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The magic of projection : augmentation and immersion in media art

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4. An Image Tradition
Historical Examples of Projection

Image 58: Rembrandt van Rijn, *Belshazzar's Feast* (detail) 1635-1638. National Gallery, London.

La nouvelle qu'icy j'avance,
N'est pas grandement
d'importance ;
Mais le récit que j'en ay fait,
C'est pour la rareté du fait :
Cette Magie est innocente,
J'en sçay la finesse excellente :
Mais me piquant d'être discret,
Je n'en aprens point le secret. [273]

Jean Loret, 1656

……..

273 Loret (1877) p. 192.

Reflection of light

In the painting *Belshazzar's Feast* (1635-1638) Rembrandt van Rijn has shown the effect a projection can have on media-illiterates. The painting depicts the Chaldean king shocked by an apparition on the wall: "the fingers of a human hand emerged and wrote opposite the candelabrum on the plaster of the wall of the king's palace, and the king saw the palm off the hand that was writing".[274]

"וישרפו, לקת, אנם, אנם"

[275]

In the story from the *Book Daniel*, the king immediately calls for his necromancers and astrologers to help him understand the ominous image. Also Daniel is called, who tells the king his days are numbered and all is lost – soon after, the king is killed. So far the story. Technically the appearance of the hand writing on a wall can be explained as a simple image projection – using a mirror and sunlight, at least this is what historian



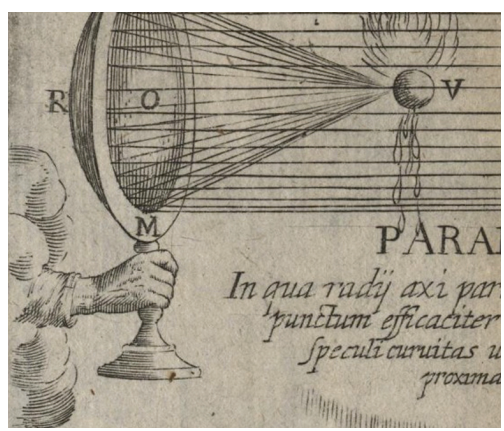


Image 59 (left): Rembrandt van Rijn, *Belshazzar's Feast* (detail) 1635-1638.
Image 60 (right): Kircher (1646) p. 882.

Hermann Hecht proposed.[276] Chinese magic mirrors are the oldest preserved example of the technique. The reflection of strong sunlight casts an image projection.

274 Torah, Daniel, Ch 5.5.

275 Mene, Mene, Tekel, Upharsin. The Jewish encyclopedia gives the following translation: "the author chose words which had a double meaning and ... Daniel, accordingly, gave the king a dual interpretation, applying both meanings of the words. Thus he interpreted *Mene* as 'to count' and 'to finish'; *Tekel*, to 'weigh' and 'to be wanting'; *Uparsin*, 'to divide' and 'Persia'". http://jewishencyclopedia.com/articles/10678-mene-mene-tekel-upharsin (accessed on 6.1.2015).

276 Hecht (1984) p. 2-6.

In case of the Chinese mirror, the projection resembles the image on the back of the mirror, as if the mirror were magically transparent. The 'magic' of the Chinese mirrors is said to be created by small unevennesses on the surface on the front of the mirror identical to the picture on the back.[277] The painting of Rembrandt shows a mirror that appears to have been sooted and letters were drawn onto it by clearing the surface. The 17th century Jesuit polymath Athanasius Kircher picked up on the mirror projector for one of his over thirty volumes of 'universal knowledge' and demonstrated how the mirror could find military applications. A hand extended from a cloud holds a parabolic mirror reflecting sunlight, either to send remote text messages, or to burn down the enemy fleet; remote warfare of 1646.[278] The text apparition of the Chaldean king, and Kircher's *steganographic* text projector, are fascinating examples of augmentations by means of projection. Both *technologies* added information to the space, yet the king and the scientist thought of the projection differently. To the Chaldean king the projection was a magical sign, to Kircher it was a secret yet pragmatic code in war.

Projection practices dating from before the cinema-era are rarely included in theories on projection art, at best they are mentioned in a footnote.[279] Yet, in my view early experiments with projections give evidence of a tradition of an expanded or augmenting approach to projection. Before projection became an immersive (cinematic) experience it augmented reality. The examples I give in the following were not intended as art, and I don't see the need to place them in an art-canon retroactively. Much the opposite, studying the various applications for projection may inspire unusual contemporary projection experiments.

In this chapter I take a tour of projection history from early technical descriptions of a projector by the 15th century Venetian magus Giovanni Fontana, to the late 19th century lantern lectures.[280] I will emphasize those projections which expanded into space '*performing*' their virtual images. I will consider how the reality

277 In China the 'magic' of the mirrors was less the fact that they projected text onto a wall, rather that they were considered to be magically transparent bronze mirrors. In bright sunlight the calligraphy on the back became visible as reflection on the wall – as if light shone though the bronze. The effect is described by Shen Gua, in his Dream Pool Essays, published in 1086. See Whitcomb (1988) p. 16.

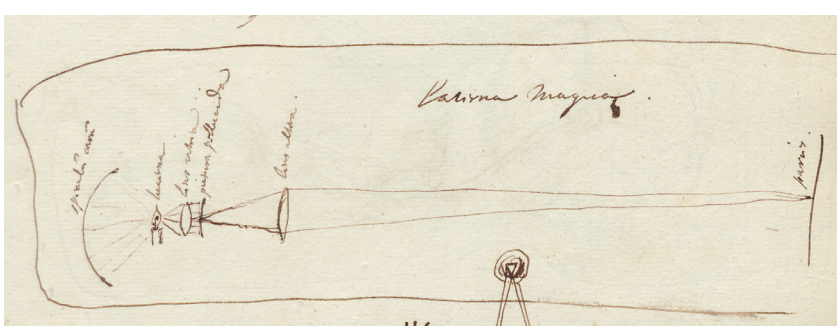
278 Kircher (1646) p. 882.

279 Oursler's *Timeline* and the book *Art of Projection* (2009) edited by Stan Douglas and Christopher Eamon are examples of exceptions.

280 A magus is a practitioner of astrology, alchemy and esoteric knowledge.

of projected images were represented and understood and what role the projectionist may have had in society. I do so by looking at images, contemporary reports, as well as at references to projections in fiction. I search to highlight a few historical moments of projection praxis that I as an artist relate to. What fascinates me is how projection machines were used in military feint attacks and at the same time as magical symbols in conjuring. It could be seen as a stage tool in theatre. Architects used projection technology in interior design, and projections were great advertising stunts in public space. All of these different projective interjections alter their surroundings by making it look strange.

When optical technology advanced in the 17th century, projection machines became viable tools. As said before, early modern projections were not immediately used as immersive screen projections. However, by the mid 19th century lantern lectures became a popular form of 'screen entertainment'. These technologically advanced slide shows were a premonitor to the cinema of the 20th century.[281] Even though the first film projections may have looked quite shady and grim in contrast to these slide shows, soon enough moving pictures as immersive projections were placed squarely onto the screen.

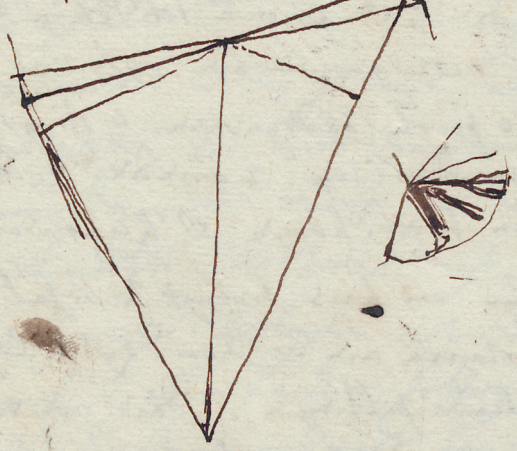


Development of a medium

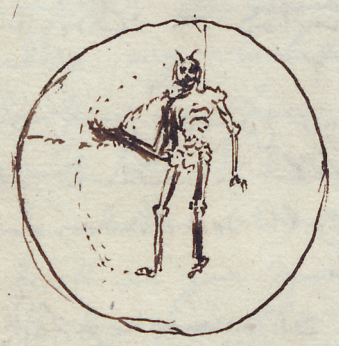
A very curious drawing can be found at the library of Leiden University. It is a small construction sketch of a projector by Christiaan Huygens. He drew a diagram showing how light from a candle, amplified by a convex mirror, directed through a set of lenses passed a glass-slide, projected an image onto a wall. A projection lantern,

281 In England powerful multiple lens projectors (biuniual or triunial lanterns) were produced, the elaborately crafted colourful slides were often animated and the stories that were performed absorbed their audiences. See http://www.magiclantern.org.uk/alphabet/alphabetab.php (accessed on 20.12.2014).

Image 61: Appendice II au premier Complément à la Dioptrique.
Image 62: Christiaan Huygens' sketches (1659), manuscript book A between feb 24 1659 and oct.11 1659. Leiden University Library.



pour des représentations
par le moyen de verres
concaves à la lampe



















or as he writes: Laterna magica.[282] An important factor for the improvement of projection technology was the growing lens making industry in 17th century Europe. New skills in lens making enhanced light refraction and optical amplifications. During its Golden Age, Holland was a centre for lens manufacturing and the city of Leiden had exceptionally skilled scientific '*instrumenten makers*'.



Image 63: Black lantern, about 1825, Gift of Mrs. Robert W. de Forest, Metropolitan Museum, New York.

Besides the sketch of a Laterna magica, on another page, Huygens had also drawn a series of apparently animated image slides for his projector. He noted: "For representations by means of convex lenses for the lamp".[283] His macabre projection would have shown a skeleton throwing its scull up and down. Christiaan Huygens appears to have thought of the projector as a mere triviality. He refused to build a functioning projector for his father Constantijn, who wanted to "play such puppets at the Louvre", at the French court, on one of his diplomatic journeys.[284]

Huygens is often credited with inventing the magic lantern around 1650.[285] Media theorist Friedrich Kittler acknowledges Christiaan Huygens' role in the product development of the magic lantern rather than it's invention.[286] Kittler suggested that the magic lantern is an adaptation of a dark lantern (a lantern

282 Christiaan Huygens' sketches (1659) Source: Leiden University Library.

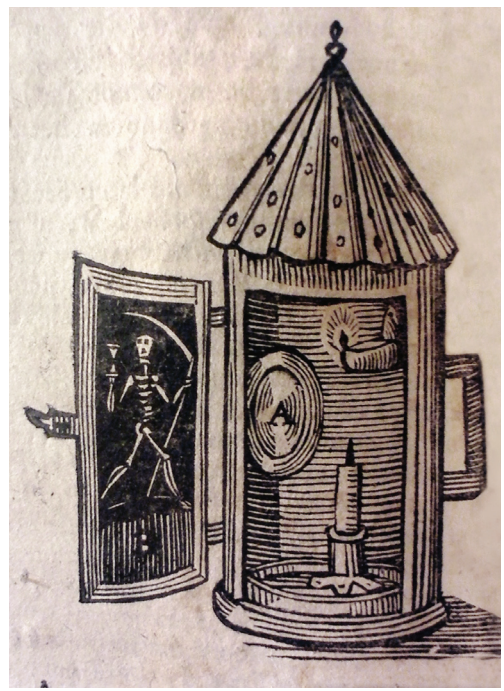
283 Huygens (1950) Manuscript A. p. 152.

284 "Puis que j'ay promis d'envoier la lanterne il faut qu'elle aille, car aussi bien ne scaurois je inventer d'excuse valable pour l'esquiver. Mais lors qu'elle sera arrivée si vous le trouvez a propos vous ferez aisement qu'elle ne puisse point servir, en ostant un des 2 verres qui sont proche l'un de l'autre, de sorte qu'il en demeurera encore 2 de reste, car il y en a 3 en tout. Je feray semblant d'ignorer ce qui y manque, et parmy ces eclaircissements il se passera du temps autant qu'il en faut. Et tout cecy pour le mieux; parce qu'il me semble que οὐ πρέπει à mon Pere de faire jouer de telles marionettes au Louvre, et que je sçay bien que vous ne seriez pas bien aise de l'y servir comme le cousin Micheli au Seigneur d'Aumale." A la Haye le 19 avril 1662. Huygens (1891). This story of Christiaan and Constantijn Huygens is described by Mannoni in great length. Mannoni (2000) p. 40-45. Compare also Terpack (2001) p. 297.

285 Willem Wagenaar makes such an argument. Wagenaar et al. (2014) p. 15, 21.

286 Kittler (1999) p. 85.

that can be dimmed with a sliding panel).[287] This lantern was a common tool and, according to Kittler, most useful to soldiers and thieves. By replacing the opaque sliding panel with a painted glass, the black lantern dazzled with images instead of strong light.[288] The two claims of origin do not necessarily contradict each other. There is a case to be made that there were various technological attempts to develop projection devices. The developments resulted from wide cultural practices.[289]



Another lamp that may have inspired the development of the magic lantern was the '*lantern vive*' – the spinning lantern.[290] Spinning lanterns were useful if not dangerous magician's tools.[291] Dangerous for the magician, or so goes the story of the performer of phantom plays called Batruni, who lived during the reign of Uthman ibn Affan (644-656).[292] Batruni demonstrated the *Moving Horse Lamp* in the courtyard of the mosque of Kufa (Iraq). He projected a monarch mounting his horse riding in circles, then a beheading that was reversed, and other such metamorphoses.[293]

Image 64: Simon Witgeest, *Het verbetert en vermeerdert natuurlyk Tover-Boek of t'nieuw Spel-Tooneel der Konsten (Amsterdam, 1695)* p. 64
Images 65, 66 (next pages): Giovanni de Fontana, *Bellicorum instrumentorum liber* (1420-1430).

287 Kittler (1999) p. 82, Liesegang (1926) p. 8.

288 Mannoni quotes a letter by a 17th century traveler Balthazar de Monconys from 1695 in which Monconys writes how he had seen in London :"[T]he effect of a dark lantern [lanterne sourde], which had a complete hemisphere of crystal [the condenser lens] of about three inches in diameter, and which could throw for a long distance the representation of objects which he placed between the light and this crystal, by means of a sheet of glass on which these objects are painted." Mannoni (2000) p. 47. Mannoni's book on the archeology of cinema gives a most detailed narrative about several key players in the technical development of the magic lantern, Mannoni's description compares well to Liesegang's booklet from 1926 that lists dates in the history of projection-art. Liesegang (1926).

289 Deac Rossell makes an argument against technological determinism in lantern history. He confirms Kittler's view that certain magic lantern models could have been made by reapplying an already existing object. Tin plate magic lanterns and black lanterns were made in the same region in south Germany. The tin-plate industry in Augsburg flourished and from the early 19th century onwards small mass-produced (sometimes hand-held) lanterns were shipped around the world. Rossell (2004).

290 Mannoni (2000) p. 28.

291 And maybe less precarious as sign boards for barbers and bakers. Ibid.

292 Hecht (1984) p. 3.

293 Butler (1993) p. 79.

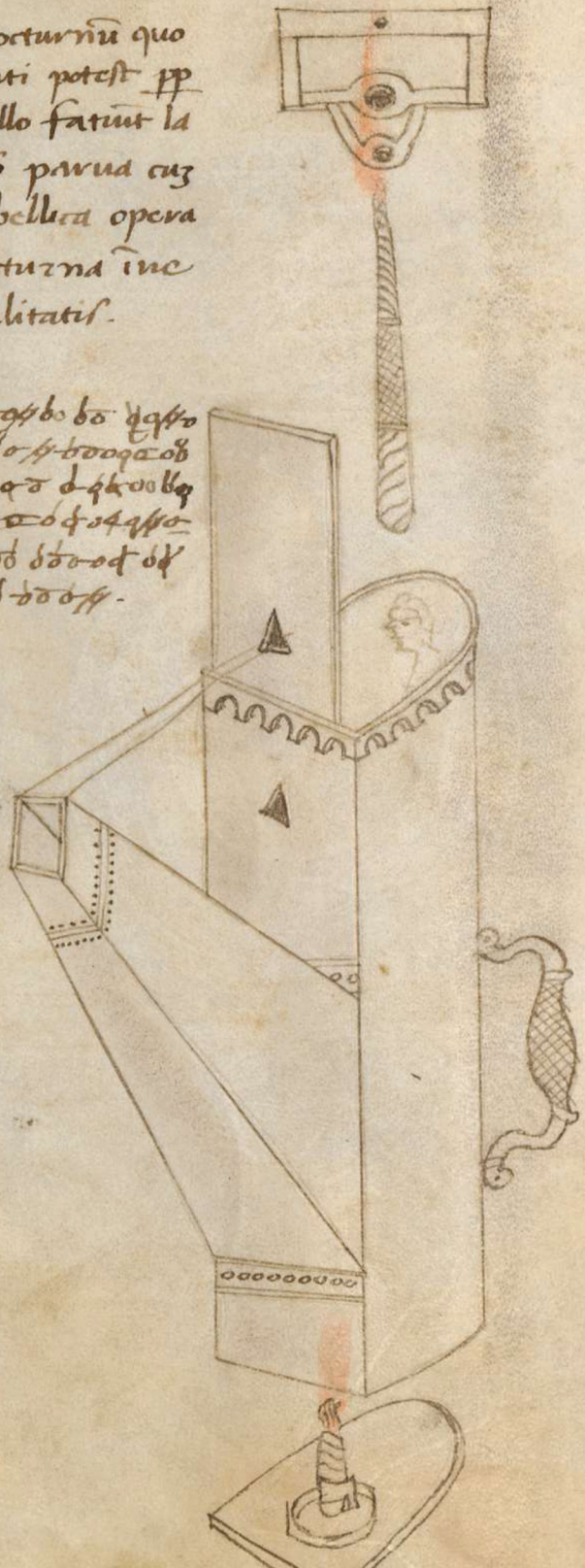


Apparentia nocturna ad terrorem
videntium



Iumināziū nocturniū quo
nemo anglic uti potest pp
mala que cū illo fiunt la
trones. Ego uō parua cuz
aditio ipz ad bellum opera
et propie nocturna inue
nio multe utilitatis.

A —





The 'magic' scared the onlookers so much that they denounced the magician as a sorcerer and had him beheaded. *The Moving Horse Lamp* could have been a lantern vive, similar to the lantern of Giovanni Fontana.[294]

According to media theorist Siegfried Zielinski the first image we know of a magic lantern was made in 1420. Giovanni Fontana drew a 'scandalous sketch' of a lantern projecting a she-devil (the she-devil has pubic hair, hence the scandal).[295] Fontana's drawing of the projected she-devil has following comment: "Apparentia nocturna ad terrorem videntium" – a nightly appearance to terrorize the onlookers.[296] The elaborate construction drawing shows a lantern that appears to throw light onto a tall tower. The front of the tower, depicted in detail with a large entrance, battlements, and several small windows, is lit in bright red. Noteworthy is the handle on the back of the lantern; it could have been used as a portable projector, an early '*palm-projector'* so to say. However, it seems unlikely that a lantern built according to this drawing would project a focussed image of large devils onto an eight or ten meter high structure. That said, to someone who has never seen a brightly coloured image projection, even a blurry shadow of a devil might have been terrifying. It was only when Huygens added stronger light (several candles or wicks and reflectors) and optical lenses (to focus the light and sharpen the projection) the lantern was not just a seductive idea, it became a very powerful tool.

294 Zielinski (2002) p. 161.

295 Ibd. For a much more detailed study on lantern illustration as well as lantern making see Rossell (2009) p. 15.

296 Fontana (1420-1430).

Image 67: Gevelsteen. Rapenburg 66, Leiden.



Image 68: Mechanical slide, Musschenbroek workshop, first quarter of the 18th century, Museum De Lakenhal, Leiden.

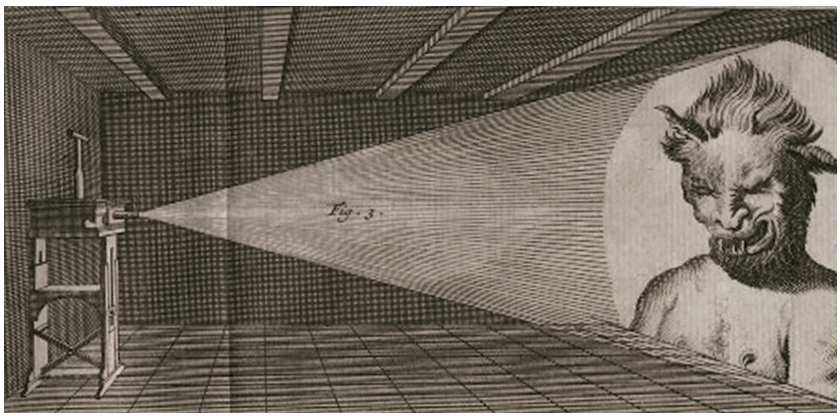
Such tools were built in 17th century Leiden. The house No. 66 at the Rapenburg, right across from the University *'Academiegebouw'*, has a notable '*gevelsteen*', a gable stone: *d'Oostersche Lamp* (The Oriental Lamp). In the late the 17th until the mid 18th century, this was the Musschenbroek workshop.[297] As the gable stone suggests, the Musschenbroek family were originally oil lamp makers. In the 17th century they became one of the leading scientific instrument makers in northern Europe. Highly specialised instruments were needed for new scientific methods of practical observation. Research institutes of experimental physics were established all over Europe and universities, scientists, and collectors from far across the borders were buying instruments in Leiden. One of Musschenbroek's main clients was, not surprisingly, the Leiden University, where some of the exceptional objects still remain.[298] Among high-tech science machines Musschenbroek also produced magic lanterns. The projector had a set of three lenses and would, at a distance of twenty feet (six meter), project a bright image six feet (1,80 meter) tall.[299] The rather sturdy machine came with artful, sometimes mechanical, lantern slides, which could project animated images. The slides were custom made and painted according to the uses and desires of the buyer. If we judge from the slides that can be found in the collection of the Rijksmuseum in Amsterdam and Museum de Lakenhal in Leiden, subjects included travel, history and mythology, science, comedy, horror, and pornography.

297 For a detailed history of the Musschenbroek Instrumentenmakerij see de Clercq (1997).

298 Museum Boerhaave at Lange Sint Agnietenstraat 10 in Leiden.

299 Musschenbroek writes in a letter in 1696: "quand on est 20 pied de la muraille les figures presentent bien 6 pied grand" de Clercq (1991) p. 102.

The projector with a set of slides made by the Musschenbroek workshop cost around fifty guilder; close to the monthly salary of a professor back then.[300] Leiden University still owns a lantern built by Musschenbroek; 'de *toverlantaarn van 's Gravesande'* was maybe named after its theoriser rather than its builder.[301]



Development of a practice

Projections had the potential to exhibit wondrous things never seen before and engage in rational science alike. Nonetheless, the lantern, although quite obviously entertaining, did have an ambiguous reputation. 's Gravesande noticed how 'optical writers', scientists, did not take the magic lantern too serious.[302] The reception of the lantern might be seen as symptomatic of the struggle going on in natural sciences. Scientists were developing academic standards; enlightened scientists were breaking with alchemist, occult and astrological traditions. Europe was in a war on religious supremacy; it was a struggle of ideas and world views.[303] For instance in a letter to Constantijn Huygens, written in 1643, René Descartes ridicules the Jesuit

300 de Clercq (1991) p. 112.

301 The toverlantaarn van 's Gravesande is on permanent display at the Museum Boerhaave in Leiden. Willem Jacob 's Gravesande, a professor at Leiden University, introduced the slide projection as a lecture tool. In his book on mathematics, 's Gravesande describes the 'strange phenomenon' of the magic lantern in technical detail, yet we can only speculate which 'useful and pleasant Spectacles' were presented with it or how did he possibly use the lantern in his teaching. 's Gravesande (1725) p. 77 [645].

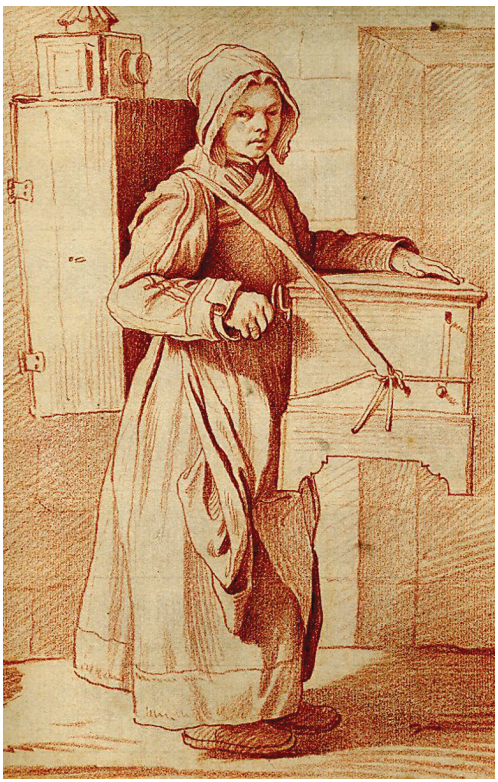
302 's Gravesande (1747) p. 231.

303 Treaty of Münster 1648 ended 80 year war, which was among other things a war on religion.

Image 69: Illustration of the magic lantern, *s' Gravesande* (1725) p.77/ 645.
Image 70: Anonymous, *Actieuse Nacht-Wind-Zanger met zyn Tover Slans*, Het Groote Tafereel der Dwaasheid, 1720. © Trustees of the British Museum.

Actieuse NACHT-WIND-Zanger met zyn Tover Slons





Athanasius Kircher for being 'more of a charlatan than a scholar'.[304] Kircher wrote on all thinkable subjects by gathering information in large illustrated volumes. He published an early technical description of the magic lantern and was often falsely credited with the invention of the *'laterna magica'*. Kircher may have seen the lantern's potential for Catholic church propaganda; the terrifying projections could frighten people into submission.[305] The projection lantern ended up on the occult side of the argument, it ended up in a mess, as film historian Laurent Mannoni puts it.[306] Even the name that was given to the new optic device reflects this: magic lantern, *'lanterne de peur'*, '*toverlantaarn'*, '*Zauberlaterne'* or even '*devil lantern'* – not 'lucerna artificiosa', 'lanterne dioptro-catoptrique', 'mégalographique', or simply image projector.[307] Nevertheless, the shady name did not put an end to the popularity of the instrument.

During this early phase of the medium different people were interested in the technology for a wide array of reasons. Magicians, teachers, and savoyards, necromancers, scientists, con-men, and priests – they each understood the projected image distinctly different. It was tested as a tool in warfare, propaganda, experimentation, entertainment, trickery, and subversion. On one side there were enlightened uses of a new optical tool and on the other magic demonstrations making the invisible visible in *mimetic sympathy* or as *analogical demonstrations* to recall Koen Vermeir.[308] Established powers or marginalized people developed very different modes of projection. In the next few

304 Mannoni (2000) p. 37.

305 Kittler (2010) p. 80.

306 Mannoni (2000) p. 67.

307 Names applied by Kircher and mathematician Johann Christoph Sturm. Mégalographique put in words that the device projected a fly and made it into an elephant. Compare: Mannoni and Pesenti-Campagnoni (2009) p. 47.

308 Chapter 1.

Image 71: *Lorge de Barbarie, Cris de Paris*, Red chalk, print studies, Edme Bouchardon, 1730s. © Trustees of the British Museum.

paragraphs I retrace some developments of projection practices and the scope of projection technology.

Projections in warfare

In the letter I quote at the beginning of this chapter, Jean Loret describes, with some sense of irony, what presumably was a '*camera obscura*' projection.[309] Magical projection was at best put down as trivial entertainment and innocent child play. Loret admonishes some secrecy, presumably not to spoil the fun. Kircher saw more danger in projection: "By this art impious people, painting a picture of the devil on a mirror and projecting it into a dark place could easily force people to carry out wicked deeds."[310] The effect of the magical illusion apparently was thought to depend on some ignorance on part of the audience; when projecting apparitions to the unsuspecting or media illiterate viewers, the lantern could be used in psychological warfare instilling fear of devil warriors, or multiplying legions of soldiers. In the 18th century Abbé Nollet thought of a rather large desktop tent-style camera obscura that could be a surveillance machine.[311] He wrote: "This kind of black chamber could be use [sic] to see what is happening outside of a fort under siege, without exposing one's head; because nothing prevents the table, on which the image is projected, from being placed behind a rampart with the mirror raised above it."[312] Other military uses of projection were the before mentioned mirrors

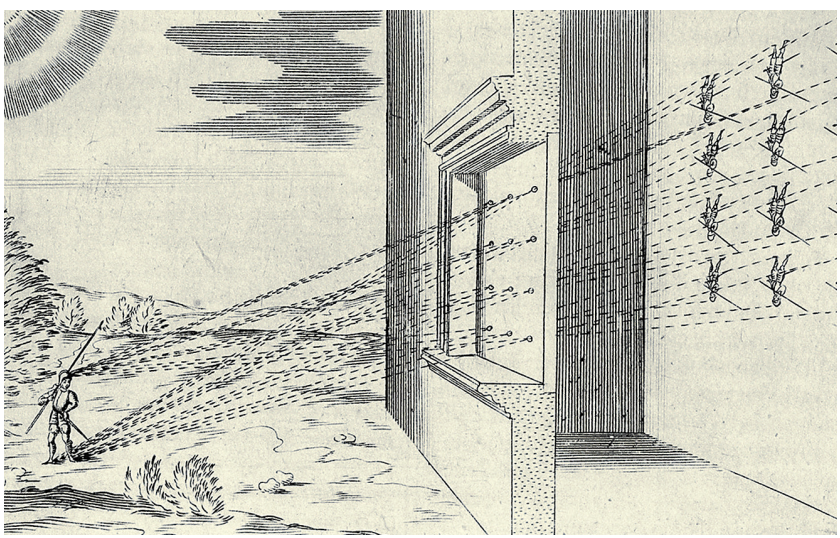
309 He wrote: "Mais ce qui me mit en sursaut, C'est qu'ils avoient les piés en haut"; (without a lens to turn the image, a camera obscura projects the outside reflected head down into the room). Loret (1877) p. 192.

310 Gorman (2007) p. 47. Kittler appears to use a different translation of the same sentence: "Through this art, Godless people could easily be prevented from committing many vices/ if the devil's image is cast onto the mirror and projected into a dark place". Kittler (2010) p. 80.

311 Kepler was credited with the portable 360° panoramic camera obscura. Sir Henry Wotton writes to Francis Bacon: "He hath a little black tent which he can suddenly set up where he will in a field, and it is convertible ... to all quarters at pleasure capable of not much more than one man, as I conceive, and perhaps at no great ease; exactly close and dark, save at one hole, about an inch and a half in Diameter, to which he applies a long perspective-trunke, with the convex glass fitted to the said hole, and the concave taken out at the other end, which extendeth to about the middle of this erected Tent, through which the visible radiations all the objects without are intromitted, falling upon a paper, which is accommodated to receive them; and so he traceth them with his pen in their natural appearance, turning his little Tent round by degrees, till he hath designed the whole aspect of the field: this I have described to your Lordship, because I think there might be good use made of it for Chorography [the making of maps and topographical views]: For otherwise, to make landskips by it were illiberal, though surely no Painter can do them so precisely". Wotton (1651) p. 413-414. For a detailed summery of applications of the camera obscura see Wenczel (2007) p. 13-30.

312 Gorman (2007) p. 46.

Athanasius Kircher described in his book *Ars Magna Lucis et Umbrae* (1646). In his book Kircher recalled the siege of Syracuse when the Greek mathematician Archimedes set the enemy fleet on fire using burning glasses.[313] He also described how a city under siege could use mirror projections to transmit orders at far distances. Complex instructions could be passed-on using concave mirrors with an alphabet written on them. Messages of Kircher's '*stenographia*' could not easily be intercepted or disturbed by the enemy. The technology had the potential to reach



populations far and wide; with advanced mirrors it could be possible to project all kinds of stories using the moon as a screen.[314]

Propaganda and advertisement

Kircher saw the potential of the magic lantern in propagating divinity. According to Kittler the Catholic church was keen on the new medium as a propaganda machine.[315] The struggle for religious hegemony during the 17th century was also a struggle of media. The printed word was the revolutionary new medium of the reformation, the counter-revolution armed itself with magical apparitions

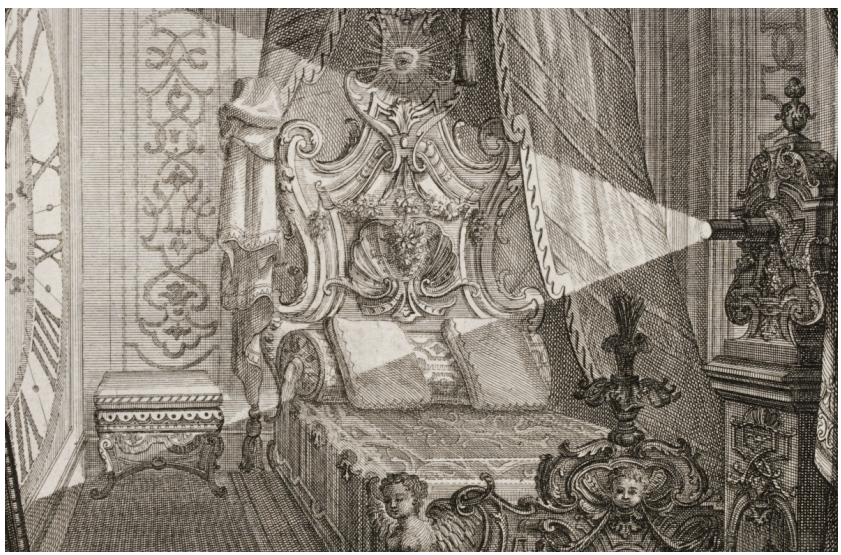
313 Kircher apparently tested the burning glass in an experiment. Zielinski (2002) p. 32.

314 Zielinski (2002) p. 183.

315 Kittler (2010) p. 80.

Image 72: Camera Obscura, image from: Bettini, Mario, *Apiaria universae philosophiae mathematicae* (Bononiae (Bologna): J. B. Ferronii, 1642) p 38.

as well as theatrical spectacles.[316] Jesuit drama were elaborate Baroque theatre shows with religious subjects used to spread Catholic doctrine during the counter reformation.[317] The Catholic church thought devices such as the magic lantern would reinstill fear of the devil.[318] Kircher appears to have experimented with the magic lantern; he installed a 'black box' screening room in his Roman Museum *Kircherianum.* He named the projector thaumaturga – miracle worker (θαῦμα thaûma, = miracle).[319] However, there is little evidence of a large scale use of



the projector by the church, possibly the optical novelty was still too costly and Athanasius Kircher did only frighten a few cardinals with these rare machines.[320]

Image 73: Johann Jakob Schübler, Plate 3 of 6 from a set of beddesigns. Augsburg, before 1748. Victoria and Albert Museum, London.

316 I.e. the Jesuit Drama and Baroque passion plays like the *Theatre of the Holy Sepulchre* (1751) which is on display in Neuzelle, Germany.

317 Zielinski (2002) p. 156.

318 In 1622 the Vatican installed the "Congregatio de propaganda fidei" to spread the Catholic dogma. Kittler (2010) p. 76.

319 Clark (2007) p. 103. Some claim Kircher got to know about the 'lantern of fear' from mathematician Thomas Rasmussen Walgensten. In 1670 Walgensten performed before the Danish King Frederik III who died few days later of a heart attack. Heard (2005).

320 Lange-Fuchs (2005) p. 155. Physician Pierre Guisony wrote to Christiaan Huygens on 25 March 1660 that if Athanasius Kircher knew about the magic lantern, "he would thoroughly frighten the cardinals with ghosts." Heard (2005).

Projection technology sparked most curious ideas. Like Kircher, the occult writer Heinrich Cornelius Agrippa von Nettesheim proposed sky-projections. In 1531 von Nettesheim described the possibility of projecting signs onto the lunar disk.[321] As a public medium, projection lend itself to addressing large audiences. It was not in church propaganda or warfare but advertisement that strong projectors were being applied; by the late 19th century large outdoor projections became actually viable with new light technology. For instance, the American showman Buffalo Bill, when touring England, advertised his Western show with the enigmatic proclamation of 'BUF' onto the clouds (FALO BILL'S WILD WEST got lost in the sky).[322] However, critics were apprehensive about sky advertisement and dreaded seeing glowing pictures of suspenders or the latest thing in ladies corsets up in the sky.[323] In 1894 the British government restricted public advertisements after Nelson's Column, a monument in central London, had been used as a screen for magic lantern projections marketing some pill.[324] Curiously enough some 100 years later projections on Trafalgar Square caused another public outcry. In this case the projection was not an advertisement but a work of art. In 1984 Wodiczko projected a ballistic missile onto the column, as well as a swastika on the South African Embassy across the street.

Universal exhibitions

In 1695 the philosopher Gottfried Wilhelm Leibniz wrote a short piece titled *Drôle de Pensée*. [325] In this text Leibniz sketches out an enterprise in which the magic lantern plays a small yet significant role. He proposes a universal exhibition of modern

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321 Although Nettesheim did not reveal the technology. Gorman (2007) p. 43.

322 Marvin (1987) p. 267.

323 Ibid. Cloud projections were a wonderful idea but had their biggest success in fiction: 'The Bat Signal!'. The bat signal first appeared in *Detective Comics, Issue* #60, February 1942, although the idea of a searchlight projection in form of a bat might be taken from the 1920s silent movie "the Bat" by Roland West. This film noire, a crime story, used projection and shadow deceptions as a tool of suspense. The origin may be the death ray by H. Grindell-Matthews which was supposed to be a particle beam with potential as military application. It never developed into a working model. Anon. (1928) p. 22.

324 Marvin (1988) p. 182.

325 Gottfried Wilhelm Leibniz, "Drôle de Pensée, Touchant une nouvelle sorte de Representations"1695. http://abu.cnam.fr/cgi-bin/go?drole2 accessed on 27.7.2013. Compare: Rossel (2002)b. p.25-26, Bredekamp (2004) p. 237.



Image 74: Samuel van Hoogstraten, *De groote schouburgh der Nederlantsche konstschilders en schilderessen* (1718-1721) p. 260.

inventions, industry and art.[326] In this handwritten document he argues for the need of patronage, lists the attractions that would be displayed and the benefits of such an enterprise. Leibniz imagines sculptors, painters, watchmakers and carpenters to be on the payroll, as well as mathematicians, architects, charlatans, musicians, booksellers and publishers. He planned a wide variety of novelties and amusements, like fireworks, artificial animals as well as exotic live ones, latest technologies of warfare, a miniature naval battle, rare musical instruments, fake jewellery, comedies from India, Persia, Turkey, technical explanations, lectures and discussions, magicians, fools and the fire-eater from London (if still alive).[327] This very first *world-fair* was to serve many purposes: it would open people's eyes to the new sciences, it would be of commercial benefit, at the same time it would entertain, deceive and trick. And in

326 Ibid.

327 Les personnes qu'on auroit à gage, seroient des peintres, des sculpteurs, des charpentiers, des horlogers, et autres gens semblables. On peut adjouter des mathematiciens, ingenieurs, architectes, bateleurs, charlatans, Musiciens, poëtes, libraires, typographes, graveurs, et autres, le tout peu à peu et avec le temps. Les representations seroient par exemple des Lanternes Magiques ; (on pourroit commencer par là) des vols, des meteores contrefaites, toutes sortes de merveilles optiques. Leibniz (1695).

all this the magic lantern was to be the theatrical opening act.[328] Leibniz described a gigantic '*Wunderkammer'* for the good of all.[329] Art historian Horst Bredekamp summarises the unusual text as a breathless confusion which nonetheless appeared to have been put together carefully. Bredekamp summarises Leibniz' idea of a public presentation of curiosities as a playful burlesque approach to sciences with a Baroque sensibility for the theatrical.[330]

Entreatments by 'Orientals' and Gothic projections

One group in Europe which added the lantern to their performance repertoire was 'das sogenannte fahrende Volk': travellers.[331] Kittler mentions them in his history of optical media, however he does not further specify the origin and sociology of this group. These travelling lanternists may have had only little impact on the technical development of projector-machines as such, nevertheless they made the lantern widely popular, and impacted the reputation of the magic lantern. '*Galantee'* showmen performed on fair grounds or private homes. The lantern showmen of western Europe were associated with poor travelling migrants from the south: from the south of the Netherlands (Luikerwaalen), south of France (Savoyards), Italy or even further. The travelling show-folk and conjurers were often regarded as

328 Deac Rossell points out Leibniz imagined animated lantern projection, not just simple things painted onto glass, representing "quite extraordinary and grotesque movements, which men would not be capable of making". "Pour les lanternes magiques, on auroit non seulement des simples choses peintes sur du transparent, mais démembrables, pour representer des mouvements bien extraordinaires et grotesques, que les hommes ne sçauroient faire." Leibniz (1695). Rossell deducts from this written document of 1695 that magic lantern projections have included movement and not simple static images long before the 19th century early cinematographic experiments. Rossell (2002)b. p. 25-26.

329 Leibniz may have been expanding this idea after experiencing Paris' play-palace's on the Foire, the annual fairs, that were a common entertainment for a large public. The fairground could be a combination of commerce and entertainment linked to a religious festival.

330 Bredekamp (2004) p. 45-47. The concept of burlesque science may be alien from the perspective of todays sciences, then again the World Expo's are still touring the globe bringing together science and technical developments as entertainment, commerce and displays of national pride.

331 Kittler (1999) p. 99.

disreputable and subversive.[332] This opinion is reflected in some of the depictions of the magic lantern performers of the time. However, we have very little written records on their craft and methods as projectionists.



More has been written by and about '*gentleman performers*' of the 18th century.[333] Some of these gentlemen have gone down in history as tragic con-men, like the necromancer Johann Georg Schröpfer (1730/1738-1774). He performed seances in a transformed billiard room of his coffee house in Leipzig, as well as at various courts of Europe. When facing bankruptcy he committed suicide after letting his creditors know the hour of his reappearance. Another such adventurer was the celebrated occultist Jospeh Balsamo known as Alessandro Count de Cagliostro (1743-1795). He eventually fell victim to the inquisition of the Roman Catholic Church.[334] To both, Schröpfer and Cagliostro, the magic lantern was a small tool in all encompassing grand deception. At the time there was a wide interest in necromancy and orientalizing rituals. A whole literary genre emerged from the interest in occult 'sciences', forbidden arts, and diableries; the gothic fiction of authors like Horace Walpole (*The Castle of Otranto*, 1764) and Ann Radcliffe (*The Mysteries of Udolpho*, 1794).

Image 75: Eckartshausen (1788) Ta III, p. 72.

332 Foreign performers were also common to England, where it was said that they were recent migrants to England and the rest of Europe. According to a 17th century author of a book on Juggling and slight of hand, the 'Egyptians' invaded England in the 16th century "having been banished from their own country, and excelled in quaint tricks and devices." Crofton (1888) p. 8 Public opinion of the time regarded the show-people with much reservation; Historian Barbara Stafford writes "Gypsies ... embodied the criminal antithesis of *authentic* performance, the satanic inversion of bourgeois respectability ... The Gypsy – like the sorcerer, witch, or quack – belong[ed] to the worldwide network of conjure, i.e., those alternative cultural practices that challenge authority" [emphasis S.E]. Stafford (1994) p. 82-83.

333 See insert 3 and 4.

334 The adventures and misfortunes of Count de Cagliostro were the subject of literature and tabloid journalism of the day. Most prominently the affair of the diamond necklace in 1780 involving Queen Marie Antoinette.

An example of gothic fiction that is especially relevant with regard to projection is the story *Der Geisterseher* (1787-89) by Friedrich Schiller, which was originally published in the newspaper Thalia as an instalment piece and was widely read at the time.[335] The title figure may have been largely based on Count de Cagliostro.[336] Schiller tells the story of a Jesuit secret society that tries to convert a young protestant prince in order to enlarge its power. To win over the melancholic prince they enwrap him in fictions using all sorts of projections. Schiller's interest in the occult and counter-currents to the churches, like the Rosicrucian and Freemasons (or Bucentauro, how he calls the brotherhood in the *Geisterseher*) can be seen as a response to the Enlightenment.[337] It is possible that Schiller initially attempted to come to terms with various influences, like his friends Gottfried Körner's freemason liberalism, and his own temporary fascination with mysticism. Nevertheless, Schiller also saw how Gothic literature was playing to a popular taste for terror and horror. Schiller used projection as a metaphor for all that is obscure and 'wrong way round'. These ghost tales may have been a way of grappling with the friction between persisting believes in the supernatural and enlightened rationalism.

Projection as education

From the mid 19th century onwards, 'professor'-projectionists used powerful projectors with large collections of photographic slides. Limelight, a new light technology, made bright projections for large audiences possible. One of the most prominent locations for educative lantern shows, The Royal Polytechnic Institution in London, was a combination of lecture room, museum and magic stage-show. The Polytechnic opened in the 1830s. It was to be "an institution where the Public, at

335 Schiller (1954). An English translation appeared in 1800: '*The Armenian; or The Ghost Seer. A History Founded on Fact*'. Schiller never completed the work which from a formal perspective he himself appeared to value little, the unsuspected success of the story greatly disconcerted him. Schiller (1847).

336 The scheming impostor of obscure birth was a recurring trope in the literature of the time and may have been largely based on figures like Count de Cagliostro and Schröpfer. In Ann Radcliff's *Mysteries of Udolpho* the deceitful villain is posing as an Italian noble man. Alexandre Dumas (1802 – 1870) used Cagliostro as a model for several of his characters and the affair of the neckless as the key plot of *The Three Musketeers*. Dumas sketched Cagliostro as a pitiable orphan gypsy boy who grows up to become a famous conjurer. Also Goethe went to great lengths researching the story of Cagliostro. He was so keen on exposing the man as a fraud that he disguised himself as a friend and lawyer gaining access to the Balsamo family in Palermo. Goethe later published the letters which Cagliostro's mother entrusted him with to forward to her son. The outcome of this underhanded research was *The Mystified*, which Goethe later reworked into one of his least popular plays *Der Groß-Cophta*'(1791).

337 Müller (1954) p. 679.

Image 76: Mr. Muybridge showing his instantaneous photographs of animal motion at the Royal Society, The Illustrated London News, No. 2614-Vol. XCIV, May 25, 1889.



little expense, may acquire practical knowledge of the various arts and branches of science connected with manufacturers, mining operations and rural economy".[338] The science lectures, quite like its sister the universal exhibition, advertised and spread the ideologies and products of industrialised Europe and America. By the end of the 19th century lantern lectures were an established form of educative entertainment and a way to propagate various technical advancements as well as colonial and religious endeavours.[339] Slide shows were taken to Africa and Asia by Christian missionaries and in return exotic oriental travel stories toured Europe and North America. A handbill at the time advertised a slide-show as "an evening's entertainment that is worth a college course... and EQUAL TO A TRIP AROUND THE GLOBE".[340]

In this chapter I looked at a number of fields applying projection technology. Initially the lantern may have been used to interject images into reality, by the mid 19th century, the projection was contained on a screen and the projected reality was seen as something wondrously separate from material reality. In almost 500 years, from the sketch made by Giovanni Fontana in 1420, magic lantern projection found many interpretations: as war machinery, propaganda medium, visualisation and stage machinery, street entertainment, child play, scientific instrument, occultist and conjuring machine, tool in disproving magic or lecture device and cinema projector. Before projection was unequivocally associated with cinema, it could be seen as magic and it's critique at the same time. I.e. Phantasmagorist Paul de Philipsthal claimed to enlighten and astonish his audience with his projections not deceive with imagined ghosts "in the falsehoods of charlatans".[341] As Tom Gunning writes: "a direct and overwhelming appeal to the senses on the one hand, and the critique of illusion on the other. The critique seems to carry on the Enlightenment project, while the sensual approach often questions the powers of the rational

338 http://www.wiut.uz/en/partners/uow_history/ (accessed on 25.4.2014).

339 Vermeir (2005) p. 159. A famous 19th century lantern lecturer was Eadweard Muybridge touring Europe and the USA with his Zoöpraxiscope.

340 Magic Lantern Show Publicity Handbill: Grand Magic Lantern Exhibition (around 1880), University of Exeter. A Youtube video of one of Willem Wagenaar's lantern demonstrations gives an impression what a lantern lecture could have looked like. Teylers museum in Haarlem, 16 Sept 2007. https://www.youtube.com/watch?v=WuvkQ5vZFJo (accessed on 18.12.2014).

341 Mannoni (2000) p. 144.

mind and circumvents rather than demonstrates its power."[342] Projection was an ambiguous medium and often used in a playful subversive manner.

To briefly recapitulate: what is my fascination with these early projection practices? Contrary to classical cinema, which produces self-contained worlds on screen, the projection practices I mentioned expanded into the world of the viewer. The phantasmagoria, celestial projections, stenographia, Moving Horse Lamp, Schröpfersche Geisterbeschwörungen, lantern vive are all examples of augmenting projection. There is no history of projection art that lauds Giovanni Fontana as the Giotto of projection. Yet I should like to appropriate these early experiments with projection as part of the image tradition I work from. And I see todays influx of projection and virtualization in the context of that history. When looking at the history of projection from the perspective of augmentation it appears as if the 'century of cinema' has been a brief interruption in an enduring praxis of augmenting (or expanding) image projection.

Projection technology necessarily plays a significant role in my own work. Besides the projector as a display technology, I use the projector in the process of creating a work. I tinker with light, reflection, shadow in interaction with objects and space. What attracts me to projection is the ambiguity of the medium and its playful and subversive qualities.

342 Gunning (2009) p. 30.



Two PUBLIC projections in Ireland:

The Virgin of Knock and the Jubilee protest



On the 21st of August 1879, 15 villagers living around the chapel of Knock saw Mary appear in a halo of light. Some months later the witnesses were interviewed in an enquiry. In large parts the accounts were coherent, however, not to the smallest detail. Dominic Bryne remembered: "At the time it was pitch dark and raining heavenly [sic.], and yet there was not one drop of rain near the images."[343] One father remembers his small son talking of seeing a bright light. So did another man who had seen the light from some distance. When Margaret Byrne went to the chapel to lock it she "saw something luminous or bright at the south gable, but it never entered my head that it was necessary to see or enquire what it was."[344] When she returned some time later she saw the Virgin. Patrick Hill's account gives a small clue to the materiality of the apparition: "At times she appeared ... I saw them move .. one old woman went up and embraced the Virgin's feet, and she found nothing in her arms and hands; they receded, she said, from her."[345]

There is little proof that Maria appearances, common in the 19th century, were brought about with the use of image projectors. Yet historian Paul Carpenter has developed the argument that, in the case of the appearance of the Virgin on the church wall of Knock in 1879, this was most likely the case.[346] Carpenter found proof of lantern experiments taking place at Knock around the time of the apparition. He suggests that "due to the witnesses' lack of

Image 77: *'Ghosts'*, Lantern slide, 1790-1830, collection Museum Rotterdam.
Image 78: Apparition projected through church window. Unknown source.

343 The official testimonies of the fifteen witnesses. http://www.knock-shrine.ie/witnesses-accounts (accessed on 25.9.2013).

344 Ibid.

345 Ibid.

346 Carpenter (2011) p. 102-120.

comprehension for the sensory-mediated technology of modernity, they would not have recognized the lantern's projection as a copy".[347] Or, in other words, Carpenter says the Irish villagers lacked media literacy and were not able to decode the projection as a virtual image. He argues that, what was described by the onlookers as one event actually took place on two different occasions. Two disturbing novel experiences: One, the ephemeral projected entertainment, and second, the lighting up of the gable of the chapel by a strong lamp. In the late 1870s strong bright lights could have been gas lanterns, even electrical light. Either lamps would have been as much a novelty as a magic lantern projection to the inhabitants of Knock during times of great poverty.

A few decades later another remarkable outdoor projection took place. In protest to the 1897 diamond jubilee of queen Victoria, Maud Gonne and other Irish nationalists projected image slides of evictions and house demolitions, as well as statistics of starvation and portraits of people who had been executed by the British.[348] It was the time of the *Land War*, a period of civil unrest as a result of the British occupation and disputes over land ownership in Ireland. Irish farmers opposed their grave conditions inflicted by the British colonisers. The poet, and Gonne's close friend, W.B. Yeats made an entry in his autobiography



Image 79: Robert French, "The Battering Ram has done its work" [Eviction scene, Ireland], between 1880-1890, National Library of Ireland.

347 Ibid.

348 Cullen (2002) p. 163.

of the jubilee protests.[349] On the evening of the queen's anniversary the activists had set up a projector at the National Club in the centre of Dublin and beamed disruptive images of recent violent incidents from the window.A crowd gathered to see the novel technology projecting large images. Soon enough the police turned up to stop the 'anti-imperialist action'.[350] Gonne's transient street protest was part of her larger political engagement. According to art historian Fintan Cullen, Gonne's use of "Photographic evidence of these eviction atrocities was clearly important to her; she used to refer to the slides as her 'documents' to prove her point about the power of landlordism".[351]

The two public demonstrations, in Knock and at the National Club, were of a very different nature, one was soliciting belief, the other understanding. Yet, they were taking place during the same political conflict. And, I would like to suggest, are both examples of projections as political agitation. In her struggle for Irish independence Maud Gonne used the slide projections as evidence. Her intention was to educate as many people as possible about the effects of British imperialism. In Knock the projections were understood as something magical and spiritually transformative.[352] The projection was intended to affirm the belief of the villagers, and there was good reason to do so. In 1879 unrest in Mayo county turned against the parish priest of Knock, the Archdeacon Cavanagh. He had sided with the British authorities and the landlords, denouncing the rebels. What better way to distract from the unrest than a celestial apparition of the Holy family.[353]

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349 Ibid.

350 In his autobiography Yeats does not mention the projection. Yeats (1999) p. 277.

351 Cullen (2002) p. 168.

352 The Catholic church proclaimed the authenticity of the apparition. In the 20th century Knock became a place of pilgrimage and a huge commercial success to the Catholic church. In the 1980s the parish priest James Horan lobbied for an airport to bring in the steady stream of visitors (in its heydays one and a half million). Knock International Airport was built in 1985.

353 *Is There Anybody There?* dir. by Christopher Hale (UK: Channel 4, 1987). Presenter Nicholas Humphrey suggests that the magic lantern was placed inside the church and the projection redirected onto the gable by a mirror. He recreates the set up to show how it could have been done.

