From Dreamtime to QuickTime: The Resurgence of the 360-Degree Panoramic View as a Form of Computer-Synthesised Architectural Representation.

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Abstract

The conference theme ‘eternity, infinity and virtuality’ may be considered in terms of time, space and the other. One form of representation that captures all three of these fundamental dimensions, at a glance, is the 360-degree panorama, a medium that is currently making a comeback in the architectural studio. This paper explores the use of the computer-synthesised panorama as a means of representing architectural space and landscape experience, and as a method of informing the design. The panoramic mural is differentiated from two subcategories of QTVR panorama, the subjective and the objective. The use of panoramic views enable landscape architecture students to design using a 2D image format which can be rendered to provide a 3D spatial effect. In summary, the paper contends that the process of design, in architectural practice and in architectural education, is significantly enhanced by the dynamic representations of time and/or space offered by the computer-synthesised panorama.

1 The panoramic view: Eternity, infinity and virtuality.

The conference theme ‘eternity, infinity and virtuality’ may be considered in terms of time, space and the other. One form of representation, which captures all three of these fundamental dimensions, at a glance, is the 360-degree panorama, which reached its height of popularity more than a century ago. As Comment states –

"The panorama was one of the most popular and most typical phenomena of the nineteenth century, of which it is in a way the signature. A motley crowd in search of wanton, enigmatic and rarely denied pleasure would rush to see these spectacular paintings... A fundamental shift had taken place in the logic and focus of representation." (Comment, 1999)

In general, the panoramic photograph or painting technique records and simulates comprehensive views of a portion of the earth’s surface, landscape, or built environment (Oettermann, 1997). Between 1787 and 1900 panorama painting was a medium through which ordinary people could access and experience the other. Namely, for those living in the large established European cities, this ‘other’ was life beyond typical mundane existence, a reality experienced by others elsewhere at some other time. Through the panorama newly discovered exotic colonial landscapes and architecture were able to be ‘captured’ by teams of painters for homeland audiences. For example, “Panorama of the Congo” by Alfred Bastien and Paul Mathieu (painted in 1913, measuring 15m x 115m) was created for the National Exhibition of Ghent. Being sponsored by the government of the time, this panorama was as much a work of colonial propaganda as it was a work of art, with expressed intention to give young Belgians “a taste for the colonies” (Comment, 1999).

The viewer of this period was also able to gaze upon the totality of significant events in time and space through a single work. For example “Panorama for the struggle for Tyrolean independence
in 1809”, by Michel Zeno Diemer (painted in 1896, measuring 10m x 100m) depicts the third battle of Bergisel. The panorama tells the tale of the 15,000 valiant Tyrolean peasants led by Andreas Hofer and their defeat of Napoleon’s 16,000 strong force commanded by Marshall Lefebvre. This was the nineteenth century equivalent of “Saving Private Ryan” with the viewer being transported to a hazardous time and location to experience a situation of spectacular interest in relative safety and comfort.

At the beginning of the twentieth century the still panorama was quickly displaced by film as the means of vicarious experience. Nonetheless the human desire for panoramic representation lingered. Consequently a moving variation of the panorama briefly emerged with the introduction of Cinerama in the 1950s – with its 160° horizontal angles and 75° vertical angles of vision, together with 360 degrees of sound (Oettermann, 1997). This form of cinema did not last given the substantial cost created by the technical requirements filming in the round. Notably, no feature films were ever produced in Cinerama format. Like Cinerama, the more recent IMAX movie format is also the domain of the travelogue/spectacular to the exclusion of any genuine narrative content.

With the introduction of television, and more particularly the proliferation of personal computers over the last decade, screen based media, which satisfy the human desire for vicarious experience have become pervasive. More recently, virtual reality computer simulations and cyberspace have become the objects of research (Anders, 1999; Heim, 1998). Given these most recent technological advances, initially, it seemed surprising that a renewed interest had been shown in the panorama as a means of creating ‘virtual environments’. With further investigation, however, the return to the panorama was in fact forged by software developers’ desire to facilitate virtual environment navigation on personal computer hardware, rather than the recreation of panoramic artwork from a century ago. As Chen describes,

Traditionally, virtual reality systems use 3D computer graphics to model and render virtual environments in real-time. This approach usually requires laborious modelling and expensive special purpose rendering hardware. The rendering quality and scene complexity are often limited because of the real-time constraint. ... a new approach which uses 360-degree cylindrical panoramic images to compose a virtual environment [is feasible]. The panoramic image is digitally warped on-the-fly to simulate camera panning and zooming. The panoramic images can be created with computer rendering, specialised panoramic cameras or by “stitching” together overlapping photographs taken with a regular camera. Walking in a space is currently accomplished by “hopping” to different panoramic points. The image-based approach has been used in the commercial product QuickTime VR, a virtual reality extension to Apple Computer’s QuickTime digital multimedia framework. (Chen, 1995)

QuickTime VR utilises an image-based rendering system which allows for (i) ‘cheap’ complexity, which uses texture maps; (ii) the ability to use 2D images to create a 3D scene, which is especially useful given the time required to build 3D models; (iii) rendering which is independent of scene complexity - a great bonus for complex 3D models which bring even the fastest personal computers to their knees if navigated on the fly (Harvey and Rangaswamy, 1997).

QuickTime VR panoramas, like the panorama paintings before them, have retained the capacity to produce vicarious experience, metaphorically transporting the viewer to another time and space.

2 The panorama in the context of architecture and landscape architecture

2.1 Design and the vicarious experience of architecture and landscape architecture

Computer aided design technologies have offered designers greater opportunity for the thorough investigation of space. The ability to easily visualise, create and present a multitude of images from different viewpoints is important for architectural design, and especially important for the design of landscape architecture because of its reliance on the visual to produce landscape experiences (Riley, 1997). Landscape experience is the realm in which visual stimulus goes beyond perception and cognition, into affect, evaluation and meaning, which are crucial components of a phenomenological design process. Because panoramic representations assist in the production of vicarious experiences they are a medium useful to the design process of architecture and landscape architecture.

Summerfield, for example, argues for the portrayal of architecture set within its actual visual context, including environment-project interactions. He identifies architectural experience as being incredibly sensitive to the relationship between the project-model and the context, a relationship, which must be represented accurately if evaluative judgments are to have validity. Summerfield
has also proposed a process (bearing some similarity to that of the QTVR panorama), which recreates the environment that surrounds both building and observer, as the means of resolving this essential but problematic feature of realistic imagery on real sites (Summerfield and Hayman, 1999).

2.2 Panoramic representation

Emphasis as to the validity of the panorama in the design studio has stemmed, in part from Corner’s call for architects to expand their repertoires beyond the relatively small number of techniques used in the landscape, architectural, and planning arts. Corner challenges the designer to augment and redevelop their palettes with respect to “analyses of image construction and examine great works of art - including maps, paintings, collage, performance arts, or cinematic and digital media” (Corner, 1998).

Two main varieties of panorama have been encouraged in the design studio. The first of these is the panoramic mural, which is digitally collaged from still photographs or slides and then printed. The second variety of panorama is the Panoramic VR. In this case QuickTime Virtual Reality Panoramas (or QTVRs) are able to be constructed out of panoramic murals using QTVR Make Panorama, or produced directly from a 3D modelling package such as ArchiCAD 6.0. For clarity these are tabulated below.

2.3 Panoramic murals

The panoramic mural gives the viewer the capacity to see an entire space, albeit stretched out, at a glance. From experience, the panoramic mural tends towards the sublime, often transcending the subject being depicted. This may occur because in mural form the panorama is a 2D perspectival abstraction rather than a direct attempt to create virtual space in the round. This aspect of the panoramic mural finds parallel in what Comment calls the ‘Rundblick’, or “circular gaze that embraces the whole horizon in one, or almost one go”. He suggests that the status of the individual becomes paradoxical because the dominance she craves presupposes personal annihilation and the loss of real space in order to hold onto the fictional space of the representation (Comment, 1999).

While ‘real’ spatial experience is reduced, the circular gaze heightens the visual impact of the architecture or landscape depicted. Through enhancing the visual impact of the image the panoramic mural is particularly effective at taking the viewer towards the realm of landscape experience.

The creation of seamless panoramic murals created from digital images shot with a digital camera has not been encouraged in studio (We have therefore chosen to omit this seamless form of panoramic collage from table 1). We considered that the seamless representation of architecture inherently denied the potential for serendipitous spatial conjunctions or formal intrigue through the removal of multiple/shifted viewpoints, which ultimately reduced the experience of architecture and landscape. Instead, a style of highly textured panoramic mural has developed which bears an affinity with David Hockney’s photographic collages. ‘Nude, London’ (1984), commissioned for the film ‘Insignificance’, which starred Theresa Russell as Marilyn Munroe, has been described as follows

“The girl’s body is fragmented so that one sees the front, back and side views at the same time. The contortions of her body are tantalising: she sprawls on a pink silk sheet, eyes firmly on the viewer and tongue between her lips. Unlike a typical calendar girl, whom the eye can take in at one go, Hockney’s pin-up requires the viewer to make slow and careful examination of every part of her body...[Hockney himself then comments that] my pin-up requires you to look very slowly, you are forced to move over every inch of her body which makes it look more interesting, more erotic.” (Webb, 1988)

By rendering architecture and landscape in the form of a textured panoramic mural the architect is required to analyse and evaluate the subject more closely, given the representation’s higher level of ‘cognitive’ detail.

New architectural forms may also be undetermined by a design process which utilises increased information provided by multiple viewpoints. Vidler points out, “the perspective distortions and compositional freedom of Frank Gehry’s assemblages rely on techniques already developed in the cinema, such as angled shots framed from below and rapid shifts of viewpoint” (Vidler, 1999). What will be the architectural, or urban design outcome of the textured panoramic collage? Some examples of textured panoramic murals are illustrated at the end of this paper.
There are two distinct sub-categories of panoramic VR: the **subjective panorama**, in which the viewpoint is centralised; and the **objective panorama** where the object/model is centralised. The subjective panorama places the individual at the centre, and thus in control of the virtual world, whereas the objective panorama places the individual above or beyond the modelled virtual world, detached yet godlike as if in an infinitely mobile tower. This idea requires further exploration given the fundamental importance of **viewpoint** in panoramic representation and social power structures.

Here, Foucault’s examination of circular architectural space seems relevant: Panorama painting had as its historical analog circular architecture. These designs were produced during a similar period to Barker’s patented panoramic effect of 1787, for example, Boullée’s Cenotaph to Newton c1784, and Bentham’s Panopticon of 1791. Foucault notes that circular architecture at that time - “was the expression of a particular political utopia” … “from the logic of spectacle passed down to us from antiquity (temples, theatres, circuses where ‘the inspection of a small number of objects is made available to a multitude of men’) we arrive at modern logic, in which, at the other extreme, it is a question of ‘procuring for a small number of people, or just one person, the simultaneous view of a great multitude’.” (Comment, 1999; Foucault, 1975)

Expanding Foucault’s critique to encompass the recent development of the QTVR panorama (and particularly the subjective panorama) the status of the viewpoint within panoramic representation can be identified as expressing/increasing the power of the individual over that of the environment.

A contrasting interpretation of the subjective QTVR panorama can be given. Firstly, the viewer does not see the whole scene at glance but in a (slow) turning process within a **QTVR Scene**. The limited view angle denies the user the status of omniscience. This is reinforced by the zoom feature, which further narrows (or widens to a preset maximum) the gaze. Secondly, the cylindrical space of the QTVR Scene engulfs the individual, belittling them in the big environment/landscape. Thus rather than the individual dominating nature, nature can be identified as dominating the individual. (The exploration of VR nodes (hot points) may be undertaken in a later paper. Here we are principally interested in the panoramic effect as it relates to the representation of an individual scene).

The panorama as a ‘new’ form of digital representation is unavoidably altering the way that we practice and teach architecture. Using automated rendering techniques (such as ArchiCAD 6.0) architectural ideas and landscapes can be realistically represented in a few minutes to a few hours in panoramic form using a desktop computer, rather than one year on average for a team of painters to create the same in the nineteenth century (Oettermann, 1997). The use of the computer-synthesised panorama has become invaluable as a means of representing architectural and landscape experience, and as a method of informing design:

- In the communication of architectural and landscape ideas on the Internet, where speed of data transfer remains an important factor. Notably the QTVR panorama is popularly used by the real estate industry, by travel agents and hoteliers alike as the means of conveying 3D images of remote interiors, exotic locations and events.

- To convey spatial architectural design ideas in practice. The QTVR is a very accessible means of presentation for practitioners and clients alike. Experience has shown that clients particularly enjoy the subjective panoramic viewpoint, which places them at the centre and (implicitly) in control of the virtual model’s environment.

- In the presentation of 3D virtual simulacra (historical reconstructions). In the studio QTVR provides easy access to remote, exotic or lost architecture. Locally created examples include the Taj Mahal, Brazilia, and the Barcelona Pavilion.

The panorama offers the student architect a technique for the investigation of spatial and formal dynamics. It should be noted that until the designer has first developed an understanding of space the development of skills in ‘planning’ remains a diversion, “the plan is the generator, but planning is not necessarily the first thing the student should learn. Spatial understanding and a sense of formal dynamics must be developed first. Otherwise planning is mere abstract pattern making. This is a process that cannot be rushed” (Heath, 1993). The value of the panoramic mural in

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2.4  **Panoramic VRs**

2.5  **The panorama applied**

2.6  **The panorama and design pedagogy**
Figure 2. Versailles, Outside Paris, Robert Hotten, 1999.

Figure 3. Irwin Garden at the Getty Centre, Los Angeles Robert Hotten, 1999.

Figure 4. The Tuileries Garden, Paris, Robert Hotten, 1999.
architectural education is in the fact that it allows students to work in a relatively simple 2D format (photographically, through drawing, and digital imaging) and then render their design idea quickly and easily in the round (using QTVR Make Panorama). Consequently students are able to develop spatial understanding without having to first learn sophisticated 3D modelling packages.

A short design exercise for landscape architecture students has been developed which utilises the (above) process of panoramic collage combined with the architectural operations of insertion, intervention, materiality, reciprocity, and threshold developed by Berrizbeitia and Pollak (1999). The outcomes of this studio program will be presented at the conference.

3 Summary: Time, space and the sublime

"Today's instructional landscape must inevitably evolve or die, like biological species, since its environment is being radically altered by volatile visualisation technologies. This ongoing displacement of fixed, monochromatic type by interactive, multi-dimensional graphics is a tumultuous process. In the realm of the artificial, as in nature, extinction occurs when there is no accommodation.” (Stafford, 1997).

A panoramic vision of landscape and architecture has re-emerged, which in our estimation is as affective as it has ever been. While the panoramic mural has an ability to capture the inherent beauty of landscape, revealing views that are not perceivable by the eye ordinarily, the QTVR panorama has evolved to be a popular means of conveying 3D images of exotica and event. With the capacity to take the observer into the vicarious realm of landscape experience, of time, space and the sublime, the computer-synthesised panorama has a role within landscape architecture and design. May our architectural dreamtime be realised in QuickTime, for in the words of Walt Disney “if you can dream it, you can do it.”

References


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a. The Subjective Panorama (subjective viewpoint) “VR Scene” (ArchiCAD 6.0)
b. The Objective Panorama (objective viewpoint) “VR Object” (ArchiCAD 6.0)

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*Table 1.* A (non-exhaustive) typology of digital panoramic design media.
Figure 6. 3XL City. Project for the Third Millennium, Venice, Peter Diprose and Robert Hotten, 1999.

Figure 7. Guggenheim at Bilbao Robert Hotten, 1999