THE MAGIC FEATURES OF THE AUDIOVISUAL IMMERSIVE ENVIRONMENTS

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Audiovisual environments have been explored by artists, scientists, writers, designers, engineers, and others, to create augmented realities and temporary autonomous spaces for a long time. The constant evolution of new media technologies gives the creators better tools each day, that allow them to converge the existing physical spaces with the virtual, the digital and the imaginary ones. The magical features of these environments attracts humans since long before the new media technologies.

The need to understand the Universe is a human characteristic, as is to understand its rules and functionalities, be able to break them and create new worlds. "*The fantasy of being transported into another world, to be taken wholly into the imaginary real, is a primal desire*".[Packer and Jordan,2001.p.XXII]. This fantasy exists since ancestral times till nowadays, crossing time, civilizations and technologies. It is embedded in human conscience and it is present in a wide range of fields, from literature, science, visual art, cinema.

In the research on media archeology we find throughout history a huge range of immersive media techniques, tools and mechanisms ,used to create audiovisual illusions and immersive states, that propelled many of the actual new media technologies.

OLD/NEW MEDIA

The Renaissance period was very rich in progresses on audio and visual fields. Scholars like Giovanni Battista de la Porta, Johannes Kepler or Athanasius Kircher were brilliant researchers in a wide range of artistic and scientific fields among many others. In this period, important progresses were achieved with light, lens and optics technologies were very important for the media technologies that we know today.

One of the most important authors was Giovanni Battista della Porta (1538-1615) who like many other scholars of the Renaissance dedicated himself to a huge variety of study fields like alchemy, astronomy, natural sciences, philosophy, mathematics or cryptography. His most famous work was an encyclopaedia called "Magia Naturalis", where "*he undertakes a colossal and daring journey through all areas of life; from zoological observations and the (alchemistic) transmutation of metals and the synthetic production of precious stones to the investigation and composition of special combinations of herbs and rituals for inducing abortions and performing quasi-genetic engineering and secret ciphers*." [Zielinski, 1996].

> "*It is also possible, using flat mirrors, to see things that are happening in far-off places...*"
> (Della Porta, 1558, quoted from [Zielinski, 1996])

The Book XVII of this encyclopaedia is dedicated to "divers mirror and lenses", where he explores optics, projection and reflexion. In his studies Della Porta focuses his attention, mainly, in the "visualization of the imagination", in the dilations, changes of dimension, deformations and transmutation of the reality that can be achieved with the lenses and the mirrors. He also gave a full description of the "camera obscura", or as he called "obscurum cubiculum" [Zielinski, 1996]. From that moment it became a common and useful tool for artists, and evolving until the cinema of the XX century.

> "*... hunting scenes and battles and other kinds of hocus pocus can be made and performed in a room... Guest performances, battle fields, games, or what you will, so clear, distinct, and pretty to see as though it were taking place before your very eyes*". (Della Porta, 1558, quoted from [Zielinski, 1996])

It is amazing his interest in the "camera obscura" and other optical illusions or the potential to create virtual realities and imagined scenarios and narratives. His words about this topics are surprisingly up to date to nowadays new media technology, features and expectations.

> "*Namely, opposite to the room where you desire to see this, there must be a large, level space that the sun can shine down upon, where can be placed all manner of trees, forests, rivers, or mountains as well as animals, and these can be real or artificial, of wood or other material...There can be stags, wild boars, rhinoceroses, elephants, lions and other animals, whatever one wants to be seen; they can slowly creep out of their corners into the space, and then the hunter can appear and stage a hunt...*" (Della Porta, 1558, quoted from [Zielinski, 1996]).
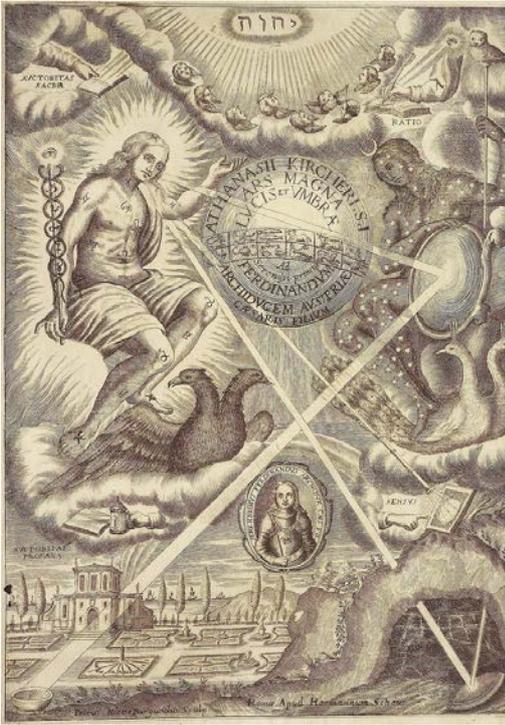
[fig.1] "Ars Magna Lucis et Umbra" cover
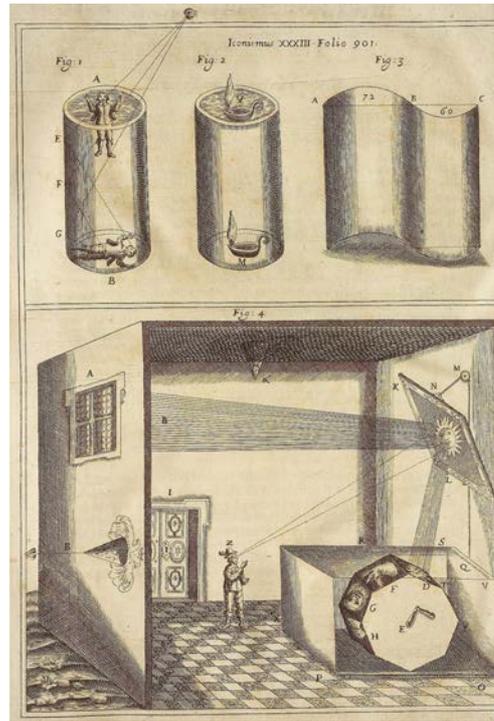
[fig.2] Kircher's projection device. Illustration from "Ars Magna Lucis et Umbra

It is also important to highlight the work of Athanasius Kircher. In 1646 he published the book "Ars Magna Lucis et Umbra" (The Great Art of Light and Shadow, Rome,1646). In this book he collected and compiled the state of art about light, lenses, mirrors, astronomy and also had detailed descriptions and illustrations about the "camera obscura" and the "lanterna magica".

Kircher collected many of the artefacts of his studies in his own museum, called "Museo Kircherianum" established in the "Collegium Romanum", Rome. "*The museum was full of marvellous optical and acoustic devices*" [Zielinski, 1996] ,that would create illusions and delight to his visitors. These devices and artefacts were mostly automata figures with hydraulic or pneumatic power that performed series of automatic movements. Many of this devices were copies or recreations of Heron of Alexandria's Theatre of Illusions.[Zielinski, 2006, p.125]

> "*With such technical artefacts and their specific arrangements, Kircher established a tradition of visual apparatus. (...)media machines were designed and built in such a way that their functioning mechanisms remained a mystery to the audience: the projected world must not be recognizable as an artificial construct.*" [Zielinski, 2006, p.138]

The "lanterna magica", was an image projector with a candle lantern that was the ancestor of the today slide projector. Although Kircher was not the creator, he is often related to the "lanterna magica" due to his extensive work in the field. (There are references to similar artefacts from many years before from many authors).
One of his breakthroughs in the field was the "Smicroscopin", that appear in the second edition of the "Ars Magna Lucis et Umbra" from 1671,Amsterdam [Zielinski, 1996]. It was a device to narrate stories through a circular surface that hold pictures of the different moments of the story. By rotating the wheel you would go throw the story. Kircher used the story of Christ divided in eight different moments/slides/scenes. This device would become clearly one of the predecessors of the nowadays motion pictures projector.
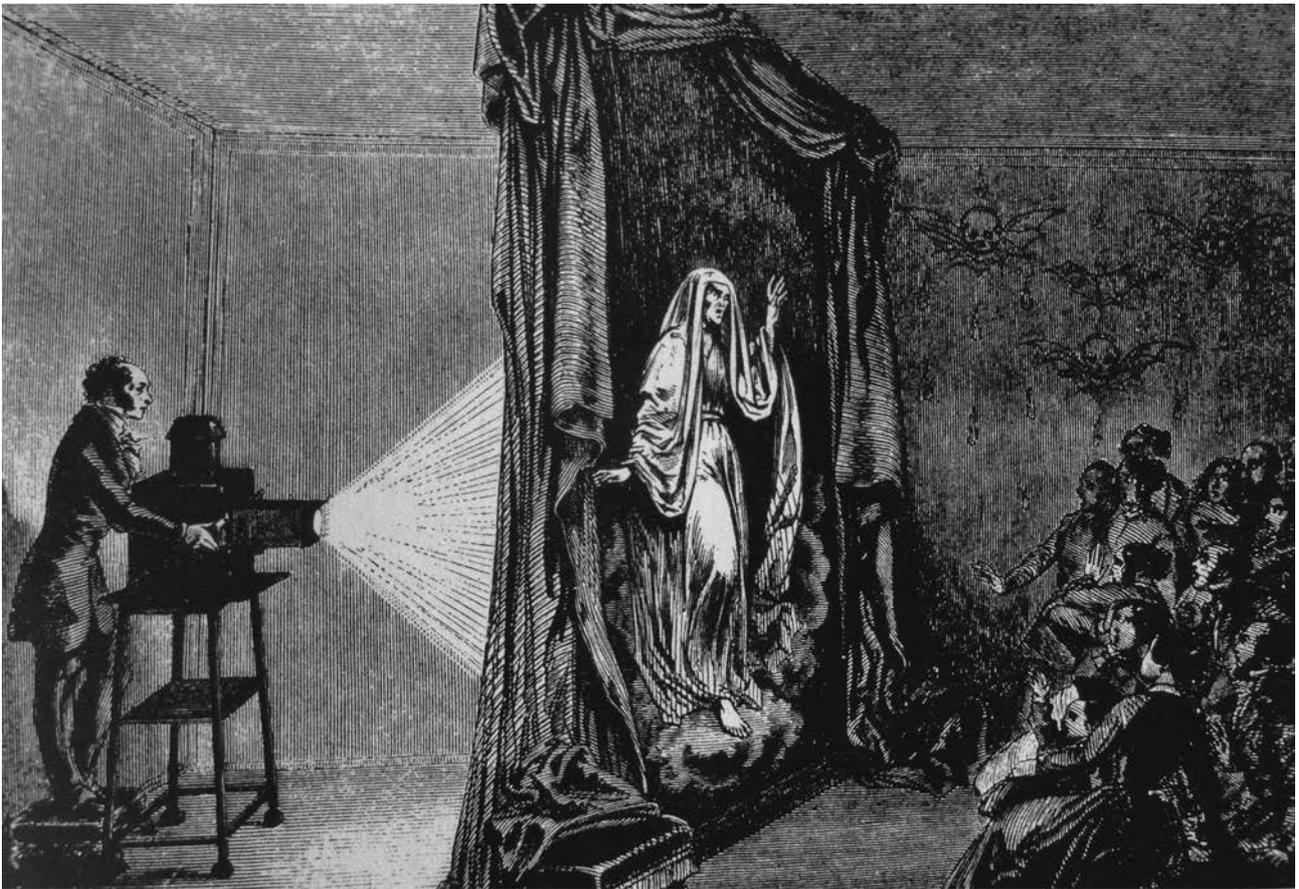
[Fig.3] Ettiene-Gaspard Robertson performing "Phantasmagoria"

By the end of the 17th century the "lanterna magica" became a common instrument, throughout all Europe, travelling showmen would set up magic theatrical show with it [Burns,1999].

A great example is "Phantasmagoria", an audiovisual performance/show from the XVIII century created by Ettiene-Gaspard Robertson. Under the theme of terror, demons, and spirits from the darkness, Robertson created an immersive audio and visual space. Using projections, light tricks, transparent screens, smoke, magic lanterns, mirrors, projections on glass, moving lanterns [Burns,1999], among other techniques, he played with the perception of the audience, creating illusions, space-time ambiguities and deformations of reality.

These illusions created by the control of light and shadow, allowed him to manipulate, create and cancel the physical space. The space became a transition between the tangible and the virtual, with the objective to "engage the audience perception and cognition, and play with their fundamental categories of world formation and orientation, of belief and confusion, of certainty and play" (Tom Gunning in [Stan and Douglas, 2009]). Magic lanterns were already well known and common for a long time, but in Phantasmagoria the lantern (or the "phantascope" as Robertson called it) was hidden. The audience saw the projected images but not their source neither the screen which created a feeling of miraculous events. The ghosts seemed to appear in the air. Robertson created an immersive media space, a temporal alternative space where abnormal events happened. His domain of the illusion techniques allowed him to play with the audience perceptions and emotions.

ALTERNATIVE WORLDS

A good metaphor to describe the features of these environments is the "Zone" from Andrey Tarkovskiy's film "Stalker"(1979). Like the *Zone* these reactive environments have magical characteristics and do not obey to the laws of physics as we know them in the real world. It is a post-apocalyptic area with very special powers, dominated by a space-time disorder. A place where the references from the real world do not fit..

> *"The Zone is a very complex system, (...). Changes at any moment and without prior notice.* "
> [*Stalker* line, in the film "Stalker" (1979)]

[Fig.4] Scene from the film "Stalker"

The *Zone* is a restricted area, closed and guarded by the government. It is known to be a very dangerous and unpredictable place, where the space and time are unstable. It is a place where if you walk in a straight line, it is possible that you return to the same place where you started. Or if you try to go back to the same place where you were some minutes ago, that place will not be there any more. Somewhere in the *Zone*, there is a special room where it is said that when someone enters there, his most profound desire becomes reality. To go inside the *Zone* and comeback alive you must hire a "Stalker", that will guide you through the *Zone*. The idea of comparing the Zone and the audiovisual interactive environments came up in 2008 in the "Interzone" project/thesis, an audiovisual reactive installation for transition public places, made by Rodrigo Carvalho and Daphne Polyzos.

Very similar to the "*Zone"* is the "*Pocket Universe"* from the TV series "Fringe". The "*Pocket Universe*" is an inter-dimensional space that has been created by Dr Walter Bishop in the episode 6 from the fifth season (2012). It is a small secret parallel universe, similar to the current universe but inter-dimensional, where many of the usual laws of physics won't apply, with "hallways running upside down or in vertical directions". In his own words "*There are few places on earth where two plus two don't equal four, and this is one of these places.*" The access to this place is made by passing through a membrane that separates both universes.
This episode from "Fringe" is a clear reference to Lewis Carroll work "*Through the Looking-Glass, and What Alice Found There*" (1971), in fact the episode itself is called "*Through the Looking Glass and What Walter Found There*"

Alice's looking-glass represents a strong analogy about crossing and creating new worlds. This metaphor is commonly used in literature, film or technology and design concepts. It represents heavily the fantasy of creating and manipulating new universes with different rules. The curiosity for the unknown and the unexplained, that makes people jump to the other side, or inside the Zone, even knowing that it can be dangerous.

> *"....In the long range it augurs a new realm of human experience, artificial realities which seek not to stimulate the physical world but to define arbitrary, abstract and otherwise impossible relationships between action and result."*
> [Myron Krueger, in [Packer and Jordan, 2001]]

The interactive audiovisual spaces are magic places with weird powers, where physics, the matter and logic do not work in the same way as in the real world, they are metaphoric places of transition between the real and the virtual world. They do not intend to simulate the real world. They intend to augment it, to cross it with non-real worlds, and to give new experiences and perceptions of the space-time.

> "*I don't know what happens here when there isn't any human being inside. But when someone gets inside, everything starts to move. Places that were safe became impassible.*" [*Stalker* line, in "Stalker" (1979)]

An important parallelism between the Tarkovsky's *Zone* and the modern interactive audiovisual spaces is the fact that the *Zone* is empty it is a quiet space, the events just happen when someone gets inside. Intruders and stalkers feed the *Zone* with their personality, thoughts and desires which will cause the *Zone*'s mutations and abnormal events.
The same happens in the interactive spaces. The users are the trigger to the audiovisual events. Their presence feeds the system with data that is used to create and interact with the image and the audio. When the users go away the space becomes a quiet zone again.
The integration of the audience as an integral part of the artwork was an important milestone, it had a great influence by Kaprow, who in the 60's coined the term Happening, "*He was particular interested in the blurring of the distinction between artwork and audience. (...) The ultimate integrated art*". [Packer and Jordan, 2001, p.XXI]
It is these generated data that gives life to the space. The audience appears now as co-author [Manovich, 2001, p.49] of the interactive new media art pieces. They are an essential element in the system as they provide a direct performance of the experience. They affect the results and the narrative of the piece.
The digital era allowed the birth of a new kind of real time performance. "*The audio or control data from the musicians' controllers were transferred to the image-generating system and used as actuators for visual impulses*" (Myron Krueger in [Packer and Jordan, 2001]) and vice versa. A new concept of artist was also born, an artist that acts at a meta-level [idem], he creates the mechanism, the instrument, and he defines the parameters, the sequences, the possibilities. Often he is surprised by unexpected results that he did not had planned.

> "*The space of the multiscreen film, like the space of the computer, compresses physically the space*"
> (Beatriz Colomina, in [Stan and Douglas, 2009])

The emergence of the computer represented a big breakthrough in this quest for alternative new worlds, the computer took the position of a universal machine that was able to replace a series of different media tools and deal at the same time with image, sound and text [Daniels, 2004]. It represents a medium that "*would appeal to all senses simultaneously*" [Packer and Jordan, 2001, p.XVI]
The computer led to endless possibilities in the creation and simulation of new worlds, manipulating images, light, sound, shapes, space and autonomous identities. It made possible the creation of "real" virtual worlds that could be experienced in space and time, crossed, modified or destroyed. In virtual reality humans are able to cross the mirror and jump in a 3D world built with data in space, the cyberspace, as described by William Gibson in is novel "Neuromancer" in 1981.
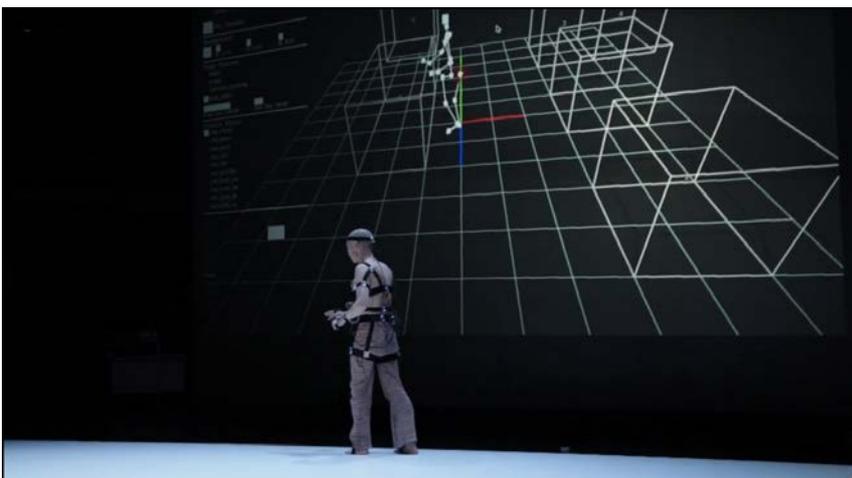
[Fig.5] Dancer interacting in a virtual stage with RAM Dance, a creative coding toolkit to create environments for dancers from YCAM Interlab.
[https://github.com/YCAMInterlab/RAMDanceToolkit/wiki/Overview]

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Audiovisual Immersive Environments represent then a "mathematical wonderland" where Alice jumped into (Ivan Sutherland in [Packer and Jordan, 2001]). They represent the primal desire of being transported into another world [Packer and Jordan, 2001, p.XVI], a desire that exist in the human conscience ever since. A common element that is present from the ancestral rituals in dark and deep painted caves, where the audiences were immersed into another domains and triggered into altered perceptions and higher states of consciousness [idem], to the optics and lights devices by Della Porta and Kircher, Roberson's phantasmagoria, Krueger's responsive environments, Gibson's Cyberspace and Virtual Realities, till nowadays Mix-Reality spaces with mapped projections and augmented objects.

Technologies, science, arts and society evolves but this desire remains constant over the time. It is embedded in human conscience, the wish to understand the world around us, and create endless alternative ones, where one could control time and space, be able to fly or teleport. Worlds with magic and surreal features.

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