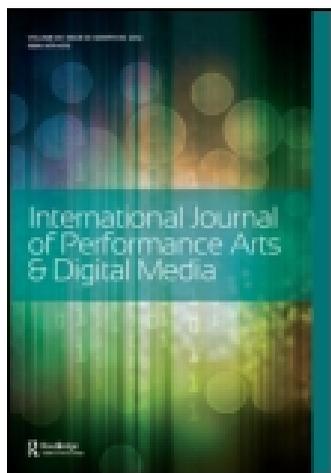


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## On the border between performance, science and the digital: The embodied orrery

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The Centre Alexandre Koyré (Paris, France) is working in partnership with the Research Centre for Visual Poetics (University of Antwerp, Belgium) and CREW on an initiative that is focused on science as spectacle; the performance of new technologies and the staging of scientific experiments. This joint project will be carried out at the ‘Interdisciplinary Cluster for the Advancement of Visual Studies’ at IrDive, a research platform based in Lille-Tourcoing (France) focusing on digital and interactive visual environments. Charlotte Bigg, a science historian, together with Kurt Vanhoutte, a theatre and intermediality scholar, are working together to investigate the intersections of astronomy with the culture of spectacle. They are specifically interested in how scientific maps and narratives of the heavens were transformed into theatrical performances in popular science shows in the nineteenth century and will trace their evolution to today. Eric Joris joined their research team to extend these preliminary aims towards the formation of an experimental performance/science project that incorporates elements of science fiction. Through a historical study and experimental digital reconstruction of planetarium performances, the project will analyse a particularly important locus of hybrid activity, where spatial and visual cultures of modernity were elaborated and experienced at the intersection of science and performance, technology and spectacle.

### Into the planetarium

Since the early nineteenth century and into the twenty-first century, the planetarium – a theatre built for presenting educational and entertaining shows about astronomy – remained a locus of innovations in the contexts of both performance and science. These spectacles animated the celestial bodies – the stars, planets and comets – in front of lively audiences, and delivered cosmological narratives that thematised the place of man, scientific progress and technology within a rapidly evolving world. These popular events were exemplary intermedial shows for the ways in which they combined aspects of the theatre with moving transparent paintings, magic lantern slides and mechanical devices. Like so many spectacular cultural examples of the nineteenth century and into the twentieth century (phantasmagoria, the wax museum, panoramic displays), the distinction between sensational entertainment and scientific

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demonstration could not be drawn. Nor was the appeal weakened when the first dome-shaped and projection-based planetarium theatres appeared in Germany in the 1920s. On the contrary, an appetite for both myth (age-old constellations) and progress (technological innovation), combined with awe and reverence, characterised the new modern theatres of the stars. These theatres functioned as sites for public debate, where modernity negotiated the contradictions of its own time. No wonder that Bertolt Brecht, Aby Warburg and Walter Benjamin were all particularly concerned with astronomy and the Zeiss projection planetarium, a device that, among others uses, served to help city dwellers rediscover nature. Indeed, the dome-shaped planetarium was the place where the historical *avant-garde* (e.g. Bauhaus) and also the *neo avant-garde* (e.g. Stan Van der Beek) started exploring new possibilities regarding both art and scientific discovery.

The digital condition and the acceleration in science, technology and production that began in the second half of the twentieth century has recently brought new challenges to the planetarium and, by extension, to the relationship between performance and science. Today, due to new scientific discoveries and revolutionary digital technologies, the art of making maps is changing drastically. Advanced digital projection systems such as IMAX movie theatres deliver a scientific account of the stars in highly immersive formats to audiences. Given this immediacy and ubiquity of digital environments in both entertainment and science, our project aims to gauge the specificity of the changing relation between performance and science. We aim to study not just the production and display of science but how it is perceived, and is experienced in a performative context. Science fiction will be used as a device through which we can visualise the project's concerns. Long used as a representational meditation on the dynamics of art and technology, science fiction has the capability of producing an effect of estrangement that makes our present condition recognisable yet different, and we hope to use this narrative form to engender a new perspective on technology and embodiment. In this respect, CREW plans to create a future planetarium performance to construct a meta-image (Mitchell 1994).

The relationship between art and science has moved through history in cycles. Since the nineteenth century, astronomical performances have woven threads between research and artistry, education and the aesthetic experience. CREW's live-action and digital re-enactment intends to make those threads visible through drawing links between the historical and the futuristic.

### Mapping the stars

Astronomy is the visual science *par excellence*. Its history can be read as a history of developing better (instrumental, mathematical, pictorial) techniques of observing, measuring and representing the heavens. It has also long been put forward as a blueprint of what science should be; a model of rationality. The narratives and visual representations astronomers have created have been used strategically by various powers, especially political and religious: the heavens have always been projection surface for earthly concerns. The planetarium performances create playful shifts in the temporal and spatial position of the spectator with respect to the solar system. These experiences are embedded in wider discourses and visual cultures of both present and future ideas of the world and humanity. Hence, as hybrids of popular

science and spectacle, of education and pleasure, these performances reveal ways in which individuals and societies conceptualise and map our place in the universe.

In former times, in order to produce and to popularise science, both the artist and the scientist made use of drawing and painting tools, objects and instruments such as astronomical installations, science performances tools and animated lectures. In London in the 1780s, Adam Walker manufactured a kind of orrery that combined mechanical movement with a method of back projection. He famously enlightened audiences with his elaborate performance *The Eidouranion* (a name based on Greek, meaning 'image of heaven'), which was performed for almost 60 years. In the 1860s in Paris, theatre-maker Henri Robin referred to himself as a physicist and to his theatre at the famous Boulevard du Temple as a place of popular science. Audiences thronged to planetarium performances in order to participate, and to be seen to participate, in a specific kind of cultural event. One way of understanding the dynamics of these shows is through the spaces they occupied in cultural geography.

Adam Walker's *Eidouranion* was staged in Theatre Royal, King's Theatre, English Opera House and Covent Garden. Walker's sons later promoted the performance as the most expensive event in the London Lyceum on the Strand,



Figure 1. Proscenium of the English Opera House, The Strand, 21 March 1817, with Walker's performance of the *Eidouranion*.

Note: Engraving by Edward Francis Burney.

where London showbusiness emerged and theatre boomed. There, more than anywhere else, the performance of science could cross the threshold of respectability and at the same time profit from both established and new kinds of theatrical genres.

The techniques of astronomers have over time developed from measuring angles with the unaided eye, through to the use of telescopes and lenses for light magnification and, later, printable plates, photography and other types of automated production, up to current methods, which include computer-automated space telescopes and digital data conversion. The accepted model of the solar system has changed accordingly, aborting a geocentric system; a theory that placed the earth at the centre of the universe, and adopting a sun-centred model. Only recently, the Hubble Space Telescope, which explores our universe for 24 hours a day, 365 days a year, has provided mankind with a new map of the universe that contains about 5500 galaxies. This stunning composite gives us the deepest view of space ever. Hubble's futuristic representation of the unrepresentable might well become our new time tunnel into the distant past. Paradoxically, this new era of discovery brings to mind Blaise Pascal, the mathematician, writer and inventor who in the seventeenth century stated in Fragment 72 of his *Pensées* that 'The whole visible world is only an imperceptible atom in the ample bosom of nature. It is an infinite sphere, the centre of which is everywhere, the circumference nowhere' (Pascal [1958] 2003). Pascal was of course pondering the misery of man without god. Nonetheless, one could argue that his philosophical intuition is somehow met by contemporary efforts to digitally map this centreless universe and to provide some kind of representation. Surely, this is a paradoxical effort, as the ambitious undertaking to pictorialise the unrepresentable by installing an impossible vantage point, unavoidably reproduces its own inherent failure. It is precisely this paradox, however, that will serve as a starting point for our experimental set-up; a realisation of a de-centred, multifaceted viewpoint, what Eric Joris terms a 'view from anywhere', an enigmatic perspective that would match the (re)current experience of the centreless universe that envelops us. Through experimenting with immersive technologies, the perspective of the spectator will merge with the perspective of the image. In the future planetarium the spectator will no longer stand in front of this image, he will embody and experience the centreless galaxy from within. CREW's performative installation will serve both as the impact and the object of research into the history of planetarium performances. Our aim is not only to historicise the notion of spectacle with its aesthetic particularities and mediating technologies, but to create a shift from the past to the present and beyond.

In terms of the performance's dramaturgy, CREW is influenced by the aesthetic of cognitive mapping as defined by Fredric Jameson. This notion stems from Kevin Lynch's (1960) classic *The Image of the City*. Jameson explores the mental map of city space to encompass the social and global totality of the postmodern schizophrenic experience, which he asserts is 'an experience of isolated, disconnected, discontinuous material signifiers which fail to link up into a coherent sequence' (Jameson 1991, 119). According to Jameson, individuals are no longer able to map either their own position or the larger world system in which they are situated. Consequently, in his reading the very task of postmodern art is seen in the invention and projection of a global cognitive mapping of multinational space. This space is technologically grounded, because it is characterised by digital media, virtual experiences and computer-simulated worlds. Working in a thoroughly mediated

culture, the artist seeks to offer their spectators a new sense of 'being there' in a world determined by technology. Art, in other words, mediates the 'multilayeredness' and 'openness' of an urban space in which a sense of presence is recaptured and retained. Extending Jameson's vision, one could argue that today there is no map (or never has been) that is better suited to perform this task than the astronomer's atlas. The planetarium performance can be seen to map the discontinuities of digital culture and to use theatre as a metamedium to investigate the technological condition of culture.

### **Into the orrery**

A specific form of planetarium, the orrery is a mechanical scale model driven by a clockwork mechanism with balls of various sizes attached to copper arms used to illustrate the relative position of the celestial bodies. Of particular interest is the somewhat strange but inspiring history of human orreries, in which individuals are made to stand in the place of the celestial bodies, re-enacting the motions of the orbiting planets. Going back at least to the eighteenth century, documentation concerning human orreries shows that it has continuously been practised to this day. In his text book *An Easy Introduction to Mechanics*, first published in 1768, the Reverend Ryland describes a 'living orrery, made with sixteen school-boys' (Ryland 1768), mapping out in the school ground, with a rope, the orbits for the planets. Astronomy, the Reverend reckoned, is best taught by 'play', by which he meant physical participation and direct interaction. Accordingly, human orreries were practised in English schools by boys actively performing the paths of the planets. The participants, each embodying a specific planet, walked around the orbits at a steady pace, moving from one position to the next and demonstrating the different distances travelled by the different planets during a fixed time interval.

Today, there are at least two permanent human orreries that enact the correct relative scale distances between the planets: one in Dynic Astropark, Japan and another in Armagh Observatory, Northern Ireland. An important function of the orrery has been and remains to this day the correction of the geocentric illusion, the idea that we are at the centre of the universe. This illusion is hard to overcome, and even modern planetarium domes inevitably put the spectator in a focal point, a chair in the audience room, around which the celestial bodies evolve. The main purpose of a 'human orrery' is to enact the dynamics of the universe by playing the role of the planets, 'walking the orrery' as it were, in a scale model laid out across the landscape. Enacting the orrery in lockstep makes users immediately experience the planets moving at different speeds, aware that the slowest lies furthest from the sun. This dynamic interactive map of the solar system gives users the opportunity, through performance and play, to cognitively map one's sense of presence and direction in space. The human orrery thus captures in a simple but effective way the essential characteristics of the specific experience of the planetarium: its immersive nature, the deliberate implication of the body of the participants as well as an explicit reflection, through spatial and visual shifts, on the position of the observer with respect to the solar system and the universe. These images often map onto broader, epistemological, cultural, metaphysical positionings about the organisation of the universe, of society and the place of 'Man' within them.

Choosing the human orrery as the guiding principle for the digital (re) construction, this project seeks to interrogate some of the central issues at the heart of the planetarium experience in a manner that melds performance with science. Building upon their expertise in performance art and new media, the team more specifically strives to add a new dimension to the history of human orrery performances by remediating a living orrery. For Bolter and Grusin (2000), in *Remediation: Understanding New Media*, the specificity of digital media, their ‘newness’, lies in the way they remediate older media. In the spirit of McLuhan, they define remediation as the representation of one medium in another. Against the technologically progressive view that celebrates new media as an improvement on old media, remediation helps conceptualise the relationship between old and new media, not on the ground of their difference but instead of their connections and affiliations. In this vein, the transformation of the living orrery into an ‘embodied orrery’ makes it possible to inhabit and (re)search the orrery from within. Digital reconstruction can help us grasp and better investigate the momentous changes, which have been the hallmark of the experience of our era. It can perhaps help us understand the imaginary ‘view from anywhere’ and obtain a deeper intuitive feel for the universe, as we know it.

### Notes on contributors

Kurt Vanhoutte is Associate Professor of Performance Studies and Visual Arts Criticism at the University of Antwerp, Belgium, where he helped to establish and currently co-coordinates a master’s programme in Film and Theatre Studies. Vanhoutte is founding member and spokesperson of The Research Centre for Visual Poetics ([www.visualpoetics.be](http://www.visualpoetics.be)). His research investigates processes of intermediality that have emerged under the cultural and technological conditions of modernity and late modernity. Between February and August 2015 he will be a Visiting Scholar at the Centre Alexandre Koyré/CNRS in Paris in order to investigate science performance in modernity.

Charlotte Bigg is a historian of science at the Centre National de la Recherche Scientifique/Centre Alexandre Koyré, Paris, France. She has published widely on the social and cultural history of the physical and astronomical sciences in the nineteenth and twentieth centuries. Her work focuses on the elaboration of optical instruments and visual cultures in scientific spaces and their communication with a range of scientific and popular audiences through devices such as panoramas, planetariums, exhibitions or lectures. She teaches at the Ecole des Hautes Etudes en Sciences Sociales, Paris.

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