is to control the behavior and fundamental structure of matter at the molecular and atomic scale. Metric definitions are also contemplated, such as that of the National Nanotechnology Initiative, of the United States, that defines nanotechnology as the interaction of structures whose size is less than 100 nanometers. A nanometer (nm) is a billionth of a meter. A nanometer is approximately 1/80,000 of the thickness of a human hair. The average width of a human hair is of 100,000 nanometers. Objects and nanonavigators are being produced in sizes comprised within 1 and 100 nanometers. This kind of research is therefore carried out on a micrometric and sub-micrometric scale, that allows for the manipulation of matter at the level of nanometric resolution, and to direct the chemical reactions of living organisms that take place within the cells, and which are thoroughfares for components such as drugs and chemical mediators, as well as acting on bacteria and viruses.

[2] In the year 2008, the EC has awarded 403,000 million euros to study and regulate such research. The potential market projection for the year 2014 is of approximately 2 million euros.

[3] Article published: Friday, 8th of April 2005 in Pasadena Star News and Monday, 11th of April 2005 in U-daily bulletin of Los Angeles Newspaper Group.

Other articles:

"Small Wonder Nanotechnology", article published Monday, April 11, 2005 in U-daily bulletin of Los Angeles Newspaper Group.

"NANOART selected for the 2006 International Digital Exhibition", article published Thursday, February 23, 2006 in IT'S ART Magazine, France.

"Technology enables cutting-edge curating for 'Softcopy'", article published Tuesday, April 11, 2006 in The Northern Light, Anchorage, Alaska.

"Nanoart: des oeuvres d'art grâce au microscope électronique", article published on March 17, 2006 in Futura Sciences, France.

"Le NanoArt: un nouveau courant artistique?", article published on March 19, 2006 in Generation Nouvelle Technologies, France

"Nano art: Molecular-level creativity", article published on Wednesday, May 24, 2006 by Associated Press

"Arts Pionniers", article published in the September 2006 issue of Stuff magazine in France.

Bibliography

Arnheim, R. *New essays on the psychology of art*. Berkeley, University of California Press, 1986.

Bateson, G. *Mind and Nature*. New York, Doubleday, 1980.

Lévy-Bruhl, L. *La mitología primitiva*. Madrid, Ediciones Peninsula, 1978.

Lipps, T. *Los fundamentos de la Estética: la contemplación estética y las artes plásticas*. Madrid, Daniel Jorro, 1924.

Rizzolati, G. and Craighero, L. The mirror-neuron system. *Annual Review of Anthropology*, 27, 169-192, 2004.

Lee, V. *The Beautiful*. Cambridge, Cambridge University Press, 1913.

■■■

Architecture in Virtual 2.0 Communities

[Alberto T. ESTÉVEZ*]

Summary

This text presents some conclusions regarding the kind of architecture that we can find in virtual communities in the Internet's parallel universe. These conclusions have been reached after much research by a large team of the ESARQ (School of Architecture at the Universitat Internacional de Catalunya), under the direction of Prof. Alberto T. Estévez. From the onset, we can highlight the enormous naïveté in architectural creation

that has yet to fully discover the potential of new technological resources. Infinite mediocrity seems to drag the greyish world of real architecture into virtual architecture. As opposed to the overwhelming optimism that we should feel when contemplating the wondrous, unexplored and boundless panorama that opens up before our eyes. Founded on the perennial human need to dream, this adopts a special exhilaration in such virtual communities, whose architecture should also consider taking a step towards a 2.0 version, which we also suggest at the end.

> "Wanted: real architect, specialising in virtual architecture, with real university degree, for real estate venture in a virtual world, with real economic retribution, from a virtual Web community." Ad posted on the Internet (www.gencity.org)

Early in the 21st Century, when it seemed that art and architecture were trapped in the dead end of remakes, "neos" and all their possible mixtures, two new and relevant techniques appeared: biological and digital (or biodigital, as their fusion is the most advanced spearhead), genetic and virtual techniques.

Having said this, the possible issues of condemnation have not changed; they remain the same, "ever since Cain killed Abel": injustice, genocide personal extreme situation, that are as ubiquitous as ever, as they were when depicted by Goya, Munch or Kirchner, among so many others that have configured our history of art.

On the other hand, now that the world's population has multiplied and spread with a significant increase in purchasing power in large areas and social groups, when those who are devoted to contemporary art can be counted in the thousands, and can be found in every corner of our globalised planet, when it is impossible to exhaustively follow the development of any issue whatsoever, it is at this point that the "forms of collective art" acquire a new meaning. They become better adapted to the times, and thus, possibly more exciting.

Consequently, the (biodigital) resources, the (human) issues and the doers/receivers (collectives) become the three main factors for evaluation and criticism.

Indeed, the first actions and creations, the first discoveries, indicate that this exploration is already under way. However, the power of the biological and digital tools is such that we can sense that we are on the threshold of something far greater. Something to which the "2.0" reference in the title relates to. Understanding that, "architecture in virtual communities" does not require that we define or debate the terms "architecture," "community" or "virtual." A worthy introduction of what we are not going to address in this text can be found in Gonzalo Vélez Jahn's article, "Architecture in Virtual Communities" that is available on the Internet [1]. In this article, we can already find some considerations on what a virtual community is, or is not, as well as a summarised history of virtual communities and an explanation of what Second Life is and represents. Therefore, this present text will focus primarily on architecture itself, as can be found –or not- in these virtual communities, with a final afterthought on the kind architecture that should be present in the "2.0" version.

Of Primitive Virtual Architectures

Time flies … For over a decade the issue of virtual architecture, with its spectacles at the ready, started to exercise some fascination, with possible promises of an imminent future laden with immersive potential and virtual dreams. In 1996, around the month of February, the author of this text organised the "Virtual Sessions on Virtual Architecture" within the Art History Department of the Universitat de Barcelona. The floor opened "virtually" for the free presentation of communications under this heading. The main speaker was the architect Julio Pérez-Català, responsible for various "real works of

virtual architecture," in this case on the sets of Catalan Television. That is, the kind of virtual architecture –in the broadest sense of the term- that television audiences can see live from their homes, thanks to the so-called "blue screens". These spaces truly do not exist in the way that they are broadcast, only television presenters and technicians actually know what they are like, when they have to work in small rooms with blue (or green) walls. This gimmick is used in the big screen frequently, and spectacularly.

Then came the year 2000, when once again the author of this text started to organise, together with the research programme of "Genetic Architectures" the acquisition of the necessary machinery for the celebration of a Digital Architecture Workshop at the ESARQ (UIC). The hope being that the necessary investment would follow, soon after, to enable a Virtual Architecture Workshop, which would permit the development of architectural design with immersive techniques. However, in the end, there was not enough time, as the process soon evolved in a different direction, so much so, that these technologies were rapidly obsolete, in retrospect, they appear almost prehistoric. Whereas other research areas related to the digital world accelerated astoundingly inasmuch as the development of their potentials. For example, digital manufacturing that unexpectedly overtook virtual architecture by making it real.

Of Virtual Communities

At present it seems as if virtual communities are basking in the limelight, obtaining a greater immersive effect in a radically different, possibly more psychological, manner but far more real. This immersion no longer circumscribes itself to the perception of a virtual space but to life itself. To the extent that our research group -"Art, Architecture and Digital Society"- also pinpointed virtual communities as one of its next research areas. This phenomenon is practically tailor-made to this group's three approaches, art-architecture-society. Suddenly, around January 2007, a snowball started to roll through most media outlets, an overwhelming avalanche of articles, in a typical journalistic "domino effect." Thus, at present, there is not one newspaper, magazine or weekend supplement that has not covered Second Life, in one way or another. Leaving aside our own personal experience with our corresponding local press, in the 27th Arquivirt bulletin, dated March 2007, there are up to ten articles on this virtual community [2]. We consider this more than sufficient bibliography to refrain from repeating or summarising any of this here.

Today, searching the words "virtual community" on Google brings up an impressive 233 million entries! 51,800,000 if we select the plural, and all the possible permutations. 54,000,000 entries if we type it with only one "m" (therefore, there are over 50 million people who believe it to be spelt that way.) We will not even go into the entries in other languages. We can therefore observe the total impossibility of any pretence at exhaustivity in the location of virtual communities, regardless of whether they are interesting or not. Moreover, we can disclose that none of the visited entries really presents a virtual space that is coherent with the specific characteristics that a space like the Internet would demand from it.

Of Architectures in Virtual Communities

We revised over forty virtual communities, including the best known (Second Life), and the more ethereal propositions (Gencity). If we concentrate solely on their architectures, what we have found is mainly conventional, mediocre and downright foolish... Not to speak of, the slightly less blameworthy, although overpowering, sense of naïveté. Overall, it reflects what we already suffer patiently in our daily lives. Therefore, escaping towards a virtual world does not imply finding an ideal world, but rather coming across something far worse, a

caricature of reality.

Activeworlds, Amigos3, Citypixel, Club Penguin, Entropia Universe, Habbo hotel, Kaneva, Kekocity, MTV's Virtual World, Second Life, Superfighetto, There, 3D Planet, Twinity, Virtual Ibiza, Virtual Laguna Beach, vSide, Worlds.com, etc., transport us to parallel universes, virtual locations, in which we can start new lives. As we all know, they include real time meetings with other on-line members, including "three-dimensional chats." Furthermore, they allow us to travel through various pre-defined (in most, but not all cases) sceneries, designed from the onset by those responsible for the location, or freely created by users (the minority), or following (or not) more or less useful menus in their configuration. Everything reproduces real specific locations, more or less literally, or, is inspired by them, or is simply imagined from one reference or another. Graphic settings where one can meet people from all over, in a radical decontextualisation of their origins, in the form of benign avatars that provide enjoyment in absolute impunity. In fact, each time one enters these locations there are countless options to create new lives or even to redo our own.

Within this style of creating architectures, other sites on the Internet, known collectively as "games", that may, or may not, originate in older videogames, posses equally pre-designed and fixed scenarios. Some of these may also include the possibility for users to reconfigure scenarios, following certain predetermined and limited menus. Some even make this reconfiguration a requirement. All of these games contain specific goals, to be attained in the, more or less, short term (Age of Empires II and III, Age of Mythology, Civilization IV, Command and Conquer, Darkageofcamelot, Electrocity, GTA Grand Theft Auto, Guilds War, Minicity, Minivilles, Myst, Lineage 2, Ragnarok, Riven, The Sims, The Witcher, Warhammer, World of Warcraft, etc.). The goals generally involve the destruction (only virtual thankfully) of beings that inhabit these scenarios.

In reality, in such virtual communities everything becomes a game, everything is part of the "game"; regardless of whether or not we have a specific goal. Or even, whether our goals are simply to "live", stroll around; meet people, everything just for fun. Everything? So far, yes, but no longer. A radical shift has already taken place. It is no longer true that everyone is in it just for fun. Some are already in there for work. The more advanced sites have, in a gradual –yet unforeseen- manner, incorporated the possibility of developing real, regular, remunerated employment. Indeed, for some there may be no pleasure whatsoever in clocking into Second Life daily from 9 to 5, employed by whatever company for an always unsatisfactory wage, and even in conditions of actual stress.

Meanwhile, back onto the specifically architectural, the sceneries are generally based on a generic, conventional, hackneyed, urban and suburban imaginary (Activeworld, Citypixel, Electrocity, Habbo hotel, Kaneva, Kekocity, Minicity y Minivilles, most of Second Life, Superfighetto, 3D Planet, Twinity, vSide, etc.). Alternatively, they are set in worlds that are more fantastic than usual (Anarchy-online, Entropia Universe, some specific cases in Second Life, Worlds.com, etc.). Or, directly rooted in definite physical realities, real pre-existing locations combined with conventional line-ups (The Sims, There, Virtual Ibiza, etc., and, of course, Second Life). Or, more of the same, but coupled to its corresponding television series (MTV's Virtual World, Virtual Laguna Beach, etc.), as an on-line spin-off that tries to go beyond television, taking advantage and exploiting the possibilities of the virtual world.

We must also mention the great success – even in the 21st Century- of anything that comes from the fantastic imaginary of the "Sword and Sorcery" genre, where the "bad guys" usually live in dark, cavernous and ghastly environments, whilst the "good guys" live in luminous, chromatic geographies with

undertones of ancestral Celtic art. This basically, replicates the age-old confrontation between the clichés of evil/darkness and good/light (Darkageofcamelot, Guilds War, Lineage 2, Myst, Riven, The Witcher, Warhammer, World of Warcraft, etc.). However, the proportion of pseudo-medieval, pseudo-Egyptian and pseudo-monumental constructions (with significant symbolic and representative content, with axes of symmetry and a formal volumetric hierarchy) in virtual communities, such as Second Life, is far greater than in the real world. In many cases, they find their inspiration in real examples of existing historic architecture, although generally reproduced with large doses of naïveté. When surfing the Internet it is not uncommon to bump into key buildings of humanity, from Michelangelo's Sistine Chapel to Mies van der Rohe's Farnsworth House. Virtual communities could even be the way to preserve such buildings if they succumb to serious damage caused by untimely tunnels or any other misfortune, including unscrupulous speculators; especially, in the unfortunate event, of their total disappearance. In any case, they allow us to explore them without travelling, without consuming fossil fuels, outside visiting hours, facilitating their conservation in the face of excessive tourism and inexorable decay. Nonetheless, at present this is all laughable because of the unfortunate graphic resolution displayed by the majority.

On the opposite extreme to the populist and historicist hodgepodge that proliferates on the Web, we find the dreadful abundance of architecture that stems, in this case, from a post-modern imaginary, according to what the masses consider "modern architecture." The amazing array of International Style is too embarrassing to look at, beside the fact that it was en vogue over eighty years ago. Not to mention, the inclusion of "wise aphorisms" from Frank Gehry to the Catalan Palau de la Música, after a process of Frankenstinian collage.

Other subject is like we can also observe naive contradictions, within the architecture of virtual communities that are comical because of their innocence, their lack of perverse intention. Just beneath the waterline of what is, or not, coherent with the digital, virtual and network medium, considering its appropriateness, or not…

For example, floating over Second Life, who is kept warm by the fireplace in that room? Should virtual architecture even bother thinking about rooms? Does that light in that other room come from the candles that can be seen "flickering" away? Is it not the computer screen that gives light to the ensemble? What sunlight are those Venetian blinds trying to block out? The buildings do have shadows, as if under the effects of sunlight. Is that an indoor or an outdoor space? Is it not all an impossible and seamless electrical amalgam? Therefore, will that piano be damaged out there? Then again, why does it have wheels? Wheels, now that really is a mystery, seeing them roll in cyberspace… Not to mention the attempts to naturalise space, by adding plants, lawns and even waterfalls (not one brain cell has been wasted to invent anything new).

At least when you are in there you will not suffer thirst or illness. Having said this, some playful hacker might invent avatar-specific ailments, with all kinds of symptoms. Furthermore, virtual inhabitants have no need for the sense of taste, smell or touch. No showers are necessary either, it is all positive! People displace themselves by "flying," "teletransporting" themselves, but none of this has brought about anything new to these communities' architecture: "houses" are still built on top of "floors," with doors and horizontal stories, as if they were subjected to an (inexistent) force of gravity. In reality, all of this is used as a mimetic referential and orientative system. Similarly, the distinction between public and private has some differences with regard to real life, by means of simple electronic passwords.

Nevertheless, it is possible to find some "loose cannons" that intend to create a new

(virtual) reality, different to the generic, conventional and cliché imaginary. Their greater or lesser virtue will therefore depend on their better or worse understanding and effective use of the specific characteristics of the digital, virtual and network medium.

On the other hand, it is normal that at present, virtual universes are configured on the basis of a formal and gravitational mimesis of the real world. There are not that many people who actually think before they act, there is still not enough experience to imitate. As with the first iron pillars that initially imitated stone pillars, as these had in turn imitated the wooden or cane pillars. The truth is that human beings are not quick learners. In the same way that no one knew what shape to give the new materials, neither does the majority know what shape virtual and digital architecture must have on the Web, much less the concept of urban planning. In fact, we could even say that a new path appears the moment we are aware of a mimetic phenomenon. Before learning anything, we must first imitate, only then can we start to create. Children first learn how to imitate what they see. It is pretty much in our genes. It is one of humanity's basic systems. Nevertheless, what is true is that anything on the Internet is 100% appropriate if there is something collective to it, if it reflects communitarianism, interaction and interconnection. Even better, if it is based on it: then, as with net.art, such digital and virtual architecture finally mutates into net.arq.

Gencity, the genetic city, the Web's Genetic City

Observing the inexistence of architecture that is coherent with what we consider a virtual community on the Web, the Gencity Project aims to redress this situation. Although at present a flat, minuscule and embryonic city, in www.gencity.org, this is only its first spark. While we wait for its architecture to fully develop, adequately exploiting the Internet's potential, until it becomes pure net.arq. At present, it is formulated as we express in the following paragraphs: Gencity, the genetic city, the Web's genetic city, an idea, an action, a seed of Genarq, genetic architectures.

Having said this, our starting point requires the creation of a virtual "urban" centre and its corresponding fabric spread out throughout the Web, exhaustively containing all the information related to genetic architecture. Instead of creating a conventional Web page, that merely compiles information; the goal is to build a digital genetic city, with real architecture in the virtual world. Furthermore, there is an attempt to establish a "natural" integration with the intrinsic mechanisms and potential of the virtual land in which it is hosted, from which it feeds from, where it proliferates.

Therefore, its digital seed grows and evolves continuously, constantly changing architecture in the Web, and in real time, as these are specific characteristics that it can have. Hence, each day that we enter a particular site we will always see something different, as the genetic city is a city in perpetual movement and mutation.

Moreover, it also possesses an expansive potential, a colonising urge (although peaceful in this case) vis-à-vis the Web. This allows it to ensure, through some degree of hacking, as if it were a spore, that the winds of cyberspace disperse it and help it take root throughout the entire virtual world, budding even in random locations. Having sown this seed in this parallel universe, Gencity can extend infinitely on its own, through mechanisms of self-reproduction and self-diffusion (potentially specific characteristics of net.arq), or through the work of new sowers, who may sow it in thousands of other locations, in fact anywhere where it is liable to grow. Even hackers can participate in this collective, uncontrollable and free endeavour, colonising Web sites that are inaccessible to normal human beings. In fact, depending on how we look at it, the hackers' work has an artistic angle to it, which through their perfect

adaptation to the medium (from within) makes them the most coherent artists that work with the Internet. Hackers make full use of the Internet's potential -they are the real Web artists. A large part of contemporary art, without pretending to have any further use than being what it is, has always tried to remain critically on the margins of what is established, often provocatively, with the desire to undermine the foundations of the civilisation that has given them their momentum: this is exactly what a computer virus does.

Gencity and the colonisation of the Web, sends out its virtual spores throughout cyberspace, as if from a big bang. Of course, we are talking about a benign colonisation, to provide greater interest to the humdrum mediocrity that is present in 95% of Internet sites. We will obviously, give the owners of colonised sites the possibility of "pruning" its branches, even chopping them off if they so desire. Maybe, one day, we may reach a point when this evolution through the more obscure corners of this virtual galaxy can be carried out in their rhizomatic lives, through the same interconnecting characteristics, enabling them to acquire a superior intelligence and a "conscience" of self that is rooted in its potentially autonomous capacity of response.

Therefore, the definition of Gencity would end up defining what, in all justice, is net.arq in itself. That is to say, abstract geometry and fractality, in permanent evolution, without pseudo-styles, gravity, conventionalisms or even physical or metaphysical mimesis. Total freedom for the infinite succession of ones and zeroes whose variability may even be programmed through digital genetic treatment. Pure order as well, to visualise them in humanly visible bands to take advantage of their conditions of emergency, self-organisation and automation. With the previously cited characteristics of: perpetual movement, mutation, evolution, rhizomatic self-expansion or through spores.

In fact, it will become a digital simulation of what a real genetic city could be in a natural environment. As advocated from the research line of "Genetic Architectures", if we apply genetic techniques to the Earth's real vegetation, transforming it into habitable spaces, we could create a real, living, soft and furry, free for all gencity growing throughout the planet, and also in a rhizomatic way or through spores. A continuous city, which could embrace the entire world with seamless vegetation. This would be much better than 95% of the current architecture. An era where humans will be capable of effectively using 100% of the potential of what we call nature.

This is all that we have yet to achieve, committed architects have the gargantuan duty of improving the real world through architecture and now they are tasked with improving the virtual world as well. We wish them strength and courage …

Notes

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[1]VÉLEZ JAHN, Gonzalo, "Arquitectura en las comunidades virtuales: lo que va de ayer a hoy... y sigue para mañana...", Arquiteturarevista, vol. 3, n° 2, pp. 15-30, UNISINOS - Universidade do Vale do Rio dos Sinos, São Leopoldo, July-December 2007.

[2]VÉLEZ JAHN, Gonzalo – LLAVANERAS, Gustavo (eds.), Arquivirt, n° 27, Caracas, March 2007.

An Introduction to Gameworld Experiences in Various Institutions

[Virginia RUISÁNCHEZ]