EXPLORING INFORMED VIRTUAL SITES THROUGH MICHEL FOUCAULT'S HETEROTOPIAS[1]

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Abstract *This papers starts with some mysterious contribution by Michel Foucault (1967) about* heterotopias *as special epistemological* sites. *With a recent case-study – an immersive virtual reality art project dealing with some ancient abbey reconstruction and managed by a French engineering school – we analyse the successive attempts to satisfy the system users by extending Foucault's heterotopology, which appears to be useful and creative for the Virtual Reality research communities.*

Keywords: Imaginary space, Informed virtual environment, Immersive art, Artificial presence, Michel Foucault's heterotopias, Realism *vs.* Provocation, Ancient abbey of Compiègne-France.

I. INTRODUCTION: MICHEL FOUCAULT'S HETEROTOPIAS

In the twentieth century, many important philosophers worked on human subjectivity with phenomenological considerations relying on space, time or history. Among them are Ernst Cassirer, Gilles Deleuze, Gaston Bachelard, Augustin Berque and many others. For example, Bachelard's monumental work taught us that we do not live in a homogeneous and empty space, but on the contrary in a space thoroughly imbued with quantities, and perhaps a thoroughly fantasmatic space as well. The space of our primary perception, our dreams and our passions holds qualities that seem intrinsic. But because several ideas that may turn into key concepts for Virtual Reality develop throughout the notion of *Heterotopias,* we have chosen to concentrate on a short text written by Michel Foucault in 1967[2], entitled *Of Other Spaces,* to give this scientific contribution a philosophical point of view.

In this amazing text, Foucault claims that after history, space is now the main preoccupation of humanity, arguing that *we are now in an era of simultaneity, juxtaposition, of proximity and distance, of side-by-side, of the dispersed.* Of course, the way we consider space is historical: according to the philosopher, today the *site* has been replaced by *extension* (the infinite Galilean space) which has replaced *emplacement* (the medieval hierarchic ensemble of sacred or secular places): the *site* is defined by relations of proximity between points or elements; formally, we can describe these relations as series, trees, or grids. Our era is one in which space takes for us the form of relations among sites, knowing what relations of propinquity, what type of storage, circulation, marking, and classification of human elements should be adopted in a given situation in order to achieve a given end.

Foucault was interested in sites that are connected with all the others, but in such a way so as to suspect, neutralize, or invent the set of relations that they happen to designate, mirror, or reflect. These spaces linked with all the others however contradict them. They are of two main types: *utopias* and *heterotopias*.

Different from utopias, heterotopias are *real* places – places that do exist and that are formed in the very founding of society – which are something like counter-sites, a kind of enacted utopia in which real sites, all the other real sites that can be found within the culture, are simultaneously represented, contested, and inverted. Places of this kind are outside of all places, even though it may be possible to indicate their location in reality. And as we may not have reached the point of a practical de-sanctification of space yet (perhaps our life is still governed by a certain number of oppositions that our institutions and practices have not yet dared to break down), our actual heterotopias may keep some trace of this hidden presence of the sacred, that still nurtures them.

Michel Foucault put forward six main principles to build up his emerging theory of heterotopias – named hetero-topology – as a way to organise the simultaneously mythic and real contestation of the space in which we live.

– *Principle #1:* There is probably not a single culture in the world that fails to constitute heterotopias. But the heterotopias obviously take quite varied forms, and perhaps not one absolutely universal form of heterotopia would be found (developed examples concerning our contemporary cultures are *boarding schools*, *military service* or *honeymoon trip* as heterotopias of crisis, remnants from the so-called primitive societies, or *psychiatric hospitals* or *prisons* from emerging heterotopias of deviation).

– *Principle #2:* Each heterotopia has a precise and determined function within a society and the same heterotopia can, according to the synchrony of the culture in which it occurs, have one function or another (developed example is *cemetery,* as a space connected with all the sites of the city, state or society or village, since each individual has relatives in the cemetery, the type of

connexion changing with the resurrection of bodies or immortality of the soul, this influencing the site. The cemeteries then came to constitute, no longer the sacred and immortal heart of the city, but the other city, where each family possesses its dark resting place).

– *Principle #3:* The heterotopia is capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible (developed examples are *theatres, cinemas* and *gardens,* as being smaller plots of land and the whole land, our modern zoological gardens springing out from that source).

– *Principle #4:* Heterotopias are most often linked to slices in time – that is to say that they open onto what might be termed, for the sake of symmetry, heterochronies (developed examples are *festivals, libraries* and *museums,* as ideas of accumulating everything, of establishing a sort of general archive, the will to enclose in one place all times, all epochs, all forms, all tastes, the idea of constituting a place of all times that is itself out of time and inaccessible to its ravages, the project of organising in this way a sort of perpetual and indefinite accumulation of time in an immobile place).

– *Principle #5:* Heterotopias always presuppose a system of opening and closing that both isolates them and makes them penetrable (developed examples are *jails, baths for Muslims*, or *Scandinavian saunas,* where the entry is compulsory or submitted to activities of purification or rites).

– *Principle #6:* The last characteristic of heterotopias is that they have a function in relation to all the space that remains (developed examples are *brothel, colony* and *boat):* their role is to create a space of illusion that exposes every real space, the site inside of which human life is partitioned, as still more illusory (*brothels*) or, to the contrary, to create a space that is other, another real space as perfect, as meticulous, as well arranged as ours is messy, ill constructed and jumbled *(colonies).*

Foucault died in 1984, too early to have the opportunity to think about Virtual Reality (VR) as a mature research and experimentation field. In this paper, we aim at presenting a particular VR project (the recent 3D reconstruction of an ancient Abbey in Compiègne-France) from the epistemological point of view that Foucault has offered us with his creative hetero-topology. It is both a way to celebrate the philosopher and an attempt to benefit from his research toward the VR community.

2. EXPERIMENTATION: VIRTUAL REALITY, REALISM, AND PROVOCATION

This section is dedicated to the description of a particular VR project, from both technical and management aspects. The accent is put on the contrast between

a first spontaneous approach, that basically failed, and a second approach, more provocative but successful, that inherited from the first failure. We are first going to report and describe that case study which is quite typical of an engineering school approach (the action takes place in the Université de Technologie de Compiègne-France – UTC). Then in a second part, we will analyse its epistemological value.

The project as a case study

An abbey in Compiègne was partially destroyed in 1790.[3] The project we carried out with UTC students consisted of the realization of a model in mixed or augmented virtual reality in order to make inhabitants understand the importance of the abbey in their city.

Virtual reality was instituted as a scientific discipline by researchers and practitioners aiming at producing artificial environments that would simulate the production of such a reality. According to Jacques Tisseau, it should remain a 'dialogue between scientific disciplines'.[4] However, since the first visualisations in the 1980s up to more recent immersive and interactive systems, advances have been mainly technical: worlds similar or close to reality are to be seen, and imaginary or artificial worlds are to be felt.

The realism of experiences, situations, and sensations has been essential criteria of performance of VR systems coming from several logics that naturally combined:

– A logic of data reduction and of re-composition with models and algorithm of image synthesis, of illumination, of calculation of details or else of inversed cinematics or dynamics, so as to convey reality as realistically as possible;
– A logic of interpretation and amplification in which the operator is to see and feel.

First 'spontaneous' approach: Targeting realism as a 'must'

The choices made for the project were fast and spontaneous, for they were obvious:

– Computer Assisted Modelling (CAO), then transfer of data in 3D;
– Addition of textures and materials coming from real photographs of the walls and vestiges of the abbey;
– Insertion of virtual characters (monks) walking in the cloister while meditating, with predefined movements;
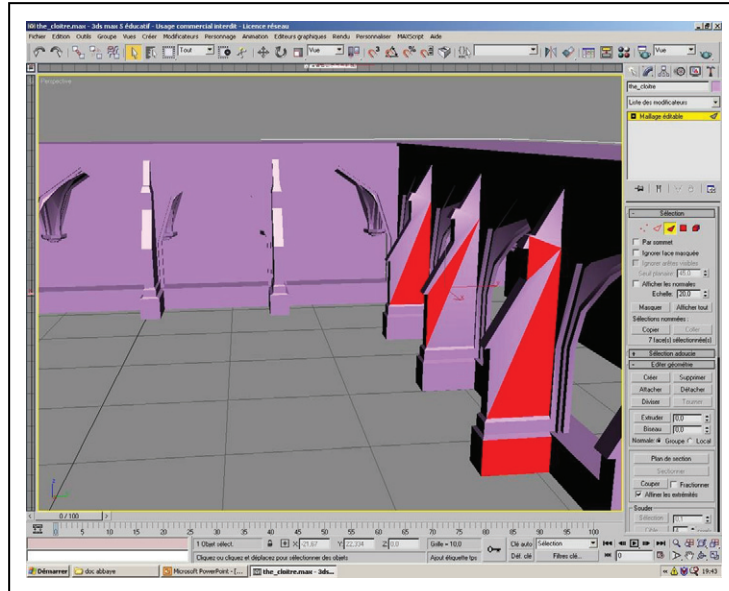– Free browsing and changes of viewpoints thanks to an appropriate interface and vignettes.

Figure 1. 3D modelling of the cloister.

The realism obtained by that kind of method driven by a 3D real time tool, *Virtools*^TM, is now classic. Representations are calculated according to the user's position. The following figures illustrate this.

The project was formative for students, but when we started the tests on representative samples of the population of the city, it appeared that something was wrong. In fact, either the users criticized the realism of the project to demand more credibility in details, (those were often video game players), or they confessed they did not find much interest in such a project (those who were used to the abbey neighbourhood).

We thus had to take into account the deception of our future users and radically rethink the foundations of our approach. As a matter of fact, the project became all the more interesting because virtual reality was no longer a simple field of technical feat but sent us back to its pluridisciplinary constitution that Jacques Tisseau held dear.

Second 'provocative' approach: Opening to some rebellious possibilities

After reading Bachelard's *Poetics of Space*[5], we realized that the presence of the visitor was central in the project. It would be important to widen his/her imagination and to use it immediately in a lived and felt experience, even
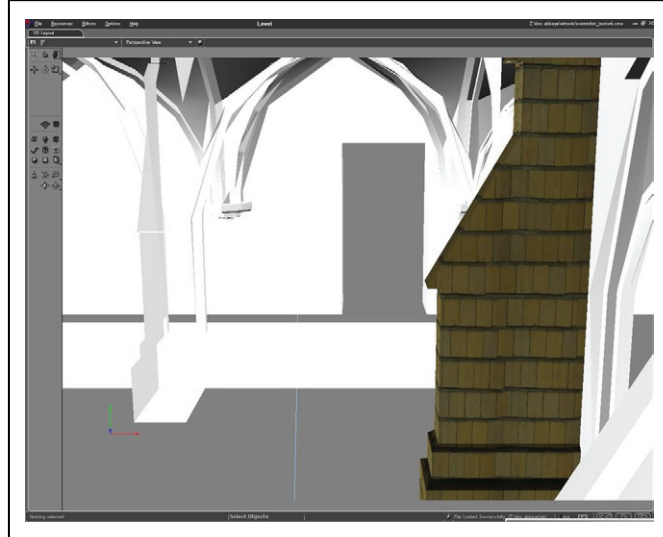
Figure 2. 3d modelled inside stairs.

Figure 3. 3D modelled monk.

though provoking it with some kind of violence. With specialists in synthetic imaging, in conservation of architectural heritage and in augmented reality and photography, we thought about what was most important for the building of mental construction the project would offer. It appeared, for example, that anachronisms were not necessarily problematic and that an air of fiction or even of scandal could be maintained.
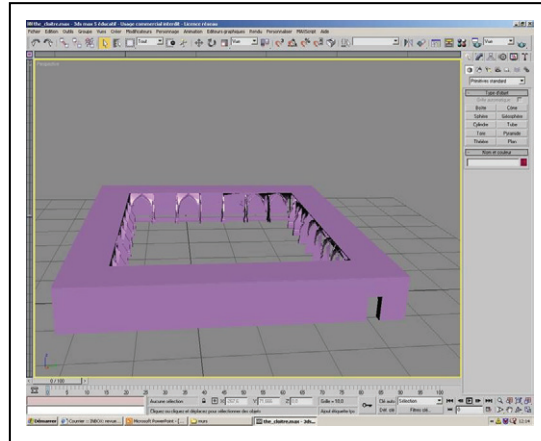
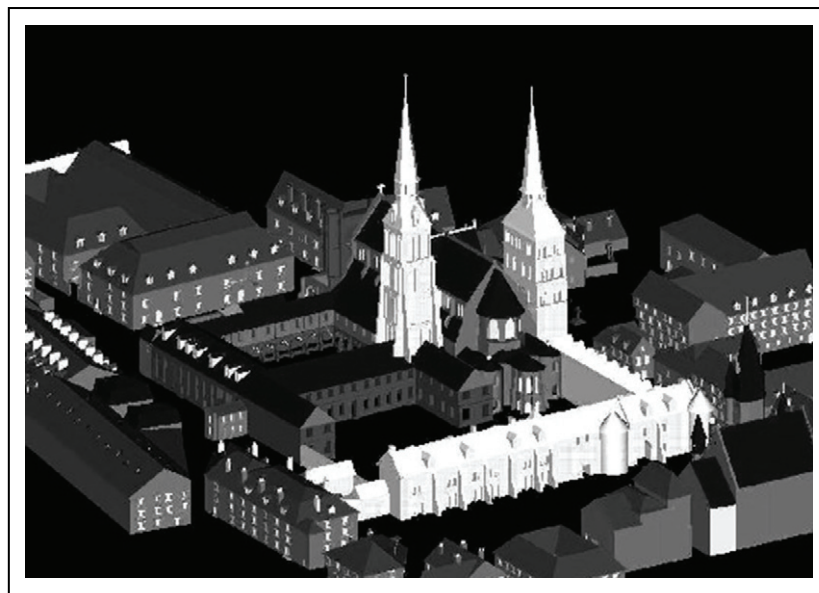**Figure 4.** 3DStudioMax™ modelled surrounding wall of the abbey.

Figure 5. complete 3D model.

The idea was now to reconstruct the abbey according to what it represented in the city until 1790, while keeping the landmarks of the contemporary city. The inhabitants of Compiègne find themselves in a familiar world where they understand space and expect not to see all the details of the disappeared abbey.

They take part in the experience. They can thus explore and deeply understand the presented space, get over conventional ideas, and arrive at new ones.

We thus chose to show the anachronic presence of the abbey inside the contemporary city. The abbey in the middle of the city in 2008, where a butcher's shop, pharmacy, greengrocer, and video store now exist, appears in its imposing size. Thanks to its two towers, its size is a shock to the inhabitants who can recognize the different reconstituted points of view. This visit into the past is worth it: we will never see the abbey again, even though its role in the community before 1790 was central.

Moreover, choices of simplification and of reinforcement have been suggested. In the second project, textures have been replaced by a diffuse material-a kind of « cartoon » rendering.

The different points of view superimpose real images in *QuickTime VR*™ panoramic with synthesis images of the abbey. It is an augmented reality, that is to say the addition of virtual objects in a real world. The browsing is no longer continuous with a virtual camera-controlled mouse but on the contrary with a cognitive map in which a ball will be launched so as to choose the zone to visualize. This 2D simplified map of the city gives an idea of the dimension and disposition of the different parts of the abbey: the cloister, the nave that has become St Corneille Street, the monks' housing, the rooms, and so on.

In his work, *Francis Bacon: The Logic of Sensation*, Gilles Deleuze describes very precisely this perception or experience made possible through the image: 'Already when too pious critics reproached Millet for painting peasants who were wearing an offertory like a potato bag, Millet would answer that the heaviness common to both objects was deeper than their figurative distinction. As a painter, he endeavoured to paint the force of heaviness and not the offertory or the potato bag. And isn't Cezanne's genius to have used all the means of painting to this task: make the force of mountains orogeny, the force of potato germination, the thermal force of a landscape visible . . . ?'.[6] It is this gesture that is continued here. It breaks away from realism to go towards fiction and emotion. It can go as far as rebellion.

The following figures give an idea of the proposed visuals.

Even before the second version of the project was finished, tests involving the general public were once more organised. This time, the reception by Compiègne inhabitants was more enthusiasti: they asked questions and we also had cooperative responses, in contrast with the apathetic reception of the first version.

Students were now convinced they were on the right track. Then we discovered Foucault's text about heterotopias, and we thus decided to use it to systematize our research.

Figure 6. Insertion of a 2D sketch in a photograph.

Figure 7. Augmented reality shot of the abbey, view of the street.

*Feed-back analysis/evaluation about the experimentation process
in front of the audience*

We have attributed enthusiastic response in the second attempt to the anachronistic setting in which participants *understood where they were,* but this has to be examined more carefully because the rendering have also improved since the first attempt.

Even more, we have to report that the first test sample from the general public (forty-five visitors of the abbey were interviewed during five minutes each, based

Figure 8. The abbey seen from the town hall.

Figure 9. The cloister and the abbey in augmented reality.

on a Multiple Choice Questionnaire – MCQ) has been partly involved (twenty-eight persons from forty- five) in the second MCQ test (involving also forty-five visitors): in other words, more than half of our second tested sample had already participated to the first test. This is an important bias, because those visitors were already used to test a virtual reality system about the abbey, and they were able to manifest a differential view on the two successive projects, by even suggesting some simplification options and/or some reinforcement ones.

Those considerations invite us to carefully interpret the compared results of the two different tests, which are not independent from the sample aspect,

Figure 10. 'Cartoon' *rendering and diffused materials*.

and rely on two very different technical configurations, not only differing from 'realism' vs. 'provocation' metaphors. Nevertheless, as both the authors participated personally to the test campaigns, they can claim for the enthusiastic and cooperative responses to the second test, in contrast with the apathetic reception of the first test campaign.

3. ANALYSIS: ANCIENT ABBEY, ACTUAL RUINS AND VIRTUAL REALITY

Professionals of national and regional development have taken note of the strong heterotopic character of the ancient abbey to try to convert it into modernity (principle #2): The abbey is thus reinterpreted according to current canons. To succeed in doing the conversion, architects and urbanists have counted on principles of functional conservation, as well as on principles of subversion (principle #6). Let us examine the conversion project in detail.

The abbey as it was in the Middle Ages

The abbey that used to be a sacred and enclosed place (only for monks in search of God) has now become a secular welcoming place open to the public (museum, library). However, we hope to keep something of its former spirit of meditation, retreat, and solitude, a place that would remain favourable for meditation and relaxation. But the liturgical time of monastic life can only give way to the hope of a hybrid time (principle #4) and of a new function, between meditation and efficiency, of such a place that remains indifferent to the swarming activities outside (principle #5). As a matter of fact, the silence of the gardens and of the

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orchards, in a cosmological connection with the rest of the world, is now in the heart of the noisy city (juxtaposition principle #3), as a kind of ship (the nave), a kind of floating place, a place without a place that would live by itself (principle #6), as if the cultural offer imposed itself within the commercial offer of the modern city.

A heretopia of crisis – the heavenly abbey that used to be at odds with earthly secular order – now gives way to a heterotopia of deviation (principle #1). Everything has changed, but something of the sacred remains in the renewed function of the place: thus, this silent sacred component of former order is still at work in modern spirits, as Foucault already said it.

The conversion of the site had kept a rather classical appearance so far, but it became more complex when the young project team of engineers came with their simulation tools.

What about a VR model of an ancient abbey?

In fact, our first attempt to model the ancient abbey within an informed virtual site was clearly corresponding to the Heterotopia 1, built up from a spontaneous *targeting realism* approach. We can easily describe the characteristics of System 1:

– Immersion in a virtual imitation of the abbey and more demanding and detailed realism;
– The secret of mystical life is unfolded but its symbolic function is gone, de-singularised and given like a utopia.

Then, our second attempt to model the actual abbey was clearly corresponding to the Heterotopia 2, built up from a provocative approach *opening some rebellious possibilities*. We can describe the characteristics of System 2:

– Superimposing, aporetic and simultaneous juxtaposition of incompatible, impenetrable and heterogeneous places in an implacable neighbourhood;
– Rebellion and contradiction, spiritual conflict and suspension of artificial harmony: Place of leisure or work? Private or public place? Cultural or commercial place? Earthly or heavenly place? Contemporary or medieval place?

The decision to implement an Informed Virtual Site (IVS) is not neutral, in so far as this option has something to do with heterotopia, which Michel Foucault could not foresee, even though we feel he had the prescience of this technical possibility. In other words, we have to rule on these heterotopias of a different kind that Informed Virtual Sites (IVS) are – and we could thus maybe call them *Heterovirtopias* as an extension of Foucault's heterotopology.

Virtual Reality as a New Investigation Field for Heterotopias

Michael Wood wrote, about Italo Calvino's *M. Palomar,* something that makes us think of what we can isolate from reality: 'A fact is something that does not want to go away, that we cannot ignore, as Henry James said about reality. However, when we come close to it, when we stare at it, when we measure our loyalty to it, it becomes more complicated. Without becoming less factual, it slides towards myth. Mr Palomar is looking at the sky, the lawn, the sea, a young girl, giraffes and even more things. He only intends to observe, and learn a modest lesson from creatures and things. But he cannot do it. There is too much to see in them for a beginning ... And there is too much in him of his culture in the world he is contemplating anyway: the world is covered with the signs of our needs and with our mythologies'.[7]

Can our IVS help us live singular throbbing? Contrary to the glasses we wore to get into the first virtual worlds, will IVS manage to make us suggest reality, fiction or rebellion glasses that will enable us to get into throbbing facts? As for the past of the Compiègne abbey, let us see what Witold Gombrowicz writes in his work entitled *Dante:* 'Sharing with the past means elaborating it with difficulty, asking it endlessly to exist ... But, we can *read* the marks the past left us. These marks depend on fate, on the material itself that can be more or less crumbly and dependent on accidents that took place over time. Time brings these marks to us, and the past can be but chaotic, accidental and fragmentary ... (...) The past is thus the same scenario made of bits and pieces ... Here is what it is ... And this gives us enough to think about the desire we have to have at our disposal a whole complete and living past full of concrete characters, and this need is deeply rooted...'.[8]

And if our IVS came with us to the most liberated fiction, even to rebellion? Rebellion could be about historical determinism, which maintains that the abbey will never exist again. Maybe André Breton is the only one to underline the importance of the everlasting presence of a non conditioned rebellion: 'It is at the precise moment when the weight of endured sufferings seems about to engulf everything, that the excess of the ordeal brings a sign change that tends to bring the human being who is unavailable to his most available side, and to afflict this being with a greatness he would never have known without it (...). One needs to have been to the end of human suffering and have discovered its strange capacities to be able to greet what is worth living in the same unlimited way. The only definitive disgrace that could be incurred, for it would make this sign conversion impossible, would be to match it against resignation (...). There is absolutely no more brazen lie than the one which consists in maintaining that rebellion is useless, even and especially in the presence of what cannot be undone. Rebellion justifies itself regardless of the chances it has to modify or not the fact which determines it. It is the spark in the wind, but the spark that is looking for powder'.[9]

Heterotopias	The Middle Ages abbey and its surroundings (as it is supposed it was)	The actual ruins (as they have recently been partly turned into a museum) and their surroundings
Characteristics of the heterotopias	Sacred and enclosed place (for monks in search of God)	Profane welcoming place open to the public (Museum, library)
	Place of retreat, meditation and solitude	Place of sharing and meditation that is hopefully favourable for relaxation
	Specific liturgy time of monastic life	
	Silence of the surrounding gardens in a cosmological connection with the rest of the world	The hope of a hybrid time and of a renewed function, between meditation and efficiency, far from the swarming urban activities around
	Heteroptopia of crisis at odds with the profane earthly order	In the heart of the noisy city, a kind of ship (the nave here has a double meaning), a kind of floating place, a place that would live by itself
		A cultural offer within the commercial offer of the city Heterotopia of deviation

Modelling through Virtual Reality approach

	System #1: Spontaneous approach *targeting realism*	System #2: Provocative approach *opening some rebellious possibilities*
Corresponding informed virtual site		
Characteristics of the informed virtual site, *Heterovirtopias*	Immersion in a virtual imitation of the abbey, more demanding and detailed realism	Superimposing, aporetic and simultaneous juxtaposition of incompatible, impenetrable and heterogeneous places in an implacable neighbourhood
	The secret of mystical life is unfolded but its symbolic function is gone, desingularized and given like a utopia	Place of leisure or work? Private or public place? Cultural or useful place? Earthly or heavenly place? Contemporary or medieval place?
		Rebellion and contradiction, spiritual conflict and suspension of artificial harmony

4. CONCLUSION: TOWARD NEW TOOLS FOR FOUCAULT'S HETEROTOPOLOGY?

It has to be one thing or the other: either our *Immersive Virtual, Mixed, or Augmented Reality Art* applications are heterotopias of a new kind or they make us re-evaluate our implicit or explicit heterotopologies. This does not mean that we have to decide between them in general. We do think that an artist sometimes produces a heterotopia of a new kind (a *Heterovirtopia*?) thanks to an IVS device. The artist can also happen to produce a displacement in the dominating heterotopology, or finds new ways of developing it. In both cases, however, each contribution is highly valuable, although both of them should not be mixed up.

Why heterotopia concept is useful in designing a virtual reality project?

In the case of our project, things probably occurred that way: a first drafting of the system made the realisation of a prototype possible, without deeply thinking about it. Its implementation questioned the heterotopias used more or less implicitly in the definition of the Museum that was to make the ruins of the abbey attractive. It is only at that time that a heterotopia of a new kind could be found. All this makes us consider the use of former sacred places differently, that is, not only as a realistic evocation.

Because not all virtual reality projects can be heterotopias, since heterotopias (and even hetero**vir**topias) have to be *real* (in Foucault's sense, remember our introduction), many of them will only remain *virtual* heterotopias (which have nothing to do with hetero**vir**topias).

Now the questions are: Can the status of *actual* hetero**vir**topia be reduced to some measurable parameters (like continuity, stability, interaction, change, realism, ...) that could enable developers to predict and reproduce the status of their IVS systems and then help to standardise their virtual reality projects? Can we generate actual heterotopias by following scrupulously the six principles, considered as specification rules prescribing our design processes?

Of course not. The notion of heterotopias is not such an operational concept with the potential to revolutionize the knowledge level of our systems.[10] It is rather an *hypothesis* than can be compared to the knowledge level approach itself, in the sense of a fruitful high level inspiration guide line to elegantly manage the design of our virtual reality projects, like the knowledge level heuristic did in its own time.

Heterotopias within virtual reality vs. *knowledge level within knowledge-based systems?*

Nowadays, everybody agree that there are too few theoretical grounds on how to design a virtual reality project: this was exactly the case at the time Newell

felt the necessity to boost knowledge-base systems design by introducing a clever heuristics hypothesis. We argued that Foucault's heterotopias could play an analogous role for virtual reality projects.

END NOTES

[1] Michel Foucault's visionary intuition marked the start of a research that bears unexpected fruit almost half a century after it was written. We are grateful to this great European philosopher. This work has been supported by the city of Compiègne. We thank deeply Mrs. Françoise De Buyer and Mrs. Juliette Lenoir for their strong investment in this project, particularly on the evaluation aspects. The augmented reality images have been realized with the Institut Image ENSAM (Jean-Michel Sanchez and Antony Charmoillaux) and the UTC students.

[2] First, Michel Foucault wrote a text entitled *Des espaces autres*, published by the French journal *Architecture, Mouvement, Continuité* in October 1984. It was the basis of a lecture that the famous philosopher gave in March 1967. Although not reviewed for publication by the author and thus not part of the official corpus of his work, the manuscript was released into the public domain for an exhibition in Berlin shortly before Michel Foucault's death. It has been translated by Jay Miskowiec and can be downloaded in both French and English from the Web (< URL: http://foucault.info/documents/heteroTopia/ >). An MP3 of the original lecture is also included.

[3] G. Bernanos, *Dialogues des carmélites* (Seuil, 1996).

[4] J. Tisseau, *Réalité virtuelle – autonomie in virtuo*, Habilitation à diriger des recherches, Université de Rennes-1, 2001.

[5] G. Bachelard, *La poétique de l'espace (*PUF, 2007).

[6] G. Deleuze, *Francis Bacon – Logique de la sensation* (Seuil, 2002).

[7] M. Wood, 'Theory with a Wife', *London Review of Books* (October, 1985).

[8] W. Grombowicz, M.Polac, and F. Bondy, *Structuralism, Jeunesse, Dante* (Paris, 1995).

[9] A. Breton, Douleur et rébellion: Osiris est un dieu noir (Paris, 1944).

[10] A. Newell, 'The knowledge level', *Artificial Intelligence* 18 (1982), 87–127.