‘Telling deep stories’

Unlocking the potential of 3D as a narrative tool, through three key technical features of the stereoscopic viewing experience

MA Thesis Arts, Culture and Media
University of Groningen

Koert Boudewijn
Studentnr.: S1912798

Supervisors: dr. M. Kiss, dr. A.M.A. van den Oever
Major: Film studies

29-08-2014
Groningen
INDEX

ABSTRACT 3

INTRODUCTION 5

INTRODUCTION OF IMPORTANT CONCEPTS 15
PERCEIVING DEPTH 16

PARALLAX 20

NEGATIVE PARALLAX 20
NEGATIVE PARALLAX’S FUNCTION 21

POSITIVE PARALLAX 24
POSITIVE PARALLAX’S FUNCTION 25

THE PARALLAX PARADOX 26
EXAMPLES 29

THE PARADOXICAL NATURE OF PARALLAX IN HOUSE OF WAX 29
DREDD: ‘LYRICISM AND AWE’ IN A DEEP WORLD 39

THREE DIMENSIONS IN CORALINE’S TWO WORLDS 48
CONCLUSION 53

EDITING 56

SOUND EDITING 59

POSSIBLE NEW STYLES 60

BAZIN AND MONTAGE IN 3D 61
EXAMPLES 65

VIEWER IDENTIFICATION IN DIAL M FOR MURDER 65

GRAVITY: A SLOWER PACE IN OUTER SPACE 72
CONCLUSION 81

THE SCREEN 84

SHARED SPACE 85

A RETURN TO THEATER 89
‘DYNAMIC FLOATING WINDOW’ 90

VOLUME 91

EXAMPLES 93

SHARED SCREEN SPACE IN CREATURE FROM THE BLACK LAGOON 93

VOLUME IN HUGO 101
CONCLUSION 106

CONCLUSION 108

OUTLOOK 114

THE PROMISE OF AVATAR 115

BIBLIOGRAPHY 118
ABSTRACT

This thesis studies 3D cinema at a moment when the general hype of stereoscopic media seems to be on the wane. Most consumers have lost interest in three-dimensional vision on their television sets and cell phones; the movie screen might be next. The output of mainstream narrative 3D films has stayed strong, especially in the form of blockbuster/action and 3D animation. But a decade after the first instances of 3D in the digital era, the initial attractive power of stereoscopy as a ‘new’ technology has worn off on the present-day viewer.

Today is a critical period of transition for stereoscopy in the cinema: 3D can either make a final push to show its added value and find acceptance, or disappear like it has done so many times before in cinema history. The development and potential of the cinematic language of 3D film has been strongly neglected in discourse, and arguably in filmmaking as well. It is not productive for both 3D scholarship and filmmaking to keep focusing on technical flaws that show how 3D “doesn’t work and never will.”¹ To overcome the absence of the initial technology-and novelty-induced hype and find a more lasting acceptance as a storytelling tool in the cinema, stereoscopy instead needs a stronger narrative appropriation, similar to that of color and synchronous sound. However, as this research will show, it is repeatedly deemed ‘incompatible’ with traditional narrative cinema by scholars and critics. Therefore, filmmakers will have to conquer some of the technique’s main technical issues to unlock stereoscopy’s underlying storytelling potential.

This thesis explores this perspective within a frame of studies that critically approach three specific elements of the 3D viewing experience. Each of these angles is seen as a (technical) hindrance to the functioning of three-dimensional narrative film, while at the same time they comprise the technique’s specific capacities through which it is able to offer a unique cinema experience. An ongoing discussion, labeled by Barbara Klinger as the “parallax debates,” focuses on the conflicting employment of added depth: images emerge from the screen and call attention to the 3D technique (negative parallax), while at the same time they recede into the screen and

aim to immerse viewers (*positive parallax*). The second issue involves *editing* in three dimensions, which this research will show to be considered problematic because viewers need more time to read 3D images. Implementing the rapid pace of montage that contemporary narrative film is accustomed to would result in jarring cuts because of the varying amounts of 3D depth. Finally, three-dimensional film’s ability to “transgress the plane of the screen” is problematized because it violates our traditional conception of the movie screen, preventing it from “being used for more serious narrative purposes.”

After exploring these prominent issues in the discourse on 3D film, which supposedly impose limitations on viewing and making films in three dimensions, this research aims to shift the focus to the way these problems can be surmounted. Through means unique to the 3D experience, all three elements may enhance storytelling. The analyses of multiple examples from the 1950s and current 3D era, most importantly illustrate how filmmakers find more narratively motivated implementations of these three elements that are characteristic to 3D film, possibly opening up a path to a more sustainable place in film history for the ancient-but-improved stereoscopic technique. The final goal is encapsulated in the following main research question:

“Are filmmakers able to overcome the problematic nature of 3D cinema, as explored in the three key technical contexts of parallax, editing and the screen, by embracing the technique’s storytelling potential? Has the stereoscopic technique thus made the move toward a more sustainable appropriation and lasting acceptance in narrative cinema?”

---


3 Jukka Häkkinen et al., “Measuring Stereoscopic Image Quality Experience with Interpretation Based Quality Methodology.” (proc. of IS&T/SPIE’s International Symposium on Electronic Imaging, San Jose, California USA, January 2008), 9.


Sandifer, “3-D Film as Demo,” 62.
INTRODUCTION

Only last year, the Consumer Electronics Show (CES) in Las Vegas seemed to announce the ‘death of 3D’. The trade show had been filled with demonstrations of stereoscopic television sets during previous years, but the technology seemed played out already. 3D glasses had to make way for VR headsets and the extra dimension was left out to introduce countless extra pixels in ‘Ultra High Definition’ televisions. Later that year, Japanese video game giant Nintendo announced a new version of its ‘3DS’ flagship handheld gaming console, which was actually the ‘2DS’. Instead of further developing the 3D element, the company ‘childproofed’ its handheld by removing the autostereoscopic (glasses-free) display altogether. The cross-media hype of 3D technology finally seemed to come to a stop in 2013.

However, the same year saw the release of nearly thirty major stereoscopic pictures in cinemas worldwide. This output is only slightly smaller than the year before and still contained many box office hits and several critically acclaimed films as well. This most importantly shows that, although manufacturers of consumer electronics have lost interest in selling stereoscopic technology, Hollywood is still actively telling stories in three dimensions. While we are only two-thirds through 2014, this year has already brought a significant amount of 3D pictures. Among approximately 20 films we find successful animated films like The LEGO Movie and How to Train Your Dragon 2. Effects-heavy action blockbusters such as Captain America: The Winter Soldier, X-Men: Days of Future Past and Transformers: Age of Extinction keep filling up the box offices. This year will see many more prominent pictures in three dimensions, such as the conclusion to the The Hobbit trilogy, and a total number of releases in 3D similar to the amount in 2013. Moreover, even this

---

year’s CES reintroduced a spark of hope for 3D-afficionados: an 85-inch TV, capable of showing glasses-free 3D in an 8K resolution was showcased by Sharp.\(^8\)

Ever since the 3D technology was brought back somewhere halfway through the 2000s, it has once again been a part of our mainstream cinema. Therefore, the current era of stereoscopic cinema is the longest and most successful one to date. Stereoscopic media have come a very long way since the discovery of the technique by Charles Wheatstone in 1838.\(^9\) His hand-drawn pictures and later photographic 3D images actually preceded the invention of moving pictures, but came from the same “impulse to capture life and replicate it with movement, color, sound and three dimensions.”\(^10\) His invention was “one of the first media crazes of the modern era.”\(^11\) Film historian Ray Zone was a recognized expert and leading scholar in the field of stereoscopic film, as well as a practicing 3D artist. The “3D King of Hollywood” is the author of several essential works, among which his extensive book on the history of 3D cinema before 1952.\(^12\) He mentions the ‘novelty period’ of conventional cinema, which lasted about ten years (1895-1905). He compares this to the “Novelty Period” of stereoscopic imagery that managed to last from the invention of stereoscopy all the way until the first boom of 3D film (1838-1952).\(^13\) Three-dimensional vision was most successful on portable viewing devices; the application of stereo in the cinema was mainly experimental. The dominance of other technological innovations in the traditional motion picture medium also kept 3D from being used in narrative cinema. Letters show that Thomas Edison already conducted experiments in the third dimension and intended to add a stereoscopic effect to pictures taken with his

---


\(^13\) Zone, *Origins of 3-D Film*, 1.
The novelty period saw very little feature films produced. Examples are *The Power of Love* (1922) in anaglyph 3D and the Soviet picture *Robinson Crusoe* (1946). While Sharp only recently showed their impressive glasses-free 3D TV, the latter film by Aleksandr Andriyevsky did not require glasses 68 years ago. It even inspired legendary Soviet filmmaker and theorist Sergei Eisenstein to write a passionate essay about stereoscopy in the cinema. Before any 3D boom commenced in Hollywood, the Soviet film industry had already produced its first full-length autostereoscopic 3D film, which left Eisenstein utterly impressed by the technique. He urged people to welcome “the astonishing artworks of the future.”\(^\text{15}\) It are mainly short stereo films emphasizing the technology itself that characterize this early period, which was above all a stage of technological progress and primarily showed the ‘gimmicky’ off-the-screen images that we are still familiar with.\(^\text{16}\) At the end of the novelty period, the technical fundamentals of 3D cinema had become widely understood and Hollywood was ready for a first brief 3D movie boom that actually made use of the “expanded narrative palette that the stereographic motion picture presented.”\(^\text{17}\) Starting with *Bwana Devil* (1952), the technique flourished for some three years and yielded more than fifty stereoscopic films. Famous examples are *House of Wax* (1953) and Alfred Hitchcock’s only attempt at 3D: *Dial M for Murder* (1954). When Hollywood studios chose to pursue a ‘wider’ experience through the CinemaScope system, the ‘deeper’ 3D film quickly disappeared from the mainstream. The short 1950’s success was part of a larger chapter in the history of 3D cinema, which Zone calls the “Era of Convergence” (1952-1985). This describes the optical and production characteristics of that time, as directors now “converged on subject matter,”\(^\text{18}\) or rather “merged Hollywood feature-length narrative with stereography.”\(^\text{19}\) An even shorter outpour of 3D films in the early 1980s proved no enhancement of the potential of an extra dimension in narrative film. Stereoscopic versions of horror films like *Friday the 13th Part III* (1982) and *Jaws 3-D* (1983) only

---

\(^\text{14}\) Ibid.


\(^\text{16}\) Zone, *Origins of 3-D Film*, 2.

\(^\text{17}\) Ibid.

\(^\text{18}\) Ibid.

showed an increased exploitation of gimmicky effects that disconnected viewers from the story and did not help the visual grammar of stereoscopy evolve. The next era of stereoscopic cinema history began with technological innovations in the large-format 15/70-mm IMAX film. This “Immersive Era” (1986-present) also contains theme park 3D and even “4D” ride film attractions that try to completely immerse the viewer in a stereoscopic experience.20 This specific era also embraces other visual experiences like Virtual Reality techniques and head-mounted displays. Devices like the Oculus Rift, recently acquired by Facebook, and Sony’s Morpheus project are trying to become part of our visual culture right now.21 The fourth and current era of stereoscopic cinema is that of “Digital 3D Cinema”, which once again employs the technique in the context of mainstream narrative cinema. Zone sets this era to begin with the digital projection of Chicken Little (2005) on a limited number of 3D screens.22 Robert Zemeckis’ The Polar Express (2004) can be considered still part of the immersive era, because it was projected from analog 70mm film in the huge IMAX format. Ariel Rogers however rightfully notes that this film was a significant factor for the renewed interest in a mainstream application of the 3D technique, as the 3D IMAX version outperformed its flat counterpart at least 10 to 1.23 The digital 3D cameras that were experimented with in the early 2000s offered cheaper projection and greater control over the stereo process.24 Stereography served most of all as a driving force to push digital cinema projection into theaters. The other way around, digital cinema, computer-generated imagery (CGI) and refined new stereographic techniques have pushed 3D cinema as a ‘new’ technological experience in our current era. Most of all the colossal success of James Cameron’s

20 Zone, Origins of 3-D Film, 3.
22 Zone, Origins of 3-D Film, 4.
24 Rogers, Cinematic Appeals, 183.
Avatar (2009) has reinforced the motivation for Hollywood and other industries to jump on the 3D bandwagon once again.

The brief history above shows that stereoscopy has always been present throughout cinema history, but it never managed to stay on the surface of narrative cinema as a truly appropriated technique for a long period of time. I would argue that 3D cinema now once again finds itself in a moment of possible transition, which deserves to be studied. Stereoscopy may either find long-lasting appropriation or disappear once again. Even though the output of stereoscopic films is still fairly strong, the industry should be alarmed: consumers have lost interest in three-dimensional vision on their television sets and cell phones; the movie screen might be next. We have mostly seen a celebration of stereoscopy as a cutting-edge realistic and spectacular technology. The technique has strongly benefited from ‘medium-sensitive’ viewers, who “went to see a film in order to see the new medium more than to see a specific film.”

Contemporary films in the third dimension have time and time again attempted to be successful by foregrounding the attraction of the technology itself, thereby diminishing the story content of the picture. A quick post-production 3D conversion of a 2D film has often been ‘good enough’ for studios that wanted to rake in higher grosses. A decade after the first tries at 3D film in the digital era, the technique’s novelty has now worn off and spectators have grown accustomed to the workings of the medium through the process of ‘automatization’. Because stereoscopy moves in and out of the mainstream, “the technology of 3-D film is perennially hyped, yet it has been largely overlooked in Film Studies.”

Even though the current resurgence of 3D, this time in a digital form, has evoked new academic writing, the area of stereoscopic media studies still craves further research. One scholar of 3D media, Bruce Bennett, calls for “further thought and development

---

in the area of stereoscopic media analysis and language.”

Miklós Kiss, while briefly walking through the history of stereoscopy, talks about “the technology’s previous miscarriages.”

Our current period of three-dimensional cinema might be the closest we have ever been to what we may call an actual ‘birth’. This generates a motivation to study whether stereoscopic cinema will truly ‘grow up’ this time around. Just like the industry put the technology forward as the unique aspect of the 3D experience, critics and scholars have focused strongly on the stereoscopic technique itself, and in particular its inabilities. A possible future for 3D has generally been dismissed because the technology itself, according to the popular view of film critic Roger Ebert, supposedly “does not work.”

Philip Sandifer calls it a technology that is “designed not to create a compelling narrative experience, but rather simply to create a compelling spectacle.” It is ineffective to keep foregrounding the technological aspect in both scholarship and practice. While we are still experiencing 3D through the use of technology that has not radically changed in decades, the cinematic language of stereoscopy might have changed all the more. Bruce Bennett rightly notes that “[i]n its fetishistic preoccupation with novel technology much of the commentary on contemporary 3D films overlooks the composition of the films, evaluating them as more or less successful demonstrations of the spectacular potential of digital stereoscopic cinema.”

The final result of the transition mentioned above depends strongly on the way the 3D technique is appropriated and the extent to which it overcomes the limitations sketched in discourse. While stereoscopy is excessively portrayed as a technology that is doomed to fail because of its irreconcilability with narrative cinema, I would like to argue that a more narratively motivated use of the technique instead might prolong 3D’s future in the cinema. Ray Zone explains: “3-D images present a heightened

---


29 Millós Kiss, “3D as narrative device,” forthcoming 2014.


31 Sandifer, “3-D Film as Demo,” 78.

realism,” in fact, “a visual allure so powerful that they can easily overwhelm the story and subvert the narrative.” Stereoscopy’s novelty period has offered more than a hundred years of exploration in the effects of 3D’s allure. Moreover, “it was also a century-long laboratory for visionary inventors, utopians of the narrative image, attempting to bring depth to the motion picture screen.”33 Zone rightfully calls the ‘utopian dream’ of stereoscopic images in the cinema a ‘double-edged sword’: “The heightened realism it presented was alluring, but it had to be justified in the context of narrative.”34 The medium’s ability to tell a story was only truly employed in the first 3D movie boom, and still seems underdeveloped in our current 3D era. By developing this quality and exposing its unique potential as a storytelling tool, three-dimensional film may overcome the absence of the initial technology- and novelty-induced hype and find a more lasting acceptance, similar to color and synchronous sound. Studying the stereo image in this context will allow us to (carefully) evaluate whether it may ever be able to co-exist with these other, full-grown and mature, technological innovations in cinema. In his article ‘On Stereocinema’, Sergei Eisenstein stresses that “[w]e must not fear the advent of a new era in art.” He is enthusiastic about the possibilities of 3D, but realizes that ensuring a future for the technique is only possible if we find new ways to tell stories: “We must make room in our minds for new themes, consistent with and enhanced by technological advances, which will require a new aesthetic to incarnate them in the astonishing artworks of the future.”35 In their book on the new grammar of stereoscopic film, Adrian Pennington and Carolyn Giardina point out the necessary turnaround for further development of 3D moviemaking:

“Getting there means shifting the focus from thinking about 3D as a purely technical discipline or a cost issue toward a vocabulary that concentrates on the potential of stereo to enhance mood and emotion or help convey a feeling of connection with an actor’s performance, a landscape, or a narrative.”36

33 Zone, Origins of 3-D Film, 4.
34 Ibid., 140.
The evaluation of such a shift is uncommon in discourse. As this research will explore, 3D cinema is repeatedly deemed ‘incompatible’ with narrative cinema on several grounds. This thesis will assess the perspective of a stronger narrative appropriation of the 3D technique within a frame of studies that critically approach stereo cinema. Central will be three specific elements of the 3D viewing experience that are extensively discussed in the ongoing debates on 3D. While these technical elements constitute the technique’s capacities to deliver a unique experience, they are mainly theorized on in terms of their impediment to the functioning of three-dimensional narrative film.

A key discussion, which Barbara Klinger marks as “the parallax debates,” revolves around conflicting employments of added depth: images emerge from the screen and call attention to the 3D technique (negative parallax), while at the same time they recede into the screen and attempt to immerse viewers (positive parallax).\(^{37}\) Parallax is thus a broad issue because it essentially entails what 3D ‘adds’ to the traditional experience: an illusion of depth on two sides of the screen. Both types of parallax are “optical illusions over which directors have control, making them part of an artistic decision-making process that helps to determine a film’s aesthetic and effect on audiences.”\(^ {38}\) Both can have strong effects on our viewing experience and are able to aid the creation of an engaging story world. The emerging image is the signature element of the 3D experience, as it produces three-dimensional cinema’s typical ‘pop-out’. Wiliam Paul, Thomas Elsaesser and Klinger discuss it most prominently in terms of its disruptive nature.\(^ {39}\) Excessive use of negative parallax may render the stereoscopic effect too disturbing; causing the viewer immersion that 3D propagates to be ruined. Hinging strongly on positive parallax, on the other hand, can make the technique’s added value imperceptible.


\(^{38}\) Klinger, “Beyond Cheap Thrills,” 187.

Bernard Mendiburu extensively discusses editing in 3D and identifies a strong and still open debate about how stereoscopic films should be cut.\textsuperscript{40} The only consensus and common view in literature, is that editing should be handled ‘differently’, as it has been proven that viewers need more time to read 3D images.\textsuperscript{41} Due to varying amounts of depth and “reorientations of space” in each shot, montage can be problematic when the common editing pace of contemporary narrative cinema is applied. Philip Sandifer further discusses the issue from this angle, while authors such as Ray Zone and William Brown explore possible new, slower paced styles of editing.\textsuperscript{42}

A third element that supposedly prevents stereoscopy from “being used for more serious narrative purposes,” is the fact that it changes our traditional conception of the screen.\textsuperscript{43} The 3D experience differs from traditional narrative cinema because images have the ability to move inside the screen and out into the theater space. Philip Sandifer evaluates the 3D screen in relation to the classical notion of the ‘Albertian window’.\textsuperscript{44} Many still suggest that 3D film offers a ‘window into reality’, but the technique causes viewers to relate to objects in the three-dimensional space instead of to the screen itself. In the discourse on 3D, Miriam Ross examines the feeling of touch created by the illusion of a continuous space between diegesis and viewer.\textsuperscript{45} William Paul and Sergei Eisenstein have discussed the screen in terms of a break of the fourth wall.\textsuperscript{46}

\textsuperscript{41} Jukka Häkkinen et al., “Measuring Stereoscopic Image Quality Experience with Interpretation Based Quality Methodology.” (proc. of IS&T/SPIE’s International Symposium on Electronic Imaging, San Jose, California USA, January 2008), 9.
\textsuperscript{42} Sandifer, “3-D Film as Demo,” 62-78.
\textsuperscript{43} Zone, \textit{3D Revolution}, 398-400.
\textsuperscript{45} Ibid., 65-66.
All three angles in the above are prominent issues in the discourse on 3D cinema and are considered significant technical limitations to viewing and making three-dimensional narrative films. After exploring these discussions, each in their own chapter, this thesis aims to shift the focus to the way their implied complications can be triumphed. Each issue offers filmmaking possibilities that are unique to the 3D experience. Parallax, for example can be used to direct viewer attention to important narrative elements or to enhance the creation of engaging story worlds. Solutions to 3D editing problems enable filmmakers to employ the technology in accordance with the editing standards of contemporary narrative cinema, while a different type of montage could open up to new styles of visual storytelling. Breaking the fourth wall to create a shared space in turn might heighten viewer engagement with the diegesis and the impact of certain traditional filmmaking techniques. Practical examples will be very important to uncovering how the explored angles are handled and fit within narrative cinema practices. General analysis of the 3D use in seven films is employed to illustrate how filmmakers might have found more narratively motivated implementations of the stereoscopic technique. Professional practitioners are the ones who will have to challenge the critical (scholarly) assessment of 3D technology in the cinema, and subsequently convince audiences of stereoscopy’s value. I choose to focus on mainstream Hollywood 3D films, because this is the category in which stereoscopy has repeatedly tried to survive without success, and in which it is yet again trying to maintain a presence. While contemporary examples are most meaningful for the future of digital 3D film, cases from the only preceding successful 3D era serve to illustrate a possible changing appropriation of the 3D technique. Furthermore, these pictures are often undeservedly dismissed as gimmicky and outdated. Due to limited availability of classic stereo films, one fifties classic was chosen for each explored angle. In addition to this, a selection of contemporary 3D films from a wide range of genres is studied, each with specific example scenes that illustrate the three problematic elements that stand central in this thesis.

In summary, three-dimensional film can no longer justify its presence on the basis of its passing (technological) hype. This research hypothesizes a stronger narrative appropriation of stereoscopy as a potential road to acceptance and prolonged existence of 3D cinema. The goal is to explore this possibility through a method that
draws up an inventory of the ongoing debate on stereoscopic film, in which 3D’s incompatibility with narrative film is central. These critical views are assessed from three technical angles and by looking at different examples of 3D narrative films. This is covered in the following main research question:

“Are filmmakers able to overcome the problematic nature of 3D cinema, as explored in the three key technical contexts of parallax, editing and the screen, by embracing the technique’s storytelling potential? Has the stereoscopic technique thus made the move toward a more sustainable appropriation and lasting acceptance in narrative cinema?”

Each chapter explores one issue based on the following two sub-questions:

1. How does discourse problematize this issue as a technical hindrance to the functioning of three-dimensional narrative film?

2. Do practical examples show a narratively motivated use of 3D that overcomes these problems?

**Introduction of important concepts**

Industry members, as well as scholars of 3D, are still continually adding to their expertise on stereoscopy. Technical jargon is unavoidable when explaining how the technique functions in film. Several recurring terms are already becoming part of the technique’s new visual grammar, “which might soon become as natural to filmmaking vocabulary as “close-up” or “racking focus”.” 47

The following paragraph is an introduction for those unfamiliar with the process of stereoscopy. Moreover, some of the technical notions that are frequently used in literature are described before they can be used in the main text.

First of all, we should remember that the fundamental idea behind stereoscopy is that it tries to replicate the depth in natural human vision. It does so by uniting the images from two separate camera lenses. This mimics stereopsis: “our ability to combine the two images our brain receives from our eyes, to perceive depth.” 48

---

47 Pennington and Giardina, Exploring 3D, 13.
48 Mendiburu, 3D Moviemaking, 11.
Stereo cameras would have to place their lenses approximately 6.35 cm (2.5 inches) apart to match our sight, as the camera lenses would then have same interocular distance as human eyes.\(^4\) This distance between both lenses is varied and influences the amount of depth in the 3D image. The added depth makes that we not only perceive the width and height of the screen frame, but can also see things behind and in front of it. This means that filmmakers now have to work on the z-axis, in addition to the traditional x- and y-axis. The ‘zero point’ of this axis is the point at which we would normally see the flat screen plane. The 3D objects can move along the z-axis from the negative to the positive side, meaning: from in front of the screen to inside of the screen.\(^5\)

**Perceiving depth**
As conventional motion pictures consist of a single image projected on a flat screen, our brains do not utilize the ability of stereopsis; there is no set of images to be combined. We may therefore conclude that watching traditional film is fundamentally different from our normal way of perceiving the world through our two eyes. However, we have been perfectly fine with viewing these ‘flat’ images for over a century. From our mobile phones to our television sets and PC monitors, most of the screens we use and images we perceive are not stereoscopic. Still, we don’t complain about this way of viewing. Knowing that one-eyed people are able to function perfectly, it is no surprise that we do not immediately feel that something essential is ‘missing’ in 2D movies. 3D film relies on the stereopsis of two images and therefore we might say that watching a regular film is like watching 3D with one eye closed: we perceive only one of both images. Obviously, our motion pictures do not look flat. Bernard Mendiburu’s handbook titled ‘3D moviemaking’ is an authoritative source on 3D filmmaking. While it is essentially a practical guide to create a 3D film ‘from script to screen’, it also extensively covers technical issues. He explains that stereopsis is “just one of many ways we understand the 3D world we’re living in.”\(^6\) Cinema has always relied heavily on monoscopic depth cues to suggest deep story worlds on a

---

\(^5\) Ibid., 15.
\(^6\) Mendiburu, *3D Moviemaking*, 11.
flat screen. These cues are very powerful and include perspective and relative size, occlusion of objects, shadows and illumination.\textsuperscript{52}

Mendiburu goes on to clarify what the most important depth cues in cinema are: those based on \textit{motion}. The notion of \textit{parallax} entails “the relative position of an object’s image in a set of pictures.”\textsuperscript{53} Motion pictures are able to portray movement on screen, and our brain in turn analyzes objects’ speed, direction and place in space from the successive images. This lets us recreate the third dimension ourselves, most effectively through lateral camera movement. When the camera changes position, our point of view changes and our depth-perception system notes the difference in distance between objects. Conversely, we notice when objects move faster (foreground) or slower (background) in relation to each other on screen. While all other monoscopic depth cues in one way or another rely on our previous knowledge of shapes and objects, parallax is “the only purely optical depth cue.”\textsuperscript{54} Unsurprisingly, parallax is also one of the key terms both in stereoscopy’s technical functioning and in its aesthetic. When looking at a stereoscopic image, we are using each eye as a different point of view. Therefore, “stereoscopic depth cues are just a specific kind of motion parallax cues.”\textsuperscript{55} The disparity between both images provides us with information about depth and size.

Filmmakers have to grasp several important elements to achieve a 3D image that is pleasant to watch. Apart from cues around us or on the screen, we receive stimuli within the body that provide us with a sense of movement and spatial orientation.\textsuperscript{56} By aiming at an object, the muscles controlling our eyes try to establish our own absolute distance from it, rather than only guessing a relative depth between several objects. Mendiburu uses the example of ‘squinting’ at objects close by, or comfortably ‘gazing’ at a faraway landscape.\textsuperscript{57} Eyestrain while watching a stereoscopic film can be caused by a painful muscular effort in this action of convergence. Similarly, we require muscle movement to make our lens accommodate and focus on objects. When we are watching a movie, our eyes stay

\begin{itemize}
\item \textsuperscript{52} Ibid., 12-23.
\item \textsuperscript{53} Ibid., 15.
\item \textsuperscript{54} Ibid., 16.
\item \textsuperscript{55} Ibid., 17.
\item \textsuperscript{56} Ibid., 20.
\item \textsuperscript{57} Ibid.
\end{itemize}
focused on the flat surface of the screen. At the same time, however, our eyes are converging on the 3D objects moving along the image’s z-axis [image 1]. In contrast to natural human vision, stereoscopic film requires viewers to focus and converge separately. Roger Ebert’s infamous article “Why 3D doesn’t work and never will” mentions this as the biggest problem of stereoscopic cinema: “600 million years of evolution has never presented this problem before. All living things with eyes have always focused and converged at the same point.”

Even though our eyes and brains may have to work harder, or rather differently, nearly all spectators are perfectly able to converge and focus separately and perceive 3D without headaches. Physical discomfort is mistakenly seen as an inevitable effect of perceiving the third dimension. However, eyestrain and headaches are mostly the result of viewers’ existing eye problems or filmmakers’ improper control over the limitations of the 3D technique. The large cinema screen greatly magnifies any small error in the image or projection, and: “the longer the mistake, the worse the headache.”

The reconstruction of depth in the cinema is limited by the resolution and quality of the projected image. Moreover, there is a certain ‘comfort zone’ to which stereoscopy is confined in order to not be painful to our eyes [image 2]. The limits of the stereoscopic technology and our own vision thus have implications for the way 3D cinema can use added depth to tell its stories.

---


60 Mendiburu, 3D Moviemaking, 25.

61 Ibid., 21-23.
**Image 1:** Separate accommodation and convergence when watching 3D film.

![Diagram showing accommodation and convergence](image1)

**Image 2:** The stereoscopic comfort zone.

![Diagram showing stereoscopic comfort zone](image2)
PARALLAX

Negative parallax

I will first elaborate on negative parallax, as 3D is most easily identified by this emergence effect. Along the positive side of the three-dimensional image’s z-axis, images may slightly protrude from the screen or even fly right at the viewer at high speed. Negative parallax can be applied in many ways, from very subtle to highly obtrusive. Moviegoers’ clearest memories of specific stereoscopic moments will probably be instances of the striking ‘pop-out’ effect. This stereoscopic filmmaking tool has shaped audience expectations ever since viewers have first experienced three-dimensional pictures. During stereoscopic cinema’s “Novelty Period”, as defined by Ray Zone, as well as during periods of novelty shortly after a re-introduction of the 3D technique, films have relied heavily on a rather ‘gimmicky’ use of negative parallax. The 1950s 3D films for example, are now somewhat notorious for their excessive use of emergence. While there are various examples of pictures from the period that found a sensible function for the stereoscopic technique, many relied on attraction through the use of negative parallax. That is exactly what has stayed with us more than half a century later. Keeping in mind the stereoscopic photographs that were extremely popular in the post-war period and preceded 3D filmmaking, we might argue that “there is no inherent reason why 3-D had to emphasize emergence so insistently.” The still 3D pictures from that period tried to draw the viewer into the picture by mainly utilizing positive parallax for its illusion of depth. The medium almost strictly functioned as a ‘window’ through which viewers could take a three-dimensional peek into reality. When stereoscopy was finally applied to cinema in a somewhat successful way during the fifties, this traditional 3D aesthetic seemed to be abandoned for a more alluring one that assaulted the viewer. The technique of negative parallax was a great tool to clearly set the stereoscopic technique apart from the other new technologies it had to compete with during the time. Opponents such as the CinemaScope widescreen technology and the spectacular IMAX-like Cinerama were often mistakenly classified as three-dimensional innovations, as they too tried to approach human vision.

---

62 Zone, Origins of 3-D Film, 1.
example like *Avatar* might be famous for its visually deep and rich world of Pandora that is portrayed with very little emergence, there are instances of ‘cheap’ use of negative parallax to be found all around contemporary 3D works. Most strongly in genres like horror that are inclined to exploitation, for example *My Bloody Valentine* (2009) and *The Final Destination* (2009). Such use of negative parallax may remind us of a period in the history of stereoscopic film that now seems rather outdated visually. Many instances of movie marketing throughout the history of 3D cinema have laid emphasis on this aspect of stereoscopic filmmaking as well. They promised audiences a strong reaction to the stereoscopic technique.

In William Paul’s seminal writings on ‘The Aesthetics of Emergence’, we read how “3-D always had to find very direct ways of announcing its status to the audience.”64 Throwing objects at the viewer in negative parallax is of course the most direct method to present a film’s stereoscopic ‘abilities’. This gimmicky use of emergence brings out strong suggestions of the fairground and the ‘cinema of attractions’, which Tom Gunning defined as “exhibitionistic” with an emphasis on “the direct stimulation of shock or surprise at the expense of unfolding a story or creating a diegetic universe.”65 Clearly, in many cases 3D films still give priority to the attractive power of negative parallax, rather than utilizing its potential to fulfill a role functional to a film’s narrative.

**Negative parallax’s function**

As gimmicky as negative parallax may now seem though, it is a 3D filmmaking tool that is nevertheless capable of supporting a film’s narrative. Emergence may find a balance between the obtrusive and invisible ends of the stereoscopic spectrum, or even utilize the z-axis to the extreme for maximum impact. Barbara Klinger recognizes that most people would rather see the effect minimized or dropped entirely as it is “caught up in already established taste formations and cultural hierarchies that help to determine its aesthetic assessment,”66 but she also argues

64 Ibid., 323.
“that it operates as an influential and multifaceted element of the film text.”\textsuperscript{67} We know that the cinema of attractions did not vanish completely when narrative cinema reached dominance. Gunning instead thinks a “synthesis of attractions and narrative”\textsuperscript{68} was achieved. Comparably, spectacular emergence effects may also still play a role in a film’s aesthetic when stereoscopy is given a narratively motivated function.

The potential of negative parallax becomes most clear when looked at in relation to a film’s mise-en-scène. It has the ability to call viewers’ attention to any visual aspect, especially to props. Through stereoscopy, a film may literally present an item to the viewer by bringing it out of the screen and closer to the audience. For example, the presentation of a key in Alfred Hitchcock’s \textit{Dial M for Murder} (1954) through a strong emergence effect reinforces the importance of an essential aspect of the narrative [image 3]. The repeated pop-out of Captain America’s shield helps characterization of the super hero and can be considered further confirmation of the fantastical Marvel universe as the story world.\textsuperscript{69} This use of mise-en-scène and prop is of course not unique to 3D cinema. However, negative parallax reinforces the impact of visual elements and the mentioned examples show how the technique can function efficiently as a tool of \textit{emphasis}. Viewer attention can be directed even stronger than in 2D films.

\textbf{Image 3:} \textit{Dial M for Murder} presents a key in negative parallax.

\textsuperscript{67} Ibid., 186.
\textsuperscript{68} Gunning, “The Cinema of Attraction[s],” 386.
\textsuperscript{69} Klinger, “Beyond Cheap Thrills,” 190.
As an opposite of the well-known bullets, arrows, weapons, and other projectiles that are often hurled at the audience, Klinger identifies ‘floaters’: floating elements of a film’s mise-en-scène.⁷⁰ A scene from contemporary 3D film containing such treatment of negative parallax can be found in James Cameron’s Avatar, where numerous bright little seeds from the ‘Tree of Souls’ drift in positive parallax as well as in negative parallax into the space of the movie theater. Miriam Ross uses this example when she discusses the ‘affective entanglement’ that is part of the cinematic illusion. When such floating elements emerge from the screen, “the shared sensory space created between the viewer and the content intensifies that entanglement.”⁷¹ Such extensions of the story world have implications for the role of the screen, as will be discussed later on. Countless other 3D films use elements like small particles of snow, rain or dust to extend the visual story world and enhance depth in a subtle manner. These floating elements have become a staple of contemporary 3D filmmaking and contrast sharply with obtrusive projectiles. Both “advance the narrative action, while underscoring an object’s or an event’s importance,”⁷² but both tools have a very different kind of impact. The projectile usually moves fast and is therefore very striking, causing it to bring up allure and shock in the viewer. Floating elements, on the other hand, move more subtly and convey “a kind of lyricism and awe” instead.⁷³

Even more subtle uses of the emergence effect can be imagined. Klinger labels one of these implementations ‘covert parallax’.⁷⁴ Objects or characters may be placed only very slightly in front of the screen plane, in such a way even that viewers would not really notice. Part of the image is pushed to the negative side of the z-axis without visibly entering the theater. Through this undercover use of negative parallax, a much stronger sense of depth is created inside the screen without resorting to conspicuous pop-outs. It is important to notice that this very discrete 3D composition goes mostly into depth and therefore also hinges very strongly on positive parallax. However, the slight use of negative parallax is able to make the depth just that more dramatic and seemingly endless.

⁷⁰ Ibid., 190.
⁷¹ Ross, “Stereoscopic visuality,” 408.
⁷³ Ibid., 191.
⁷⁴ Ibid.
We can now say that negative parallax appears to us in many different forms. While its cinematic heritage seems to be the cinema of attractions, the emergence effect has been implemented in many different and less obtrusive ways. In order to not disturb the cinematic illusion, the technique should be handled with care when it is put to use in narrative cinema. William Paul signals there was already a “tendency to downplay the emergence effect” as the third dimension began to be used for ‘quality films’ during the 1950’s 3D boom.\textsuperscript{75} As the practical examples will underline later on, negative parallax has moved beyond its obvious ability of exhibiting spectacle and it is now also strongly functioning within the traditional storytelling practices of Hollywood cinema, often as an integral part of a film’s mise-en-scène.

**Positive parallax**

While both types of parallax are of course inextricably linked, they are opposites in several ways. Positive parallax is capable of bringing forth a very different aesthetic as it is simply located on the opposite side of the z-axis or screen plane. Instead of extending beyond the screen, it recedes into the screen and therefore adds substantial depth to the image. A blogger is quoted saying “negative parallax… is more of a novelty. Whereas positive parallax… is really where the magic of stereoscopy happens… You immerse yourself in the story and often in a different world.”\textsuperscript{76} This immersive quality is the essential characteristic of positive parallax and often seems to be put forward as the ultimate goal of contemporary stereoscopic cinema. We may recall spectacular instances of negative parallax best, but filmmaking in the third dimension focuses most strongly on ‘deepening’ the experience via positive parallax. Its subtlety allows for easier narrative appropriation of the 3D technique as well. Positive parallax literally functions in the background, and therefore often goes unnoticed. Even though it is not the attractive tool we usually identify 3D cinema with, it is arguably a more essential part of stereoscopy.

The more discrete look of a depth-oriented aesthetic increasingly seems to be favored over heavy use of negative parallax. We might say that, “with deep focus as an historical touchstone, positive parallax has a more distinguished lineage, while

\textsuperscript{75} Paul, “The Aesthetics of Emergence,” 331.

\textsuperscript{76} Seth Baumwell, in: Klinger, “Beyond Cheap Thrills,” 187.
low-brow 1950’s 3D comes back to haunt the pop-out’s reappearance today.”

William Paul suggests looking at 3D in the fifties as “one development in an aesthetic movement that had been taking place in Hollywood films during the previous 15 years or so.” The 1940’s brought us deep focus photography and movements in depth, accompanied by longer takes and less cutting. What followed was a broader tendency of removing the image frame and increasing cinematic realism through technologies like Cinerama and CinemaScope. Deep focus filmmaking used specific strategies to convey depth on the flat surface. This type of composition has points of contact with 3D film as stereoscopic cinema is now once again “reinventing itself on the z-axis.” As mentioned before, three-dimensional filmmaking is greatly embedded within traditions of Hollywood continuity filmmaking. But just as deep focus filmmaking strongly influenced the practice of film editing, 3D’s added depth through positive and negative parallax will have implications for the way films are cut as well. Editing of stereoscopic films will be explained in the next chapter and examples will show whether we can truly speak of stronger compositions in depth and a clear connection to deep focus cinematography. In our contemporary context, the addition of depth can be seen as a development in an aesthetic movement that moves towards increased cinematic realism through different means, such as computer-generated imagery and crisp digital projection.

**Positive parallax’s function**

The primary function of positive parallax is again strongly connected to elements of mise-en-scène. A film’s setting in particular, most strongly contributes to the construction of detailed and unique story worlds on the screen in which the viewer can be immersed. Positive parallax is “inextricably bound to world creation” as it “establishes mise-en-scène and space through extreme depth cues” and deepens the flat worlds we would normally see. Variations in the amount of depth can greatly influence the atmosphere of a specific setting as well. Dependent of the setting, adjusting the interocular distance to achieve an extreme amount of depth in positive

---

77 Klinger, “Beyond Cheap Thrills,” 188.
79 Zone, 3-D Revolution, 399.
parallax may evoke feelings like vertigo, grandeur or emptiness. Brian Gardner uses depth to create ‘perceptual associations’: when the space around a character is made deeper, “[y]ou associate that person with depth.” The other way around, “I can put another person in a shallower space, and you automatically think that that person has a shallower life,” he argues. Positive parallax may play with our perception in many ways. Positive parallax can be just subtle enough so that audiences ‘feel it’. When the third dimension is added, viewers have extra information to process from a story world.

**The parallax paradox**

We have established that negative parallax emerges from the screen while positive parallax is more strongly aimed at immersion. Both are used in coherence, but the purpose of each type of parallax seems so strongly incompatible with the other. The concern about the use of the emergence effect actually problematizes one of the central issues of the 3D film aesthetic in general: “Almost from the beginning, there was concern with how to make use of the emergence effect within the context of a narrative film.” It often seems that the 3D technology still tries to provide the ‘aesthetic of astonishment’. Paul notes that this aesthetic was already fifty years outdated during the first 3D boom. Using such strong attractions “within the context of narrative film – the very framework that supplanted the aesthetic of attractions,” he argues, “can be awkward.” Like many technological innovations in the cinema, stereoscopy has to function within the medium’s storytelling traditions. In 1953, producer Samuel Goldwyn already stressed the dominance of narrative over 3D depth: “In any consideration of new dimensions for motion pictures, the fact still remains that the most important dimension is that of the story.”

A film’s narrative may absorb spectators in such a way that they forget that they are looking at a movie screen. 3D technology adds to this absorption through immersive strategies. Oliver Asselin and Louis Auger Gosselin define immersion as

---

83 Ibid.
“an experience that gives one the feeling of physically entering a separate space.”

Using Marie-Laure Ryan’s ‘Narrative as Virtual Reality’, the authors discern three types of immersion. Stereoscopy is most strongly concerned with spatial immersion, which is a response to setting. The other two types are more strongly tied to narrative: temporal and emotional immersion are responses to plot and character respectively. With its immersive strategy, the 3D experience can be typified as an “egocentric display” that gives viewers the impression they are immersed in the represented world.

Asselin and Gosselin want to reinforce that in different technologies “immersion has always been a primary goal in all research and development programs, and a key factor in the buying patterns of consumers.” Three-dimensional film seems to perfectly fit this trend. Its ‘immersive program’ is also concerned with realism, as it adds an illusion of depth and tries to incorporate a sense of volume into the picture. This matches the vision of several theorists who see technological developments as a natural evolution of cinema. Rudolf Arnheim’s thoughts of a ‘complete film’, for example, mention an “age-old striving for the complete illusion” that would “carry the mechanical imitation of nature to an extreme.” Similarly, André Bazin envisioned a ‘Total Cinema’: “the reconstruction of a perfect illusion of the exterior world in sound, color and relief.” However, with negative parallax as the main culprit, the 3D technique has the ability to annihilate any type of audience immersion or illusion of realism:

“3-D, by moving out into the three-dimensional space of the theatre, constantly calls our attention to the fantastic nature of the image, to its almost magical

87 Asselin & Gosselin, “This Side of Paradise,” 132.
88 Rudolf Arnheim, Film as Art (Berkely and Los Angeles, CA: University of California Press, 1957), 158.
89 Ibid., 154.
ability to create a seeming reality that is in fact an illusion thinner than the air through which it moves."\textsuperscript{91}

Stereoscopic cinema therefore seems to find itself trapped in a paradox. It has the option to make optimal use of all available visual possibilities by aggressively implementing 3D effects. Negative parallax in particular clearly showcases the added dimension, and it has become part of viewers’ expectations; emergence is practically a synonym for 3D film. But, it may also divert audience attention from story content to the technology itself. Furthermore, it is strongly associated with cheap spectacle and will almost automatically mark the film gimmicky or ‘artificial’. In a second scenario the 3D film can rely more strongly on traditional storytelling conventions and dial down the stereo to keep the viewer engaged in the narrative. However, this time around the picture will be condemned for not using the stereoscopic technique at all. The 3D technique risks being perceived as totally ‘invisible’ when a picture keeps a modest aesthetic and stays within the confines of the screen. Viewers might feel ‘cheated’ and will then ask the often-heard question: “What did the 3D add?” Barbara Flueckiger sees two opposing paradigms between which 3D is caught: “one claiming that S3D [stereoscopic 3D] should not apply gimmicks but should first and foremost serve the story, the other claiming that S3D should enhance the viewers’ experience in the cinema, sometimes even to the point of becoming an end in itself.”\textsuperscript{92}

In his article on the return of 3D, Thomas Elsaesser offers a different view. He poses four ‘counternarratives’ as an alternative to prevalent critical views on three-dimensional film, such as those of Roger Ebert, Mark Kermode, Kristin Thompson and other authors whom he calls the “Cassandras of 3-D.”\textsuperscript{93} His fourth point is the following:

“From an aesthetic perspective, D3D aspires to become, in the films themselves, an invisible rather than visible special effect. That is, much of the effort of directors, designers, and draftspersons working in 3-D goes towards

\textsuperscript{91} Paul, “The Aesthetics of Emergence,” 345.
naturalizing this type of technologically produced spatial vision, making it increasingly indiscernible. ⁹⁴

Elsaesser tries to go against views that simply dismiss the 3D technique as too eye-catching to have a place in the cinema. Instead of focusing on stereoscopy’s problematic visibility, the author observes an ongoing process that moves towards invisibility. His use of the term ‘naturalization’ suggests a development of stereo use that is better adapted to traditional narrative cinema. By simply comparing the aggressive marketing strategies for 3D from the 1950s with the current state of affairs, where even the mandatory 3D-tag seems to slowly disappear from movie titles, we may argue that efforts toward invisibility are certainly noticeable. The treatment of parallax in practice will be studied in the following examples. These three films represent different genres that commonly get a 3D treatment: classic horror, action and animation.

EXAMPLES

The paradoxical nature of parallax in House of Wax
André de Toth’s House of Wax is one of the most famous stereoscopic pictures from the 1950s 3D era. It is a great looking picture that drew huge profits internationally. The film is a good illustration of how 3D works well when coordinated to mise-en-scène. Part of its success must have been due to the newness of the 3D technique and the shocks promised by its marketing [image 4]. However, House of Wax does not exclusively rely on cheap emergence effects. It uses certain strategies to prevent itself from being trapped in the paradox of parallax. The seemingly simple horror flick has a somewhat conscious and playful attitude toward the conflicting natures of emergence and immersion and the viewer expectations that come with 3D film.

⁹⁴ Ibid., 221.
Image 4: Advertisements promise thrills that “come off the screen right at you!” Gum was sold separately to “ease the tension” of the new and intense 3D experience.

Vincent Price plays the role of professor Henry Jarrod, an artist who makes wax figures. His sculptures are incredibly realistic and are displayed in his studio that also functions as a museum. The film’s use of positive parallax as a tool for ‘world creation’ immediately becomes apparent in the first scene of the film. Establishing shots of the studio/museum introduce us to the artist’s world as seen in the stills [image 5].
Image 5: The studio and its wax figures are introduced.

Cleopatra, Queen of Egypt, and Mark Antony. Their last meeting.
The 2D images make the composition seem somewhat cramped and flat, but the characters’ movement in 3D adds a great sense of volume and space to the studio. The viewer is introduced to all the wax figures one at a time. Each has its own story and their specific facial expressions are shown in close-up. While Jarrod functions as a narrator that explains his own works, the added depth aids the visual introduction of the museum. The 3D effect is used effectively to transpose the composition of the wax dioramas to the screen. Stereoscopic compositions are sometimes criticized to look like flat dioramas themselves, but in *House of Wax* they have volume. The third dimension is adopted in accordance with other elements of the scene’s mise-en-scène, as full lighting is used to enhance the illusion of depth even further. It helps to keep all objects from front to back fully lit and in focus. As Bob Furmanek observes: “The set design was simple and straightforward. The concept of the wax museum at the turn of the century was well suited to 3-D and was effectively laid out by the designers using a good deal of stage space.”

Only minutes after this introductory sequence, we see all of the beauty destroyed. Jarrod’s business partner tries to push him to create more shocking and horrifying wax pieces to draw more visitors, because “There are people in the world who love beauty. But more who want sensation, shock!” The artist responds: “Morbidly curious! I won’t cater to them.” This mirrors the situation that is still going on in 3D filmmaking, and the discussion in discourse on stereoscopy. The artist does not want to give up his integrity by implementing elements of shock just to please audiences. The ‘ordinary businessman’ however, does not care and simply wants “a quick return on his investment [image 6].” When Vincent Price’s character refuses to give up his life’s work, his financial associate starts to light all the figures on fire to strike up the insurance money from their joint venture. We might argue that the shock the audience has to endure is that much tougher because of the strong visual contrast produced by the three-dimensional effect.

---

There are people in the world who love beauty.

But more who want sensation, shock!

Morbidly curious! I won't cater to them.

I'm an ordinary businessman who wants a quick return on his investment.

Image 6: Sculptor Jarrod in an argument that could be about the 3D technology itself.

Their money is as good as anybody else's.
The tour of the museum was quite cheerful and had a spacious feel to it. These shots are now replaced by images of the burning wax people. Close-ups of their melting faces are used to intensify the portrayal of the destruction of the artist’s life’s work. This is an important moment in *House of Wax*’s narrative, as it explains why the sculptor turns into a murderous villain. The added stereoscopic depth elevates the scene to an early dramatic high point. While the close-up already brings us closer to the action, the 3D effect makes the wax props stand out much stronger. Instead of a flat face we see the figure in depth, engulfed between flames in the foreground and background of the shot [image 7]. It should be noted that *House of Wax* was also the first picture to feature ‘WarnerPhonic Sound’. This new four-channel sound process allowed for sound to come from a separate effects (surround) channel. In addition to the stereoscopic images, this stereophonic sound heightened the dramatic effect even further. Sadly, current 3D Blu-Ray releases of *House of Wax* do not contain surround sound, as the magnetic tracks containing the multi-channel audio were not preserved. This opening sequence is a prime illustration of how the film uses the third dimension, and mainly positive parallax, to increase dramatic tension in an essential part of the narrative. World *creation* is immediately followed by literal *destruction*. Furthermore, it shows the wax figures as very suitable examples of how props can be used for staging in three-dimensional depth.

*Image 7:* The wax figures are now seen engulfed in 3D flames.

---

House of Wax is famous for its ‘paddleball scene’, in which a fifties stand-up comedian plays the role of a carnival Barker. He tries to lure audiences to the renewed wax museum by doing tricks with a ball and paddle. The character talks to the museum audience but also directly addresses the real audience in the movie theater, by repeatedly tossing a ball at them and by talking to them: “Well, there’s someone with a bag of popcorn!” [image 8]. Even though this circus act is affiliated with the wax figure show in the story world, it is not a significant part of House of Wax’s plot. The scene appears to be just a form of cheap three-dimensional spectacle. When looking more closely however, it does have meaning and an actual function. First of all, it obviously refers to the art-versus-commerce discussion in 3D discourse. Earlier on in the film, we witnessed the conversation between sculptor Vincent Price and the businessman who has invested in his venture. While the businessman explained he wishes to profit from people who want sensation and shock, the artist wants to cater to people who love beauty. The paddleball scene above all quickly provides this type of ‘cheap’ sensation and shock through a very blatant use of negative parallax. It is that more striking because it is used within a film that utilizes an overall more restrained depth effect and limits negative parallax to a few scenes. Both the people looking for sensation and those looking for beauty are thus catered to in House of Wax. The second function of the paddleball scene becomes apparent when its timing is considered. Even though this film is only 88 minutes long, it contained an intermission like many pictures from the same era. This particular scene follows right after the break. House of Wax uses this scene as a tool to bring audiences back into the movie. Right when the viewers have returned to their
seats, they are directly addressed by a funny character that even ‘attacks’ them with his paddleball. On top of that, the man looks straight into the camera, which is considered a taboo in classical Hollywood cinema. Even though this strategy would not be the most effective tool to immerse the audience back into the narrative because of its directness, it most successfully grabs their attention and reminds them that the feature has started again. Some of them have probably actually bought a bag of popcorn during the intermission. When we return to the narrative and the inside of the wax museum, the sculptor apologizes for this shameless use of 3D spectacle: “I hope you don’t think I’ve gone too far hiring this fellow to bring people in. Once we’re established we won’t need that kind of thing” [image 9]. This line perfectly fits the history of 3D cinema. After exploitation features have announced that the stereoscopic technique is back through the unashamed use of negative parallax, later pictures usually try to integrate a more restrained and artistic use of the 3D effect. House of Wax places itself between obtrusive 3D films and pictures that move very strongly toward invisibility of the effect.

**Image 8:** Following the intermission, the infamous paddleball scene repeatedly shows a ball being tossed into the theater space.
An example along these lines is a visit to a Sunday matinee show [image 10]. The main characters' being there is only a minor part of the film’s narrative development, but the director takes the opportunity to display the show in all its glory. The glamour of the dancing girls is shown in bright colors and their movement in depth is enhanced by the stereoscopic technique. Dancers move to and from the foreground and kick their legs toward the audience. Contrary to the paddleball scene, this dancing sequence seems to act more like an intermission in itself. The narrative motivation behind it is just as little, but the visual appeal is much more playful and artistic. The audience gets a chance to ease their nerves through this specific use of the 3D technique, instead of being assaulted by it.

Overall the employment of 3D in *House of Wax* is quite balanced. While we do encounter the much-criticized 3D tradition of, literally, throwing stuff at the viewer in several fighting scenes, the film uses stereoscopy to enhance the story world and intensify dramatic moments. Another example of this is the pursuit of the heroine by the evil sculptor [image 11]. The 3D effect intensifies the chase through the streets as the villain is shown in the background running toward the heroine in the foreground. The picture plays with the planes of foreground and background in an effective way, most clearly by having the female protagonist hide behind a corner in the foreground, while the sculptor runs way in the distance looking for her. In other moments the director gladly seizes a few opportunities to quickly display the technique’s possibilities and answer to viewer expectations. Negative parallax is handled quite
playfully to prevent it from being too obtrusive. Positive parallax is handled superbly in combination with lighting, color and overall mise-en-scène. All in all, *House of Wax* keeps itself free from being trapped in parallax’s paradoxical nature. It moves somewhat toward invisibility, but keeps the typical 1950s appeal of 3D.

**Image 10:** A matinee show offers another playful 3D 'intermission'.

**Image 11:** Different planes of depth are used to intensify the suspense in a nightly chase through the streets.
Dredd: ‘lyricism and awe’ in a deep world

Pete Travis’ Dredd (2012) is a more modern example of a movie that utilizes both negative and positive parallax to specific ends. The action movie is a reboot of the original Judge Dredd movie from 1995 that featured Sylvester Stallone as a ‘Judge’ in the dystopian futuristic city ‘Mega City One’. In the recent version, the added 3D helps to portray the vastness of this violent metropolis in the beginning of the film. Shots from above show the numerous skyscrapers stretched out in depth. Most of the film is set in an interior décor: a high-rise building filled with criminals, which is deceptively named ‘Peach Trees’. Early on, these outside shots introduce the viewer to the story world in its entirety [image 12]. Peach Trees is especially suited for 3D because it is a very high building with an open inside [image 13]. The story world of Dredd seems quite spacious even though the film is mostly confined to this single area. Shots show us views down the structure, revealing the building’s many floors. Peach Trees’ height represents the film’s narrative structure as well. In traditional video game fashion, Judge Dredd and his rookie companion Anderson have to shoot their way up the building’s levels to finally pass judgment on the evil drug-distributing villain. Dredd’s use of positive parallax works particularly well for the goal of world creation. Around the halfway point of the film, the main characters shortly find themselves outside of the skyscraper. High in the sky, the film once more opens up to the stretched out megalopolis in full 3D depth as a welcome variation to the one-sided and confined décor.

**Image 12:** Introductory shots give a sense of depth of the outside world.
Image 13: Outside and inside of ‘Peach Trees’. 
The narrative in *Dredd* is centered on a reality-altering drug branded ‘Slo-Mo’. A gang and its female leader ‘Ma-Ma’ have taken control of Peach Trees and distribute the dangerous drug all around the city. The effect of Slo-Mo is shown in several scenes throughout the film. Combined with elements of mise-en-scène, 3D greatly aids the portrayal of the drug-induced trips. A particular shootout scene very well illustrates the “lyricism and awe” that can be conveyed through the use of negative parallax, as Klinger described. Judge, jury and executioner Dredd and his sidekick attack a group of people who are on the drug that gives users a sense of warped time. Right after the criminals take a hit of the Slo-Mo, our two heroes burst through the door. Because of the use of actual slow motion imagery nearly all elements of the mise-en-scène, even bullets, turn into floaters: smoke, fire, and blood.

---

all drift around the room [image 14]. Visual effects supervisor Jon Thum explains how sparkles were added to float around and “make it feel otherworldly.” While the deceleration of time is the most striking and effective aesthetic tool, a great mix of negative parallax and traditional filmmaking elements like color saturation enhances this scene’s visual power even further. In her analysis of the film, Miriam Ross notices how “Dredd changes the entire mise-en-scène to reflect an entirely different perception of the world brought about by the drug use.” She adds that although she did not feel as if on a trip herself, the effects did leave her with “a heightened bodily experience that wasn't available in the other scenes in the film.” Both the actual impact of the bullets in characters’ bodies and the effect of the Slo-Mo drug are presented with a certain ‘lyricism and awe’, while they would traditionally be depicted through quick shock. Rapid shots at normal speed that show Dredd firing his gun are alternated with the slow-motion shots of his victims. This emphasizes their different perception of the world around them. The floating elements in negative parallax may suck the viewer into the expanded screen, but function most strongly to illustrate the distorted world of the drug addicts. The dialed down tempo and saturated look of the scene also heighten the impact of what follows: the rest of this sequence is depicted as a raw gunfight, without slow motion and floating elements.

Image 14: a. Two Slo-Mo addicts take a hit, colors saturate.

---


b. Dredd and Anderson burst through the door in slow motion.

c. The blast from the door distorts a bad guy’s body.

d. Blood and sparkling elements float around the 3D space.
The Slo-Mo sequences are the main strength of Dredd's 3D use. Therefore, it is no surprise that the final scene follows the same aesthetic. Dredd administers a shot of Slo-Mo to villain Ma-Ma before he kills her. Both the motif of the drug and the height of the building come together here as she is thrown down the top floor. Our sense of vertigo might be heightened when looking down because of the strong positive parallax, and because we have already been introduced to the height of the building several times before. At the beginning of the film, Dredd even showed a similar kill. We enter Ma-Ma's point of view as she looks at Dredd while falling down the depths of Peach Trees. Shattered pieces of glass in negative parallax and a slowed down image add to the drama of her floating toward us in the theater space [image 15].

**Image 15:** Villain Ma-Ma is thrown into the depths of Peach Trees on her last Slo-Mo trip. She gets one final look at our hero before she floats toward us, accompanied by pieces of glass.
Then, all of a sudden we are confronted with the traditional screen again: the villain meets her death as she shatters her face on the ‘zero-plane’ of the 3D screen. Blood splatters across the screen and the image blurs out. The villain’s overly dramatic fall in slow motion and 3D might only seem to function as stylistic excess. However, it heightens the shock of this raw and bloody impact [image 16].

**Image 16:**

a. Ma-Ma is about to hit the ground face-first.

b. The screen is leveled with the floor upon her impact.
A shot reminiscent of a 3D close-up on the dial of a watch in *Dial M for Murder* shows us the bomb detonation device that is attached to Ma-Ma’s arm. Just like in Alfred Hitchcok’s film, a close-up on the wrist is used to remind us of an important plot point: in this case, the explosive that threatens to kill all of Peach Trees. In anticipation of the explosion, we look up at the great height of the building that Ma-Ma just fell down from. When the bomb does not go off after all, Dredd declares his power by nodding a satisfied “yeah!” as he stands on the top floor [image 17].

This bomb is a fairly traditional device to create suspense and it is used to round off the narrative. Rather than implementing depth for innovative (visual) storytelling throughout the film, *Dredd* successfully manages to use the 3D to enhance the depiction of the story world. Moreover, it gives the visual style and impact of one recurring narrative element a great boost.

**Image 17:** The watch in *Dial M for Murder* vs. bomb detonator in *Dredd*
b. A satisfied Dredd has conquered the danger.
Three dimensions in Coraline’s two worlds

2009 is widely accepted as the pivotal year for modern 3D cinema because of the release of James Cameron’s Avatar. However, arguably one of the greatest landmarks in stereoscopic animation was released as well: Coraline directed by Henry Selick, the man behind 1993 classic The Nightmare Before Christmas. While big studios like Pixar and Dreamworks have dominated the 3D platform with many successful computer animated pictures in three dimensions, the stop motion animation of Coraline is a spectacular showcase for stereoscopy in its own way. Animation in general is perfectly suited for the technique because filmmakers can exert much greater control over every element of the image; the animated family film “presents a safe arena for 3D.” Filmmakers can test the potential of the process “without fear of driving away high-minded adults,” Higgins argues.\(^{101}\) Coraline benefits greatly from this freedom even though it is not a CGI animation. Each frame is composed and photographed manually, all with the 3D in mind. This brings it somewhat closer to live action 3D and all the challenges that come with shooting stereo on physical sets.\(^{102}\) The film experiments very successfully with applications of the technique that aid the narrative. It distinguishes itself from the fairly ‘safe’ 3D aesthetic that we find in popular computer animation from the last half decade.

Coraline follows the adventures of a young girl that just moved to an old house. We see her struggling with boredom as her parents neglect her. Everything changes when Coraline finds a hidden door that leads to a parallel Other World where everything seems to be a better version of her dull life [image 18]. Here, her new Other Father and Mother finally care for her and the new house seems not so bad after all. However, grotesque-looking creatures suggest that something is off. Her parents now have buttons instead of eyes and try to lure her into staying in the Other World. Coraline uses 3D in combination with masterfully crafted decors and figures to bring the two different worlds to life. The film stays away from obtrusive uses of emergence and nearly all of the film is shown in positive parallax. We already read that positive parallax “is really where the magic of stereoscopy happens.”\(^{103}\) Coraline’s 3D immerses the viewer in the story and literally in a different world.

\(^{101}\) Scott Higgins, “3D in Depth: Coraline, Hugo, and a Sustainable Aesthetic,” Film History 24, no. 2 (2012): 199.

\(^{102}\) Ibid., 200.

\(^{103}\) Klinger, “Beyond Cheap Thrills,” 187.
Instead of extending the screen into the space of the theater, the traditional screen plane seems to be acknowledged. Higgins points out that “Selick could embrace the shoebox diorama effect as an aesthetic choice rather than as a deficiency.” Coraline indeed sometimes evokes the feeling of looking through a screen at figurines in a dollhouse, but this fits the style of the puppets and settings that were used. The film is still able to play with depth creatively in this ‘shoebox’ that extends into the screen. In several instances the visual limit of the story world is equated to the cinema screen, or placed slightly behind it. For example, raindrops or reflections are used to place the window that Coraline is looking through at the screen surface [image 19]. This is part of the film’s ‘depth-oriented aesthetic’ and reveals depth behind the screen. Variations in depth help defamiliarize our stereo view. While depth is quite shallow when Coraline stands in front of a door, our view plunges into a deep room as she opens it. On multiple occasions, the door’s frame is kept in the image by holding on to the shot a little longer before going into the room. This way we see the contrast in depth between foreground and background [image 20].

104 Higgins, “3D in Depth,” 200.
105 Ibid., 202.
**Image 19:** A bored Coraline talks to her normal mother in the background.

**Image 20:** Coraline opens the door to the spacious and colorful kitchen in the Other World.
Variation in depth is an essential part of *Coraline*’s 3D aesthetic. It is tied to the plot, which revolves around the two different worlds. The added depth is used in conjunction with the elements of mise-en-scène to create a different atmosphere in each of the worlds. “From the beginning, we knew the two worlds *Coraline* inhabits – the drab “Real World” and the fantastic “Other World” – would be distorted mirror images of each other, as different in tone as Kansas and Oz,” Director of photography Pete Kozachik explains. “Camera and art departments would create the differences, keeping the emphasis on Coraline’s feelings.” Depth in the normal world was kept shallow by using a low interocular distance. This represents Coraline’s apathy toward her ‘flat’ world. Additionally, conflicting depth cues within a single shot reinforce the feeling that something is off [image 21a]. One could also argue that it works against our sense of immersion. David Bordwell shows examples of images in *Coraline* that are reminiscent of the Japanese tradition of ‘ukiyo-e’ woodblock prints. The “parallel perspective” employed in *Coraline* flips the regular perspective that meets in a certain distant point. Instead it makes the background appear wider than areas in front. To create a stark contrast, the appeal of the Other World is represented through greater depth. Perspective is pushed back to normal and depth cues are consistent [image 21b]. The film plays with our perception to evoke feelings in the viewer similar to Coraline’s. She likes the Other World better; therefore it is given a ‘better’ visual representation. Before shooting, Kozachik and his colleagues experimented with 3D as a tool for creating moods: “We found that a setting receding deeply behind screen creates a sense of space and freedom and is more effective at evoking pleasant feelings than bringing everything out into the theater.” *Coraline* is a perfect example that confirms that 3D is “inextricably bound to world creation” and “establishes mise-en-scène and space through extreme depth cues”. This film goes to great lengths to achieve a 3D aesthetic that is easy to watch but still works in aid of the narrative.

---

108 Kozachik, “2 Worlds in 3 Dimensions.”
Image 21:
a. 3D makes the normal kitchen look flat. Set design makes the perspective look off.

b. The Other Kitchen is colorful, shot with greater depth and from a different angle with normal perspective.
Viewers may not notice the efficient use of 3D because of the positive parallax-heavy look. However, one might argue that Coraline’s play with our perception must be done subconsciously to be effective. Higgins acknowledges this and expects the film to be “perfectly legible in 2D” as well, but nevertheless thinks “[t]he depth-oriented stereo space of Coraline may help point forward to a more sustainable 3D, which in previous waves, has crashed on the rocks of protrusion.”\(^{110}\) Whether viewers will notice the use of positive p

**CONCLUSION**

As we have seen, parallax is the crucial concept in three-dimensional film. It can either be positive and expand the image behind the screen, or emerge onto the negative side of the 3D screen’s z-axis. While the pop-out effect most strongly typifies stereoscopic film, negative parallax also has the ‘bad reputation’ of a gimmick and obtrusive element. Positive parallax helps in creating deep story worlds. Each has its own cinematic heritage, and both types of parallax have specific uses that can either aid, or, particularly in the case of negative parallax, disturb a film’s narrative. The problematic duality that is evident in the notion of parallax has been pointed out above. As their names suggest, negative and positive parallax seem to contradict each other. Both have their own function and each triggers a different response in the viewer. Several authors even suggest that parallax’ paradoxical nature makes 3D cinema incompatible with standard cinematic narrative and style. Negative parallax in particular endows three-dimensional cinema with a heightened visibility.

Barbara Klinger argues that this does not harm 3D’s aesthetic and storytelling, as it fits within David Bordwell’s notion of ‘intensified continuity’. By looking at four strategies of camerawork and editing, he explains how contemporary blockbuster films do not refuse the rules of classical continuity, but rather intensify them. In this visual regime, classical cinema is “updated by more pervasive principles of audio-visual flamboyance that lend visibility to its typically more invisible style.”\(^{111}\) The total number of shots in a film, for example, has been amped up from 300-700 shots

\(^{110}\) Higgins, “3D in Depth,” 206.

\(^{111}\) Klinger, Beyond Cheap Thrills, 192.
between the 1930s and 1960s, to approximately 3000-4000 shots at the end of the 20th century.112 This first stylistic trait of ‘more rapid editing’ is up for discussion in the context of contemporary 3D cinema, as will be shown in the next chapter. Arguably, stereoscopy opens up possibilities for the second technique of ‘bipolar extremes of lens lengths’. Positive parallax can aid the different planes of depth portrayed by wide-angle lenses and the “shifting compositions in depth” that are created with long lenses would seem like a great fit as well.113 One might expect ‘bi-polar extremes of depth’ to be explored in 3D cinema in addition to the often-used extremes of lens lengths of the intensified continuity style. Especially the ‘free-ranging camera’ can be given new meaning in stereoscopic film. Bordwell mentions today’s “prolonged following shot, where we track a character moving along a lengthy path.”114 Reflecting in the perspective of 3D cinema, thoughts of films like James Cameron’s Avatar instantly come up: in spectacular flight sequences, the camera freely moves around the story world to follow characters’ movements through depth.

The points of contact with intensified continuity, and 3D’s strong embeddedness in contemporary modes of expression in general point out that stereoscopy is not completely incompatible with narrative cinema. Klinger recognizes a place in a “larger, dominant visual aesthetic dedicated to self-conscious hyperbole.”115 This would suggest that 3D is a better fit for contemporary visual standards and less for the filmmaking traditions of the 1950’s. The fact that stereoscopic films from that period are remembered mostly for their emergence effects further insinuates a level of visibility that is ‘less compatible’ with the standards of that time. 3D’s parallax effects in particular seem to adhere to Bordwell’s general observation of “a higher pitch of emphasis” in contemporary Hollywood film.116 Like the intensified continuity style, 3D opens up and prohibits certain filmmaking options. While some parallax effects can certainly harm the cinema experience, we should take note of the author’s closing comments: excessive

113 Ibid., 18.
114 Ibid., 20.
techniques do not prevent us from grasping story content, and “[t]he triumph of intensified continuity reminds us that as styles change, so do viewing skills.”

Keith M. Johnston is right to ask the question “does talk of negative and positive parallax aid or hinder our attempts to describe and talk about the 3-D aesthetic?” Analysis of stereoscopic films usually concentrates very strongly on the use of emergence effects and immersive scenes. While this may seem one-sided, I would argue that this focus is very helpful in dissecting 3D film’s aesthetic. Parallax should be studied because it is essentially what the third dimension adds to the traditional ‘flat’ viewing experience. The examples have shown that 3D will always act, and has to be studied, in accordance with other elements of filmmaking because it is still strongly embedded within the conventions of narrative film.

While *House of Wax* is a 1950s film, it seems to perfectly fit the aesthetic of ‘self-conscious hyperbole’. Any film, classic or contemporary, would probably be harmed by such blatant use of parallax effects. De Toth’s film takes a playful approach to the 3D that is clearly self-conscious as it addresses the paradoxical nature of parallax verbally and visually. The 3D use does stay balanced: positive parallax is employed well to aid the look of the diegesis and the most spectacular emergence effects are limited to narratively unimportant scenes. *Dredd* uses 3D to establish its story world and further illustrated how stereoscopy can work together with mise-en-scène. Its most effective 3D scenes combined the effect with a slowed down image, saturated colors and floating elements. Negative parallax in this film is not obtrusive; it rather aims to give us a taste or even a bodily experience of the Slo-Mo drug, which is an important plot element. In *Coraline* the use of 3D is tied to the film’s narrative even stronger. Positive parallax and image composition subconsciously try to affect our perception to give a sense of the feeling Coraline has in each of both worlds. All three films employ both types of parallax to specific ends and show that 3D can be balanced. While *House of Wax* displays some obvious stereoscopic effects, the 3D aesthetic in none of these films can truly be labeled gimmicky of overtly obtrusive.

---

117 Ibid., 25.
118 “What is the Future of Stereoscopic Media Studies?”
EDITING

The added dimension in the stereoscopic image has implications for all elements of filmmaking; editing is certainly no exception. The topic enjoys plenty discussion and is strongly linked to the way we perceive 3D imagery. Bernard Mendiburu’s practical guide has an extensive chapter on editing, which covers both theoretical issues and the practical side of cutting in three dimensions. He observes that there is still much debate among filmmakers about how 3D films should be cut, but the 3D edit style and pace seem to be “a continuation of the 3D photographic style.” The only consensus the discussion has provided so far is that 3D should be cut a ‘different’ way. This different method is still undefined except for a need for a slower pace of editing, simply because stereo is more difficult to process visually. The reading time for 3D images is longer and on top of that viewers tend to scan a whole scene before going back to the important subject. This explains the aforementioned continuation of the 3D photographic style: more information on screen and slower reading because of 3D photography calls for adjusted editing. Jukka Häkkinen, et al. have conducted experiments that explored the way audiences experience 3D images. Participants were shown a range of content in both stereoscopic and non-stereoscopic form. Besides comments on realism and emotional involvement, there were strong feelings from the subjects about editing as well. Many confirmed the claim that 3D images require a longer reading time by saying it was “stressful to try to grasp all the details” because there was so much more to see. The technique might even have users focus on unimportant aspects of the image, because “[c]omplex natural objects were regarded as interesting and the participants would had liked to have more time to explore them.” The authors conclude that there might in fact be a need to lengthen the duration of shots: “Editing too short scenes might miss the aesthetic potential of stereoscopic contents and create stress for the viewer.”

119 Mendiburu, 3D Moviemaking, 151.
120 Ibid.
121 Jukka Häkkinen et al., “Measuring Stereoscopic Image Quality Experience with Interpretation Based Quality Methodology.” (proc. of IS&T/SPIE’s International Symposium on Electronic Imaging, San Jose, California USA, January 2008), 9.
122 Ibid., 6.
123 Ibid., 9-10.
In line with Roger Ebert’s harsh condemnation of 3D film in general, some authors see this aspect of our perception of the stereoscopic image as a major drawback for editing. To Philip Sandifer, the cut, as a “major semiotic component of film,” is quite problematic in the third dimension: “Because the viewer’s physical position in the theater is relevant to the act of spectatorship, cuts within 3-D films are much more jarring and difficult to follow, as they involve much larger reorientations of space.” Our eyes will struggle with the (extremely) fast editing practice we see nowadays. This means that, among other things, refocusing becomes difficult and certain staples of continuity editing will be unsustainable in 3D: “a major source of semiotic codes for cinema is simply inaccessible to 3-D film,” Sandifer notes. He goes as far as to say that “films are forced into an almost theatrical tableau that is unsatisfyingly composed.” This implies not only consequences for editing, but for staging and shot composition as well.

Besides the increased visual workload for viewers, 3D film editing as a profession is extra sluggish because the dual stream of images causes extra load on editing systems. Real-time response is only possible on recently developed high-end editing stations. Independent filmmakers would therefore have to edit using 2D tools. In the extensive work ‘Foundations of the Stereoscopic Cinema’, written in 1982 by renowned expert on 3D Lenny Lipton, the author mentions such practical problems that come up at the editing table as well. His lack of attention for the implications 3D editing has for the aesthetic potential of the image itself confirm that this has become more of an issue in recent discourse on 3D.

It is important to note that there is no real basis for the study or teaching of 3D editing. Stereoscopy has been present in the mainstream cinema several times before, but only for very short periods of time. Therefore no distinctive editing practice seems to have ever gotten off the ground. Editing experience from theme park rides or epic 3D IMAX projects would also seem of very little use for the editing of contemporary narrative dramas. Our editing culture has shifted rapidly from classical practices to the so-called ‘MTV generation’ with its complex image

---

124 Sandifer, “3-D Film as demo,” 73.
125 Ibid., 73-74.
126 Mendiburu, 3D Moviemaking, 165.
compositions, and fast-paced edit rhythm. On top of that, many of the recent three-dimensional pictures were originally 2D and got converted to 3D at the last minute in post-production. Bernard Mendiburu admits that these factors make it "really hard to have an honestly definitive opinion on 3D editing." Now that stereoscopy has been able to establish a presence in mainstream cinema for a longer period of time, the organization of camera takes is given more thorough consideration.

The debate about editing in 3D is still very much open as the stereoscopic grammar itself keeps developing. Mendiburu explains that there now seem to be basically two options: "You will either adapt the edit to the depth or adapt the depth to the edit." The first option entails editing in 2D, following ‘2D rules’, after which a 3D version is generated and checked to make sure the depth in the image has sufficient continuity. This method is ‘not to be frowned on’ because this way filmmakers are not hampered by the limitations of stereoscopy while shooting. The second possibility always checks the image in 3D. When depth is limited, the edit can be done according to 2D rules. When the image has a ‘strong 3D character’, it is dealt with in a way specific to stereoscopy. The 3D can be ‘strong’ in multiple ways. When parallax is strong, the editor should make sure the audience is “physiologically able to follow the filmmaker’s visual discourse in 3D.” It is essential to prevent exhaustion of the eyes by keeping the points of convergence from changing too greatly and rapidly. Additionally, a 3D image can be strong because it conveys more emotional content through the third dimension. The presence of depth can make shots all the more dramatic, which may simply force directors to slow down their pace of editing to preserve impact. Pictures that ‘read’ differently should be edited differently as well.

In 3D, all continuities a movie editor normally has to consider are now reinforced by added depth. A cut between shots will be disruptive to the suspension of disbelief if the amount of depth in shot one is very different from that in shot two. Shots have to be ‘matched’ so that viewers will “immediately fuse in 3D the incoming

128 Mendiburu, 3D Moviemaking, 26.
129 Ibid., 152.
130 Ibid., 151.
131 Ibid., 152.
132 Ibid., 153.
A cut from a wide shot that goes behind the screen to an emerging close-up can be as jarring as a two-dimensional jump cut, because viewers will lose 3D perception until they have adjusted to the new point of convergence.

**Sound editing**

A quick mention should be made of sound editing in stereoscopic film. Of course, audio was ‘three-dimensional’ before our current digital 3D pictures. Left, center and front screen channels have made place for multichannel surround sound, which in some cases may have up to ten speakers and two subwoofers. Asselin and Gosselin note that “sound technologies – with the appearance of stereophonic sound, surround sound, binaural recording and ambiophonic – have surpassed image technologies in situating users egocentrically, in the heart of the representation.” This ‘historical gap’ is evident in the cinema, where the 360-degrees possibilities of surround sound are not used to their full potential and sound stays too much in front of the viewer, they argue. The 3D image presents a ‘sound-image relationship’ that is different from our tradition of fitting a 2D world into a surrounding aural space. This new relationship has not been fully explored yet and presents a number of problems that may not be noticed by most viewers. First of all, the 3D image’s ‘comfort zone’ occupies the space of a triangle that tapers beyond the screen, while multichannel surround sound is constrained to the rectangular space of the movie theater. Sound may therefore originate from a source in front of, instead of equivalent to, the image. Also, instead of having a properly balanced surround mix, some 3D audio tracks seem to emphasize front-to-back effects just like gimmicky 3D effects. Because filmmakers are still exploring the visual side of stereoscopic filmmaking, it is obvious that even bigger steps can still be made in the sound department. A suitable mix of sound that is specifically adapted to the 3D imagery can only add to the immersive worlds that are created in three-dimensional films.

---

133 Ibid., 153.
134 Asselin & Gosselin, “This Side of Paradise,” 138.
Possible new styles

William Brown expresses many critics’ objections to contemporary 3D editing practices by suggesting that “the perceived failure of 3D cinema is not because 3D is inferior, but because too often filmmakers apply the ‘intensified continuity’ aesthetic that is so successful for 2D cinema to a 3D cinema to which it is not suited.” Instead, he argues, 3D cinema should favor the long take as it is a cinema that works well with a slower rhythm of cutting, which “allows time to come to the fore.”\(^\text{136}\) He carries his argument as far as to compare it to Italian neorealist cinema, as a cinema that ‘rejects the cut’. Elsaesser also repeatedly brings up the ‘temporal dimension’,\(^\text{137}\) as he sees 3D as one element in a process “that is changing our sense of spatial and temporal orientation” (emphasis added).\(^\text{138}\) We can easily establish that stereoscopy is still widely applied to blockbuster projects and follows the dominant mode of filmmaking. Brown instead sees opportunities for 3D as a tool that justifies slower ‘art house’ aesthetics.\(^\text{139}\)

\(^{136}\) “William Brown Research Provocation.”


\(^{138}\) Ibid., 221.

\(^{139}\) “William Brown Research Provocation.”
**Bazin and montage in 3D**

In the epilogue of his extensive book ‘3-D Revolution’, the reference book on modern stereoscopic cinema, Ray Zone dedicates a paragraph to what he calls ‘evolutionary montage’. Barbara Klinger already mentioned deep focus filmmaking as part of the heritage of positive parallax; Elsaesser and Paul, among others, also make the connection to this style of filmmaking.\(^{140}\) It entails shooting the action within one framing without resorting to montage, thereby greatly reducing the overall number of shots. Zone refers to this technique, and especially André Bazin’s thoughts on it, to suggest a possible future aesthetic. The title of the subsection in Zone’s book clearly is a direct reference to the seminal essay ‘The Evolution of the Language of Cinema’, by the French film critic and scholar. Bazin focuses on filmmakers who changed the grammar of the cinema of their time and used their own strategies to represent depth. Orson Welles’ 1941 debut *Citizen Kane* as the prime example, challenged the common fashion of editing, namely the standardized style of silent film editing. Silent film made use of montage or rapid intercutting as seen in films by D.W. Griffith and later Soviet works in the 1920’s.\(^{141}\) Bazin classifies silent filmmakers that relied on montage as “directors who put faith in the image,” as opposed to filmmakers from the 1940s “put their faith in reality.”\(^{142}\) His general point is thus that shooting in depth achieves much greater cinematic realism than would be possible through heavy use of montage: “depth of focus brings the spectator into a relation with the image closer to that which he enjoys with reality.” At the same time, the viewer is forced to have a “more active mental attitude” when looking at a shot. Montage instead lets the director decide what the viewer pays attention to, leaving no room for ambiguous interpretations of the meaning in an image.\(^{143}\)

Deep focus is often accompanied by staging in deep space. Zone is another example of an author that thinks the way to go for three-dimensional filmmaking grammar is to evolve into a slower-paced style with fewer cuts, that lets the action

---

Klinger, “Beyond Cheap Thrills,” 188.
Zone, *3-D Revolution*, 398.


\(^{143}\) Ibid., 35.
unfold in depth. As two-dimensional film has always used effective visual strategies to convey depth in flat images, a true need for stereoscopic imagery in narrative cinema was prevented. The monocular depth cues worked fine in representing spatial worlds on the flat screen, even in combination with selective focus and narrow depth of field. While filmmakers previously relied on two-dimensional strategies such as camera motion (horizontal, vertical and on the x-axis), lighting and monocular depth cues, “thanks to the depth of field, whole scenes are covered in one take, the camera remaining motionless.” Now, “[d]ramatic effects for which we had formerly relied on montage were created out of the movements of the actors within a fixed framework.” Deep focus photography allows for greater realism in the sense of continuity of dramatic space and time. The connection between 3D and Bazin’s montage theory is easily made because stereoscopy creates illusionary layers of depth on the screen. These ‘layers in depth’ are exactly where the action takes place in deep focus filmmaking.

While Zone comments that he does not want to claim traditional editing has no place at all in stereoscopic cinema, he does imply that Wellesian compositions offer inspiration for 3D filmmaking:

“These thoughts offer rich implications for the stereoscopic filmmaker at a time when cinema is reinventing itself on the z-axis. As the tools for production, postproduction, and exhibition of stereoscopic narratives become increasingly transparent and standardized in the motion picture industry of the twenty-first century, new genres and narrative modes will evolve. Technology is laying the groundwork for z-axis grammar and a new syntax that will be articulated in visual space, both behind the screen and in the room with the audience.”

Bazin’s thoughts are very relevant in the context of stereoscopic filmmaking. The 3D technique opens up to depth and also tries to bring the spectator “into a relation with the image closer to that which he enjoys with reality,” simply because 3D combines

---

144 Zone, 3-D Revolution, 398.
146 Ibid., 34.
147 Zone, 3-D Revolution, 399-400.
two separate images just like our natural perception. There is no denying that the depth planes in 3D seem to facilitate a possible return to a slower paced editing and a more utilized staging in depth. A welcome bonus is that the longer takes in deep focus automatically take account of the extended reading time of 3D images. But rather than taking this as the only way to go for the stereoscopic aesthetic, I would argue that Bazin’s views should function as a stimulus for similar creative development in styles of 3D photography and editing. His thoughts offer implications for stereoscopic filmmakers, as Zone stated. It is too harsh to say 3D cinema is forced into this style because of its own limitations.

In fact, cutting in three dimensions may not be as extremely problematic as discourse suggests. An example of experimental reediting on Kung Fu Panda (2008) by Dreamworks animator Phil McNally demonstrates a different option, as he shows that “3D can be cut just as fast, if you think 3D from end to end.” After converting the images from 2D to 3D, points of cutting were altered and some editing decisions needed to be changed altogether in order to maintain the impact of 3D and keep an image that is pleasant to watch. However, McNally was able to keep the number of shots and overall cutting speed the same as in the 2D fragment of Kung Fu Panda. This suggests that, different from general opinion, fast editing or an ‘intensified’ style is not impossible to achieve with the 3D technique. The dominant aesthetic of contemporary stereoscopic films also confirms that a widespread switch to new compositions or editing practices has not been made.

A solution to disturbing cuts is the ‘active depth cut’. Filmmakers may want to cut from a figure emerging from the screen to a deep landscape in negative parallax. In the first shot, which employs positive parallax, viewers converge at a point in front of the screen. In the active depth cut, this point is moved back to the screen plane before cutting to the next shot. In the ‘deeper’ shot that follows, the convergence point gradually moves to the correct position behind the screen plane. Audiences will not notice the reconvergence of their eyes when this technique is carried out at the right speed and such active cuts even “generate a feeling of a faster edit. This compensates for the often slower pace of 3D cuts.”

149 Mendiburu, 3D Moviemaking, 153.
150 Ibid., 154.
3D editing can be used with a purpose as well. A ‘forward jump cut’ suddenly switches from a convergence point behind the screen to one close to the viewer. This abrupt change can be used as a disturbance effect as the viewer is now confronted with a nearby image. The opposite ‘backward jump cut’ switches to a shot with a convergence point further away from the viewer. This technique will be less disturbing, but can deliver an “unexpected opening on a landscape” or “a feeling of vertigo”.\textsuperscript{151} Mendiburu also touches on other transitions than clean cuts. An example that he thinks works particularly well in 3D is the cross-fade. When both shots occupy the same depth area, objects or characters from the new shot will appear to materialize inside the setting that is fading out. This creates a stronger continuity feeling between the two shots than in a regular 2D cross-fade. Not all techniques are applicable in 3D. Tools like split-screen effects are possible in stereo, but require both sides of the split to be in the same depth area as they will otherwise be very disturbing.\textsuperscript{152}

As various authors have already pointed out that 3D film is still very strongly embedded within traditional editing practices, it is to be expected that even though stereoscopy has been back in the mainstream for a while now, filmmakers have not utilized the possibilities of editing in the third dimension to the fullest. In his text on intensified continuity, David Bordwell asks: “Everybody thinks that movies are being cut faster now, but how fast is fast? And faster compared to what?”\textsuperscript{153} In the case of 3D we might wonder: “Everybody thinks that 3D movies are being cut slower now, but how slow is slow?” Are 3D movies actually cut slower compared to contemporary flat pictures, and should they even be? A ‘three-dimensional Citizen Kane’ of our current digital 3D era is yet to come. Comparisons to deep focus filmmaking are easily made, but compositions in 3D and staging in deep space are quite different. Directors get an extra space in front of and behind the screen to deal with. The following examples will show how the alleged problematic editing is handled in practice.

\textsuperscript{151} Ibid.
\textsuperscript{152} Ibid., 154-155.
\textsuperscript{153} Bordwell, “Intensified Continuity,” 16.
EXAMPLES

Viewer identification in Dial M for Murder

Alfred Hitchcock’s Dial M for Murder is probably one of very few films from the 1950s 3D boom that is still being watched and widely appreciated. The majority of people have seen it in a flat version, even during its release in 1954. Several stereoscopic pictures were doing quite well at the box office right before the film went into production. Therefore, the 3D boom seemed to still be going strong. Dial M’s time of release was very unfortunate however, as 3D was just announced dead in a Variety article three days earlier.154 A limited amount of theaters showed it in its intended 3D format, while other venues took advantage of the fact that people were done with the technique: they promoted the fact that people could see it in 2D without glasses. A 3D Blu-Ray version is now available for everyone to experience the film in its original format. The film’s implementation of stereoscopy has stood the test of time just as well as its gripping narrative. Dial M is plagued by the myth that Hitchcock was unwilling to use 3D. Many believe the master of suspense was in fact forced to use the technique at the last minute. Furmanek stresses that the director was open to new technologies:

“Hitchcock was not known for backing away from new technology: on the contrary, he had a history of using special effects, exploring rear-screen projection, matte, and other techniques that enabled him to present his material in unusual ways. In DIAL M, he handled 3-D in his own masterful style. Every shot was carefully composed so that, with proper camera movement and very precise convergence, virtually error-free 3-D was achieved. Hitchcock’s daring use of unusual techniques makes this a landmark 3-D film.”155

This film offers rich examples in different problematic area’s of 3D filmmaking. Even though Hitchcock expressed how ‘marvelous’ 3D would be for “tricks like squirting

155 “An In-Depth Look at DIAL M FOR MURDER.”
water into the audience.” Dial M for Murder uses negative parallax in a very restrained way [image 23]. Emergence effects function as “the cinematic equivalent of the exclamation point in language”; it is limited to important narrative devices (close-ups of emerging keys) or dramatic high points (an emerging hand of a murder victim) [image 3 & 24]. Like Philip Sandifer feared “films are forced into an almost theatrical tableau that is unsatisfyingly composed,” Alfred Hitchcock expected a return to theater aesthetics because of the limitations of the technique during that time [image 23]. It is probably no coincidence that Dial M is an adaptation of a stage play. The film was celebrated for the way stereoscopy aided it’s aesthetic without resorting to the gimmicky 3D that was often seen in the fifties. In a Hollywood Reporter review from April 27, 1954 it is called “one of the few films in which 3-D is a decided asset, even though not a single audience-participation gimmick is used. The extra-dimension, coupled with the way Hitchcock uses the camera, gives the impression that one is sitting in a theatre watching a stage play.” Even though Hitchcock’s legendary storytelling makes Dial M highly engaging ‘even’ in 2D, I would like to focus on the way editing, and most of all, composition in 3D helps the narrative. The film is able to deliver a feeling of depth and movement in a very confined and intimate setting.

Image 23: Hitchcock thoughts on 3D

---

156 Ibid.
158 Sandifer, “3-D Film as demo,” 73-74.
159 “An In-Depth Look at DIAL M FOR MURDER.”
160 Ibid.
Dial M for Murder stays close to its stage original with respect to setting: the main décor is an apartment. The camera rarely leaves the room and scenes outside the house are exceptional. Hitchcock has confined his plots to such limited settings before in Lifeboat (1944) and Rope (1948), and in the same year in Rear Window (1954). “Dial M can look like a retreat,” David Bordwell argues, because the previous examples are much more extreme in their own ways: a lifeboat is one of the most cramped spaces possible, and Rope used ‘one’ extremely long take. Dial M for Murder briefly expands to other settings and its long takes are not consistent. While some shots are up to a minute long, they average less than ten seconds. Long takes are used effectively in some instances, but the film adheres to the standards of its time regarding average shot length. It does deviate from the common aesthetic by offering a filmed theatre look that is enhanced by compositions in depth in a narrow setting.

The film tells the story of a murder plot initiated by ex-tennis player Tony (Ray Milland) to inherit his wife Margot’s (Grace Kelly) fortune. Tony knew of his wife’s affair and blackmails the character named Swann, whom he knew from college, to murder Margot. While we would expect to feel most sympathy for the wife throughout the film, character identification does not seem to be limited to one person, but instead changes between different protagonists. Sheldon Hall notes how

---


162 Ibid.
“identification is passed around, or parceled out, to the figures most suited to the plot’s dramatic requirements.” A certain distance from the characters is necessary to achieve this passing around of identification. It certainly helps that each character is a victim and a villain at the same time. Tony is being cheated on, but wants to kill his wife for her money. Conversely, Margot looks like an innocent and beautiful woman that is going to be the victim of a crime, while after all she cheated on her husband while he was on tour playing tennis. Swann is the victim of blackmail but still agrees to carry through a horrible murder plan. At specific moments, any character may gain the audience’s support. Hall dismisses the claim that the film’s appeal is the experience of what it is like to be a murderer because the audience would identify with the villain. Identification is more narratively driven than mere emotionally or psychologically: characters are used to act out or explain elements of the narrative for the audience. For example: In once scene Hitchcock lets the audience follow Swann, but only to let him go through the features of the apartment that are crucial to the murder plan. Identification, visually and emotionally, shifts between villains and victims all the time, following the narrative’s unfolding logic. Pleasure in Dial M for Murder is derived from seeing the murder plan unfold, or rather, seeing Hitchcock’s suspenseful puzzle fall into place.

The composition of shots in depth further prevents strong character identification. Hitchcock shuns any type of real 3D gimmickry and instead uses the multiple depth planes offered by the third dimension to evoke a feeling of depth in a cramped setting. The set is well lit and mostly in focus. Numerous shots contain objects, mostly lampshades, which are conveniently placed on the foreground. This is one of the recurring compositional choices in the film’s aesthetic. The somewhat obtrusive objects suggest depth in the scene but can also be seen as emphasizing the gap between the camera and the space of action. Thereby shielding the space between viewer and characters and limiting our spatial immersion. In one scene, a lamp in the foreground shortly blocks out Swann [image 25]. Hall sees this as a device to make viewers focus on the plot: “Ultimately, it introduces an imaginative distance from all the film’s characters in favour of an awareness of the plot, and the

163 Sheldon Hall, “Dial M for Murder,” Film History 16, no. 3 (2004): 244.
164 Ibid., 244.
whole film, as a mechanism for the production of suspense." Selective identification becomes apparent in the film’s camera movement and editing as well. In one scene we see Margot answering a phone call from her husband. The camera slowly moves behind her to present us Swann’s point of view as he is about to kill her. This point of view lasts only very briefly though. The identification with Swann’s view is quickly abandoned for a less subjective shot that best displays the attack [image 26].

Image 25: A lampshade awkwardly blocks out Swann as he walks by.

165 Ibid., 246.
While many compliment the intricate and interesting plot, to Hall the film’s formal strength is most praiseworthy: “The sheer precision of Hitchcock’s camera placement and cutting, his careful exploitation of space and vision, the delicacy with which the viewer’s attention to dialogue and mise-en-scène is sustained and controlled.”

Dial M’s plot is what makes the film great in any format, but the added dimension visually pushes its narrative power further. The composition in 3D helps the viewer to become better aware of the space in the apartment and limits the audience’s emotional involvement. However, not everyone agrees with Hall’s reading, in which Hitchcock is assumed to deliberately block stereoscopy’s power to create an immersive space. Stereographer Alonso Homs comments that the director’s use of stereo “helped put the audience into that cramped space,” and adds that the 3D and composition of set pieces also “made the characters emotionally more accessible because we are better able to read their motivation.”

I would also argue that we do sympathize somewhat stronger with female protagonist Margot. Even though she has her flaws, she is still the victim of (an attempt at) the worst possible crime. On top of

---

166 Ibid., 254.
167 Pennington and Giardina, Exploring 3D, 194.
that, it is the beautiful Grace Kelly who portrays the character. In the sequence of Margot’s trial, instead of showing her in an actual courtroom, Hitchcock stays in the space of the apartment and presents us with her face; therefore, automatically showing her emotion. This sequence can be described as a “remarkable passage of mental subjectivity reminiscent of 1940s montage sequences.” Even though the 3D composition allegedly creates distance, we might still be inclined to identify with Kelly’s character the most.

In several instances, the added depth enables Hitchcock to let the action revolve in the space of the room without cutting, but Dial M’s aesthetic does not signal a return to true staging in deep space. David Bordwell rightfully notes that the 2D version of Dial M is ‘crisper’ than the 3D original, probably because only one of both negatives from the dual camera was used. Hitchcock in fact used focus quite selectively. Composition is done along many layers of depth, but not all planes stay in focus. It was also hard to achieve such extreme arrangements in depth as in true deep focus style. 3D cameras in 1954 did not allow for the foreground to be very close to the lens. The wide 35mm lens often had to be dropped for a 50mm one. This makes that composition in Dial M for Murder is done somewhat in depth, but within the confines of a quite shallow set. The film’s composition and pace might still be of inspiration for modern 3D filmmakers. Barrie M. Osborne, executive producer on The Great Gatsby (2013), was convinced of the power of stereo after watching Hitchcock’s film: “You experience the interactions of other actors in a scene. Instead of cutting in coverage Hitchcock created more dramatic impact simply by holding on the shot,” he remarks. “The 3D heightened the dramatic tension that you felt for the characters and the situation.” Sandifer expected all 3D films to look like a ‘theatrical tableau’ because of the limitations in editing. Dial M deliberately looks and feels like a stage play, but still is all but ‘unsatisfyingly composed’.

It is a shame that Dial M was released when the 1950s 3D boom had already ended. Alfred Hitchcock never got to shoot any other pictures in stereo. His sole attempt turned out well, but clearly the star in Dial M is the plot. The director’s use of stereo is pleasant on the eyes. Because the film is confined to a small setting, cuts

---

168 David Bordwell, “DIAL M FOR MURDER.”
169 Ibid.
170 Ibid.
171 Pennington and Giardina, Exploring 3D, 193.
do not present severe shifts in depth. It would have been interesting to see how Hitchcock would have developed his use the technique in a different project.

*Gravity: a slower pace in outer space*

The 3D film with possibly the most critical acclaim to date is Alfonso Cuarón’s *Gravity*. In 2013, this picture gave us a taste of what is possible when 3D is combined with a slower paced style. The performances by Sandra Bullock and George Clooney were praised, as well as the technical expertise behind the production. Nearly all of the film is set in weightless outer space. Unlike Hitchcock’s single-setting *Dial M for Murder*, *Gravity* is able to achieve *maximum aesthetic* and emotional impact with a very *minimal plot*: inexperienced astronaut Ryan Stone (Bullock) has to execute an undefined repair on a spacecraft with colleagues Shariff and the retiring Kowalski (Clooney). Disaster hits when a cloud of debris smashes into their shuttle, sending the two main characters, Stone and Kowalski, adrift in space. The remainder of the film is a struggle to return home safely and features very little backstory on any of the characters. To Kristin Thompson, the treatment of space and camera movement evokes the feeling of experimental film. Audiences accept this because “it is so well motivated by the story and situation,” however simple those may be. Her laconic conclusion on *Gravity*’s narrative structure: “It all worked.”

*Gravity* has extremely few shots: 206 in 83 minutes, which results in an average shot length slightly longer than 24 seconds. This number is dwarfed by another outer-space film: *Star Trek Into Darkness* (2013). J.J. Abrams’ film has more than 2000 shots in a little more than 120 minutes. Cuarón uses very long takes and editing is often done seamlessly. He immediately displays the epitome of this style at the beginning of the film. This already-famous opening sequence is an extremely long uninterrupted run of the camera that introduces us to the characters and plot. The first cut is made after 13 minutes.

---


Gravity begins with a shot of Earth and sound of communications with the NASA base before the protagonists’ spacecraft slowly enters the image. Clooney’s character moves toward us in a fluent motion and the ‘repair sequence’ begins [image 27]. The camera moves closer to Dr. Stone as she is working on the craft’s system board. Kowalski joins her and ground control Houston informs them of some innocent debris floating around space. The two are shown trying to complete their task in a medium close-up shot with the Earth as backdrop.

**Image 27: a.** The spacecraft enters the shot upside down in the distance.

![Image 27: a.](image_url)

**b.** Kowalski flies toward and past us.

![Image 27: b.](image_url)

- Speaking of which, did I ever tell you—

  CONTROL: We know the Corvette story.
c. He then moves in to help Stone with the repairs.

The mood becomes very lighthearted: the camera moves to show beautiful shots of our planet and ambient music plays in the background. Kowalski is joking around and colleague Shariff is fooling around in the background of a shot [image 28]. When suddenly the 'mission abort!' command is communicated, the movement of the camera through space increases and speeds up. The music intensifies as our main characters try to get away. One particular shot in this long take shows great staging in depth: Bullock and Clooney’s characters are interacting in the foreground while Shariff is suddenly hit and killed by a piece of deadly debris in the background. There is no cut to move us closer to this significant piece of action. The astronaut’s death is suggested as we see his lifeless body pulling the cord that connects him to the spaceship, but only later we see how badly his face has been wounded [image 29].

Image 28:

a. Clooney with the beautiful Earth as backdrop: “You can't beat the view.”
b. Kowalski and Dr. Stone happily working together. The 3D effect again places Earth way in the background.

c. The two colleagues are aligned in the foreground while Shariff fools around in the back of the shot.

Image 29:

a. From a cheerful sequence to “mission abort!”
b. Shariff is killed, but stays in the background.

By now, the 3D space is filled with pieces of debris floating around or passing by at high speed. The mechanical arm Stone was attached to is cut loose from the space shuttle and she starts swinging around at high speed. She is portrayed in long-shot in front of a background of Earth, which gives us a point of reference in the vast space. She is swung closer and further away from us; Thompson describes how the camera then “attaches” itself to her, which brings her in medium close-up shot [image 30].

\[174\]

Ibid.
Image 30:

a. Dr. Stone stays attached to the mechanical arm.

![Dr. Stone staying attached to the mechanical arm](image)

b. The camera sticks to Stone.

![The camera sticking to Stone](image)

This lets us spin with her and visually increases the gravity of her situation. The background alternates the distant Earth with the even vaster blackness of space. We are now able to see her facial expression and also get a better view of her attempts at untying herself. When she detaches herself from the arm, the camera is cut loose as well. We now see her floating far away into the deep black space. Cuarón then makes the first cut to a shot of Stone floating toward us.
The film seems to match the conceptions about editing and composition in 3D that were explored earlier. Stereo supervisor Chris Parks explains how the long takes greatly helped him in his use of 3D:

“They don’t distract you, they involve you more in the film. But it also allows me, in charge of the 3D, to control the 3D through a single shot. Every time you have a cut, it takes you a couple of seconds to get back in the 3D. In quick cuts you lose a lot of the depth. In long shots you can appreciate the 3D… appreciate the depth. And you can moderate the depth over it.”

Disturbing cuts are a thing of the past because of Gravity’s slow-paced style: the “reorientations of space” Sandifer spoke of are no longer a problem because the long takes allow depth to be controlled within a shot. Our eyes can perfectly adjust to the smoothly changing points of convergence. Cuarón moves away from the rapid editing seen in intensified continuity style and instead turns to the ‘free-ranging camera’ completely. While the first scene is one extremely long take, it is comprised of many different shots. Dynamic camera movements through 3D space define the film’s aesthetic and they actually function as cuts that set up new shots. This detaches Gravity from traditional deep space photography that normally would let the action revolve in different static planes of depth.

Different shots also makes for different compositions. In the 13-minute opener, compositions and amount of depth change all the time. Earlier on we see characters aligned in depth, set against the background of their spacecraft. When we see Sharif in the background, for example, all the elements are visible in clear focus. This is alternated with shots that show Stone and Kowalski framed medium or close in front of the distant Earth or the stars in infinite black space. When Sandra Bullock’s character drifts in isolation she is cut off from any other reference points in the endless space around her. Right after the first cut, the camera again sticks to Stone as she comes closer and spins around. The camera moves in to extreme close-up of her face and then switches to her POV [image 31].

---

175 3DCreativeSummit, “Chris Parks on 3D Techniques used in Gravity @ 3DCS 2014,” accessed 10 April 2014, https://www.youtube.com/watch?v=QNMIRnMDgBs.
176 Sandifer, “3-D Film as demo,” 73.

b. The camera has moved in to close-up.

c. One slow camera motion then moves to Stone’s POV through her helmet, revealing the low level of oxygen in her suit.
Throughout the film Cuarón is able to switch between objective and subjective shots without cutting. Cinematographer Emmanuel Lubezki clarifies this method: “We use that throughout the movie a couple of times. It’s very immersive and immediate and it makes you really go into the world and the head of the characters.”\(^{177}\) The viewer gets a claustrophobic feeling by looking through the glass of Stone’s helmet. Finally Kowalski finds her and the next cut is a whole six minutes later.

It is important to note that the long take is a signature device in Cuarón’s style. This is visible in *Y tu mamá también* (2001), *Children of Men* (2006) and even his Harry Potter film. *Gravity* would probably have been cut slow even if it was shot in traditional 2D. Still, it dares to combine an exciting new technology with a seemingly much less innovative way of cutting. As scholars expected, the slower pacing takes away many of the complications of editing in 3D. The dynamic camera movements and limited narrative scope, however, suggest a more experimental approach that was mentioned before by Kristin Thompson. She identifies the many different shots within one take, which she calls ‘elastic shots’, as a true innovation in Cuarón’s visual mode of operation.\(^{178}\) At the same time the outer space setting is a great fit that gets a better representation in three dimensions. For example, the technique makes for more believable images when a character drifts in endless black space. Monoscopic depth cues are lacking and the image might have looked much flatter without stereo. The director was able to take inspiration from IMAX documentary films and Discovery shows to make *Gravity* as “photo-real and as scientifically accurate as possible.”\(^{179}\) This signals a move toward realism that is often theorized about in studies of 3D. In Ian Christie’s words: “Gravity has taken us into new realms, where a ‘realist’ (though highly contrived) version of outer space that would surely have intrigued Bazin gives audiences a new sense of filmic space, reviving and extending the cinematic experience.”\(^{180}\) *Gravity* might be the closest attempt to achieve a ‘3D Citizen Kane’ in

---


178 Thompson, “GRAVITY, Part 2.”


the sense that it offers a new approach to cutting and composition. It certainly is a perfect example that seems to take inspiration from Bazin’s notions on montage. I argued before that his thoughts should only function as a stimulus for development of new 3D editing styles. *Gravity* shows that taking *certain* elements from deep focus photography may indeed work very well. We have yet to see a film immerse its viewers so effectively by letting its audience linger on the 3D.

**CONCLUSION**

Discourse assumes that the editing of stereoscopic images is highly problematic. The empirical research by Häkkinen, et al showed that the reading time for 3D is definitely longer than for flat images. Viewers have to converge their eyes after each cut and the three-dimensional image also offers extra visual information. Several authors argue that the 3D effect is not suited for contemporary editing practices because cuts will be too disruptive. Research on editing mostly focuses on the ‘inability’ of the human visual system to process quick successions of 3D images with conflicting amounts of depth. Scholars and critics use this to dismiss the 3D technique as an inevitable failure, while studying the editing practice of existing stereoscopic pictures would show them that most films are perfectly legible. Others assume 3D should move away from the intensified form of continuity editing. Cutting at a slower pace would then make up for 3D’s longer reading time. This also allows for possible new styles of editing and staging. Ray Zone, among others, sees the slower editing and staging in depth from the tradition of deep focus filmmaking as a source of inspiration for 3D pictures. Mendiburu showed several solutions that enable 3D films to maintain contemporary editing pace.

Alfred Hitchcock’s *Dial M for Murder* was praised for its compositions and editing. It clearly has a slower pace than we are used to today, but the film has an average shot length that perfectly fits the editing conventions of its time. *Dial M* uses objects to create compositions on the different planes of the 3D image. Hall argued that the objects in the foreground in fact shut off the viewer. Immersion is prevented to keep the audience from identifying too strongly with the characters. Hitchcock allegedly chose a theatrical composition in depth to direct attention to the film’s key narrative element: the intricate murder plot. The film uses longer takes to let the
action play out in depth on several occasions. However, staging in depth is not a recurring part of its aesthetic.

In contrast to Alfred Hitchcock, Alfonso Cuarón relied very little on the power of his film’s plot. *Gravity*’s narrative is minimal but effective. The film, instead of presenting an intricate story, relies on a very slow pace and great camera movements in space. The 13 minute long opening take is an impressive display of filmmaking. Like in the deep focus tradition, action often unfolds in deep compositions. However, the static camera is interchanged for a camera that dynamically moves through 3D depth to establish new compositions. By creating shots within one take, *Gravity* has complete control over the three-dimensional effect. The factors in the technology or our perception that complicate editing are smoothed out. While Cuarón was already known for his long takes, he has adjusted his style to something that can be of inspiration for future 3D films.

A few exceptions aside, we can conclude that three-dimensional movies are not cut slower. *House of Wax* and *Dial M for Murder* both have an average shot length slightly under 10 seconds, which is normal for films from the 1950s. Most contemporary pictures show no real move away from the rapid editing seen in the intensified continuity style. *Dredd*, *Coraline* and *Hugo*, which will be studied in the next chapter, all have an average shot length of around four seconds.181 3D films simply still mostly follow ‘2D rules’ and therefore do not explore and realize the possibilities of new editing practices. *Gravity* was able to drop the intense editing tempo, while the camera still somewhat follows the tendency “to move very frequently, picking out one detail after another.”182 Jesko Jockenhövel has linked contemporary blockbuster aesthetic and narrative strategies to the ‘montage controversy’ of 3D that was explored in the above. Films often combine expansive spectacle with rapidly cut and “tightly framed explosive-montage-impact effects.”183 The first may offer impressive wide views of the story world, while the latter is used in intense action sequences. Using *Avatar* as an example, the author assumes the 3D

---


depth plays a much bigger role in portraying the fantastical world of Pandora through longer shots. It is less cut out for the fast-paced action later on in the film; viewers have trouble comprehending the depth at such a high speed in such close shots.\(^{184}\)

To me, the strategy pointed out by Jöckenhövel might hint at a possible development of 3D editing. It must be possible to have a whole range of styles between the extremes of films that are too rapidly cut to comprehend the stereo, and slow-paced pictures like *Gravity* that work exceptionally well. While it is assumed that the editing pace should be adjusted to 3D, the amount of depth might instead be dialed down to allow rapid cutting where necessary.

THE SCREEN

So-called ‘floaters’ have already been discussed as a prime example of the subtle use of negative parallax. Ross characterizes them as ‘stereoscopic debris’ and part of a “particular form of stereoscopic envisioning that can be seen in a number of 21st century 3D films.”\(^\text{185}\) Elements like dust particles or the seeds in *Avatar* are able to cross the theatre space and create a “thick, tactile field screen.”\(^\text{186}\) Such elements are especially helpful in extending the screen because they break down the illusion of depth less easily due to their small size. Many scholars have discussed the changing role of the screen and its frame in three-dimensional filmmaking. Philip Sandifer has dedicated an article to 3D’s ‘demo aesthetic’; his central thesis:

“This essay argues that 3-D film violates the essential metaphor of film, and that this limits it to brief periods of success as a spectacle, as opposed to being used for more serious narrative purposes.”\(^\text{187}\)

Sandifer resorts to the ‘Albertian window’ to explain this ‘essential metaphor’ of film. The author focuses on our relationship as viewers to the picture on a framed screen. Using Leon Battista Alberti’s own writings, we can characterize the frame as “a rectangle of whatever size… as an open window through which the subject to be painted is seen.”\(^\text{188}\) Alberti’s theory aimed to help painters represent spaces through central perspective, applying parallel lines from an assumed viewer position to make sure geometrical proportions would be right. While this seems to diminish the relevance of his model for the cinema, film can be said to follow the Albertian tradition.\(^\text{189}\) The movie screen functions as the window and displays an image that has perspective. The image’s perspective is influenced by camera position, whereas the painting used the assumed position of an observer as its point of origin. The camera position, and thus the point of origin for the linear perspective, constantly changes in film. One could argue that a painting can be viewed from any position as

\(^{185}\) Ross, “Stereoscopic visuality,” 409.
\(^{186}\) Ibid., 409.
\(^{187}\) Sandifer, “3-D Film as Demo,” 62.
\(^{189}\) Sandifer, “3-D Film as Demo,” 66.
well. The Albertian window simply conveys a view. In ‘Narration in the Fiction Film’, David Bordwell critiques this comparison and the tendency to see the camera and microphone as anthropomorphic. Perspective in film will adjust to the “best possible way to understand the story action,” which “may not correspond to a geometrically consistent construction.” What film and painting have in common in Sandifer’s argumentation is their divide of the depicted scene and reality. The traditional metaphor for him is a framed window that displaces the subject: it holds an image and separates the space of the image from the space of the viewer.

**Shared space**

Bordwell showed that there are objections to applying the Albertian window as a fundamental metaphor for conventional 2D film. A strict divide between diegetic and viewer space also suggests that immersion in film is hard to be fully achieved in terms of perception. Ray Zone once again stresses the importance for students of stereoscopic cinema to read André Bazin and the classic film criticism by several other authors. Their writings on how cinema distinguished itself from the other arts bring up ideas on how three-dimensional cinema could in turn develop a new aesthetic that differs from conventional 2D filmmaking. The frame around a painting is oriented inwards and calls attention to what is depicted within its edges. This points out the difference between the painted and the real world. In the cinema instead, “what the screen shows us seems to be part of something prolonged indefinitely into the universe,” Bazin argues. He coins the term ‘centrifugal’ to point out the cinema screen’s tendency to divert from the center; its outward orientation. To Zone, the fundamental concept to the unique status of 3D pictures is the ‘stereo window’. This is the term by which the frame around 3D pictures is often referred to. This simply signifies the plane from which images seem to move into depth or emerge toward the viewer. While the frame around stereoscopic film may

---

191 Ibid., 9.
193 Ray Zone, *3-D Revolution*, 400.
still offer a ‘window into reality’, it discerns itself from the conventional Albertian window. The stereo window does not necessarily coincide with the physical screen plane, but can be moved freely along the z-axis. The screen can move around throughout a film and even be tilted in any direction, as we will see later on in an explanation of the ‘Dynamic Floating Window’. Thus, 3D film moves further away from traditional conceptions of the frame and cinema screen. Instead, it favors one in which “the material space of theatrical viewing and the act of spectatorship are actively engaged.”\(^\text{194}\) The 3D images constitute to a relationship between audience and the screen that many authors see as problematic. Once again negative parallax plays a main role: the three-dimensional pictures move into a space in front of the screen and therefore seemingly enter a space that coexists with the ‘real space’ in which the audience is seated. This way Sandifer’s ‘metaphor’ is indeed violated, as both spaces are no longer strictly divided. The following problem occurs: 3D objects occupy a spot in the diegesis that seems to be visible for the actual viewer as well. However, the object is not physically present in the movie theater. One might recall inexperienced audiences of stereoscopic film unsuccessfully trying to reach out to emerging objects from the story world, whether as a joke or as a true response to the new experience of seeing in three dimensions. Sandifer expands on this relationship to the audience: “Rather than being immersive, 3-D film is profoundly bound up in an act of spectatorship whereby the theater, instead of disappearing, is even more conspicuously visible.”\(^\text{195}\) The author argues it is no coincidence that the two resurgences of 3D film, the brief one in the 1980’s and our current 3D era, came shortly after developments in home movie viewing. He thereby implies that three-dimensional cinema \textit{deliberately} calls attention to the theatre space in order to differentiate itself from the experience of watching film at home.

3D is “touted as a technology that blurs the boundaries between image and theater space,” just like widescreen was. The widescreen technology unites the represented and actual space mostly though screen size, “which pushed the limits of the frame outside the viewer’s central field of vision.” 3D has the added ability of allowing “the cinematic image to appear to transgress the plane of the screen.”\(^\text{196}\)

\(^{194}\) Sandifer, “3-D Film as Demo,” 69.
\(^{195}\) Ibid.
\(^{196}\) Ariel Rogers, \textit{Cinematic Appeals}, 189.
Moreover, one might argue that viewers are reoriented away from the screen because their eyes no longer converge exclusively on the screen plane. Ariel Rogers reinforces this view with a claim from Louis Lumière, who explained that the spectator’s ‘being unable to estimate his distance from the screen’ is what makes the stereoscopic effect complete.¹⁹⁷ Still, the legendary filmmaker did resort to a window metaphor to describe the ideal experience of someone watching a stereoscopic film: “It seems to him that he is in front of an open window, and the actors are moving within the very room.”¹⁹⁸ Rogers then quotes James Cameron to show a more contemporary view that is strikingly similar. The successful director still acknowledges the boundaries of the screen as the edges of a ‘window into a reality’. To him as well, “the distance between the viewer and the screen is meaningless,” as the objects seen inside the window seem as far away from the audience as they were to the camera when they were shot.¹⁹⁹ Both Lumière and Cameron use the classic metaphor of a window, but they clearly point out that the relationship between viewer and screen plane changes in 3D film. Viewers instead converge on, and relate to the objects that are represented in the window: “… the abundance of depth planes provokes an immersive effect through which the body is located within and in relation to, rather than at a fixed distance from, the content.”²⁰⁰

Miriam Ross uses the simple question ‘Where is the screen?’ to further problematize the 3D screen in a research provocation. She rightfully notices that, just like Lumière and Cameron continue to speak of a window, many still speak of a ‘traditional’ screen in the context of 3D film. “Insightful and rigorous scholarship in this field” use terminology that seems similar to examples of marketing for 1950’s stereoscopic film. Discourse speaks of objects that ‘pop out of the screen’ and ‘off-the-screen’ effects, which to Ross “suggests the screen remains.” The author does acknowledge that, in practice, “there is no longer a viewing body opposite the screen but a shared screen space in which action is tantalisingly close but never fully

---

¹⁹⁷ Ibid.
¹⁹⁹ Rogers, *Cinematic Appeals*, 189.
touchable.” Rogers explains that the ‘familiar conception of screen as window’ is used in discourse on 3D to suggest a realistic diegesis. The audience looks through a window to see a more convincingly reproduced world. In addition, it is used “to emphasize a sense of continuity between the space of the cinematic spectacle and the space of the movie theater.” This is similar to Ross’ explanation of the screen and suggests that traditional terminology is still being used, but refers to changed concepts.

Now that we know how 3D violates the essential metaphor of film, we might argue that this does not necessarily limit it to “brief periods of success as a spectacle,” but instead allows for new possibilities. Stereoscopy creates the illusion of a continuous space between diegesis and viewer and this aspect might in fact be capable of “being used for more serious narrative purposes.” The floating seeds in James Cameron’s Avatar were already used as an example of an extension of the screen into a shared sensory space that intensifies the audience’s entanglement in the cinematic illusion. Moving the screen plane into the theater to bring the story world closer to the viewer can have a strong effect as well. It can be used to heighten the impact of important narrative moments, giving the audience a feeling of being inside the window, instead of looking through it: “the lived body feels to be tangibly amongst, rather than at a distance from the filmic content it is experiencing.”

Asselin and Gosselin deem this communication between the virtual world and the movie theater problematic to the narrative, “since the propulsion of figures into the theatre activates the body of the viewer.” While moments of emergence can be destabilizing to the viewing experience, Ross explains that “viewers quickly become literate to the ‘almost there’ nature of negative parallax moments.” In the case of the so-called ‘woodsprites’ from Avatar’s Tree of Souls, viewers “already know that the seeds will not become solid objects to be touched but instead remain an imagination of what that touching process might be like.” Floating elements like this suggest what

---

202 Rogers, Cinematic Appeals, 190.
203 Sandifer, “3-D Film as Demo,” 62.
205 Asselin & Gosselin, “This Side of Paradise,” 134.
the author calls a certain ‘to-be-touchedness’. Jockenhövel clarifies that in 3D film the “tactile and kinetic sensation” are not just suggested to heighten the spectacle, but also to support the viewer’s feeling of immersion “as characterized by diminishing critical distance to what is shown and increasing emotional involvement in what is happening.”

A return to theater
William Paul reverts to early 20th century theater to expand on 3D cinema’s breaking of the fourth wall. Avant-garde practices sought to break the conventional divide between actors and audience. A physical area traditionally surrounds the stage to keep both separated. “Abolish the proscenium!” was the motto to encourage a break from standing conventions and an attack of the ‘passive viewing habits’. At the same time in the early 20th century, the newer medium of cinema was still pursuing naturalism modeled after theater practices. Theater architecture was even an influence, as cinema screens were placed on a stage to benefit from the other medium’s reputation as art. 1950’s innovations Cinerama and CinemaScope in some way also destroyed the proscenium, but only in the sense that they barely fit the movie palaces and sometimes even required architectural alterations. These widescreen technologies, however, intended to enhance the realism of the film image, whereas 3D tried to get closer to the viewer. They did so by crossing the divide between the flat screen and the audience, just like avant-garde theater crossed the proscenium to reach the passive viewer. According to Paul, this was an attempt to exploit the artistic status of avant-garde theater. Sergei Eisenstein, in his article ‘On Stereocinema’, sees a connection to theater history as well. “The initial state of unity” in theater was broken by a separation of participants and observers. Distant seating and the closing curtain are the clearest examples of a divide between two worlds. A third phase follows, however, which entails a return to the original state: “a new reunification of action and audience into a certain organic whole, where the spectacle penetrates into the mass of spectators and, at the same time, draws it

209 Ibid, 234.
into itself.” The extension of the frame is certainly not a simple gimmick to Eisenstein. Breaking the fourth wall or the extension of the screen should instead be seen as a device that “appeals to a very basic, innate tendency” to “restore the lost unity of actor and spectator.”

‘Dynamic Floating Window’
The illusion of a continuous and shared space problematizes movement in 3D space. We deviate from our traditional conception of the screen and tend to forget the presence of the physical frame around the 3D image whilst looking into the seemingly endless depth of the three-dimensional image. Problems arise when we are suddenly confronted with the limits of the screen: “as the emerging object approaches the viewer, it is quickly cut by the frame, producing a twisting of perspective worthy of Escher: at the centre, the object is projected beyond the surface through negative parallax, but at the edges, it is pushed behind the surface by the frame.” Such violations of depth can be highly disturbing and limits 3D cinema in its storytelling ability. Objects are either unnaturally cut off by the frame, or pushed behind the screen as the brain attempts to make sense of the conflicting visual cues. So-called ‘retinal rivalry’ occurs when the image of one eye is placed outside the frame while the other eye observes an inside the screen.

A fairly recent innovation in stereoscopic filmmaking has proven to be a solution to this problem. This makes it mainly an issue from the past eras of stereoscopic film. In our current period of Digital 3D, harsh violations of the stereo window should be rarely seen in films that handle the technique with care. Brian Gardner’s development of the ‘Dynamic Floating Window’ has opened up many new possibilities since first introduced in the 2007 film Meet the Robinsons. This technique has been used in nearly every three-dimensional film since then. The stereographer came up with his invention whilst playing with the frame around the 3D image. Just like it is possible to move the picture into or out of the screen through parallax, he discovered that the black edge around the screen could be moved

---

211 Ibid., 39.
212 Asselin and Gosselin, “This Side of Paradise,” 134.
213 Mendiburu, 3D moviemaking, 21.
around freely just as well. By making the frame itself part of the set of 3D filmmaking tools, obtrusive window violations could now be prevented. Gardner mentions the endeavour by the Spottiswoode brothers to move the frame forward in its entirety while keeping the screen in place. Everything between the screen and the separate frame would be prevented from suffering any of the violation issues described above.\(^\text{214}\) Because the window in their short 1952 ballet film *The Black Swan* was a static mask, however, it was obvious that the screen and frame were disconnected. Thus, an obtrusive new window was used as a tool to get rid of obtrusive violations of the regular frame. Gardner’s stereo window is dynamic, which means that the different parts of the frame are changing position all the time. Instead of being visible constantly, the frame becomes quite invisible, as its position is adapted to the arrangement of objects. Even during shots the frame can freely rotate and float.\(^\text{215}\) Mendiburu explains: “If you can use it on purpose... you can use it for your storytelling.” Instead of simply being a static artefact, the stereo window becomes part of the “spatial grammar” of 3D moviemaking.\(^\text{216}\) The dynamic window masks elements of the 3D image that would normally be obtrusive, thereby making it easier to keep the audience engaged in the story. Higgins adds the remark that it also greatly simplifies the implementation of fundamental 2D storytelling strategies such as the shot/reverse-shot and over-the-shoulder shot.\(^\text{217}\) The ability to freely move the frame and the screen makes Gardner’s invention a revolutionary tool for 3D storytelling.

**Volume**

Ryan Pierson points out the “widespread assumption that the stereoscopic image demands a more embodied response by the spectator.” As described in the above, the experience of shared space in 3D cinema evokes a feeling of almost being able to touch objects in the shared space, or even being able to step into the world. The

---


\(^{215}\) Gardner, “Perception and The Art of 3D Storytelling.”

\(^{216}\) Gardner, “The Dynamic Floating Window.”

author therefore speaks of a ‘new haptical cinema’.\textsuperscript{218} To evoke the sense of touch, however, \textit{volume} is needed.

Like seeing in depth, an increased sense of volume has always been mentioned as one of the key visual features of stereoscopy. An article from the June 1859 issue of American literary and cultural commentary magazine ‘The Atlantic’ extensively covered the workings of the stereoscope. The home entertainment device, which enjoyed major popularity during that time, was described as “an instrument which makes surfaces look solid.” This is of course caused by the combination of two different views, each of which shows slightly more of one side of an object. Author Oliver Wendell Holmes illustrated this as ‘clasping’ an object with our eyes, just like our hands would do. “The mind, as it were, feels round it and gets an idea of its solidity.”\textsuperscript{219} This sense of volume works hand in hand with the changed conception of the screen that has been discussed above. The fact that the stereoscopic film is no longer a projection of a single image onto a flat screen helps to give figures more presence. Actors’ bodies are now more “round, and voluptuous, no longer flat surfaces as they have always been on the screen.”\textsuperscript{220} Looking at a more solid image instead of flat figures in turn aids the illusion of sharing a space with “touchable” characters.

While the term ‘stereoscopy’ itself is derived from the Greek words στερεός and σκοπέω, which literally translates to ‘seeing solid’,\textsuperscript{221} added depth does not automatically produce a believable and solid image. A common criticism for 3D film is that it would create a ‘cardboard-cutout effect’ through the organization of the stereoscopic image on different screen planes. Instead of suggesting a continuous space, the depicted space can look like several flat images stacked on top of each other. While a film might present depth simply by showing objects in relation to each other in space, the images can still be felt to be without volume. This seems to have

been more of an issue during the 1950’s 3D boom, but may still occur today. Pierson defines volume as “a palpable sense that an object itself occupies space.”

The movement along different layers of depth sometimes calls extra attention to the empty space between those planes. Jonathan Cary feels the objects themselves can feel insubstantial, while “the absolutely airless space surrounding them has a disturbing palpability.” This is most strongly felt when seemingly flat objects occupy the plane closest to the viewer. Flatness is of course especially striking in subtitles or lens flares in the foreground, Pierson explains. But, ineptly lit characters, for example, may lose their volume in 3D just as well. We could already read about such requirements for solid stereoscopy in Holmes’ article. He refined his claims about solidity with the remark that any picture can convey some sense of volume. As we have seen in other chapters, 3D again functions to increase the impact a traditional picture would have had:

“All pictures in which perspective and light and shade are properly managed, have more or less of the effect of solidity; but by this instrument that effect is so heightened as to produce an appearance of reality which cheats the senses with its seeming truth.”

EXAMPLES

Shared screen space in Creature from the Black Lagoon

1954 ‘B-horror’ classic *Creature from the Black Lagoon* is a great example of a 3D movie that succeeds in using the shared space to complement its narrative. At first glance, this film seems to perfectly fit the conception of a typical cheap fifties B-movie spectacle in three dimensions. It is, however, a very entertaining and solid piece of classic monster horror that makes notable use of the different possibilities offered by the 3D technique. The film is too easily positioned alongside fifties films that make heavy use of gimmicky emergence effects. While it gladly exploits the 1950s

---

222 “A New Haptic Cinema.”
224 “A New Haptic Cinema.”
225 “The Stereoscope and the Stereograph”
marketing that promised “thrills coming at you!” the film evokes an encounter also by
immersing the viewer through more modest expansions of the screen.\textsuperscript{226} This film
was quite successful, and it is the only 1950’s film that got a sequel in 3D as well

\textit{Creature} tells the story of an expedition team that travels to the Amazon after
archaeologists found a fossilized claw dating from the Devonian period. The modern
scientists intrude into an ancient and still natural part of the world and find a half-
human, half-fish monster, ‘the Gillman’. They try to take it home for further study and
exploration using violence, and suffer the consequences. This Gillman can be
described as a ‘dead end’ in our evolution. It is disturbing to the modern humans who
try to understand their past and assert their position as ‘knowers’ and ‘controllers’ of
the evolutionary mechanism.\textsuperscript{227} The newly released conversion the Blu-Ray format
looks very crisp and the 3D seems to work fine. However, according to Bob
Furmanek, convergence is off in several cases and some scenes push the stereo
window too much forward. Meaning, for example, that in some underwater scenes
characters may now be closer to the stereo window than in the original: “The
underwater scenes were truly DEEP, with divers and Gillman often behind the stereo
window.”\textsuperscript{228} While depth was still clearly visible during analysis of this version of
\textit{Creature}, it is important to note that the illusion of depth was slightly stronger in the
original.

The opening sequence of \textit{Creature from the Black Lagoon} introduces us to the
theme of the film right away. A voice-over describes the evolutionary development of
life on Earth while 3D effects help visualize the Big Bang Theory. Rocks and debris
hurl toward the audience to intensify the impact of the ‘bang’. The camera, moving
from sea to land, finally introduces us to the setting of the Amazon riverbanks where
we see a close-up of a fossilized claw in negative parallax \textbf{[image 32]}. Rogers
explains how this protruding hand is meaningful to the rest of the film:

\begin{flushright}
\textsuperscript{226} Rogers, \textit{Cinematic Appeals}, 202-203.
\textsuperscript{227} J.P. Telotte, “Making Tele-Contact: 3-D Film and the Creature from the Black Lagoon,”
\textsuperscript{228} Bob Furmanek and Greg Kintz, “An In-Depth Look at CREATURE FROM THE BLACK
\end{flushright}
“The threatening nature of this fossilized creature is underscored by its capacity to transgress the stereo window and reach into the audience, creating a spectatorial address that associates dread with the prospect of tactile contact with an alternate life form and that will pervade the film as a whole.”

Image 32: The Big Bang and the protruding claw.

The introductory scene of *Creature* uses some 3D depth to assist the introduction of its narrative. It also aims to establish or meet audience expectations about form and genre by means of this specific application of the 3D technique. Debris flying toward the viewer and the claw that points at the viewer in negative parallax are predictable applications of the three-dimensional effect; they affirm the film’s status as 3D horror spectacle right away. However, the claw appeals to the viewer’s immersion and sense of shared space. It is used to prepare the audience to be assaulted, almost physically even. But it also signifies an important motif of the film’s narrative: that of touch.

Expansion of the screen to a shared space is most effectively done in *Creature*’s numerous underwater scenes. Unsurprisingly, diving is a recurring element in the film’s narrative. Rogers notes that by placing objects from the

---

Rogers, *Cinematic Appeals*, 203.
underwater space in front of the screen plane, “instead of pulling the viewer into the depth of the diegesis, the film creates the illusion that diegetic space pervades the theater space.”

We are introduced to some of the main characters shortly after the opening scene. Scientist David and assistant Kay are shown as David practices his diving before he goes on expedition [image 33]. One could argue that this is not only an introduction to the main characters and a recurring narrative theme, but also to a frequently repeated use of 3D. Just like the scientist makes a practice dive to get used to the changing pressure, the underwater scene helps us get used to the film’s upcoming implementations of 3D, as J.P. Telotte argues.

The author also points out that underwater exploration and the ‘thrill of seeing depth’ entails certain dangers. The friendly introductory diving scene is followed by a cut back to the archaeological site in the Amazon. We see natives getting killed in their encampment through a point of view perspective of the clawed monster. This introduces us to the threat that lies ahead for the characters that are soon to venture into the Amazon. Danger is repeatedly linked to seeing in depth.

**Image 33:** David gets used to the pressure at different depths.

---

230 Ibid., 205.

231 Telotte, “Making Tele-Contact,” 299.
This connection between stereoscopy and the film’s theme expands when the crew moves to their place of study. In tracking shots, the steamboat named Rita is carefully steered through protruding obstacles in order to enter the dangerous Black Lagoon. This emphasis on danger and ‘near contact’ is underlined in the following underwater scenes. In the first, diving expedition members Mark and David almost encounter the creature, whose familiar claw is once more pointed toward us. After this, Kay goes for a recreational swim and the creature is seen getting as closely underneath her as possible; it even lightly touches her foot. When the Gillman trails her back to the boat it gets caught in a net. The creature manages to escape just before the net is hoisted, leaving a gaping hole for us to see through. Tension is heightened several times in a row through both the narrative action and frightening near contact in deep underwater settings [image 34]. Viewers feel absorbed by the shared three-dimensional space and have a sense of nearly being able to touch the objects and characters. Like the 3D effect itself, the creature invades our space. Arguably, this makes the threat of the film’s monster much stronger than on a traditional flat screen.
Image 34: Early on, contact is nearly made with the monster on several instances.

It was no rock that left *this* in the net.
Telotte uses Paul Virilio’s concept of ‘tele-contact’ to describe both our own ability of ‘contact-at-a-distance’ through 3D and the characters’ dramatized near contact with the creature.\footnote{Ibid., 294.} The narrative continually foregrounds this “contact effect.” The author assumes the invasive or threatening nature of the 3D technique itself was ‘profitably linked’ to the monstrous theme. “We might find in the creature... a commentary on this technique’s problematic character,”\footnote{Ibid., 297.} namely, a hybrid man/fish creature in a sci-fi/horror hybrid in an uncomfortable new cinematic hybrid. Also, the film is about humans “trying to see into areas we were not meant to probe” and “seeing in ways we traditionally had not”, which connects it to 3D.\footnote{Ibid., 298.} We can only speculate whether we can see this as a deliberate link between the film’s narrative and the nature of the stereoscopic technology. Virilio’s tele-contact implies a distortion of our traditional senses of space, which Telotte describes as “the creation of holes or gaps in our experience of the world.” In the narrative of *Creature*, the grotesque humanoid Gillman can be seen as a gap in our evolutionary history. The motif of nearly making contact in the depth of the 3D screen is however more than clear, and this eventually progresses to actual contact with the monster near the film’s climax. *Creature from the Black Lagoon*’s narrative then develops into a game of cat and mouse between the monster with human behavior (desire for the female protagonist) and the humans with monstrous behavior (trying to catch or kill the Gillman).

As mentioned, one of the main locations in *Creature* is the steamboat that either navigates the Amazon or lies at anchor in the Black Lagoon. The depths of the lagoon in which the Gillman resides become a more prominent setting as the story progresses and the crew tries to find the monster. This film does a very decent job at employing 3D to create a visual contrast between the cramped boat and the spacious waters of the lagoon. While characters are limited to very narrow compositions in positive parallax on the cramped boat, diving expeditionists and the creature itself move around the space of the water freely. An array of underwater elements that would normally only ‘suggest’ depth in 2D, such as fish, seaweed and air bubbles, are ideal tools to enhance three-dimensionality through placement on different planes of depth. 3D depth becomes particularly evident in motion: in a specific scene, air
bubbles come closer to the viewer while a diver moves deeper into the depths of the Black Lagoon and the image [image 35]. Furmanek notes,

“Jack Arnold made the aesthetic choice to place the underwater scenes very deep within the stereoscopic window, giving the viewer a sense of limitless space – and unknown danger – to the Gillman’s underwater domain. Director of Photography William E. Snyder converged various seaweed, fish and flora at the stereo window; being careful they would not leave the screen and enter the theater space. The emphasis was on deep, not “in your face.”"  

Image 35: As David swims away into depth, air bubbles move toward the viewer.

Creature from the Black Lagoon mostly uses positive parallax to expand the underwater world. The film creates an illusion of it being in the same space instead of using strong negative parallax to move the screen toward us. While Furmanek’s quote suggests otherwise, elements may still subtly emerge on several occasions. As can be expected of any 1950s 3D movie, negative parallax is used for several obvious off-screen effects as well. Because Creature predominantly tries to immerse the viewer into its world, the quick shocks might be slightly more disturbing. In one

235 “An In-Depth Look at CREATURE FROM THE BLACK LAGOON.”
example, harpoons that are being shot at the monster miss and instead come at the
viewer. The third dimension most importantly aids the portrayal of the Creature’s
story world; an exotic and spacious world that the viewer shares with the threatening
creature and which evokes the danger of a tactile encounter.

Volume in Hugo
Alfred Hitchcock was the first auteur filmmaker to direct a film using a 3D camera. His
Dial M for Murder is often regarded as the only quality film from the 1950s stereo
boom. In our digital 3D era, ‘movie brat’ Martin Scorsese is probably the most
respected filmmaker that has dared to enter three-dimensionality. The fact that a
director with the status of a major auteur thinks his storytelling would be enhanced by
3D automatically offers the process “aesthetic legitimacy” and turns his film into a
“creative benchmark” for stereoscopy, Higgins argues.236 Unlike other contemporary
greats like James Cameron (Avatar) and Steven Spielberg (The Adventures of
Tintin), who focused more strongly on action, spectacle and computer animation,
Scorsese uses live-action in a fantastical setting. For Kristin Thompson, Hugo shows
the best of what can be done with digital 3D. Most remarkable to her: “For once,
every shot was filmed in 3D.” The crew shot everything in native 3D, instead of
resorting to post-conversion of flat images for certain shots.237 Just like Hitchcock’s
Dial M was seen as the first ‘quality film’ to receive the 3D treatment, Scorsese’s
Hugo was seen as an important step toward a future for 3D film. One reviewer hailed
his three-dimensional effort as “the future of 3-D moviemaking.”238 Hugo pays
homage to Georges Méliès, and like his French colleague, Scorsese feels free to
experiment with the new tools that are at his disposal. The setting of 1930s Paris is
filled with elements that add depth; for example snow, dust, tunnels, ladders and the
inside of clocks.

For Scorsese one of the biggest delights of 3D was that characters seemed to
be so much more alive:

---

236 Higgins, “3D in Depth,” 208.
237 Kristin Thompson, “HUGO: Scorsese’s birthday present to George Méliès,” last modified
February 26, 2014, http://www.davidbordwell.net/blog/2011/12/07/hugo-scorseses-birthday-present-to-
georges-melies/.
238 Andrew O’Hehir, “Scorsese’s spectacular 3-D “Hugo”,” accessed July 22, 2014,
“I was looking at moving statues. Faces in particular were given a special intimacy. 3D makes characters more accessible for the audience. If subtly done 3D allows the audience to become more immersed in the narrative and in an understanding of a character's behavior. I found this to be very strong, so much so that when we did the final 3D pass on that movie, a few weeks before release, I brought the characters in medium close-ups out even more from the screen.”

In *Hugo*, negative parallax is handled with great care and no disturbing pop-outs are used to shock the viewer. Scorsese uses a small part of the space in front of the screen to slightly extend the screen and bring the world of young Hugo closer to the spectator. Nothing is thrown at the viewer, but instead the frame “bows outward in the center and gently recedes at the frame edges.” Negative parallax close to the screen is used to increase depth subtly, but effectively, and give characters more volume. A feeling of tangibility is accomplished in the shared screen space but more so through 3D's capability to capture volume. Snow, dust and steam all enter the theater several times to open up the story world. Second unit director Robert Legato explains that these elements most of all add “a subtle layer helping you to understand the positioning of objects in the foreground, middle ground, and background.” For example, dust helps beams of light coming through windows seem more solid and defined [image 36]. The volume of the light rays helps define the different planes of depth in the shot.

---


240 Higgins, “3D in Depth,” 207.

241 Pennington and Giardina, *Exploring 3D*, 188.
Image 36:

a. The often-seen ‘3D snow’ is used to enhance the suggestion of depth in *Hugo*.

b. 3D makes the rays of sunlight look more solid, causing the already spacious Film Academy library to look endlessly deep.
c. Rays of sunlight are used in closer shots as well: they emphasize the different planes of depth along with other objects and characters.

The close-up plays a major role in Hugo’s aesthetic. While it is already a very powerful dramatic tool in traditional film, many filmmakers think the addition of 3D can increase the impact of such a shot even more. We know that 2D images are able to imply depth using monoscopic depth cues, but Legato argues that “2D naturally flattens out the features of an actor’s face.”\textsuperscript{242} The stereoscopic depth of 3D would then return some of the angles and depth that the picture is missing. Because there is ‘more to see’ in a three-dimensional picture, it should better convey the actor’s emotion. Facial expression is a vital part of the performance. Hugo’s producer Graham King even thinks 3D helps “reveal the innermost thoughts of characters,”\textsuperscript{243} just like a piece of literature can do through text. Such extreme claims should of course be nuanced, as close-ups have always been effective even in two dimensions. However, Hugo does make good use of the increased feeling of volume and roundness suggested by 3D to further aid the impact of the close-up. One particular example is a scene that features Sacha Baron Cohen as the inspector at the train station. Throughout the film he is a constant threat that Hugo tries to avoid. When our main character gets caught he is interrogated and in danger of being sent to an orphanage. His friend Isabelle, George Méliès god-daughter, comes up with a

\textsuperscript{242} Ibid., 179.
\textsuperscript{243} Ibid., 185.
story in an attempt to keep him out of trouble. The inspector is shown in close-up while he leans forward angrily to confront Hugo and see if they are telling the truth [image 37]. Legato discloses that the amount of depth was gradually being increased during this scene: “We pushed the 3D in close-up on the inspector’s face until it is looming larger than life and a little uncomfortable out of the screen.”244 An increase of depth and volume is employed to heighten the suspenseful nature of this shot. Even more fascinating is the fact that the face starts to slightly protrude from the screen. Scorsese uses a small portion of the shared space to bring the inspector’s solid face closer to the audience. The viewer is very subtly assaulted by the facial expression and feels Hugo’s fear: “It’s like when someone gets aggressive and gets a little too close to you, you feel threatened and invaded. The staging is very simple but the drama of the moment is heightened.”245 This shows how the solidity of 3D, through increased volume in close-up, and the shared screen space go together. The third dimension adds depth to the face, making the face more real and expressive. On top of that, the face invades our space in negative parallax and indeed mimics the feeling of someone getting threateningly close to our own face.

**Image 37:** Sacha Baron Cohen’s character is leaning forward an slightly out of the screen to confront Hugo.

---

244 Ibid., 187.
245 Ibid., 187.
CONCLUSION

Stereoscopy in the cinema is regarded problematic because it changes our traditional conception of the screen. It can still be said to offer a ‘window into reality’ and is often referred to as such in literature. Besides adding depth to the normally flat screen, the 3D technique opens up into the theater as well. Through the creation of a ‘shared space’ the conventional divide between the diegesis and real space is violated and audience involvement is amplified, to the extent that viewers may imagine touching the image. Christiane Voss argues that in two-dimensional film, “it is only the spectator’s body, in its mental and sensorial-affective resonance with the events onscreen, which … ‘loans’ a three-dimensional body to the screen and thus flips the second dimension of the film event over into the third dimension of the sensing body.” The shared space is an optical illusion in a similar way, as the viewer is essential in creating and believing this cinematic experience. One only has to reach at emerging 3D images to find proof that the objects are not in the same physical space. Several authors have explained the different relationship the viewer has to the screen. Audiences no longer converge at one static screen plane, but relate to the objects that are seen in different planes of depth. The Dynamic Floating Window has solved the technical problems of the three-dimensional screen. Because the frame is controlled and moved around in depth, otherwise problematic staples of narrative cinema can now be used without problems. Finally, the creation of a sense of volume or solidity in 3D images works together with the expanded screen. An image that is shot properly in stereo can look rounder than in 2D, which further enhances the sense of touch.

3D film does violate our standing notions of film and the screen, but this does not prevent it from being used in the service of narrative. In *Creature from the Black Lagoon* the narrative centers on contact with a horrible monster. This works out well in 3D because viewers will arguably have a stronger fear of making contact with the creature because of the shared space. Director Jack Arnold was experienced in 3D filmmaking. In this example, he successfully connected the technique to the film’s theme. Arnold turned the invasion of viewer space into a tool that benefited from the

‘monstrous presence’ of the creature. From the start, contact is suggested through added depth. Martin Scorsese’s Hugo offers several great examples of the increased volume in the 3D image. The director liked how rounder faces made characters more accessible for the audience. The close-up is especially appreciated in 3D and this shot plays a significant role in Hugo. Supposedly, it better conveys the actors’ expressions and performance. In one scene the shared space is used to increase the impact of the close-up even further. Similar to Creature, Scorsese’s film explores the feeling of touch in accordance with a recurring narrative element: Hugo must not make physical contact with the station inspector.

The snowflakes in Hugo are a subtle way to expand the screen space. They fit the atmosphere of Paris and the film’s overall color scheme, but they may not truly engage the viewer. Dust, snow and rain seem to be used in countless examples of contemporary stereoscopic film. One might be inclined to think these elements miss the target of screen expansion, as they seem to be implemented just to show off the 3D technique. Both films show that the expanded screen can offer a rounder and more tangible image without disrupting viewers’ engagement in the narrative. Letting objects enter the shared space in overt negative parallax is unnecessary and mostly avoided. Creature does not move the underwater world way into the theater and Hugo uses a screen that lightly ‘bulges’ outward; slightly pushing the image into the theater in this fashion might work best.

---

248 Telotte, “Making Tele-Contact,” 297.
CONCLUSION

December 2014 will mark the 10-year anniversary of *The Polar Express*. While previous years already saw the release of several stereoscopic films, this was arguably the first major mainstream motion picture to get a 3D release in our current era of digital 3D cinema. It was only shown in limited IMAX theaters, which in combination with its impressive motion captured computer animation, made it a great first showcase for the new and improved digital incarnation of stereoscopic technology. Films like *Spy Kids 3-D: Game Over* (2003) used inferior 3D technology and projects like James Cameron’s *Ghosts of the Abyss* (2003) were documentaries solely meant for IMAX. The industry was triggered and *Chicken Little* (2005) was the first film to be released in digital 3D in limited regular theaters. More and more directors have tried stereoscopy since then and for many years now we have been enjoying, or detesting, stereoscopic picture releases on a regular basis. While contemporary blockbuster films in general continue to rake in record revenues, six out of the 10 all-time highest grossing films had a prominent 3D release. Even though most also had a 2D version and would probably have been just as successful in the traditional flat format, this indicates significant success for 3D. If nothing else, the technique has helped increase revenues for the film industry due to higher admission prices. The more expensive tickets seemed to be justified by the hype that was generated solely around the technology itself. Looking back at the past decade, however, various great films have been made with 3D in mind from the start. They have not only gained commercial success but were received positively by critics as well. Some of these movies have functioned as helpful examples in this research.

Despite finally going through a huge long-awaited economic and smaller artistic revival, 3D cinema is still addressed critically in both scholarly and regular discourse. The same way as more than half a century ago, complaints about headaches and the polarized glasses are still often heard. These comments cannot be ignored, but the (digital) stereoscopic technology and its implementation have been improved continually. Although lacking empirical evidence for his claim,

---

Furmanek already explained that most cases of uncomfortable 3D are the result of inadequate control over the technology or problems in viewers’ visual systems.\textsuperscript{250}

The study of the academic discourse on 3D in turn revealed that three-dimensional film is often still regarded as incapable of finding a lasting home in conventional narrative cinema. Several authors have been shown to argue that it is limited to providing spectacle, because it is simply too disruptive or ‘incompatible’ to be applied to serious narrative cinema. The notion of parallax is one of the most heavily discussed of technical issues that are considered to problematize the role of 3D in narrative film. It constitutes stereoscopy’s addition of depth; it is therefore vital to the unique experience 3D cinema offers and “it gets to the heart of 3D cinema as a style.”\textsuperscript{251} The concept is divided in negative and positive parallax, with each previously described as having its own specific ‘cinematic heritage’. The latter establishes depth that goes beyond the screen to reinforce 3D cinema’s immersive strategy. However, the disturbing nature of images that emerge from the screen can strongly disrupt the viewer absorption that is essential to narrative cinema. Negative parallax can therefore be said to still adhere to the aesthetic of attractions, as it emphasizes shock and surprise “at the expense of unfolding story or creating a diegetic universe.”\textsuperscript{252} Nick Jones describes the paradoxical nature of both types of parallax as a “stylistic impasse between classical invisibility and stereoscopic allure.”\textsuperscript{253} At the same time, Klinger’s connection of stereoscopy’s heightened visibility to David Bordwell’s notion of intensified continuity has shown us that the unique experience established through parallax does fit contemporary filmmaking practices.\textsuperscript{254} Both types of parallax have their own ways of aiding a film’s narrative through methods that are not available to traditional ‘flat’ films, ranging from the creation of a deeper world to functioning as a visual exclamation point of sorts. As became apparent in the three examples as well, parallax is a vital part of the 3D cinema but cannot be studied separately: it functions in accordance with mise-en-

\textsuperscript{250} “Top Ten 3-D Myths.”
\textsuperscript{251} Klinger, ‘Beyond Cheap Thrills,” 186.
\textsuperscript{252} Gunning, “The Cinema of Attraction[s],” 385.
\textsuperscript{254} Klinger, “Beyond Cheap Thrills,” 192.
scène in the broadest sense and is tied to conventions of regular cinema. *House of Wax* displayed a use of parallax that is far from reserved, but still finds a playful balance between negative and positive. The emergence effects that are characteristic of 1950s 3D do aim at shock, but they are implemented in scenes that are unimportant to the plot. In *Dredd*, added depth plays an important role in establishing the film’s setting. However, it is also used to visualize one of the film’s main narrative elements in a more creative and compelling fashion than in the 2D version. *Coraline* shows a typical subtle and ‘invisible’ 3D aesthetic that is mostly directed into depth. The effect works subconsciously and superbly aids the depiction of a distinctive mood in two different worlds; this difference in locale is essential to the film’s main narrative premise. There is no doubt that *House of Wax* is still a fifties horror classic, *Dredd* still an entertaining action movie and *Coraline* a craftily made stop-motion film regardless of the addition of 3D. However, specific scenes show that the different uses of parallax open up new filmmaking possibilities, especially when combined with existing filmmaking tools. All three films, with *House of Wax* as a possible example, might prove a move toward ‘invisibility’ because their use of negative parallax is very restrained and subtle. All examples certainly show a move past gimmicky pop-out effects and technological spectacle towards an implementation of stereoscopy that foregrounds narrative.

The main finding from literature that covers editing in three-dimensional cinema is that it is considered to be more ‘complex’: variations in depth must be carefully handled in the editing room to ensure a pleasant viewing experience. Texts try to verify this by mentioning our ‘inability’ to quickly read 3D images. Rapid cuts present us with new amounts of depth, which can be irritating. A slower editing pace is often proposed as the (only) solution to this issue. In addition to editing, composition would be restricted by 3D as well. Within the context of stereoscopy’s sustainability, some have expressed to envision a new aesthetic that is reminiscent of deep focus filmmaking traditions, with the story action playing out in planes of depth at a slower pace. Stereoscopic cinema in general shows that films still

---

255 Mendiburu, *3D Moviemaking*, 151.
256 Sandifer, “3-D Film as Demo,” 73-74.
257 Klinger, “Beyond Cheap Thrills,” 188.
mostly follow the pace of regular contemporary film. In *Dial M for Murder*, Alfred Hitchcock uses 3D compositions that block viewers' immersion and identification with characters. This functions to shift the focus to the narrative and let viewers fully enjoy the film's engaging plot, as argued by Sheldon Hall.\(^{258}\) The film employs some longer takes and compositions in depth, but does not significantly deviate from the norms of its time. While some films are able to control depth at a fast pace, there could be some merit in exploring new ways of montage. There is validity to claims of longer reading times of 3D pictures and *Gravity* clearly shows how fewer cuts make for greater control over the stereo image. Alfonso Cuarón resolutely eliminates the issues of editing in depth and his long takes give viewers time to linger on the film's many-layered visuals and enjoy the story world, which is nevertheless motivated by a very minimal narrative. Stereoscopy can be used to let the narrative unfold in longer takes, because it adds layers of depth that are 'more visible' than in 2D.

The expansion of the flat cinema screen into a shared space is an essential feature of the 3D experience. Because it refuses the strong divide between image and viewer space, stereoscopy in the cinema is argued to violate "the essential metaphor of film."\(^{259}\) Audiences now relate to the 3D objects instead of focusing on a flat surface. Images that emerge into the theater space activate the viewer's body in a way unfamiliar to the traditional cinema experience.\(^{260}\) This can however be utilized to evoke a stronger sense of touch, hence the term "tactile field screen."\(^{261}\) Related to this is the feeling of increased volume in 3D. The analysis of *Creature from the Black Lagoon* has shown that it expands the screen from a narrative motivation. The stereoscopic technique's "astonishing" or problematic ability to "transgress the plane of the screen" and reach out to the viewer is linked to the narrative's main theme: danger of exploration of new areas and near contact with a monstrous being.\(^{262}\) Martin Scorsese lets the image enter the shared space on several occasions to evoke a stronger feeling of depth and increase impact of specific shots. The effect of

---

Zone, *3-D Revolution*, 399-400.
\(^{258}\) Hall, "Dial M for Murder," 244.
\(^{259}\) Sandifer, "3-D Film as Demo," 62.
\(^{260}\) Asselin & Gosselin, "This Side of Paradise," 134.
\(^{261}\) Ross, "Stereoscopic visuality," 409.
\(^{262}\) Ariel Rogers, *Cinematic Appeals*, 189.
the traditional close-up gets a boost because faces have more volume and are able to enter the theater space. In both films the narrative contains elements that foreground the danger of possible contact. Without being disruptive, the 3D technique expands the screen to engage the viewer in the story world and intensify the fear of a physical encounter.

Three crucial technical issues in 3D discourse have been explored and summarized above. All three are vital qualities of the 3D experience, which are nonetheless assumed to prevent the technique from finding a longer-term place in mainstream narrative cinema. Some authors have also looked at feasible applications of 3D from each angle, namely: a balanced use of parallax and its place in contemporary intensified continuity style, the possibility of slower paced editing and stronger compositions in depth, and the opportunity to engage the viewer through the shared screen space. The accompanying practical examples have shown that filmmakers are able to overcome the problematic nature of 3D cinema, as explored in three key technical contexts, by embracing the technique’s storytelling potential. Implementing 3D from a narrative motivation is an effective method to conquer the critical stances that have been discussed. The seven films diminish the disturbing nature of all three studied angles and show unique storytelling possibilities that fit in, and even enhance traditional narrative cinema practices. This employment of added depth in support of a film’s narrative suggests a more sustainable appropriation than use of stereoscopy that still tries to appeal to viewers that have already grown accustomed to visual shock and technological spectacle. Ariel Rogers identifies “a less obtrusive approach to 3D, which is taken to be more commensurate with Hollywood narrative and therefore more sustainable.” However, she adds that “those making a case for the sustainability of digital 3D have advocated for an “immersive” aesthetic reminiscent of widescreen.” This would make any claim that stereoscopic 3D will find a lasting acceptance in narrative cinema, simply because its use is more narratively motivated and sustainable, too premature. A complete focus on the specific immersive experience Rogers implies, simply means removing all obtrusive elements of the unique 3D experience. This ‘move toward invisibility’ as described before by Elsaesser, will no doubt make stereoscopy a ‘better fit’ for

263 Rogers, Cinematic Appeals, 186-187.
narrative cinema, but it entails the elimination of some of the technique’s appeal and vital elements, such as negative parallax and the corresponding infringement of the traditional screen plane. John Belton summarizes this seemingly unmanageable paradox as follows:

“If it is ever to become a norm, it must cease calling attention to itself… Yet, if 3D is to be 3D, it must necessarily exploit the phenomenon of emergence, violating the segregation of spaces that lies at the core of the experience of classical cinema.”

Belton labels 3D “essentially an avant-garde technology, throwing itself at audiences.” The studied examples however, try to still adhere to the experience of classical narrative cinema by being less conspicuous and embracing storytelling. They do not throw themselves at the viewer, but still exploit means to convey story content that are specific to the unique experience of 3D cinema. I would suggest this method is more likely to succeed, as it places itself between the obtrusive 3D that is incompatible with narrative cinema and the invisible use of stereoscopy that loses much of the appeal of the 3D experience.

The analyzed films indeed suggest a shift from a conception of stereoscopy as “a purely technical discipline or a cost issue” toward an attitude that is open to “the potential of stereo to enhance mood and emotion or help convey a feeling of connection with an actor’s performance, a landscape, or a narrative.” We have seen that some of the most effective uses of stereoscopy that enhance mood or connect to narrative are very subtle. The play with depth in Henry Selick’s Coraline, for example, does not announce itself but takes a delicate ride with our perception. Any viewer watching the film without prior knowledge will not notice most of the effects in play and deem the 3D ‘invisible’. Audiences tend to focus on what they do notice when going to the theater to watch a three-dimensional film: the costly price of admission, the ‘annoying’ glasses, disturbing emergence effects and ‘bad’ headache-inducing images. Especially the higher price may still play an important role: while it

266 Pennington & Giardina, Exploring 3D, 8.
motivates the industry to keep 3D releases going, it keeps shaping audience expectations. While we don’t pay extra money for projections in color or sound, the 3D film clearly still announces itself as a premium product or experience; therefore viewers expect to see what they are paying for. Disappointment is inevitable when the stereoscopic effect is too much in the background. This shows that more factors are in play than just those studied in this thesis.

**Outlook**

Film directors seemingly tend to lack the 'language' to direct in 3D, let alone discuss the technique. During my research, I have repeatedly stumbled upon accounts from directors of photography or so-called '3D supervisors' that were much more enlightening. These crewmembers have a far greater understanding of the technical limitations and possibilities of 3D, as well as the aesthetic and storytelling potential that is still to be fully explored. Even though 3D has now been present in mainstream filmmaking longer than ever before, the nonexistence of background knowledge and previous experience is still striking. It confirms the infancy of 3D filmmaking, even after ten years. At the same time, this inexperience lures directors into creative experimentation. Projects like *Cave of Forgotten Dreams* (2010) and *Pina* (2011) looked like promising signals of a widespread interest in the 3D technique even outside the mainstream. Films such as Ang Lee’s *Life of Pi* (2012) and Baz Luhrmann’s *The Great Gatsby* (2012) also point out an increased interest in 3D by more ‘distinguished’ filmmakers. It is remarkable that even a fairly recent mainstream action movie like *Dredd* gets a 3D treatment that is very appealing in a purely aesthetic sense and very effective in terms of narrative. Renowned director Martin Scorsese seemed happy to explore what was possible in three dimensions in the magical world of *Hugo*. However, his latest project, *The Wolf of Wall Street* (2013), was a regular 2D release. Many filmmakers appear to regard shooting stereoscopic film as a fun detour from their ‘normal’ practice. A second 3D effort from one director seems mostly restricted to blockbuster sequels (*The Hobbit* series, *The Amazing Spider-Man*) and animation films (*How to Train Your Dragon 2, Frankenweenie*). In fact, the only directors in this study to have filmed multiple projects in 3D are from the 1950s era: *Creature from the Black Lagoon*’s Jack Arnold and *House of Wax*’s André de Toth, who was unable to perceive stereoscopic images. Alfonso Cuarón appears
to be the only contemporary filmmaker who was pleased with his accomplishments in 3D. After the effects-heavy Gravity, he is “intrigued at the prospect of doing a simple drama in 3D.” Instead of once-off exercises in 3D, efforts from experienced directors are needed to further develop the move towards a sustainable use of stereoscopy as studied in this thesis.

**The promise of Avatar**

One director that has clearly expressed his commitment to 3D cinema is James Cameron. In an interview following his 2003 IMAX 3D documentary Ghosts of the Abyss he declared: “I’m going to do everything in 3D now. I’m going to shoot my daughter’s birthday party in 3D.” His 2009 smash-hit Avatar has been left out of the body of studied examples as it has already been extensively analyzed in numerous pieces of literature. However, it cannot be neglected in any reflection on the future of 3D cinema. Cameron’s highly ambitious project has clearly proven its worth in a commercial sense with a total worldwide gross of nearly 2.8 billion dollars. The film convinced movie theaters all over the world to equip for digital and stereoscopic projection. Hollywood’s push to pursue similar economical success through 3D’s appeal is still going on today. Avatar has shown the industry executives the potential of 3D in terms of revenue, but can the film be seen as a model for stereoscopic filmmakers as well?

What Cameron delivered onto the screen has been a truly new cinema experience for many viewers. Even though Avatar impresses with its visual spectacle, its use of 3D can indeed be called ‘subtle’. Cameron exerted great control over the three-dimensional imagery to ensure a pleasant experience. Scott Higgins identifies the so-called “Cameron look”, which “aims to keep the planes of focus and convergence aligned near the screen surface.” The author underscores that “[t]his model is influential but not uncontroversial,” as the tendency to keep everything

---


269 “All Time Box Office.”
behind the screen plane can be quite limiting. In this sense, Avatar might have restricted the development of 3D filmmaking from an aesthetic perspective. One could argue that it plays into digital 3D’s aspiration of becoming an increasingly invisible technique, as mentioned by Elsaesser. On the grounds of similarities in theme, Cameron’s film may be compared to Creature from the Black Lagoon. Ariel Rogers observes how both explore “the dangers of scientific inquiry by capitalistic greed, warning of humankind’s menace to the natural world, and depicting human beings’ encounter with humanoid species.” She also underlines the difference in approach to immersion in both films: whereas Creature exerts power over the viewer’s body by focusing on ‘bodily vulnerability’ and the danger of a tactile encounter in the shared screen space, Avatar displays the freedom of world exploration through the use of stereoscopic technology. This seems representative for the general use of stereo in the respective films’ 3D eras. The shocking emergence effects from the fifties have made place for subtler, less visible, applications of stereoscopy that try to enhance world creation and exploration. 3D is not used in service of narrative, but rather to create a perfectly immersive experience in combination with very high quality CGI and motion capturing. In this context, the “3-D experience, for Cameron, should be a hermetic interior phenomenon.”

The sequels to his epic were set to begin production this year. Looking at the decelerating rate at which three-dimensional cinema is developing, one might think that the industry is waiting for these projects to set new standards for the 3D filmmaking game. I am eager to see whether Avatar 2 to 4 will do something truly different. While the implementation of stereoscopy in the first part of the franchise was received positively, viewers will need something more than just CGI spectacle and ‘safe 3D’ to be impressed this time around. Still, the anticipation alone, fuelled by viewers’ recollections of the initial astonishment they experienced in 2009, will lure audiences into the theaters. Because of Avatar’s monstrous success, 3D technology

---

270 Higgins, “3D in Depth,” 198.
272 Rogers, Cinematic Appeals, 201.
273 Ibid.
will probably be around at least until late 2018 to rake in the profits of the third and final sequel. Increased use of 3D’s proven storytelling potential could keep up or even renew interest in stereoscopy until then. We once watched movies without sound or color, but a complete embrace of filmmaking in 3D still seems unlikely.
BIBLIOGRAPHY


Telotte, J.P. “Making Tele-Contact: 3-D Film and the Creature from the Black Lagoon.” *Extrapolation* 45, No. 3 (2004): 294-304.


**Blu-Ray discs**


