

Published by :



**Tom Gunning** is Professor Emeritus of Art History, Cinema and Media Studies at the University of Chicago. He works on problems of film style and interpretation, film history and film culture. His published work (approximately one hundred publications) has concentrated on early cinema (from its origins to the WW I) as well as on the culture of modernity from which cinema arose. He is the author of *D. W. Griffith and the Origins of American Narrative Film* and *The Films of Fritz Lang: Allegories of Vision and Modernity*. He has written on the Avant-Garde film, both in its European pre-World War I manifestations and the American Avant-Garde film up to the present day. He has also written on genre in Hollywood cinema and on the relation between cinema and technology. The issues of film culture, the historical factors of exhibition and criticism and spectator's experience throughout film history are recurrent themes in his work.

# 3-D: REALIST ILLUSION OR PERCEPTION CONFUSION? THE TECHNOLOGICAL IMAGE AS A SPACE FOR PLAY

TOM GUNNING

The University of Chicago

## Abstract

*This paper seeks to explore the ambiguities of the devices of stereoscopic imagery both moving and still. Since the invention of the stereoscope there has been the claim that stereoscopic images gave a more complete representation of their objects by adding an appearance of three-dimensionality. However, it has also been acknowledged that stereoscopy creates merely an optical illusion of three-dimensionality, one which presents its own perceptual ambiguities. Moving from the issues raised by Jonathan Crary in his discussion of stereoscopy in *The Techniques of the Observer* to the history 3-D films, this paper explores how the tension between an illusionist approach of fooling the senses into believing an image and an outright challenge to representation which fosters the contradictions of stereoscopic images has made 3-D a dynamic aesthetic form. I will discuss both commercial films, such as the late *Transformers* series, as well as avant-garde works by Ken Jacob and The OpenEnded Group (Marc Downie and Paul Kaiser).*

**Keywords:** 3-D devices; avant-garde; Virtual images; stereoscope; Ken Jacobs; Openendedgroup

What sort of image is a 3-D image? Britt Salvesen's wonderful catalogue for her 2018 LACMA exhibition *3-D Double Vision* usefully articulates the 3-D image into five categories: Stereo pairs; Anaglyph; Polarization; Lenticular and Holography (Salvesen, 2018, p. 1). Undoubtedly, one could subdivide further or create alternate categories, but this parsing of the field reveals a key aspect of my question: 3-D images are images created through particular optical processes and devices. To use a term I will define later, the 3-D image is a technological image.

In this paper, I will not primarily explore the technical intricacies or varieties of 3-D, but rather discuss 3-D images *qua* images. Salvesen's introduces her catalogue with a phrase that indicates how high the stakes in defining the 3-D image can be. She talks about: "The quest for a perfect image – that captures reality as it is perceived in full chromatic and volumetric detail" (Salvesen, 2018, p. 9). This shorthand definition of the perfect image has been rattling around in some form for decades – if not longer. Film theorist Andre Bazin called this "the myth of total cinema", which, he claimed, the various inventors of motion pictures had already envisioned at the close of the nineteenth century: "in their imaginations they saw the cinema as a total and complete representation of reality; they saw in a trice the reconstruction of a perfect illusion of the outside world in sound, color, and relief" (Bazin, 1967). The pursuit of the perfect image has been not only an eternal myth, but also an actual technological project. Yet it creates its own contradictions. If we have the perfect image, what need is there for the original? Or, if we have the original,

who needs an image that perfectly reproduces it? The perfect image, by fulfilling the ideal of representation brings the very process of representation into question. Oliver Wendell Holmes sr., inventor of the most popular form of stereoscope and one its first theorists, envisioned the consequences of such a perfect image wryly: "Form is henceforth divorced from matter. In fact, matter as a visible object is of no great use any longer, except as the mould on which form is shaped. Give us a few negatives of a thing worth seeing, taken from different points of view, and that is all we want of it. Pull it down or burn it up, if you please." (Holmes, 1980, p. 80). Salvesen is well aware of the aporia that the pursuit of the perfect image entails. She cites Jorge Luis Borges' famous description of the "Map of the Empire whose size was that of the Empire and which coincided point for point with it" (Salvesen, 2018, p. 124).<sup>1</sup> However, rather than seeing the paradox of the perfect image as a dead end, I believe it can open up new ways of thinking about what an image is and that the 3-D image allows us to rethink the nature of representation in our technological era.

The initial claim made for the 3-D image emphasised its realism, the obvious (but not so easily described) quality of the perfect image. 3-D images seem to offer a fusion of the visual image with a virtual sense of tactility, of solidity and relief, implying we could reach out and touch the objects we see. Publicity for 3-D devices claim that they capture the way our eyes see the world. The slogan for the photographic device of the Stereo Realist 3-D system introduced in the late 1940s is revealing: "The camera that sees the same as

<sup>1</sup>) Borges' fable can be found in Jorge Luis Borges, *Collected Fictions* (trans. Andrew Hurley) (London: Penguin Books, 1998), p. 325.

you” (Drysdale, 2018, p.100). This seems simply to claim that the photograph perfectly reproduces human eyesight. But in their publicity another claim underlies this: “the Stereo Realist system is different from other cameras”. Thus the uniqueness of a 3-D image is not just that it matches our vision, but that the image it produces is *different* from other images. Rather subtly, this claim switches our focus from capturing the world as we see it, to a claim about the nature of the image itself.

So how is a 3-D image different from other images? Perhaps most significantly, the 3-D image is a virtual image. As Holmes stressed about the stereograph, in spite of its claim to an experience of solidity and implied tactility, the image we see is immaterial. We hold the stereoscope in our hands, but the image it produces swims before our eyes. We perceive it, yet we cannot place it. As Salvesen says, “the stereoscope effected the leap from pictorial image to virtual space” (Salveson, 2018, p. 9). Let us consider the gap that leap clears. The 3-Dimensional image that a stereoscope or a 3-D movie creates is not embodied: that is, we cannot hold it in our hand. The defining reaction to a 3-D image is to attempt to touch or grasp it – or ward it off as it emerges towards us, – an attempt that always delightfully fails. I would claim that this uncanny experience of perceptual contradiction – there, and yet, *not* there – defines a core attraction of the 3-D image, a sensation at least as vivid as its impression of reality. Traditionally a realist image is understood as an image that doesn’t seem to be an image at all. Zeuxis’ painting of grapes that birds apparently think are real and therefore try to eat supplies the classic example: in other words, an illusion. In the totally realist image, there appears

to be no mediation, no canvas that separates us from what is represented. But paradoxically the supposedly realist 3-D image never lets you forget that it is an *only* an image. Take the stereoscope as our clearest example; it remains before us, even rests in our hand. The device is not the image, but it indisputably causes us to see it. The image is an effect of the device. We cannot get away from it.

This, then, is my working definition of the technological image, of which the 3-D image is one example:

A class of images produced by a technical viewing device. The image’s manifestations consist in its appearance and effects rather than in being embodied in a material object, such as a painting or photograph. It requires an observer, a witnessing subject, but not simply to look at the image; rather the observer must interact with the device so that their perception creates the image through the mediation of the technical device.

The technological image is a perceptual effect triggered by a device designed for that purpose. It uses aspects of human visual perception to produce an image with specific qualities, relief in the case of 3-D images. My principle point about the nature of the technological image lies in its triangular relationship: not just an image as a representation of something else, but a relationship between a human perceiver, a technological device and an image which is a product of this interaction. Instead of simply portraying something, the technological device causes the viewer to reflect on this triangular relationship. The 3-D image is “about” perception as much as it is “about” an emerging sea monster or an archeological ruin.

The Technological image can be described as a virtual image, a term which has a variety of meanings.<sup>2</sup> I will deal primarily with the concept of the virtual as it has developed in relation to digital media. The *Oxford English Dictionary* (OED) gives this definition under the subcategory of *Computing*: “Not physically existing as such but made by software to appear to do so from the point of view of the program or the user.”

But the term has deeper roots and existed long before the computer. Rob Shield, discussing the Virtual as a “key idea”, observes, “Virtue means the power to produce results, to have an effect” (Shield, 2003). *Webster’s Third International Dictionary Unabridged* stresses the non-material nature of the virtual, even before cybernetics, defining it as “relating to, or possessing a power of acting without the agency of matter.” Thus a virtual image in this context indicates the appearance of an image lacking physical embodiment. But besides its immaterial nature, the term stresses it as an effect, its manifestation of the power of the device. The primary meaning of its Latin root *virtus* is force, power or efficacy. In classical mechanics, *virtus* was the Latin translation of the Greek term *δύναμις* (*dynamis*), a conception of power as potential, distinct from an actually operating force. Virtue referred to power *in potentia*, a power lurking within or behind things. Thinking of the 3-D image less as a representation, than as an effect, opens up a more dynamic approach to the term. A virtual image becomes an image which has power over us, that affects us, often viscerally.

Art historian Jonathan Crary’s account of the stereoscope in *Techniques of the Observer* reconsidered its supposed realist effect (Crary, 1990). Crary’s archeology of the stereoscopic devices of Charles Wheatstone, Sir David Brewster, Holmes and others, demonstrated that the device came out of the nineteenth century scientific exploration of the physiology of vision that Crary calls “subjective vision”, images we see that may have no material existence in the exterior world, such as afterimages. This scientific examination of vision motivated the original construction of the stereoscope, more directly than any desire to achieve “the perfect image” of realism. As Crary points out, the stereoscope’s effect of relief is variable and its depth is different from that found in painting or photography: “the fundamental organization of the stereoscopic image is *planar*. We perceive the individual elements as flat, cutout forms arrayed as either nearer or further from us” (Crary, 1990, p. 123). He concludes: “Thus stereoscopic relief or depth has no unifying logic or order. If perspective implied a homogenous and potentially metric space, the stereoscope discloses a fundamentally disunified and aggregate field of disjunct elements.” Crary foregrounds the way the stereoscope interrelates all points of the triangle that define the technological image: the human perceiving subject, the technological device and the images they produce in concert. The optical devices of the mid-nineteenth century therefore have a complex relationship to representation: “The optical experience they manufacture are clearly disjunct from the images used in the device. They refer as much to the functional interaction of body and machine as they do to external objects, no matter how ‘vivid’ the illusion” (Crary, 1990, p. 132).

2) See my essay, “Moving through Friedberg’s Properly adjusted Virtual Window” in Edward Dimendberg (ed.) *The Moving Eye: Film, Television, Architecture, Visual Art and the Modern* (New York: Oxford University Press, 2019), pp. 13-31.

A technological image in this context serves less as a means of conveying a perfect image of the world and its objects, or even reproducing human binocular vision, than allowing us to experience perception itself at work – or better – at play.

I want to stress the *play* of perception in 3-D imagery. By invoking “play I summon up a realm of delight that seems to have no purpose: the opposite of work, pure delight in movement. But I also intend a more technical meaning: flexibility, as the *OED* puts it, “Esp. in a joint, mechanism, etc.: freedom or room for movement; the space in or through which a thing can or does move.” Play indicates the back-and-forth movement of a joint or lever that keeps a mechanism from becoming rigid. I relate this not only to the playful surprise that the 3-D image elicits, but to one of its fundamental aspects which is often seen as a failing. I mean the often gradual appearance of the 3-D effect, the time it can take for a person to see depth or relief in an image. Salvesen quotes mathematician Henry Viubert in his 1912 book of three-dimensional illusions *Les Anaglyphes geometriques*, instructing readers to have patience when viewing his illustrations through the red and green glasses he provided:

Actually, the image does not necessarily appear all at once to the inexperienced observer ... you still need a little more patience, you need to apply yourself really to possess the anaglyph; the moment comes you see it rise and plant itself in front of you; it looks as if you could touch it, grasp it, and follow its contours with your hand. It's a strange striking thing to see. (Salvesen, 2018, p. 11)

This temporal dimension to perceiving the 3-D image varies, of course, from person to person and as well as from device to device. For instance, I, like Mr. Pitt, in a famous episode from the TV series *Seinfeld*, have a great deal of trouble seeing the autostereogram “Magic Eye” images. At the height of their popularity, one’s ability to see this illusion fostered competition as much as irritation. Even with devices that seem easy to master, a concern remains that I might not *really* be seeing this, that it might just disappear. This causes a certain vertigo about losing purchase on the image. This can be a source of frustration and may be a reason certain viewers dislike 3-D or complain of headaches. But, unquestionably, the adventure of uncertainty is also part of its attraction. Salvesen quotes abstract animator Oskar Fischinger’s comment on viewing his own stereoscopic paintings:

If you should not succeed at first, don’t feel discouraged. Perhaps at another time you will succeed. You are only postponing the moment of your discovery and joy. You still have it ahead of you. New conclusions, ideas, consequences spring out of space paintings. (Salvesen, 2018, p.84)

What some viewers might experience as a technical flaw, Fischinger sees as a source of joy whose postponement may be as pleasurable as delivery.

Differing receptions of 3-D images exist, corresponding to different desires and regimes of pleasure. Between the extremes of the “perfect image” of realistic illusions of depth and volume and the highly imperfect, perpetually transforming play with one’s perception, there exists less a logical opposition

than a dialectical interaction. There are not simply two receptions of the 3-D image but two traditions: the illusionist and the avant-garde. These traditions differ, but they also intertwine and can fertilise each other.

The list of modernist artists who have worked with the 3-D image is rather long and certainly distinguished. While these works vary enormously, all explore the fault lines within the 3-D image rather than pursuing a realist/illusionist end. But the interchange between these extremes can be fruitful. On the advice of avant-garde filmmaker Ken Jacobs, I went to an early Imax 3-D fiction film taking place in a space station (I think it was *L5 The First City in Space* from 1996). I sat before the giant screen wearing a bulky helmet with polarised lenses, enduring the bad acting, silly plotting and wretched dialogue, and yet ... absolutely captivated by the feathers on a character’s costume, which ruffled slightly as she moved. I felt as though I was seeing cinema for the first time, experiencing the pure phenomenology of cinematic texture and movement. It was my friend, the late master avant-garde filmmaker Phil Solomon, who told me to see *Transformers 4 Age of Extinction* in 2014. Michael Bay’s spectacle brought to life the apocalyptic possibilities of stereovision that Oliver Wendell Holmes had described, as the intergalactic Transformers demolished the skyscrapers of my hometown Chicago on the screen, and provided a compelling allegory for the extinction of the movie theatre as a way of life. My point here is not to collapse the difference between multi-million-dollar special effects blockbusters and the work of filmmakers with limited means expanding their medium into the third dimension. But

even explicitly commercial 3-D films can open up new habits of vision and reveal unexpected dimensions of the cinema experience. Ken Jacobs put this well in an interview:

I recently saw the Harry Potter film in 3D. Now we haven’t kept up, have no idea about the Harry Potter story, couldn’t understand what people were doing, what they were saying, nothing, seemed stupid. But the effects that could be done to make the impossible happen, and the impossible was incredible. The possible and the impossible. They could take the possible, and also take the impossible. Amazing. So, there was something very important about seeing that there is that strain in movies, of moving towards that: asking *what’s real?*<sup>3</sup>

In 2010, the Pulitzer Prize-winning film critic, Roger Ebert, greeted the recent (and now apparently dead and gone) upsurge in 3-D feature films with an angry denunciation entitled “Why I Hate 3-D Movies (and you should too)”. He cobbled together a number of objections to the form, both traditional (“It can create nausea and headaches”) and economic (“Theaters slap on a surcharge of \$5.00 to \$7.50”) and a few that might be called aesthetic, culminating in the claim, “I cannot imagine a serious drama, such as *Up in the Air* or *The Hurt Locker*, in 3-D”. Indeed, I could apply another one of Ebert’s objections to my own experience of 3-D: “It can be a distraction.” Yes, 3-D did distract me from the stories of these films (which was often a blessing). Being distracted from the drama led me to a different engagement (physical as well as emotional) with

3) Ken Jacobs, Interview with Michelle Menzies, Oct. 2011 (unpublished).

the image. I was not absorbed by an unfolding drama, but was made aware of an intense sensation of a new dimension. Which is better?

If 3-D's success in immersing us in serious drama, or even in the realm of fiction, can be debated, I am proclaiming its power in a different sort of cinema: 3-D's role in works that focus precisely on our perception, that explore the outer reaches of 3-D vision by complicating our relation to the effects of depth and solidity. The ambition to reproduce ordinary vision through 3-D finds little place on the agenda of this cinema. Ken Jacobs stands primary among these artists for both the depth and breadth of his treatment of 3-D. Jacobs has explored 3-D effects for at least four decades, experimenting with a range of devices and methods (from anaglyph to polarisation to shutter systems and Pulfrich filters – as well as his own patented process “eternalism”, which requires no glasses and has triggered depth perception even in one-eyed viewers). The prolific nature of Jacobs’ 3-D work over the last two decades will require at least another decade to thoroughly explore every nook and cranny of his exposed universe. So, I can only offer a few inadequate observations in this essay. Rather than pursuing greater realism in the image, Jacobs often calls his method “2 and a half D” precisely to accent its difference from the conventional pursuit of an illusionist third-dimension. Jacobs’ devices include homemade projection systems, which he calls the Nervous Magic Lantern, generating images and sounds to create the delight (and sometimes terror) that occurs when a master craftsman plays our perceptual mechanism like a keyboard. Jacobs deconstructs conventional cinematic images, allowing us to experience our minds and sensorium as they are being re-programmed by his work. He demonstrates that the

seeming solid world of repression that we ordinarily dwell in actually possesses points of exit and entry not normally noticed.

And yet Jacobs’ work does not entirely contradict the traditional experience of 3-Dimensional depth. One of my most powerful experiences of Jacobs’ 3-D was a film he projected in the late 1970s under the title, as I recall, *Rehearsal for the Russian Revolution*. He distributed to the audience a small piece of polarised film and a bit of tape which we were supposed to attach over one eye. This primitive device would create a 3-D effect as the spectator watched an amazing film Jacobs had shot of a record snowfall in a housing development in Binghamton, New York where he taught at the State University. The footage was shot from a moving car gliding past the still virginal snow heaped over suburban lawns on a bright sunny day. Simultaneous with this surfeit of the visual, Jacobs played a recording of the then best-selling self-help book *The Sensuous Woman* describing the proper technique for fellatio. This vertical montage of sound and image, cradled within the hallucinatory depth of a mobile tour of American suburbia, created a total effect I will never forget. The technological third-dimension, exaggerated by the car careening down the orderly grid of suburban streets, seemed to both capture the dream of middle-class life and deconstruct it at the same time. Cinematic depth and movement immersed me in the scene, as I peered through my precariously attached frame of film. This low-budget device transformed the flat screen in front of me into a deep portal leading to the good life and its pleasures, but with an underlying awareness of its fragility.

When the screening was over, and the lights came up in the auditorium, I became brutally aware of my physical participation

in the spectacle I had just watched. As a devoted cinephile, I sat in the front row close to the screen and the glare reflecting off the snow had hit me directly. Since our eyes cannot adjust separately to light levels, the eye cloaked by the dark piece of film caused the iris of my other, naked and exposed, eye to open widely. This dilated pupil, open to the onslaught of reflected light left me, in effect, snow blind from the film I had just watched. When I looked around me through this eye, the world became suffused with red and barely visible. For the next hour or so I was terrified that Jacobs’ film had altered my vision forever. It *had* – but fortunately not in the way I feared, since that effect slowly wore off after an hour or so. But an awareness of my vision as an integral element of the film experience remains to this day.

Jacobs’ 3-D includes both stereoscopic footage he has shot of the environment surrounding him, and his own interventions into images that were shot by others. By subjecting this found footage to the scalpel of his various 3-D methods, he uncovers the hidden pathways that connect our nervous systems to cinema’s secret logic. In the anatomy theater of Dr. Jacobs, I have watched him dissect newsreels of WWII, French porno from the twenties, train rides from the turn of the century, chase farces staged in a New York Studio in 1905, the hilarious doings of vanished comedians, and the surging crowds of city streets – all flayed and opened, frame by frame to my astonished gaze. Through his intervention, the unconscious of the cinema has been made to speak its deepest desires.

Even seemingly innocent stereographs have been brought to life through the process Jacobs has devised and named

“eternalism”. Through a pattern which alternates frames bearing images with interspersed black leader, Jacobs simultaneously dissects and resurrects the frozen motion caught in the stereographic pairs of forgotten parlour amusements. His method causes them to rotate and flicker before us like shades of the dead condemned to endless repetition in some photographic Tartarus. Like a blinking eyelid, the black frames rhythmically eclipse these images, and open a new dimension beyond their seeming stillness. The inherent creativity of the human perceptual system leaps into that brief black abyss, and discovers in it the roots of cinematic motion. As Jacobs once said to me, “it doesn’t work without the flicker”. He describes his transformation of stereograph images this way:

But the old stereographs, you just sat there. You can sit there for easily an hour and watch a movie with your eyes moving around within the space. Do you ever look at those pictures? One can roam within them for a long time, and move. Something I’m trying to do is to give them back something of the third dimensional. I want them to have *weight* and *reality*, I don’t want them to just be a picture. The 3D effect triggers that: it made it real. And at the same time that it’s black and white, and scratched, and coming through a media – a real, historical medium. (Menzies, 2016, p.50)

Like atomic fission, Jacobs’ series *Capitalism versus Slavery/Child Labor* releases from these frozen images the roar of endless rows of machines consuming, like a modern Moloch, the lives of worker-children; or the heat of a sun boiling over a field of cotton picked by slaves whose lives barely mattered

other than as the means of production for their owners. The realism of Jacob's third-dimension has little to do with reproducing the world the way we see it and everything to do with turning our received images inside out so that the seamy side of life lies open to view.

On the cusp of the modern holocaust that would destroy so many innocent lives, including his own, Walter Benjamin famously described the possibilities of new visual media:

Our bars and city streets, our offices and furnished rooms, our railroad stations and our factories seemed to close relentlessly around us. Then came the film and exploded this prison-world with the dynamite of the split second, so that now, we can set off calmly on journeys of adventure among its far-flung debris, we calmly and adventurously go traveling. ... Clearly it is another nature which speaks to the camera as compared to the eye. Other above all in the sense that a space informed by human consciousness gives way to a space informed by the unconscious. (Benjamin, 2003, p. 265-266)

Rather than reproducing our normal eyesight, the processing of the technological image in the hands of someone like Jacobs offers us something else, another way of seeing, and exposes the possibility of a different world. Jacobs' work opens the space between spaces, inserts an awareness of our role into the seemingly tranquil flow of film frames. Between each burst of cinematic light occurs the darkness of the flicker and in that darkness both dreams and nightmares are born.

I will close my remarks by briefly discussing a 3-Dimensional digital work that the Openended group (consisting of Marc Downie and Paul Kaiser) made in collaboration with Jacobs, an attempt to deliver the fourth-dimension of sound, called *Ulysses in the Subway* completed in 2016. Downie and Kaiser have taught me the ways the array of digital pixels can catch and transform information, serving both as a tool of analysis and a mode of creation. The complex multilayered image that a digitalised 3-Dimensional image can provide seems to penetrate the very fibre of materiality and visual experience, so that the tissues of our eyes and the integuments of objects come apart and circulate together, intertwining, and outlining a new sort of space: digital, cybernetic, surely, but also where the human eye and technology meet. The Openended group accomplish this not only by refashioning works of art (dance, films, a medieval chapel, a Roman sarcophagus,) but also exploring the infernal-seeming environments of daily life, as in their series of works filmed in Detroit, in which abandoned industrial spaces, the pavement of streets, and the corridors that slice through urban space are transformed by digital three-dimensional means. *Ulysses in the Subway*, a work of collaboration among Jacobs, Downie and Kaiser, began with an audio work by Jacobs, a recording of a journey he took, largely on the subway, from midtown Manhattan to his downtown loft.

Jacobs tasked Kaiser and Downie with a seemingly impossible request: to render sound visible, without being representational – and in 3-D to boot. The visual aspect of this piece is primarily abstract, with brief quotations from more tradition motion pictures sources: a 1905 film of the New York subway, and snippets from a Betty Boop cartoon. On the screen

we mostly see a constant interlacing and untangling of light-etched lines against a dark matrix. Downie once described what he and Kaiser created as a three-dimensional wire sculpture several miles long. Of course, in cinema, space becomes time, and those miles of sculpture are traversed in motion. This constantly animated three-dimensional entity was produced by manipulating Jacobs' sound track. To quote from the Openended group's description:

What you **see** are extraordinary detailed animations that reflect the fact that for every 1/24th of a second, there are 2000 audio samples recorded. Each frame, then, is built from these 2000 sources. **Built:** that is, constructed in 3D from more than 20 different ways of algorithmically analyzing and visualizing sound. So that while the sound is always pictured accurately, the way it's pictured can switch on a dime. These switches re-tune your eyes and ears; you perceive the world anew.<sup>4</sup>

This radical re-arrangement of the senses (seeing sound as an image, while imaging scenes corresponding to the complex soundscape we hear), sketches a modern Odyssey recalling Leopold Bloom's walk through Dublin. But we don't only move along this visual artifact of interlacing lines; the pattern itself moves, instinct with life, responding constantly (but in often unpredictable ways) to the sounds we are hearing. This is not simply a converging line of sight leading us into perspectival depth. It vibrates and recoils, moves towards us and away, leaps in different rhythms, coils in new configurations,

bounds up and shrinks, dancing, but also chasing after the sound we hear. Jacobs' aural Odyssey moves into the subterranean depths of the city, where it encounters not only modes of transportation, but also the often seraphic music of crowds of fellow New Yorkers as they push through, pursuing their individual missions of purpose or loitering in the in-between. The twisting lines we follow threaten to turn the subway track into a labyrinth, where we might get lost or encounter voracious monsters. But with the aid of the jaunty step inherent in the soundtrack and the Openended group's images offering an Ariadne's thread, a clue to guide us through, we manage to make our way with pleasure. Returning home, Jacobs/Ulysses emerges from the underground and ascends the laborious stairway to his loft home where he is greeted by Penelope cum Betty Boop aka Flo, Ken's wife and collaborator. We recognise the sonic landscape of domesticity as clearly as we heard the clamour of the voyage home through urban space. The wanderer comes home again.

What odyssey have we been tracing here through the familiar terrain and pathways of the everyday? The 3-Dimensional animated line that not only traces the route but also transcribes its energy and sound, allows us to hear and see the mysteries that lurk around the edge of every image, beyond the borders of every frame. Our whole perceptual mechanism, mind and eye, dwells in the space between successive frames, holding it all together – or stretching it as far as it can go. Instead of a familiar predictable plotted space, we travel in a realm whose only limits are our openness to the world and to our own vision and hearing. The images and sounds produce an

4) Retrieved from <http://openendedgroup.com/artworks/ulysses.html>

ultimate space for play where we can discover how unexpected the familiar everyday can be.

Shield, R. (2003). *The Virtual (Key Ideas)*. London: Routledge. Kindle edition Taylor & Francis e-library.

### References

Bazin, A. (1967). The Myth of Total Cinema. In Hugh Gray (ed. & trans.), *What is Cinema?* Vol. 1 (pp. 17–22). Berkeley: University of California Press.

Benjamin, W. (2003). The Work of Art in the Age of its Technological Reproducibility (Third Version). In H. Eiland and M. Jennings (eds), Harry Zohn and Edmund Jephcott (trans.) *Selected Works* Vol 4 1938–1940. Cambridge: Harvard University Press.

Crary, J. (1990). *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. Cambridge: MIT Press.

Drysdale, E. (2018). Stereo Realist: “The Camera That Sees the Same as You”. In B. Salvesen (Ed.), *3-D Double Vision*. London: Prestel.

Holmes, O. W. (1980). Stereoscope and the Stereograph. In Alan Trachtenberg (ed.) *Classic Essays on Photography*. New Haven: Leete’s Island Books.

Menzies, M. (2016). On Cinema as Media: Archeology, Experience, Digital Aesthetics (Dissertation). University of Chicago.

Salvesen, B. (2018). *3-D Double Vision*. London: Prestel.