

## **Making Space: Caught between the Monster and the Wall.**

Long ago when the world was young.... Humankind found itself at large in a multi-dimensional world, and being human– our ancestors began trying to understand and control it. At a very early stage they began to fashion models – in the form of objects and images to assist them in this task. They created pictures of their animal enemies and prey upon the wall of the caves they sometimes shared with these animals; they traced out lines in the dust of the ground to represent the paths and rivers and landmarks of the world about them, and in doing so exhibited that most human trait of **cognitive blending** – being able to hold two ideas, based on different conceptual frameworks in their heads – more precisely as meaning-laden pictures in their imaginations at the same time.

Fast forwarding a few thousand years we discover that humans are creating more sophisticated maps, depicting in graphic form what they knew of the shape and solid geometry of land, and mountains and seas. It would be fascinating to know in greater detail how these early maps were created – how they gathered, interpreted and chose between various bits of evidence to produce their models – the same process we go through today. What we do know is that they developed ways of indicating not just what they knew, but also what remained obscure or unknown. Lands were designated as "terra incognita", while uncharted seas containing things you did not want to bump into in the night had their mysterious and unexplored mysteries more colourfully presented with images and phrases such as "here be MONSTERS!" Here's a depiction of the monsters thought to be off the British isles: cold and fearful. And here in the rather more friendly and familiar seas around Italy, a rather more friendly, not to say "familiar" monster.

Well, the monsters are still with us, and it to the task of taming them that this symposium devote its thought, energies --- and imagination.

1) The focus of this Symposium is upon standards and transparency in the deployment of 3D modelling as an historiographical method, in which its international participants are leaders. Specifically we wish to discuss and identify how best to document both the process and outcomes of this type of research in such a manner that other scholars can fully understand and rigorously evaluate them, enabling such methods to acquire greater recognition and standing in the scholarly community, and driving up standards of such work throughout the academic and cultural heritage sectors. It aspires to be somewhat different from other types of symposia. In addition to exchanging in the usual manner fascinating information about colleagues' work, it aims above all to inform the drafting of a guidelines document. We hope this will significantly assist in providing the basis for future standards and methodologies in our fields, both enhancing the quality of the actual modelling process, and in establishing minimum levels of documentation necessary for users critically to assess visualisation-based research processes. An objective is to identify and disseminate the choices and decisions that occur during the complex process of modelling, which may include the reasons for choices made, as well indications of possible alternative hypotheses.

2) It's a "burning issue". The work in this new area of investigation, and the application of digital technologies is hugely promising (and productive), but problematic. Our work has been called "**Disney-esque**" or worse! Some of the images we've been working on have had what might be called "a very bad press". Just to provide a bit of context for the sort of problems we've all faced, let me begin by a few choice quotes from one academic critic (actually a rather respected authority) I read recently, who was pretty scathing on the dangerous nature of this sort of work.

3) He started off by suggesting that "the traditional work based upon the reality of facts and evidence, has now been rejected by the misplaced preferences that are currently so fashionable". Then (abandoning the sort of restraint one would like to see from a respected scholar) he blasted the new outcomes of our work pointing out that "proper representations based on what is actual factual reality, have now been replaced by Monsters!" Elaborating that these VR monsters are just fantasies "which never existed, don't exist now, and never will exist" he complained "nevertheless, when people look at these misrepresentations, instead of rejecting and condemning them, they welcome them! People have become so infatuated by this fashionable rubbish that they've lost all sense of critical judgement. Let's be clear: designs that aren't based on

reality really have to be rejected; and just because they look impressive and seem to have had a lot of imaginative work put into them, is no reason to approve representations that don't conform to the facts."

He goes on with a lot more of the same sort of criticism. And concludes "we really need to ask why it is that these new false methodologies are pushing the truth aside".

*"Sed quare vincat veritatem ratio falsa, non erit alenum exponere."*

Well, some of you will have discerned that our angry critic is in fact Vitruvius – Italian! -- writing in the last decades of the first century BC. [7.5.3-4] So although our technologies may be modern, our critics have been around for a long time. Clearly we need to see these things in perspective. And again, Vitruvius may be of some use to us, since he has a few things to say on the subject of perspective. Or indeed, about 3 D visualisation of architectural structures.

Vitruvius tells us something about the history of our craft/discipline. He records that in the fifth century, in Athens, when Aeschylus was staging a play, he employed a scene painter named Agathargus' to decorate the wall of the scene building. Just as we would expect, no sooner had Agathargus done this and written it up, than the theorists were close behind, nipping at his heels, trying to formulate a nice theory to explain his new art form to everyone else. And in doing so they developed the first theory of perspectival visualisation. "Democritus and Anaxagoras wrote upon the same topic in order to show that when one has determined a place as the central viewing point, the rays of the eyes can be coordinated in a natural manner so that on the basis of something unreal, realistic images of buildings can be in the scenery of the stage and these can be depicted on the vertical and flat surfaces so that some appear to be extending and others receding".

Another ancient historian, Plutarch, records that almost at once that dashing young Athenian man about town, Alcibiades, insisted that Agathargus decorate the walls of his house with this extraordinary new art form, and would not let him out until he had done so. So here at the very beginning of our discipline we find the two poles -- art and entertainment on the one hand, science and theory -- on the other, between which it has played out its continuing and controversial existence.

And we are still at it.

Leaving aside for the moment the question of graphical representation of fields of vision, perspective and the like, it appears that there were two major Ancient theories about the nature of vision itself.

The quote from Vitruvius (7. prae. 11) noted above is based upon the optical theory of Euclid, early in the third century BC. A cone of rays extends from the eye of the viewer (as its apex) to form as its base a circle around the viewed object. It is not vanishing point perspective, but axial perspective, in which the central point is not beyond the object, but rather in the eye of the beholder. It was believed that there was direct interaction between the eyes of the observer and the object. One theory believed that a picture – a sort of film -- was given off by the object which then collided with the eye, and the other was that the eye itself sent out rays to touch the object of its sight. Indeed, one ancient author, Varro, believed (erroneously) that the word for vision was derived from “Vis” “force”, noting that it was the strongest of the senses and that “the force of the eyes perception reaches even to the stars”. Sight was an active agent.

Elsewhere (1.2.2) Vitruvius actually puts forward a second theory of 3 D visualisation, in which indeed, he does describe central perspective: “Skenographia is the depiction of facades and receding sides with a correspondence of all the lines to the centre of a compass [*insertion point of a compass*]” Thus all the orthogonals converge in the mid point of the picture surface. He implies with the word that it is derived from the type of stage painting mentioned in the earlier quotation. He then adds (as a sort of challenge to us, perhaps) that plan, elevation and perspective “arise from thinking and invention (*cogitatio et inventio*). Thinking rests upon the attention directed with minute and observant fervour towards the proposed pleasing effect. Invention, however is the solution of obscure problems; the understanding of new things uncovered by active effort.” In other words, Research!

**So there we have it!** Our agenda here at this symposium is to look at the activity of visualisation for *research* purposes; not into visualisation as such, primarily, but as the basis for research which draws upon visualisation as a means of studying the material culture of the past. Although visualisation used as research may encompass a wide range of visualisation types (from etchings and sketchings to immersive environments), our primary focus is upon textured, 3D digital models that

go beyond the schematic or diagrammatic to constitute a visual *simulacrum* of the thing being studied, or some aspect of it.

**“But, here be monsters!”**

Vitruvius (warming up perhaps for his subsequent polemic) earlier spoke about the deceptive effect of painting, noting (6.2.2-3) that “visualisation [*effectus visus*] does not appear to bring accurate results, but rather the mind in its interpretation is often deceived by it, as for example, in the paintings of stages, when there seem to be projecting columns, outstanding shapes of statues, and the like, although the picture is undoubtedly vertical and flat.” **[some examples will be seen later..]**

So one of the major problems identified by Vitruvius, and one with which, obviously, we continue to wrestle, is the reconciliation of what we see with what we know, or believe we know. Or as it is frequently expressed these days: how do we think with things; how do we get them to talk to us? To start with basics, the computer monitor is still flat -- in effect it's just a flat wall – But our normal vision is of course "rounded" by 3 D binocular vision. We can simulate that, but ultimately the monitor before us, or the screen upon which we cast our projections, is a 2 D field trying to convey to our understanding a 3D perception comparable to what we have in real space everyday. Addressing the underlying situation – how we visualise -- is rather more complicated than just giving the computer viewer an illusion of 3 D

**Thinking with things – epitomised – cognitive psychologist James Gibson and Ecological Space.** <sup>1</sup> This is an interpretation of visualisation as determined by our habitation, as embodied creatures, within a physical and stable environment. We do not generally perceive or locate ourselves either visually or psychologically within an unstructured, open, and infinitely continuous space. Instead, the persisting surfaces of the physical structures normally about us are the determining coordinates for visual reality; we see and understand “not with the eyes but with the eyes-in-the-head-on-the-body-resting-on-the-ground”, and also perceive the world around us sequentially as a dynamic “optical array” composed of “surfaces, continuities, breaks, edges, obstacles and openings, representing potential routes for movement and barriers to get

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<sup>1</sup> Developed by cognitive psychologist James Gibson: *The Ecological Approach to Visual Perception* (New York, 1979). For Embodiment theory, see M. Johnson, "Embodied Reason", in G. Weiss & H. Haber, eds., *Perspectives on Embodiment*, (London, 1999), Chap. 5.

around.”<sup>2</sup> Mobility adds to space the element of time, as through movement we experience both the dynamic disclosing of the setting ahead and the disappearance of what we have left behind. In order to locate ourselves within spaces, we need to be able to take our bearings from the physical elements which serve as the coordinates defining and giving structure to the space, a portion of which we perceive ourselves to be in and occupying. In brief, we are spatially and temporally relational creatures.

Ecological space, and the closely related concept of embodiment, help to describe how we normally perceive and experience the three-dimensional world both as observers and as objects who are ourselves within it. However, that concrete world which constitutes the ecology of space is subject to imitation, perceptual distortion and misrepresentation; space can be fictionalised and so too our own role within it.

I want now to consider as a “case study” some work which the KVL has done on ancient Roman wall painting. Instead of emphasising our research questions and outcomes per se, I want rather to illustrate the *type* of data with which we have dealt, (and consequently the *type* of questions we could – or indeed had to – ask, and in turn the type of choices we made in employing that data). It is the record of such factors, which must constitute any historiographical analysis we might record or communicate to others for this particular project.

The Romans appear to have developed their own variant on the idea of ecological space. The evidence suggests they thought of the third dimension not (as we tend to) as an open and ever expanding contiguous extension of voluminous space, but rather as a series of segmented views of the visible world, each of which might be thought of as comprising a discrete plane of vision which was most effectively seen as structured vistas or apertures through windows, columns, or other framing devices. This has been described as the **Roman concept of *Durckblicke***. Roman domestic architecture (together with the frescoes insistently created upon its walls, with their emphasis upon *trompe l’oeil*) exhibits a particular and evidently intention visual strategy. It positions and manipulates suggestive (but often deceptive) vistas, and successive planes of (often framed and carefully fashioned) views that have been coordinated to give the (often false) visual impression of axial symmetry. and views seen through real or painted apertures (*Durchblicke*), serves to destabilise and

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<sup>2</sup> R. Rehm *The Play of Space: Spatial Transformation in Greek Tragedy*, (Princeton, 2002), p.8.

disrupt the elements out of which we construct normal visual reality; and in the process may in effect theatricalise it.

The principle was that of axial symmetry, which sought to give the impression (often ingeniously suggested) that the house was itself symmetrically organised as an ensemble of spaces, when very frequently, it was not. As many commentators have noted, the visual axis proceeding from a centrally located point in the *atrium* by means of a linear series of framed views through a window or door in the *tablinum*, into the peristyle, and beyond, and often concluding with a distant *exedra* or wall painting, was organised so that it appeared to reveal to the viewer an architectural symmetry that in fact very often did not conform to the actual axis of an asymmetrically constructed house. As soon as the viewer moved from a static and optically determined axial position, for example, to move around either side of the *impluvium*, or traverse the *tablinum* to obtain a wider, more panoramic view of the house, this illusion was shattered. In effect the actual reality was fictionalised.

The earlier, so-called second style paintings of which Vitruvius approved also contained monsters, although perhaps not so blatantly. The Roman wall painter faced (in quite a literal sense), the same problem we do: how to use a 2 D medium to convey 3 D by suggesting permeable, contiguous space. The difference with this type of painting from most of our work, is that it trying to be “immersive” it literally took the challenge “head-on”: it attempts to link up the real space occupied by the spectator with imaginary –through the looking glass -- space on the same scale and immediately contingent upon that real space. Such painting in effect calls attention to itself rather insistently, and challenges the viewer to observe its fictive qualities by using *trompe l’oeil* to create the illusion of much more deeply articulated and varied architecture projecting in front of and receding behind the actual wall and opening up imaginary apertures within it. [3]

The results are interesting. The paintings convey the viewer, often with great subtlety, into a transitional area between a real and an imaginary world while at the same time, presenting obstacles (walls, curtains, windows, doors) that, tantalisingly, suggested access even while they denied it.

We have chosen to take Vitruvius at his word by trying to discern the possible “real life” referents that inform the paintings. These are his

words at the beginning of his discussion of wall painting: “the ancients used definite methods for depicting definite objects. For through depiction an image is made of what is, or of what may be; for example men, buildings, ships, and other objects; of whose definite and finite bodies imitations are taken and fashioned in their likeness.” [7.5.1]

Our 3D "real" reconstructions in this project were thus derived from someone (ancient) else's attempt to think/visualise from things to images. And then we took as our task their conversion through 3 D modelling back to their “real life” spatial analogues/referents.

## **IMAGES:**

The first challenge is relatively easy: that of modelling the actual rooms upon the walls of which the paintings were created. Sometimes this has meant restoring virtually, paintings to walls from which they have been removed.

One of the things Vitruvius says Roman painters depicted, were stage sets; this makes the matter of modelling rather more complicated, because we already know from him that the stage sets themselves, in attention to their own, “real” architecture, also had painted – 3 D visualisations of architecture depicted upon them. So in attempting to reconstitute in our own 3 D visualisation models what we believe may have been in “the minds eye” (**oculis mentis**) of the ancient painters, we are likely to be drawn further into a “looking glass” world.

Room 23 We undertook the same process in a room from the Roman imperial villa at **Oplontis**, close to Pompeii.

We then had a chance actually to build a full scale real model, at the Getty Roman villa in Malibu, California, based upon what we saw in the painting, and had reconstituted as a 3 D computer model.

However, many wall paintings re far more complex and ambiguous. Not only did such painting represent as a matter of course unreal architectural elements, it sometimes depicted an altogether impossible architecture that never was and never could have been built.



**Apollo** paintings We can observe the same sort of architectural sleight of hand in the House of Apollo at Pompeii.

Here, there was further complexity in the nature of the evidence. The paintings themselves are poorly preserved, and in order to study them, we had to draw upon earlier sketches made (quite accurately) when they were in better shape. But modelling carried an additional challenge: not only did we have to **see** what the painters had depicted upon the wall – we also had in effect to see **into their mind’s eyes**, to try to determine what changes they appeared to be making – quite deliberately – in the “actual” (even if imagined) structures from which their painted works were playfully derived. This was in some ways the most complicated process of our “history writing”, since it involved a great many individual choices, (themselves in part determined by trying to second guess the intentions and choices made by our ancient predecessors) with knock-on consequences for the evolving structure of the model.

### **Cryptoporticus** paintings and reconstructions

Again we had paintings in a ruinous state, but were able to supplement our own first hand examination and recording of their existing state with earlier, 2 D graphic reconstructions.

From this we created a model which revealed quite clearly the deliberate adjustments which the ancient artist had made in the depiction of his structure in order to make it more visually effective in the very confined space it which he created it. Thus for example, the upper portion of the composition had a single vanishing point perspective, while the features in the lower portion are done with parallel perspective taking into account the proximity of the viewer and the height of his viewing point.

## **Paintings from the Baths of Sarno:**

Quoting from Drew Baker's report on the Sarno work: *“Rather than paint what the eye sees, the artist displays what the mind's eye imagines, foregrounding what is most important, not necessarily what is most visible. It is worth noting in this regard that the human figures are the only elements which are not integrated in perspective or scale with any other zone within the composition.*

*The recession of these zones ever further into the fantastical is analogous to the levels of reality and fantasy encountered upon actual scaenarum frontes during theatrical performances: behind the frons scaenae are the most wild, fantastical materials out of which myths come bodied forth into the reality of the audience.*

*Perspectival inconsistency between compartments allows the painter incrementally to squash and stretch the non-rectangular subject matter into the rectangular 'frame' provided by the wall, while concealing the distortions from the viewer, thereby giving the impression of a 'realistic' structure, by ensuring that each local section is perspectively consistent. In each case, the perspective leads the viewer deeper into the composition, before the view is blocked by architectural elements in the next Zone.”*

Now all of this might suggest that in a painting such as this, we are very far indeed from any “real-life” referent in either actual built architecture, or indeed in anything that could have been built. But in fact the paintings at the Sarno building are not at all far from their real life models: indeed they are only a few hundred feet away!

When we compare the “footprints” of the Sarno painted structure and the actual theatre at Pompeii, something remarkable can be seen.

Now the activity we have just gone through in the course of this paper: looking at a variety of data types and how we used them to create as part of a process of research, 3 D models, addresses if only in briefly, the fundamental problem of making the process transparent. At least a few of the problems could be identified, the choices and the reasons for making them indicated, and the consequences for outcomes shown. But it's a pretty labour intensive process!

Writing history (which is what we are doing when we use 3 D modelling as a research process) is always about making choices between “all that happened” and those events which we think somehow meaningful -- significant. Just as historians benefit from critical theory enabling them to compose their histories as a reflection of the questions they are raising about the past, so too our modelling work as it unfolds on a particular project requires a set of (often changeable) research questions. We select, examine and evaluate our material according to these questions and the answers which emerge incrementally as we explore a topic more deeply. Our task now in this symposium is to develop an historiography capable of documenting that process, as a species of historical enquiry. Only then with the benefit of transparency, can we credibly claim both to be fully aware of the monsters, lurking behind the walls, while also endeavouring to tame and contain them.