





BACK

TO THE FUTURE: S3D CINEMA RENAISSANCE IS UPON US BUT NOT WITHOUT THE BYZANTINES

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Advances in film-projection technologies and loss of moviegoers carried along by the current abundance of new entertainment technologies are the reason for renaissance in stereoscopic three-dimensional film (S3D). Fueled by a convergence of economic need and technical progress, studios are stepping up their productions of feature films in S3D format. However, claims have been made that recent S3D releases don't offer anything to narrative cinema. After a few minutes the novelty wears off, and the audience tends not to notice it. This paper will examine the validity of these claims and propose solutions. Three topics in film history research may offer some solutions for S3D technology; a) how to give 2D image on screen illusion of depth; b) deep focus (in cinema) and c) lateral depth of field (in cinema). It was André Bazin who first noticed this and in his writings about Jean Renoir's film *La règle du jeu* where he coined the term "Lateral depth of field." From that moment on, this new concept found its place in cinematic vocabulary. Renoir's experimentation, also known as "deep focus or cinematic depth of field", returned from America via brilliant classics such as *Citizen Kane* and *The Best Years of Our Lives*. It only took a few years for cinematic geniuses such as Orson Welles and William Wyler to put "Renoir's invention" to good use with the finally found answer to one of the most compelling problems in cinematography: how to give a 2D image on the screen an illusion of depth. At this point of cinematic technological development we are not dealing any more with "2D into 3D illusion," 3D is technological reality that is here to stay. This invention needs to ascend from pure technological novelty into a more creative tool. Great tools give creative people command over technology, S3D will only succeed if filmmakers learn how to take command of the "depth of field" as a means to enhance their stories. In order to do so, as history has shown, they may need to turn to classics. This paper will examine and analyze art and film history classics and their experimentation with "lateral depth of field", hoping to shed more light on how classics and their creative wisdom can inspire contemporary producers to help S3D become the most important innovation in film since the use of color in motion pictures. My original paper dealt only with a few examples, I suggest further film history research that may be more comprehensive, including, if at all possible, every film that ever dealt with these three topics. This may serve as "cinematic creative database" which would in turn help researchers find more inspiration and creative answers to the directions that S3D may turn to.

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Abstract

Advances in film-projection technologies and loss of moviegoers caused by the current abundance of new entertainment technologies are the reason for a renaissance in stereoscopic three-dimensional film (S3D). Fueled by a convergence of economic need and technical progress, studios are stepping up their productions of feature films in S3D format. However, claims have been made that recent S3D releases don't offer anything to narrative cinema. After a few minutes the novelty wears off, and audience tends not to notice it. This paper will examine the validity of these claims and propose solutions. The historical method of research will be used to help us better understand the background and creative applications of 3D in art and cinema. During the Renaissance in Italy, artists investigated the question of how to draw 3D objects on flat surfaces. They began to think of a painting as an "open window" through which the viewer sees the painted world. They also developed a system of mathematical rules known as linear perspective. Contrary to this, Byzantine artists developed inverted perspective. The lines of this perspective meet at a point in front of the canvas. In this sense "Byzantine - inverted perspective" is the opposite of Renaissance linear perspective. It is not the window through which the mind must go to have access to the world represented. In inverted perspective, space itself becomes active instead of the observer who in fact is acted on. Filmmakers were inspired by these two studies of perspective and experimented with it. André Bazin noticed it and in his writings about Jean Renoir's film La règle du jeu coined the term "Lateral depth of field." From that moment on this new concept found its place in cinematic vocabulary. Renoir's experimentation, also known as "deep focus or cinematic depth of field", returned from America via brilliant classics such as Citizen Kane and The Best Years of Our Lives. It only took few years for cinematic geniuses such as Orson Welles and William Wyler to put "Renoir's invention" to good use with a finally found answer to one of the most compelling problems in cinematography: how to give a 2D image on screen an illusion of depth. Great tools give creative people command over technology, S3D will only succeed if filmmakers learn how to take command of the "depth of field" as a means to enhance their stories. In order to do so, as history has shown, they may need to turn to classics. This paper will examine and analyze art and film history classics and their experimentation with "lateral depth of field" hoping to shed more light on how classics and their creative wisdom can inspire contemporary producers to help S3D become the most important innovation in film since the use of color in motion pictures.

Keywords: Stereoscopic 3D cinema, Film-projection technologies, Lateral depth of field in cinema, Deep focus in cinema, S3D cinema.

Advances in film-projection technologies and loss of moviegoers caused by the current abundance of new entertainment technologies are the reason for a renaissance in stereoscopic three-dimensional film (S3D). Fueled by a convergence of economic need and technical progress, studios are stepping up their productions of feature films in S3D format. However, claims have been made that recent S3D releases don't offer anything to narrative cinema. After a few minutes the novelty wears off, and audience tends not to notice it. This paper will examine the validity of these claims and propose solutions. In December 2009, S3D movie *Avatar* had a record breaking opening weekend for any S3D film of over \$77 million, and has grossed over \$1 billion worldwide since then. Besides being a really big Stereoscopic S3D hit, one of the distinguishing parts was that it features huge and very detailed scenes and an extensive cast of virtual characters set in computer generated (CG) environments mixed with live people. The primary visual effects vendor on the film, Weta Digital, utilized NVIDIA's Quadro professional graphics solutions and Tesla high performance computing solutions in its visual effects (VFX) production pipeline. The company had to build sequences with as many as 800 fully CG characters in highly stylized digital setting. The computational power required to process the *Avatar* shots was higher than that required by any project Visual Digital effects had faced to date, so they turned to NVIDIA for help, because for the first time in the history of CG visual effects, the number of polygons required was going to be measured in billions rather than in millions.¹ This isn't the 3-D of the 1950s or even contemporary films. The 2010 director uses S3D cinematic technology to amplify the immersive experience of spectacle cinema and close the space between the audience and the screen. However, many reviewers reported that after a few minutes the audience tends not to notice the 3-D anymore. Is this the shape of cinema to come? Undoubtedly many digital spectacles will follow. Therefore, *Avatar*'s real significance is almost certainly as a Research and Development probe for new generations of cinema technologies. *Avatar* is *The Jazz Singer* of S3D filmmaking and a phenomenon that should not be ignored. An extraordinary act of visual imagination, *Avatar* is not the first of the new generation of S3D films, just as *The Jazz Singer* was not the first time people had spoken on screen. But like the Al Jolson vehicle, it's the one that energized audiences about the full potential of the new technology. As with *Avatar*'s S3D technology *The Jazz Singer* role in bringing new technology to cinema was not the one of primacy but commercial success. *The Jazz Singer* was the first commercially successful feature length film to use synchronized sound. As such it helped tremendously in advancing investment in research and development of sound playback technology. After years of expensive failures that had caused sound films to be written off as a dead- end gimmick, the movie industry suddenly realized that that this was the direction cinematic technology was going to take. *The Jazz Singer*'s commercial success helped further research

and development investments which in turn stimulated artistic imagination. For example, Howard Hawks' 1932 film *Scarface* is filled with extraordinary creative ways in which the sound was used. In this film a plethora of "acoustic figures of speech" was invented, there were numerous sound metaphors, sound leitmotifs etc. Addition of sound enhanced cinema and allowed artistic creativity to flourish. The case of Hawks' *Scarface* is a perfect example, a blueprint for today's S3D directors. It shows exactly what they need to do in order to escape from under the S3D "technological gimmick stigma". There is no doubt, S3D technology is here to stay, the only question is how long it is going to take for S3D to find its deserved place among contemporary visual technologies. The example of Howard Hawks' 1932 *Scarface* shows the way; creative applications are the key. Through better understanding of perspective, classic cinema attempts to create 3D on 2D screens and careful analysis of these cinematic masterpieces we should be able to make creative recommendations for S3D directors/producers. First and foremost is comprehensive understanding of the laws of perspective. Perspective is the projection of lines of space and bodies onto a plane. Such an operation thus gives us the impression that the space extends behind the surface of the "cinematic canvas" This does not mean, however, that the projected space is identical with the illusion of reality. There are several systems of perspective which vary with different historical cultures (Egypt, Greece, Byzantium, the Renaissance, India etc.) All these systems represent reality in a different way and were automatically understood by the peoples for whom they were created. It is wrong therefore to judge these systems according to linear perspective and its derivative, modern central perspective. Each age had its own system for expressing its worldview according to its own particular methods. Thus we are not justified in considering one system as closer to reality or superior to another. What is more, perspective is not just a way of creating the illusion of space; it is also a symbolic form in itself. The diversity in the representations of space on cinematic screen provide us with sufficient reasons to study the many theories of perspective that deal with cinematic screen and its image. Before that we need to examine in general terms the possibilities at our disposal for representing 3D space on 2D surface. The most familiar systems of this representation are: Linear Perspective; Perceptive Perspective, Isometric Perspective and Inverted Perspective.²

Linear perspective

This is known today as natural perspective. Its discovery is attributed to Renaissance artist Brunelleschi (-1446). His theory was spread by his students Ghiberti, Massacio and Donatello and aroused great enthusiasm in the 15th and 16th centuries. At that time people thought that a subjective visual impression could serve as the basis for the construction of an objective world, that psychological space was transportable into mathematical space and finally that art was capable of rising to the level of science (Panovsky

1975). The representation of space in depth became possible due to a knowledge of the laws of vision which are based on the following natural phenomenon: straight parallel lines seem to cross in infinity at a point called the vanishing point. In order to represent space and objects in their real position and dimensions on a screen, it is necessary to express the relations between three elements a) spectators eye b) the vanishing point and c) the plane of the screen. By using these elements, an infinite number of structures in three dimensional space is possible. The cursory presentation of linear perspective brings out its characteristic elements, but above all it is a representation of spatial depth. We must be careful however not to consider linear perspective to be a simple instrument for creating a naturalistic illusion. The theory of linear perspective has been the subject of two types of criticism: 1) its subjectivism because it constructs a world on the basis of one point and thus turns veritable being into an ephemeral phenomenon, and 2) its rationalism because, representing reality in a geometric system linear perspective imposes a structure on being and thus destroys the freedom of imagination. These two objections, however, are nearly contradictory.

Perceptive Perspective

In linear perspective everything is subordinated to the principle according to which straight parallel lines meet at the vanishing point on the horizon. This corresponds to a photographic image. The image is built on geometric principles is abstract, but it has the advantage of unity and clarity. In perceptive perspective, other factors come into play, the closer object is to the spectator, the less its lines are governed by linear perspective; the more an object recedes into the distance, the more it conforms to linear perspective. Yet another phenomenon is visible in the mountain on the horizon: it appears larger than in linear perspective. We observe the same effect when we compare a countryside view seen with the naked eye and its photograph. In the picture, the mountain seems to be too small; this is due to the fact that the brain transforms optical impressions. In this process, our minds are influenced by our knowledge of the object, its distance from the observer, the distance between the object and other objects, and the general comparison with other elements in the visual field. The characteristic of this perspective is that space is still a "quantum continuum", but that its continuity does not always have the same density. It is halfway between linear continuity and the broken space of other perspectives.³

Isometric Perspective

This type of perspective represents the object without the deformations of linear perspective, that is the lines of the object remain parallel despite a certain illusion of space. This effect is only possible however, if the object is very close to the spectator. The

parallel lines create the impression that the object has no relation to the surrounding space. The object is itself space, isolated space with its own structures, and has no relation with another element in a whole. Thus the isometric perspective does not indicate a focal point, as does linear perspective which opens itself to the spectator so he can enter into its depth. The isometric object is neutral; it is a simple presence or the statement of a truth, outside of space and time.

Inverted Perspective

There are no philosophical or historical sources that explain why, after the illusionist art of antiquity, Byzantium as well as Western Europe abruptly began to represent the world by reversing the spatial focus. This fact expresses a profound change in the cultural life of the period. As the name indicates inverted perspective is perspective whose structures are reversed in relation to linear perspective. This means that the technical conception of inversed perspective is historically later than that of linear perspective . In fact, research in this area has only been carried out since the beginning of the 20th century. The principle of inverted perspective is simple. The lines of this perspective do not meet at a vanishing point situated behind the screen but at the point in front of the screen. In fact, we cannot really speak of the system whose vanishing point is found in the observer because in inverted perspective picture there is rarely one convergence point, and often each represented object has its own perspective. In the same way we do not find a scale of width, which in linear perspective has the function of representing the lateral extension of space. The people and objects are often not placed in a “proper order” according to distances and dimension but simply set side by side according to a principle of composition and according to the meaning which the objects have in the pictured scene. Thus there is no depth inside the representation; space is reduced, and it extends out toward the spectator. In this way, the focus is reversed; the lines come out from the inside of the image and move toward the spectator. In this sense reverse perspective is the opposite of linear perspective. It is not a window through which the mind must go to have access to the world represented. It is rather a place where a presence is encountered. In the reverse perspective the represented world shines out toward the person who opens himself to receive it. In inversed perspective, space itself becomes active instead of the observer who in fact is acted on.⁴

Classic cinema attempts to create 3D on 2D screen

Filmmakers were inspired by these two studies of perspective and experimented with it. André Bazin noticed it and, in his writings about Jean Renoir’s film *La règle du jeu*, coined the term “Lateral depth of field.” From that moment on this new concept found its place in cinematic vocabulary. Renoir’s experimentation also known as “deep focus or cinematic depth of field”, returned from America via brilliant classics such as *Citizen Kane* and *The Best Years of Our*

Lives. It only took a few years for cinematic geniuses such as Orson Welles and William Wyler to put “Renoir’s invention” to good use with a finally found answer to one of the most compelling problems in cinematography: how to give a 2D image an illusion of depth on the screen. Great tools give creative people command over technology, S3D will only succeed if filmmakers learn how to take command of the “depth of field” as a means to enhance their stories. In order to do so, as history has shown, they may need to turn to classics. Classics and their attempts with perception and lateral depth of field were not unnoticed by critics and film studies experts. However, there were other films and filmmakers that had attempted the same. Those were the few examples of experimentation with depth of field in the mainstream cinema. Unfortunately, their attempts were just that, attempts. There was no follow up and with a great degree of confidence one can claim that cinematic studies of depth of field took another turn in the sixties - multi- imagery. And as a matter of fact with the proliferation of windows (computer technologies and television) multi- imagery dominates mainstream cinema today. However, serious attempts towards studies and experimentation of lateral depth of field were almost abandoned until the appearance of *Avatar*, although there were some attempts in the past that kept this issue alive. I would like to mention two interesting examples from the early 1950s. It is easy to see how these two neglected classics focused their attention on lateral depth of field. The first is Ray Baker’s *Don’t Bother to Knock* (1952) and the second is Kubrick’s (1955) film *Killer’s Kiss*.

In *Don’t Bother to Knock* Jed (Richard Widmark), an airline pilot, after arriving home goes to the McKinley Hotel to meet up with his girlfriend Lyn (Anne Bancroft) who sings in the hotel’s bar. Things turn sour and she breaks up with him without giving him much of an explanation. Retiring to his room with a bottle of cheap alcohol, he notices Nell (Marilyn Monroe) dancing around in her room across the yard. Nell has just arrived in Manhattan from Oregon and is staying with her Uncle Eddie (Elisha Cook Jr.) who got her a job babysitting for some of the hotel’s guests. However, she seems to have been severely traumatized by her ex-boyfriend and doesn’t exactly seem to be the best person to be babysitting eight-year olds. Still, excited by attention the handsome pilot gives her, she invites him over. In this late B noir film British director Ray Baker constructs a very complex set that will allow him to play with depth of field. Jed’s

and Nell’s hotel rooms are both on the second floor of a small hotel and they are facing each other across the atrium. During the daytime the atrium is the source of light but late at night it turns into a dark hole. However, Nell’s window is facing Jed’s, and two lonely souls are both sitting at the “edge of their darkness”. Between them is the atrium, or what is during the daylight supposed to be the source of light. But now it happens to be their way out



of personal darkness, the bridge between them. Jed can see Nell through his window and she can see him. Ironically the darkness becomes the bridge. The two lonely souls each on his/her own edge of loneliness-darkness make contact, and their lives suddenly appear to have meaning. Ray Baker and his art directors (Lyle Wheeler and Richard Irvine) organized their set around the dark atrium between the two rooms. The director used this spatial organization to set up an elaborate mise-en-scene and he very cleverly worked with lateral depth of field. He used all of the above mentioned perspective approaches to create this elaborate visual dance. Their relationship is played within the depth of field in such a way that all three planes played a very important



role in the director’s juxtaposition (foreground, middle ground and background). The director skillfully constructed this visual set-up establishing the dark atrium as a central middle ground around which all action is being played out. His 180 degree reverse angle shots play back and forth between him and her. In a very carefully orchestrated combination of Point of View Shots and 180 degree reversed combination, Baker achieves the illusion of 3D. That illusion is being elevated to a very important metaphor, the pitch dark atrium between them. One can just imagine what Roy Baker could have done if he had S3D technology. It is obvious that both Kubrick, who three years later released his second feature *Killer’s Kiss*, and Hitchcock with his 1954 *Rear Window* owe a lot to Ray Baker. Although Roy Baker was not the first filmmaker to tackle this issue, he was definitely very skillful with preparing his “depth script”. What was certainly novelty was his clear attempt to use all the above mentioned perspective theories. One scene stands out, it involves lateral depth of field Extreme Close Up Shot in the foreground and its reflection in the mirror. Nell was preparing herself to meet Jed. She sat in front of the large mirror and pulled out a small hand held mirror. The shot depth was split in three levels: Background - Large Mirror, middle ground- Medium Waist shot of Nell and foreground ECU Shot of reflection in a small mirror.



The camera tilted down, concentrating only on the image in the small mirror (ECU of scar on her wrist). At the same time the middle ground shot reveals an enigmatic expression on her face (probably wondering if what she was doing was right). The overall master background depth of field in focus reveals another angle of her with the mirror in hand and scar clearly reflected for the second time in the large mirror. Movement of the camera added dynamism to this shot and helped with the 3D illusion bringing with it doubt that metaphorically clouds her past present and future.



Just two years later Hitchcock came up with his masterpiece *Rear Window* using Ray Baker's set-up. Unfortunately, in *Rear Window* only in one shot can we recognize a serious attempt towards 3D illustration and that is the shot that Hitchcock partially owes to Vittorio De Sica (appropriated from *Umberto D*, 1952), the depressed young maid's long tracking POV shot of a cat that walks across the glass roof.



In *Rear Window* there is a similar shot of a cat that walks across the yard. It is a long high angle of James Stuart's panning POV. Both shots include slight camera move, following the cat's elegant walk through space. In both films lateral depth of field and deep focus are certainly contributing not just to the specific mood and states of mind of the main characters but to higher metaphorical meaning.



Killer's Kiss (1955) was Stanley Kubrick's second feature film; he was 26 when he made it. This extraordinary film was a prime example of a directorial attempt to illustrate 3D on a 2D screen. He had borrowed heavily from Ray Baker, the whole set-up design of two "lonely souls" and their windows (apartments) facing each other across the atrium is a blueprint that originated in *Don't Bother to Knock*. However, Kubrick had enhanced it beautifully. The story of two lost souls and their search is very similar in basic concept to Baker's.

As welterweight boxer Davey Gordon paces in New York's Grand Central Station, waiting for the train to Seattle, he reminisces about the events of the past few days: Three days earlier, Davey is in his small apartment, preparing for his bout with Kid Rodriguez. Across the courtyard, taxi dancer Gloria Price gets ready for work at the Pleasure Land dance hall. Although their windows are directly opposite the other, Davey and Gloria rarely notice each other. After they walk out at the same time, Gloria is picked up by her boss, Vincent Rapallo, who teases Gloria about the washed-up Davey being her boyfriend. As the bout begins, Rapallo calls Gloria into his office to watch the fight on television. At twenty-nine, Davey is older than his opponent, and his years of boxing have been frustratingly unsuccessful. As happens whenever he has an important match, Davey's "glass jaw" proves his undoing, and he is knocked out by Rodriguez. Although Gloria is nauseated by the slugging, Rapallo is excited, and soon turns his lustful attentions to Gloria. That evening, Davey receives a call from his uncle George, who urges him to come home to Seattle for a vacation. Despite his deep disappointment in his life, Davey demurs, and soon falls into a nightmare- filled sleep. He is awakened by screams coming from Gloria's room, and when he looks out, sees that Gloria is being attacked by Rapallo. Davey runs across the rooftop and down the stairs to Gloria's room, frightening away Rapallo. Davey then comforts Gloria, who relates that Rapallo had come over to apologize, although for what, she does not explain. Rapallo promised Gloria a secure life and assured her of his undying love, but Gloria, unable to forgive him, ordered him to leave. Rapallo then attacked her, prompting the screams that woke Davey. Davey tucks Gloria in, then as she sleeps, looks over her belongings, including photographs of a man and a woman. The next morning, Davey, instead of asking Gloria what Rapallo was sorry about, which is what really interests him, asks her about the people in the photographs. Gloria tells him that they are her father and older sister Iris, who was a ballet dancer. Gloria relates that her mother died when she was born, and that as the years passed, Iris and her father grew closer, often excluding her. Gloria began to hate Iris, especially after she became an established dancer. Iris was proposed to by a wealthy older man, but when her suitor insisted that she give up her career, Iris turned him down. Iris was forced to accept him, however, when their father grew ill and required expensive medical attention. Gloria, who was a teenager at the time, lived with Iris and her husband on his Long Island estate, where Iris was constantly by their father's side. On the day of their father's death, the hysterical Gloria accused the seemingly calm Iris of never loving their father. Hours later, Iris's husband found her body after she had committed suicide. Soon after, Gloria began work at

the dance hall, which she calls a "human zoo," and there immersed herself in the dehumanizing atmosphere to forget her grief. The couple spends the day together, and Davey is pleased to hear Gloria laugh for the first time. Gloria's somber mood resumes, however, when Davey tells her that he has decided to return to Seattle for good. Upon their return to Gloria's apartment, Davey realizes that he has fallen in love with her, and Gloria responds to his kiss. Gloria agrees to accompany Davey to Seattle, and the couple organizes their finances. Davey calls his manager, Albert, and asks to meet him outside Pleasure Land that night to cash his check from the fight. Albert agrees, and at the dance hall, while Gloria goes inside to ask Rapallo for her final wages, Davey waits on the street for Albert. Furious at being spurned, especially when he looks out the window and sees Davey, Rapallo refuses to pay Gloria. Meanwhile, Davey's scarf has been stolen by two high-spirited conventioners, and he chases them. Albert arrives after Davey runs off, and Rapallo, determined to have Gloria, orders two of his henchmen to beat up the man waiting on the street. While the henchmen are mistakenly beating up Albert in an alley, Rapallo calls Gloria into his office and pays her. When Gloria returns to the street, Davey is waiting, and they decide that Albert must have come and gone already. The couple go to their respective apartments to pack, and when Davey goes to Gloria's window as the manager lets two policemen into his apartment. The policemen reveal that Albert was beaten to death, and that Davey is the prime suspect. Retrieving a gun from his suitcase, Davey returns to Pleasure Land and follows Rapallo after he leaves in the morning. When Rapallo stops at a stoplight, Davey jumps into his convertible and demands to know where Gloria is. Rapallo drives him to the warehouse where Gloria is being held by two hoodlums, who soon overpower Davey. As Davey pretends to be unconscious, he hears Gloria promise to do whatever Rapallo wants if he will spare her life. Suddenly, Davey jumps out the window and runs, followed by Rapallo and one of the thugs. Davey climbs a fire escape to the rooftops, and when a henchman tries to follow the fleeing boxer, he injures his leg. Davey eventually finds an open door and descends into a mannequin factory. As Davey hides, Rapallo enters and knocks out the curious owner. Armed with a fire axe and pole, the two men battle each other among the mannequins, until Davey impales Rapallo with the pole. Back at the train station, Davey finishes his thoughts by remembering that the police judged Rapallo's death to be self-defense and cleared him of Albert's murder after the two hoodlums confessed. Davey ponders having fallen in love with a girl he knew for only a few days, and realizes he will never see her again. Just as he is about to board his train, however, Davey hears Gloria calling his name, and eagerly embraces her.

There are several scenes in this film that have been enhanced by 3D simulated vision. It is worth exploring Kubrick's elaborate design of scenes meticulously constructed to enhance lateral depth of field and the ultimate metaphor that it obviously carries. Most of these scenes depict Dave and Gloria in their apartments. As was the case in *Don't Bother to Knock* their apartments are facing each other across the atrium.





Kubrick enhances this set by insisting on similarity between the two tenants, mirror image of their lonely lives. A young man on one side and a young woman on the other side of this apartment complex. In addition, in order to highlight their similarities the director uses 180 degree reverse line that is accompanied by actual mirrors and actual photographs. Shadows, and light as well as absence of light, are elements that contribute to this lateral depth design. Kubrick plays with this and our understanding of POV with incredible mastery. At the end of each 180 degree line Kubrick placed a mirror, so it is



not just that their lives are a mirror image of one another but that idea “reflects” in reality too. Along the line of sight from his mirror in his apartment through his window across the atrium through her window and all the way towards the mirror on the wall in her room. The two mirrors are facing each other and their lives’ possessions and their lives are all packed along this lateral depth of field line?! In addition, Kubrick plays with these mirrors’ reflections. When Dave leans his back against the mirror in his room and we see him in a waist shot we can also see the reflection in his mirror (behind him) and actually see what he sees, the entire depth of field across the atrium is in front of us (him). In the same shot we can also see her and her “performance” with her mirror on the wall that reflects all of this including Dave and his gaze! Kubrick had organized this elaborate depth of field shot not just to impress us with his visual genius but to offer additional metaphorical context and depth to his story.

Creative Challenges: Stereopsis and Depth Script

This particular example is a proof that a very well thought out story-telling plan existed not just in the head of the moviemaker but in his notes and in his script. With a great degree of certainty we can claim that Ray Baker and Kubrick were among the first stereopsis writers in the history of cinema. The elements of stereopsis include

light and shade, relative size, aerial perspective, motion parallax (a visual clue created by movement whereby nearby objects move farther across the field of view than more distant objects), and, most importantly, occlusion interposition (objects on top or behind other objects) and perspective. There are differences of opinion with regard to whether certain monoscopic (contemporary 2D films) conventions would work when carried over into S3D. One example is “rack focusing” a common film language tool used to shift focus from a foreground object to a background object by turning the focal ring on a lens (in 2D cinema). “Rack focusing” may throw out of focus background (or foreground) in common 2D, drawing audience’s attention to one or the other. S3D technology is based on binocular pattern matching. A blurred background will appear flat in S3D. Rack focusing is just one classic cinematic tool that will have to be adapted to this new cinematic creative vision. Others will certainly follow, let me mention just a few: all moving shots (dolly-ing ; tracking; 360 degree tracking - especially etc.), shots that are defined by the distance between the camera and the subject (object), POV, special and unusual angle shots. Transition shots and shot sequences that we know in 2D cinema will have to be also adapted. Most importantly it is the whole pre-production process that must endure significant change especially in the area of already mentioned stereopsis and depth script. Those are two brand new creative applications that will play a big role in the new S3D cinema. However, in order to be able to produce quality S3D films creative people of this future cinema need to be acquainted with the technology. They should have a good control and understanding of the following: Parallax, Interaxial separation, Screen Surround (refers to visual: left right vertical sides of the window and the north south horizontal edges of the window are called screen surround - reference to perceptual conflict that the brain under certain circumstances cannot resolve), Zero Parallax Setting, Horizontal Image Transition and Viewer Space Effects.

After all this is said it is clear that, unless altered, 2D moviemaking experiences simply will not work if carried over to S3D realm. However, filmmaking has always been and will continue to be a collaborative effort which requires craft, tools and knowledge, all of which help creative people do what they have been doing throughout the last century of cinema. So, it is not a question anymore of if S3D is just a passing fad, it is here to stay not just judging by the number of projects currently in the works but by continuous box office successes. S3D is only marginally more expensive than standard 2D cinema and almost all studios are planning S3D versions of their upcoming releases. It is really only up to filmmakers; if they are willing to use S3D as their storytelling medium then they will have to develop a new creative S3D visual vocabulary not very different from the one created by Baker and Kubrick.

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Notes

- ¹ Autodesk, *The Business and Technology of Stereoscopic Filmmaking*. (2008)
- ² Egon Sendler, *The Icon: Image of the Invisible*. (Okawood Publ. Paris) 1981. *Ibid*.
- ³ *Ibid*.
- ⁴ Idem.



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