

# A DRAMA IN TIME: THE LIFE OF A CITY

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## INTRODUCTION

Cities are dynamic and can be likened to living entities, but ones with lifespans that can measure hundreds or thousands of years. All aspects of human culture, both tangible and intangible, are dynamic. The built environment of a city is constantly changing along with the behaviours and activities of the inhabitants and their clothing, hairstyles, mannerisms, language(s) and much more besides. Even a dead city, empty and abandoned for whatever reason, goes on changing. The material remains suffer the ravages of time and, as was the case with Troy, once they recede from living memory the cultural memories of a city can morph into fable and myth. Aside from short-lived cities such as Amarna in Egypt, which was built for the Pharaoh Akhenaten and then abandoned after his death, cities exist for many human generations making it impossible for a single individual to directly experience the whole life of a city in its entirety. The plethora of museums devoted to the history of particular cities, and their popularity with both locals and tourists, indicate a deep and abiding interest in the histories of cities among the general public.

Museums devoted to the history of a particular city commonly use illustrations and dioramas to help audiences visualise how the city may have looked in earlier times. The Edo-Tokyo Museum in Japan offers visitors a journey through the 400-year history

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of Edo-Tokyo and encourages them to reflect on the history and culture of Edo-Tokyo. The museum has several extensive dioramas showing Edo-Tokyo at various stages in its transformation from the simple fishing village of Edo to the megacity of present day Tokyo. In addition to illustrations and dioramas, museums are increasingly using 3D computer graphics to create visualisations for public edification. Seminal New Media theorist Lev Manovich has identified virtual space, which he terms «navigable space», as possibly the key cultural form of the twenty-first century — essentially what cinema was to the twentieth century<sup>1</sup>. The mainstream popularity of online virtual game worlds such as World of Warcraft, with their many millions of subscribers (most of whom are not teenaged boys), supports this proposition. Navigable space allows users to interactively explore three-dimensional virtual worlds viewed from a first-person perspective so has many practical uses. 3D computer graphics are regularly used in an ever-expanding list of fields including entertainment (film and games), medicine, engineering, architecture, design, scientific visualisation and heritage.

Many people who experience virtual environments report a feeling of presence or «being there» where «there» refers to the virtual world. Research has revealed a large number of factors that influence presence in virtual environments and these can be grouped into the three main categories of experiential realism, social interaction and individual user characteristics. With regard to realism, the video needs to be recognisable, the audio understandable and the interactivity responsive for presence to be evoked but complete realism is not necessary. Some computer games aspire to be photo-real, while other games, equally popular and financially successful, opt for highly stylised looks. So while visual realism may get noticed and appreciated by users, it is not key to their engagement<sup>2</sup>. Social interaction is an extremely strong, but not critical, contributor to presence. Consider the strong sense of a shared «space» experienced by two people having a phone conversation who, despite being geographically distant from each other, feel a very strong sense of physical proximity with the other person. The huge success of massively multiplayer online games (MMOGs) attests to the attraction of playing with real people in virtual worlds. However individual users of virtual worlds also experience presence so, while social interaction is a strong multiplier, it is not a critical factor. Presence has been found to depend to a large extent on personal factors, with researchers noting that «differences among individual users often account for more variability in performance than system design factors»<sup>3</sup>.

Common to all the explanations for presence is the concept of engagement or immersion, where the immersion is not only of the senses but also of the mind. No matter how convincing the virtual environment, presence is diminished or lost completely if the

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<sup>1</sup> MANOVICH, 2001.

<sup>2</sup> NUNEZ, 2006.

<sup>3</sup> KABER *et al.*, 2002: 379.

user becomes bored and their mind wanders. This should not be a surprise to anyone who has ever been «lost in thought». If reality itself cannot hold your attention reliably, then there is no reason that a digital approximation of reality, no matter how photo-real, will be any different. The level of conscious engagement of the user with the virtual world would appear to be a critical factor of presence. To put it simply, you are present wherever your attention is and, regardless of the factors of presence, in and of itself presence presumes a place to be present in.

Yi-Fu Tuan, founder of humanist geography, writes in his seminal work *Space and Place: The Perspective of Experience*<sup>4</sup> that places are unique and determined by the webs of individual memories, cultural meanings and connections that overlay the architecture and topography of homes, environs, regions and countries. For Tuan time and place are deeply intertwined. He argues that the act of spending time in a location is critical to creating the experience of place, declaring that «What begins as undifferentiated space becomes place as we get to know it better and endow it with value»<sup>5</sup>. Places are ongoing and dynamic with lifespans that are often many times that of a human<sup>6</sup>. The Scottish sociologist, geographer and pioneering town planner Sir Patrick Geddes describes a city as «more than a place in space, it is a drama in time»<sup>7</sup>.

The experience of place is a *mélange* of the phenomenological, the cultural and the personal. It is a gestalt made up of direct sensory impressions and the web of individual meanings, memories and connections (both cultural and personal) that overlay the topography of homes, environs, regions and countries. The phenomenological affect of a place, the sensory impression it makes on an individual, is highly variable. The sights, sounds and smells of a place are determined in part by the weather, in part by floral and faunal behaviours, and in part by human activities. Being in a graveyard at midnight during a thunderstorm is different from being in the same location in the middle of the afternoon on a sunny day. These phenomenological contributors are all influenced, to varying degrees, by time. The seasons of the year, the hour of the day and the phases of the moon drive behaviours in the natural world, while the historical moment determines the cultural context, including the built environment, the inhabitants and their activities. Finally, the experience of a place is also shaped by the unique personality, identity and history of the individual concerned.

Certain places are widely recognised as having cultural significance. In 1972 the general conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted a recommendation concerning the protection, at national

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<sup>4</sup> TUAN, 1977.

<sup>5</sup> TUAN, 1977: 6.

<sup>6</sup> CASEY 1997; SMITH, 2006.

<sup>7</sup> GEDDES, 1904: 108.

level, of cultural and natural heritage<sup>8</sup>. A World Heritage Site is a place that is listed by UNESCO as being of outstanding universal value from the point of view of history, art or science. Australia in turn defines its national heritage as comprising «exceptional natural and cultural places that contribute to Australia's national identity»<sup>9</sup>. Laurajane Smith proposes that heritage is not limited to material culture with associated age and aesthetically related social values<sup>10</sup>. She defines heritage as a multilayered performance that constructs a sense of place, belonging and understanding in the present through acts of remembrance and commemoration. She uses place to mean not only location in space but also metaphorically to mean cultural immersion. She defines heritage as a cultural practice that constructs and regulates a range of understandings and values. Furthermore she argues that heritage is not decided by institutions or experts but comes from the meanings people construct for it in their daily lives. Tuan notes that place makes time visible, acting as a memorial to the past<sup>11</sup>. This is particularly true for heritage places. Heritage places are not just the places themselves but also the cultural meanings associated with them and the activities that take place within them. Just as the material fabric of a heritage place changes over time so too do its associated meanings. These are not frozen but change as wider societal changes affect attitudes about heritage in general and those places in particular. Heritage places are dynamic and they are experienced in the context of the present from the perspective of the individual.

Virtual worlds, despite their immateriality, are also places. Virtual game worlds provide important practical examples of virtual place-making and the author agrees with Richard Bartle that «others may debate whether or not virtual spaces are actual places, but for players and designers there is no conception that they might not be. The five million people who enjoy World of Warcraft certainly look upon it as a world, and in the face of this any argument to the contrary is pretty well moot»<sup>12</sup>. Virtual heritage worlds are likewise real, though virtual, places in their own right, but what is the nature and purpose of virtual heritage places, and what is their relationship with their real world counterparts?

A virtual model of a heritage place is clearly not the same as the actual place but it is nonetheless a real, though virtual, place. It is useful at this point to consider the difference between the virtual reconstructions of heritage sites for archaeologists (often termed virtual archaeology) and virtual reconstructions of heritage sites intended for public edification in museums. The audience for a virtual archaeology reconstruction is assumed to be expert while virtual heritage in a museum context is intended for a

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<sup>8</sup> UNESCO, 1972.

<sup>9</sup> COMMONWEALTH OF AUSTRALIA. Department of the Environment, 1999.

<sup>10</sup> SMITH, 2006.

<sup>11</sup> TUAN, 1977.

<sup>12</sup> BARTLE, 2007: 2.

general audience. Virtual archaeology is therefore an exploration tool for specialists while museum-based virtual heritage is an educational tool for the general public. There is an inherent and central pedagogical dimension to museum-based virtual heritage that is absent in Virtual Archaeology.

Despite time being an inherent capability of virtual technologies, and a critical factor to place, time is curiously lacking from much virtual heritage where it always seems to be around noon on a sunny day. The author argues that time-based virtual heritage is uniquely able to show cultural activity, support the creation of phenomenologically immersive places and create affective experiences. Additionally, by using time-lapses, it can deliver a more cognitively affective experience. Just as a time-lapsed video showing a glacier brings an immediate understanding to the description of a glacier as «a river of ice», so a time-lapse of a heritage place makes plain the change that occurs in the built environment of that place over timespans that are impossible to experience directly. Time-based virtual heritage supports what the author terms navigable time, which gives users the ability to move as freely in time as they do in space<sup>13</sup>. This may have its downside as jumping to specific, but temporally scattered dates, results in an experience that is deeply at odds with the temporal narrative of heritage. Time gives us a way to order our thoughts, to follow a tune, to tell a story and, fundamentally, to make sense of the world<sup>14</sup>. So, when used in a time-lapse fashion, navigable time re-imposes the temporal order and restores the traditional time-based narrative of heritage<sup>15</sup>.

## THE VIRTUAL SYDNEY ROCKS

To explore the educational potential of time-based virtual heritage the author has created a time-based virtual model of the historic Rocks district of Sydney, Australia, from settlement to the present day. On the 26th of January 1788, the First Fleet anchored in Sydney Cove and established a penal colony that was the first European settlement in Australia. The eastern headland of Sydney Cove is currently the site of the Sydney Opera House and the sandy beach at the head of the cove is hidden under a busy ferry terminal and railway station, but in 1788 the shore was thickly wooded with a small stream flowing into the cove at the western end of the beach and with high sandstone cliffs rising in steps to the west. The majority of the convict tents were set up on the western side of the stream while the tents of the Governor and his staff were on the eastern side. Within months the convicts were constructing wattle-and-daub huts on the sandstone ledges of what was already known as «the Rocks»<sup>16</sup>. In 1994 a combined historical and archaeological project, known as «the Big Dig», excavated a large site in the historic

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<sup>13</sup> DEVINE, 2014.

<sup>14</sup> HOFFMAN, 2009; OZEKI, 2013.

<sup>15</sup> DEVINE, 2014.

<sup>16</sup> KELLY, 1997.

Rocks district on the western shore of Sydney Cove uncovering over two hundred years of history<sup>17</sup>. The excavations revealed traces of some of the early huts overlaid with 200 years of urban development. The dig uncovered over three quarters of a million artefacts and evidence of 42 separate dwellings while the historical research produced a host of documentary evidence. This led to the identification of specific individuals, the houses they lived in and, in some cases, a direct connection with artefacts recovered during the dig<sup>18</sup>. Among the people identified was George Cribb, a colourful character, who had at one time owned much of the Big Dig site. His rags-to-riches-to-rags story included multiple marriages (one of which was bigamous) and repeated brushes with the law.

The Big Dig site was an ideal subject for the author's research to investigate the user experience of navigable time and to discover what navigable time can offer museum audiences. The dataset was exemplary, the site was of historic significance, the time range of just over two hundred years was both small enough to be manageable and large enough to show great change. The models were created using Autodesk Maya (an industry standard 3D package) and then imported into 3DVIA Virtools which was the development environment being used by the author while she was based at the iCinema Centre for Interactive Cinema Research. High resolution models were built of the individual dwellings identified for the Big Dig site. Several objects including two china bowls, a butcher's knife and an alcohol still were created. These objects had been uncovered in a midden in an old well during the Big Dig and dated to 1813-1824, the period when George Cribb owned much of the site. Lower resolution buildings were created for the area surrounding Sydney Cove and visible from the Big Dig site.

Given the limited resources available to the author, especially when compared with the million dollar budgets used to create state-of-the-art game worlds inhabited by numerous software controlled non-player characters, it was not possible to populate the VSR at this stage. In any case, populating a virtual heritage world can be deeply problematic. For many ancient cultures there is no surviving evidence of clothing or hairstyles so any depiction of them is purely speculative. Likewise, all social behaviour prior to the invention of writing is completely lost to time. Did Neolithic peoples kiss hello? On the mouth or on the cheek? How many kisses? However, in the case of Sydney, there is sufficient data with respect to the varying habits, dress, speech and behaviours of Indigenous Australians and the British colonists and their descendants from 1788 to the present day that, given funding, it should be possible to create a populated virtual world that would have a sufficient level of historical validity to satisfy the expectations of both museum staff and audiences. Future development of the VSR will explore the addition of inhabitants to the VSR as the social immersion should be a significant contributor to cultural

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<sup>17</sup> KARSKENS, 1999.

<sup>18</sup> KARSKENS, 1999; CROOK *et al.*, 2005.

presence. In addition, it is easy to imagine role-playing games that would allow players to learn more about life in Sydney at different times. In the early years of settlement players could choose to be a male or female convict or an Aborigine, a soldier, a sailor or the wife or child of a soldier or sailor with each particular role revealing the impact of status and gender on life at that time. In later years players could experience important incidents in the history of Sydney such as the Rum Rebellion from the perspective of a soldier, the burning of the Garden Palace from the perspective of a fireman, the outbreak of bubonic plague from the perspective of a rat catcher, explore crime from the viewpoint of a member of the Razor Gangs of the 1930s and explore politics from the perspective of a union member during the Green Bans of the 1970s.

The author, cognisant of the need for cultural immersion in an unpopulated world, took great pains to provide a wealth of related information supporting prolonged engagement for users, encouraging their active participation with the making of meaning. A dedicated website, *The Virtual Sydney Guidebook* (<http://virtualsydneyrocks.com/>), was created with individual webpages for each building, the vessels of the First Fleet, and several of the people identified by the archival research as being closely associated with the Big Dig site. Selecting a building, or boat, caused the associated webpage to open on a second screen. Each webpage has a short summary of pertinent information and a collection of links to directly related material that was available at authoritative sites such as the Dictionary of Sydney, the Heritage and Conservation Register of NSW, the State Library of New South Wales and the Australian Dictionary of Biography. The combination of the virtual model with the database could be compared to an iceberg where the bit above the surface is the virtual model and the much larger bulk of the iceberg below the surface is the database of related material. The world itself acts as the interface to the (database of) information about it. A city has many stories to tell. A story for each of its inhabitants, each of its buildings and many stories about the city itself. Visitors to a real heritage city can engage with it in a variety of ways. They can take tours, wander freely and attend cultural events. The author believed that a virtual heritage city should likewise offer users a variety of ways to engage with it. So, once the VSR was sufficiently developed for users to be able to explore freely in space and time, and access the content in the Guidebook, a game and a tour based on the life of George Cribb were developed as examples of what would, in a more developed version, be a range of tours and games.

## TESTING

The VSR was tested at the Rocks Discovery Museum, a small museum dedicated to local history that is located in a heritage-listed building in the historic Rocks district of Sydney. The museum attracts a wide range of visitors of all ages and nationalities, including international, interstate and local tourists, school parties and individuals with

a specific interest in the Rocks<sup>19</sup>. During the week of testing museum staff at the entrance to the museum made a point of informing visitors of the presence on-site of the prototype Virtual Sydney Rocks and encouraged them to try it out.

Users had the choice of playing the game, watching the pre-recorded video tour or exploring at will in time and space. In both the Game and the Explore modes users could set the time, the date and the speed of time. The Game was a treasure-hunt styled game where players had to explore in time and space to find a boning knife, some china bowls and an alcohol still. These objects had all been uncovered during the Big Dig in a filled-in well at the back of George Cribb's house and were associated with different periods of the Cribb's occupancy. The Tour consisted of a pre-recorded video that described the life of George Cribb while showing his house and properties. The Tour concluded by showing a time-lapsed aerial view of the Sydney Rocks from 1788 to 2010.

The computer running the VSR was set up in the same room as a glass cabinet that contained items recovered from the Cribb's well and among them were the china bowls, the alcohol still and the butcher's knife that were featured in the George Cribb game. After testers had played the game the objects were pointed out to them by the author so as to connect the virtual content of the VSR with real tangible objects that were physically present. Passively recording people using the prototype and assessing the resulting video was not going to give the depth of feedback that the author wanted and, as the author would be acting as a docent during testing, it would not be possible to conduct interviews at the same time. Additionally, follow up in-depth interviews would be extremely difficult as over three quarters of the visitors to the Rocks Discovery Museum are from interstate or overseas<sup>20</sup>. The author decided therefore to use a mixed methods single questionnaire which would, at the very least, give some quantitative data and, at best, would elucidate some interesting, highly relevant and informative qualitative data<sup>21</sup>. A key concern was not to impose too great a time burden on testers. The Tour ran for four minutes, the Game took between three and five minutes to play and the author assumed that people would spend at least three to five minutes in self-directed exploring. This meant that a tester who tried all three would already have spent at least fifteen minutes engaged with the VSR. The questionnaire was designed so that someone could answer the multiple choice questions in less than five minutes but there was ample space for respondents to elaborate on their responses in depth if they wanted to. This resulted in a rough estimate of about 25 minutes in total for testers who used all three modes and who also gave answers to the open response qualitative questions as well as to the multiple choice quantitative questions. Research into museum visitors indicates

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<sup>19</sup> SHFA, 2011.

<sup>20</sup> SHFA, 2011

<sup>21</sup> DRISCOLL *et al.*, 2007.



that 30-40 minutes is an average time for them to engage with museum content<sup>22</sup>. The author decided that 25 minutes was towards the upper range of time commitment to ask of testers but would still be acceptable to many.

The questionnaire began with a page of demographic questions that requested age, sex and occupation data followed by three questions about computer and computer game usage. These were followed by 21 numbered questions specifically to do with the VSR and Guidebook. There were six questions under the heading on the questionnaire of Interaction Questions. Questions 1, 2 and 3 ask in turn «Did you take the virtual Tour?», «Did you play the Game?» and «Did you Explore?» These questions were followed by subsidiary questions asking testers if they had tried more than one interaction mode and, if they had, in what order. Users then had the opportunity to elaborate on which mode of interaction they liked best and why. There were twelve questions under the heading on the questionnaire of Place, Presence, History and Culture Questions. These sought to find out about the influence of the three different interaction modes of Tour, Game and Explore on the temporal, spatial and cultural immersion experienced by the user, their experience of change over time and the associated opportunities for insight and understanding. Finally testers were asked to nominate most liked and least liked features of the VSR and suggest improvements.

## RESULTS, FINDINGS AND CONCLUSIONS

A total number of fifty-six questionnaires were returned, one of which contained data for three individuals (a woman and her two sons) giving a total of fifty-eight individuals. Thirty-one of the respondents tried all three interaction modes of game, tour and explore. The respondents represented a wide range of ages and professions and an almost even number of each sex. The museum audience in general is equally wide-ranging in size and background<sup>23</sup> so the author argues that the sample size, though on the small side, is representative. The respondents were overwhelmingly familiar with computers and nearly two thirds (62%) were currently, though to differing degrees, players of electronic games.

For users who tried all three modes, nearly 60% of users nominated the Explore mode as the best at showing change over time. This may be because in the Explore mode the time-lapse is under the user's control. The Tour mode was nominated as the most effective by just over a quarter of users. It is unsurprising that the Game was only nominated by one user as the best mode for showing change over time as players only had to travel 15 years in time and there was little obvious change. A game that featured time travel to a greater degree might produce quite different results.

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<sup>22</sup> HEIN, 1998.

<sup>23</sup> FALK & DIERKING, 2000.

Users found the VSR useful for learning some of the history of the Rocks with 39% preferring to take the tour, 32% preferring to explore and 10% preferring to play the game. This is an interesting finding given the current enthusiasm for Serious Games which use game-style interaction for teaching and learning. A significant minority of testers, despite trying both the tour and explore options and also completing the questionnaire, chose not to play the game. This group was 14 in number with four of them in their 20s, two in their 30s, five in their 40s, two in their 50s, while one supplied no age data. Nine of this group were female and five were male. All of them reported using computers daily while seven played games at least once a month and seven did not play games. This lack of interest in the game option in such a range of users is an interesting finding and indicates that game-focused virtual heritage may not appeal to a large minority of museum audiences. However, given the small sample size, and the positive feedback from respondents who did play the Game, further research is clearly indicated.

With regard to learning some of the history of the Rocks, respondents gave considered reasons for their choices. One person preferred the Explore mode because it «covers more of the area from first person perspective and gives more information about each specific part of the Rocks. Also lets me play with different time periods and observe the changes». Another preferred the Game because «it was fun & interactive & informative» and a third person preferred the Tour because she «enjoyed the guidance and the added information about Mr Cribb — made it more personal and engaging». The responses reveal that museum visitors have strong individual preferences for different interaction modes when they engage with virtual heritage and that there was no single interaction mode that worked best with all users.

As has been noted, museums have a long history of using illustrations and dioramas to help audiences engage more deeply with heritage and foster historical understanding, insight and learning. Virtual heritage is part of this pedagogical tradition and, while virtual heritage places cannot match the physical and cultural immersion and affect of real heritage places, they like illustrations and dioramas, can engender insight, understanding and learning in museum audiences. The ability of virtual environments to engender a sense of «being there» makes them particularly well suited to heritage pertaining to the built environment. Place is of course much more than just a geographical setting, it is a social construct, with multiple layers of human meanings and activities underlying and overlaying geography and architecture. The author argues that time-based virtual heritage enables a richer phenomenological and cultural re-creation of place. Additionally, time-lapsed virtual heritage, by showing changes in the built environment over timescales outside of normal human experience, allows heritage audiences to gain insight and understanding of historical processes, opening up a dialogic engagement with heritage itself.

Cities are particularly well suited to the potential of time-based virtual heritage as they usually exist for many hundreds, and sometimes thousands, of years. The story of each individual inhabitant of a city is limited to a single lifetime but the story of the city itself takes place over longer timescales than it is possible to experience directly. Time-lapsed virtual heritage enables users to literally see this longer history unfold. This is phenomenologically powerful, creating affective and memorable experiences rich with opportunities for insight, understanding and learning. Many cities have museums dedicated to their history and, as the costs of virtual heritage continue to fall, projects like the Virtual Sydney Rocks will become increasingly viable. Additionally, the data combined with GPS supports the development of AR versions which would allow users in the Rocks to layer the past directly onto the present and so encouraging deeper connections with, and understanding of, heritage places.

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