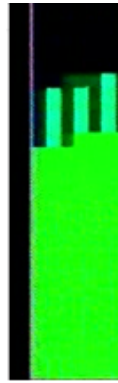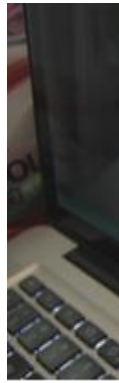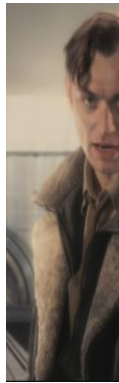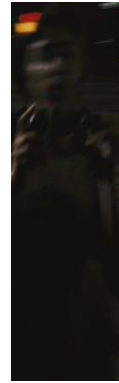# Rupture and Recuperation:

Technological Traces in Digital Narrative Cinema.

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ABSTRACT

In this thesis I analyse visual traces of digital technologies in narrative cinema as a way of exploring broader questions about the medium and the cultural status of its technological constituents. In so doing, I not only identify a number of areas of filmmaking that are currently under-researched or overlooked, but move the focus away from the questions of what digitisation means for cinema's 'identity', and towards a consideration of how the implications of digitisation are at once exaggerated in rhetoric and tempered in practice by aesthetic, ideological, and economic factors.

To do this, I focus on recent narrative films (1998-2013) in which digital filmmaking technologies are themselves salient features of the cinematic image. I argue that initial appearances of these digital traces are presented and received as disruptive, in that they appear to symbolise both a break with the ontological assumptions of cinema, and the potential to re-imagine the very notion of the medium itself. However, I demonstrate how each of these disruptions are, to differing extents, soon absorbed into the conventional formal structures of narrative cinema, such that their ultimate effect on the medium is to broaden its stylistic palate rather than to radically transform its identity.

In so doing, I make four main scholarly contributions. Firstly, I provide an account of digital cinema contextualised in relation to the broader use of digital image technologies over this time period. Secondly, I use the technological trace as a locus for exploring intersections of aesthetic, ideological, and industrial factors in the production of these films. Thirdly, I temper hyperbolic reactions to digitisation by stressing continuities with, and echoes of, the history of analogue narrative cinema. Finally, I demonstrate how digital ontologies are shaped by popular discourses, and how these reinforce, qualify, and in some instances, contest, existing scholarly debate.

Dedications

Elizabeth June Barton (1930 -2015)

Frank Barton (1952 -2012)

Frank Marshall Barton (1921-2014)

Acknowledgments

Table of Contents

List of Figures

Introduction

In an early scene from the horror movie *Paranormal Activity* (Oren Peli, 2007) a digital camera exudes a disruptive presence, both within the fictional world of the film and as a feature of the cinematic image itself. In keeping with the conceit of the "found-footage" genre, *Paranormal Activity* presents itself in the form of digital video files 'recovered' from the scene of a domestic murder. For much of the film, the camera is operated by Micah, one of the film's protagonists, with its viewfinder functioning as the audience's point of view within the diegetic space of the film. Since the arrival of his fiancée Katie, Micah's house has been the site of a series of strange occurrences which Katie attributes to a demon that has haunted her since her childhood. Unconvinced by this explanation, but relishing the excuse to buy a new toy, Micah purchases an expensive high-definition (HD) digital camera with which to document the strange goings-on. Unfortunately for Micah, the demon interprets this documentary-making as an attempt to communicate and responds by possessing Katie, using her to murder Micah. However, it is not just within the story space of the film that the camera proves disruptive. In one particular sequence set in the couple's en-suite bathroom, Micah films Katie as she prepares for bed; Micah's reflection, and that of his camera, appear in the mirror (Fig. 1). In this shot, the technology that was actually used to produce the cinematic image is present in the image itself, paying testament to the act of filming in a general sense, and the process of digital image capture more specifically. This optical reflection in turn invites a philosophical reflection, not only upon the technological artifice underpinning the cinematic image, but upon the pace at which these digital technologies develop and proliferate, given that it is not inconceivable that this kind of camera would be used to produce a home movie by an American couple in the late 2000s.
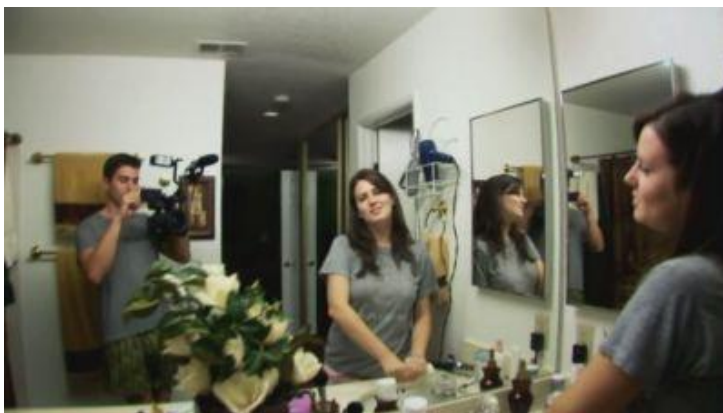
Figure 1: Reflections of, and upon, digital technologies in *Paranormal Activity*.

This thesis is concerned primarily with these moments, in which ostensibly disruptive technologies appear in the cinematic frame and invite questions about the relationship between the cinema medium and its technical constituents. Such ruptures can take the form of the example from *Paranormal Activity*, in which the actual digital camera used to capture the pro-filmic image is incorporated into the film's story-space. Alternatively, they can be found in the highly stylised composite images of the so-called "digital backlot", whereby live-action footage is self-consciously redeployed in state-of-the-art animated environments. Or these traces may take the form of deliberate or accidental malfunctions which speak of the concealed electronic processes that help produce otherwise 'seamless' digital images. What unites these various traces and makes them particularly attractive as objects of study, though, is how they are characterised by their presentation and reception. Typically, initial appearances of digital technologies are framed and received by their creators and audiences as formally or ontologically disruptive, threatening to destabilise the underpinnings of cinema or to radically expand its expressive facilities to unimagined new heights. Subsequent iterations, however, find these technological traces absorbed into the conventional formal structures of narrative cinema, amounting to modest reform rather than fundamental revolution. Upon closer inspection, then, the significance of these traces lies more in what they reveal about the cultural status of the cinema medium and its technological constituents at a particular historical moment than in what they reveal about their present or future creative possibilities. Like Micah pointing his camera at the bathroom mirror to record his girlfriend 'changing', these films reflexively document their own technological transitions.

In turn, this observation invites more questions, the most pressing being one of characterisation, namely: how might we typify this process? In answering this, it is important to note that these traces reflect the intertwined concerns of formal experimentation, innovation in film and related communications technologies, changing industrial environments, and an array of discourses surrounding the abstractions and practicalities of 'the digital'. As such, any satisfactory investigation into this phenomenon needs to place itself at the crossroads of these aesthetic, economic, and ideological factors. With this in mind, I offer the phrase *rupture and recuperation* not only to characterise this process, but also to set the parameters within which a discussion can take place about the various junctures between media aesthetics, histories of technological change, and associated cultural values. 'Rupture and recuperation' is thus a starting point from which to explore these multiple intersections and address the further questions that might arise: How unique is this historical juncture in relation to the broader history of technological change in cinema? What does the framing and reception of these traces reveal about the

cultural status of digital technologies? How might we reconcile the notion of visual 'ruptures' to the story-telling structures of narrative cinema, and what does this tell us about the ongoing evolution of the medium?

To answer these questions in turn requires the reconfiguration of existing scholarship on digital cinema so that it speaks to both histories of cinematic technologies and theories of wider digital culture[s]. I demonstrate that a key strand of scholarship on digital cinema tends to be concerned with questions of the medium's ontological status. Though this is an appropriate response to what are, in many ways, disruptive changes, I suggest that subsequent scholarship needs to develop a wider sense of the forces that contribute to the formation of cinema's ontology, and pay attention to how and why digital cinema has maintained considerable narrative and formal continuities with its analogue predecessor. Taking a broader approach, I draw on a nascent body of work about the relationship between technological change and cinematic form so as to locate my account of this particular juncture in the medium's wider history. So doing offers a consistent perspective from which to intervene in debates regarding specific aspects of digital cinema and connect them to discussions of wider historical and industrial concerns. Finally, I engage with theories and histories of digital culture, particularly those which posit a new cultural dominant, distinct from postmodernism, which is founded upon digital technologies and their creative and commercial applications. Such an approach allows me to explain how the framing and reception of these traces reveals and complicates dominant contemporary ideologies of digital technology.

In order to achieve this, I divide the thesis into five main sections. Chapter 1 establishes a conceptual framework with which to best explore the process of rupture and recuperation in digital narrative cinema, and, in so doing, constitutes a review of existing relevant scholarship. Chapters 2, 3, and 4 take the form of case studies, each illustrating a distinct instance of rupture and recuperation: these focus on DV cameras, digital backlots, and glitches, respectively. Each of these instances is placed on a broader continuum of rupture and recuperation which considers how complete the recuperation is, could potentially be, and in some instances, speculates as to the hypothetical extent of rupture in the absence of restraining factors. While the three chapters are structured as individual case studies, rather than a step-by-step advancement of a thesis, they nevertheless contribute to a broader discursive project with regards to the technological trace. Connections and similarities are noted, but more importantly, contrasting versions of the trace and their different narrative and rhetorical functions are emphasised, so as to fully appreciate how the cinema of this period acts a site of contestation for notions of its own mediality.

This approach demonstrates how the digitisation of image capture and other cinematic technologies relates to changes in cinematic form and style, as well as exploring and explaining the continuities that persist in the face of these technological and industrial changes. By demonstrating instances of rupture and recuperation in a series of contexts, I offer an account of how narrative cinema develops that is rooted in an understanding of the medium as a fluid collection of historically specific formal and technological components, rather than a vague identity which is necessarily threatened by change.

Chapter 1. Rupture and Recuperation

1.1   Digital Cinema

"While film disappears, cinema persists."

-D.N. Rodowick, *The Virtual Life of Film* 2009.

Through interviews with directors and DPs, editors and effects supervisors, actors and archivists, Christopher Kenneally's 2012 documentary *Side by Side* attempts to present a plurality of opinions on the significance of digitisation for films and filmmaking. Talking heads debate changes in workflow patterns, image resolution, and data storage, with their assessments of digitisation falling somewhere in the middle ground between George Lucas's digital evangelism on the one hand, and Wally Pfister's allegiance to analogue on the other. What is revealing, however, is that the ontological questions raised by digitisation so prominent in academic ruminations upon the subject barely feature in the comments of industry professionals. While VFX supervisor John Knoll argues that digital capture places "no limit" upon "what you can do", and *Apocalypse Now* editor Walter Murch describes digital as an "unbelievably malleable plastic of images and sounds", these comments constitute the beginning and end of *Side by Side*'s engagement with this particular strand of thought. Revealingly, Murch follows his digital/plastic analogy by stressing that filmmakers have always been "sculptors of images and sounds". When interviewees speak of a digital "revolution", then, it is not in describing the ontological identity or formal conventions of cinema but rather, the affordability of cameras, faster shoots, and the practicalities of camera movement. Whereas prominent media scholars such as Lev Manovich spent the late 1990s and early 2000s imagining how a radically different cinema might emerge out of these technological shifts, such possibilities apparently do not perturb the practitioners that Kenneally canvassed for his documentary. *Side by Side* ends with its interviewees in disagreement as to the fate of cinefilm, but united in their belief in how technological matters should be subordinated to the storytelling impulse that drives the ongoing production and consumption of cinema. The notion that such technological change could impact upon *how* images and sounds are used to tell stories, however, does not appear to be a pressing concern.

Why would a scholarly debate about the future existence of cinema –one which had been underway, in fits and starts, for nearly two decades within the academy– fail to be reflected in a documentary on digital cinema targeted at a general audience? Assuming

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that questions about cinema's ontology are worthy enough to engage a general audience, then their absence might be due to perceived irrelevance; in other words, by 2012, high profile filmmakers possess a secure enough conception of the cinema medium to render the question of how it might potentially be transformed by digital technologies as purely hypothetical. This disconnect between some of the most prominent scholarly voices of the 1990s and 2000s, and most famous filmmakers of the early 2010s, is both revealing and enticing.[1] While this thesis is not a work of industrial research, and does not principally set out to bring the comments of practitioners to bear methodically upon existing theory, it is nevertheless inspired by, and aims to address, this peculiar contrast. Rather than explore the abstract territory of creative possibility, this thesis makes the case for examining the minutiae of 'actually-existing' digital cinema, arguing that a focus on the details of digital cinema in the period 1998-2013 is as valid a way of answering questions about the formal constitution of the medium and the discursive contestation of its ontologies as any other.

To do this, this chapter outlines the main research questions and the scholarly, cultural, and historical contexts in which they emerge, and develops the conceptual framework best suited to answering them. In particular, I stress the importance of paying attention to two issues: firstly, how films and their makers contest the ontology of digital cinema and, secondly, how the potential for a radical digital re-imagining of cinema –itself not a logical impossibility– is restrained by narrative conventions and economic imperatives. I begin by defining basic terms used throughout this chapter and thesis ('digital' and 'traces') before engaging in a longer discussion of the concepts of 'medium' and 'digital cinema'. In discussing the latter two terms I draw upon D.N. Rodowick's (2007) suggestion that the cinema medium, like any other, consists of mutable formal and technical constituents, rather than a definitive phenomenological character or aesthetic aspiration. That is to say, I outline how a given medium is defined not by an 'essence', but by a combination of distinct features which may change over time.

Thus, I argue that, while many of the analogue technical constituents of the cinema medium have indeed been gradually replaced by digital ones, and these replacements undoubtedly have implications for questions of form and style, it remains the case that cinema in the early twenty-first century appears largely consistent with the narrative and other formal aspects of preceding decades. As part of this change in perspective, I argue that strands of existing criticism suffer from what I term the 'fallacy of immateriality', whereby digitisation is imagined as transforming cinema from a tangible, material medium into the esoteric resident of cyberspace. Drawing upon the work of practitioner-

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[1] Albeit, not entirely unprecedented. Melanie Bell (2014) argues that this disconnect should be seen as part of a wider absence of industry voices in scholarly publications over the last 20-25 years.

theorists Michael Betancourt (2006) and Terry Flaxton (2011), I refute this, and focus on the traces of material digital technologies in the cinematic image. By concentrating on how traces of new technologies are represented within cinematic narratives and frames as well as how they are discussed by filmmakers, reviewers and audiences, I suggest that this fallacy of immateriality is not limited to academic circles. Given that there is not one singular function of the technological trace, however, I show how many of these markers can also be used to challenge this view of digital cinema as immaterial.

While I do not necessarily reject the claims of existing scholarship with regards to the ontology of digital cinema and its implications for the future of the medium, I instead make the case for focusing on the ways in which digital cinema has actually developed, both in terms of stylistic innovations and departures, and overwhelming formal continuities. As Barry Keith Grant (2007) reminds us, formal continuities in narrative cinema are constitutive of the commercially reliable formula of "standardisation and differentiation", of "sameness and difference" (8) that underpins much of institutionalised global film production. An appreciation of this key institutional insight –in other words, of generic imperatives– explains how digital cinema balances stylistic innovation and conformity. With this renewed focus, I place the scholarship on cinema's ontology of Manovich et al. in its historical context, noting how echoes of its claims can be found in particular films themselves. Finally, I engage with the work of digital theorists such as Alan Kirby so as to further contextualise this particular historical moment in relation to wider digital culture.

1.1.1 *'Traces of digital technologies'*

Given that digital technologies have become increasingly prevalent features of social life over the last forty years,[2] it is unsurprising to find that the term 'digital' is a commonplace affix in discussions of contemporary cultural activity, both within the academy and outside of it. This ubiquity, however, does not guarantee widely-held understanding, which is especially troubling given that discussions of such technologies and media often treat the basic technical principles of 'the digital' as axiomatic.[3] With this in mind, to simply identify individual digital objects of study in this manner would be to fail to define precisely what it is that unites them as digital phenomena. Moreover, given that I frequently explore competing conceptions of 'the digital' as an essence or quiddity,

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[2] Mark Shepard terms these "everyday techno-social practices" (2009, 209). Of course, these practices are only an "everyday" experience for a global minority, and as such my observations take into consideration the "digital divides" that exist between the global North and South and between socioeconomic classes within particular countries (Norris 2001, Wilson 2004, Pick and Azari 2008, Hilbert 2013).
[3] The *Digital Britain Report* produced by the British government in 2009, for example, routinely features phrases such as "digital thinking" (27) "digital revolution" (29), and "Digital Age" (107) without ever defining what is understood, technologically or otherwise, by the adjective 'digital'.

then the need for a clear explanation of the technical principles that underpin these contesting visions becomes all the more important.

What these examples share, and what indeed defines them as 'digital', is a process of data storage whereby information is represented discretely and numerically. Manovich offers numerical discreteness as *the* essential characteristic of digital media (50),[4] but stops short of explicitly defining the underlying technical processes themselves. For this more fundamental definition I turn to computer scientists Ronald J. Tocci et al. and their study of digital systems, which defines digital data as the representation of quantities via "symbols called digits" (4). In digital systems, this symbolic representation of quantities changes in discrete steps. This is in direct contrast with analogue representations, in which "a quantity is represented by a voltage, current, or meter movement that is proportional to the value of that quantity [that] can vary over a continuous range of values". The fundamental distinction that Tocci et al. draw between analogue and digital processes is thus one of representation as a continuous process versus representation as a discrete, or step-by-step, process. Extrapolating further from this distinction, it can be said that analogue values, given to positions on a continuous range, are actually radical simplifications of numbers with series of decimal places that are theoretically infinite, whereas digital information, by definition, can never be anywhere between values.

The most salient example of this distinction to be found in cinema is that between cinefilm and digital capture technologies. The operation of cinefilm inside a camera is an analogue process –a photochemical reaction between silver halide crystals and light reflected off the object being filmed– which yields a continuous pattern of crystals in emulsion.[5] The operation of a digital image sensor, by contrast, converts an optical image into a discrete electronic signal via pixel-based technology. These light sensitive photosites, as professional cinematographer and film theorist Terry Flaxton observes, "produce information, in the form of packets of data, which [are] in turn represented on screen by a changing luminosity and colour identity via a pixel display" (115).[6] It is the significance of this distinction that underpins much of the theoretical work surrounding digital cinema. As I will later demonstrate, the majority of this criticism interprets the discrete, numerical and thus *mutable* status of the digital image as evidence of its

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[4] "In contrast to analogue media, which is continuous", Manovich argues, "digitally encoded media is discrete" (50).

[5] Known as the "latent image" in photographic terminology.

[6] In his discussion, Flaxton also refers to the two main categories of digital image sensor technologies: charge-coupled devices (CCDs) and complementary metal-oxide-semiconductors (CMOS), also known as axel pixel sensors. In an early study of the two technologies, Fossum (1993) outlines the fundamental differences between them.

'immateriality'. However, Flaxton contests this by stressing the materiality of the digitally captured image:

> In both photochemical and electronic cinematography, until the image is developed, the image resides in latent form in both the silver halide crystals and the unrendered data. Development –the bringing forth of an image in film– is similar to the rendering of an image in the digital and electronic domain, and importantly, colour is within the bit-depth of electronic data and is therefore an integral part of its material form. This developing practical understanding in the professional realm is counter to arguments that circulate within media theory […] *industrial and professional expertise now challenges academic convention by seeking to re-inscribe digital image making as a material process* (119, emphasis added)

This is a pivotal intervention in the debate about digital cinema, and I will return to it, alongside the work of Michael Betancourt, to challenge the existing consensus surrounding the medium's techno-ontology. Given that Tocci et al. define a digital system as "a combination of devices designed to manipulate logical information or physical quantities that are represented in digital form" (5), it follows that 'digital technologies' can be defined as technologies which rely upon digital systems. As Andrew Utterson notes, "theorists have routinely classified cinema according to its own mechanical underpinnings" (2); my intention here is to consider more closely how and why "digital cinema" should be classified in relation to its mechanical underpinnings, through a framework that avoids technologically deterministic conclusions.

1.1.2   *'Traces of ~~digital~~ technologies'*

By 'traces', I refer to the presence that cinematic digital technologies exude within the frame itself. Dan North reminds us that the pleasure of cinema partly rests upon the identification of artifice (2008, 25), and the digital visual effects pioneered in the 1980s, in which actually existing digital filmmaking technologies are used to realise science fiction gadgetry, are no different in this regard.[7] Rather than focusing on these speculative and spectacular technologies, however, I limit my scope to the visual traces of *cinematic*

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[7] While it is not my intention here to offer a history of this trend, one might begin with the use of vector graphics to realise the computer displays of the S.S. Enterprise in Nicholas Myer's 1982 *Star Trek II: the Wrath of Khan* (North 127), and end with all manner of technological imaginaries, be it the cyberspace "grid" of *Tron: Legacy* (Joseph Kosinski, 2010), or the "Jaeger" mecha-suits of *Pacific Rim* (Guillermo del Toro, 2013) (North 2013). Yvonne Speilmann (2003) considers the relationship between high-tech imagery and digital visual effects in *Terminator 2: Judgement Day* (James Cameron 1991) and *The Matrix* (The Wachowskis 1999), suggesting that "the digital can simultaneously operate as both content and as a mode of representation" (58).

technologies: DV cameras, so-called "digital backlots",[8] and glitches. Indeed, even if they are not used to realise SF technologies, computer animated visual effects and the mechanical special effects that precede them still exude a presence in the cinematic image. For North, "all special effects leave vestigial traces of their means of production" (4), and their detection by audiences forms part of "a constant collusion between realistic representation and the acknowledgement that an illusion is being displayed" (2008, 16-17). Rather than this general form of spectatorship, however, in which the trace is figured as less important than the semiconscious viewing processes that register it, I focus on the trace itself, identifying it as a site of scholarly interest in its own right.

In so doing, I argue that the technological trace in the cinematic image should be read as an object of "cultural refraction" (Utterson 6): that is, as a technological artefact that shapes the discourses which surround cinema and its evolution. Jay David Bolter and Richard Grusin make a similar observation in their theory of remediation, which accounts for the way in which the features of one medium appear –or are "remediated" – within another. Bolter and Grusin's focus, however, is on the [re]iteration of formal constituents, such as the use of columns and headlines of print newspapers in news websites (9-10), rather than with technological concerns. While Bolter and Grusin discuss computer animation and digital filmmaking technologies (48), I suggest that my focus on the presence of technologies themselves opens up a more fruitful dimension of studying the cinematic frame.

Moreover, in figuring the technological trace as an object of study, I offer a means by which to intervene in and widen the debate surrounding the significance of digital technologies for the identity of cinema. Glimpses of DV cameras and malfunctioning digital technologies are not merely discussed in descriptive terms –of how they demonstrate innovative processes or broadened stylistic palates– but in analytical terms: as a visual territory in which we can map the intersection of industrial, ideological, and aesthetic factors. André Gaudreault, in discussing the films of George Méliès, identifies traces of glue in the top of the frame as evidence of continuity editing, a formal technique that many film historians claim Méliès does not use (161). Observing that Méliès was a magician before he was a filmmaker, Gaudreault argues that editing in Méliès' films can be seen as "the contribution of external principles" from magic tricks "to the inner world of kinematography" (174). Extrapolating from this, we could argue that Gaudreault's

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[8] That is not to say that, for example, the digital backlot movie *Casshern* discussed in Chapter 3 is not replete with SF technologies. Rather, Chapter 3's focus is the notion of the "digital backlot movie" itself – its reception, and the role of technological traces in structuring its 'cinematicness' and relationship to other media.

identification of glue is a way of using the technological trace as a locus for a broader discussion about the relationship between formal and technical conventions.

Throughout my case studies, I identify traces of new technologies in the same manner, using visual markers as a starting point to broaden the digitisation debate. As I will go onto demonstrate, however, there is not a singular trace serving one function in these films. Some of these traces expose technological processes to exploit aesthetic novelty, while others employ them in order to conform to an established visual language of realism. Certain deployments of the trace perform a satirical function, critiquing attitudes towards the 'proper' role of technologies, with other traces reinforcing these self-same narratives. Part of the work of this thesis, then, is to explore to what extent these contradictions can be reconciled.

Figure 2: *Le Diable Noir [The Black Imp]* (George Méliès 1905). Traces of adhesive in the top of the frame comprise just one of sixty such instances in this four-minute shot which reveal how Méliès constructed it from "fragments" of glued together film stock (Gaudreault 167) rather than via in-camera stop motion techniques.

1.1.3   *The cinema medium*

In order to focus on technological traces in this way, it is pivotal to distinguish between a medium and its technological base. Without qualification, the term 'medium' can be misread as merely implying a set of material or technological parameters. This is understandable, given that the word stems from the Latin *medium*, meaning "middle, centre, midst, intermediate course", with the various uses of the term "medium" sharing this sense of process located *within* a channel, set of physical parameters, or "intervening substance" ("Medium"). The specific use of the term in the fine arts to refer to the raw physical materials with which an artist works – their yet-to-be-processed clay and the devices that convention permits them to use to process it – further equates "medium" with a simultaneously enabling and limiting set of physical objects and tools. This analogy can of course be carried over into discourses of digital media, whereby the singular 'digital

medium' emphasises the potentialities offered by digital technologies. Manovich suggests one such interpretation when he argues that "a [digital] new media object is subject to algorithmic manipulation" (27), and that "a new media object is not something fixed once and for all, but something that can exist in different, potentially infinite versions" (36). However, these interpretations fail to capture the relative autonomy of a medium's formal conventions from its underlying technological processes.

What is required, then, is a definition that captures the malleability of the medium, but does not irrevocably tie it to an unalterable set of technologies. Werner Wolf answers the first part of this call, characterising a medium as a "conventionally distinct means of communicating cultural contents", though this does not outline how such means should be related to a particular technology, or indeed suggest how a medium may develop over time and still be perceived as "conventionally distinct" (253). It is in this respect that Rodowick's *The Virtual Life of Film* (2007) becomes indispensable, and returns this discussion back to digital cinema. Rodowick suggests that the scholarly debate about digitisation holds significance not just for the identity of cinema, but for film studies itself. If technological transition threatens to undermine the certainties of a given medium, it follows that its scholars should be precise in what they even understand by "medium" if they are to establish their object of study and ensure its survival. For Rodowick, the question "what is to become of cinema studies if film should disappear?" (3) begs the more fundamental question "*What is cinema?*" (9, emphasis added).[9] This, in turn, leads Rodowick to define precisely what he understands the cinematic medium to be, and at a more basic level, what he understands the term "medium" to signify. His answer shares with Wolf's the emphasis on the autonomy and malleability of cultural units:

> A medium is nothing more nor less than a set of potentialities from which creative acts may unfold. These potentialities, the powers of the medium as it were, are conditioned by multiple elements or components that can be material, instrumental, and/or formal. Moreover these elements may vary, individually and in combination with one another, such that a medium may be defined without a presumption that any integral identity or an essence unites these elements into a whole or resolves them into a unique substance (ibid)

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[9] Spurred on by the same concerns about the implications of digitisation for their object of study and the parameters of study itself, Philippe Gauthier (2014) and Andre Gaudreault (2014) have asked similar questions. Gauthier observes both a broadening of the discipline of film studies to include more comparative study and a simultaneous narrowing of the definition of cinema, while Gaudreault outlines the various contexts of this scholarly reconfiguration (the shift from studying 'cinema' to studying the 'moving image') in more detail.

Cinema, then, is not an 'essence' defined by a fundamental characteristic, but rather, a group of formal and technological components, any of which may individually change. Of course, if all of the components were to change, this would lead to "a set of potentialities" which bear little to no resemblance to those which once shared its name, which might invite identification as a distinct cultural series.[10] However, if only certain components change, as in this case of the digitisation of cinema, it proves limiting to discuss this process in terms of a 'fundamental change' in the 'essence' of cinema, given that cinema cannot be satisfactorily said to possess such an essence.

In rejecting the notion that a medium possesses an essential identity, Rodowick also avoids defining a medium with regards to the attendant "essence" of the technologies through which it operates. This makes it possible to understand the flexibility of the formal components of a medium in relation to its technological constituents, and therefore enables accounts which demonstrate how "a medium may appear in response to technological processes and in that sense be conditioned by them", but also capture how media are "equally sensitive to the historical variability of their technological elements and to the responsiveness of those elements to often unforeseen aesthetic purposes" (84). Radical changes in common practice can leave the medium 'intact' if the material base does not change, and radical alterations in the technological base can leave the medium 'intact' if establish habits of common practice are still possible with the new base.[11] There are, therefore, multiple digital cinemas, and indeed multiple ways in which technological processes and developments shape, and are shaped by, these cinemas. In taking into consideration the technological contexts in which a medium might emerge or be reshaped, and, moreover, by paying attention to how this can happen or, revealingly, *fail* to happen, at the constituency level, Rodowick provides a workable term suited to the exploration of industrial, ideological, and aesthetic factors and their intersections.

1.1.4 *The* digital *cinema medium*

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[10] In discussing the "constitution", or institutionalisation, of cinema as a "cultural series" in the early twentieth century, Gaudreault and Philippe Marion (2002) maintain the use of the term "identity", though with considerable qualification. "When we talk about the identity of a medium", they explain, "identity must be understood in the sense suggested by Paul Ricoeur: it must be seen as being inscribed in a resolutely historical perspective, that of a permanent state of transformation, of an ipseity which makes it possible to overcome the same and the different. Which is to say that a medium's identity is in part composed of permanent features but that all media are engaged in a process of constant development. Its identity is perpetually being re-defined. These questions lead us to state the obvious: a medium's identity is a very complex affair. Moreover, specificity by no means signifies separation or isolation" (15).
[11] That said, a theory of media based on the idea of components might reject the notion of 'intactness' altogether.

Having arrived at a definition of medium which bears the capacity to describe the interplay of these factors, it remains to establish the "set of potentialities" and "creative acts" that constitute digital cinema. If there are multiple digital cinemas, then the preferred set of potentialities needs to be identified and justified.[12] Of course, some of these interpretations of "digital cinema" are of less relevance to my central concerns. For example, in accepting *Screen Digest*'s not inconceivable 2012 claim that "almost all theatres" worldwide will have made the conversion to digital projection by 2015 (Persico), it could be said that the vast majority of global commercial distributed and exhibited cinema is digital cinema, in this sense. While these issues have been the subject of film studies, they are less relevant to my primary focus.[13] As Manovich puts it, such issues have little impact for the "language of film" (289). Indeed, it is this focus on the language of film that leads Manovich to offer a list summarising "the effects of computerisation on cinema proper". While his list does not align precisely with the particular aspects of digital cinema that I explore in the ensuing chapters, it nevertheless demonstrates several definitions of the term that I entertain throughout this thesis, as well as those that I do not. Manovich's first category, which details the "use of computer techniques in traditional filmmaking" (287), lists the examples of digital cinema with which this thesis is principally concerned:

1.1 3-D computer animation/digital composing

1.2 Digital painting

1.3 Virtual sets

1.4 Virtual actors/motion capture

In these examples, digital processes either replace or expand the capacity of existing analogue techniques (digital painting and composing, virtual sets), or open up new possibilities for the production of the cinematic image (virtual actors/motion capture). With the exception of virtual actors,[14] I discuss all of these categories in Chapter 3, under the title "digital backlot", though my interpretation as to the significance of these differs from Manovich, who also discusses these same three examples of digitisation. In Chapter 2, I also

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[12] Manovich and Rodowick are not the only critics to explore what is meant by digital cinema. Monica Mak (2003) explores this dilemma in her article about digital non-linear editing (NLE). In offering her own definitions of "digital filmmaking" and "digital film", she conceptualises them as "two separate concepts with limitless possible incarnations. The former can vary from being a practice (e.g. filmmaking with a DV camera) to a film style (e.g. the Dogme 95 movement); the latter from an intangible, audio-visually perceptible construct (e.g. film narrative) to a concrete object (e.g. digital videotape)" (38). Again, it is revealing that the "concrete object" here is videotape, an analogue storage method.

[13] For work on industrial dimensions and the political economy of digital cinema, see Culkin and Randle 2003, Leon Gurevitch 2011; for digital distribution see Herold 2003, Sickel, 2010, Lobato 2012; for archiving Cherchi Usai 2001; and the methodological implications of digital interfaces, see Chávez Hereas 2012, Groo 2012, Shambu 2012.

[14] Given the amount of existing work on the virtual actor, I have little to contribute to the scholarly discussion. For a way into this discussion, see Wolf 2003, Bode 2010, Aldred 2011, Freedman 2012, Chapter 3 of Stephen Prince's *Digital Visual Effects* (2011) and Chapter 3 of North's *Performing Illusions*.

explore examples from Manovich's list that he chooses not to discuss, namely, "films that focus on the new possibilities offered by inexpensive DV (Digital Video) cameras", and "filmmakers' reactions to the conventions of [the] computer screen [and] game narrative". All of these particular examples amount to technological traces, with their respective implications for questions of conventional form and style.

1.1.5 *The ontological 'break'*

Adopting this more flexible understanding of a medium enables a discussion of how digitisation changes cinema which sidesteps rhetoric of existential threats. Manovich's 2001 text *The Language of New Media* is perhaps the most prominent critical work to frame the distinctly digital ontology of cinema an existential rupture. For Manovich, the discrete and numerical structure of the digital image constitutes not just a break with the ontology of cinefilm but one which necessarily figures analogue cinema as an ontological blip in the broader history of visual media:

> the mutability of digital data impairs the value of cinema recordings as documents of reality. In retrospect, we can see that twentieth-century cinema's regime of visual realism, the result of automatically recording visual reality, was only an exception, an isolated accident in the history of visual representation, which has always involved, and now again involves, the manual construction of images. *Cinema becomes a particular branch of painting – painting in time. No longer a kino-eye, but a kino-brush* (307-8 emphasis added).

While Manovich is correct in that digital *painting* allows for the manual construction of images, it does not necessarily follow that the digital capture of pro-filmic, live-action events through an image sensor is itself any more "manual" or painterly a process than capturing the image with a cinefilm camera. Though the digitally captured image exists indefinitely as digital data, it remains automatically recorded.

While this is the most hyperbolic example of this critical tendency, it is by no means the first. In 1994, William J. Mitchell argues that the digital image's impermanence as data threatens the assurances of the reacted silver halide crystals settled in emulsion, and as such "dramatically changes the rules of the game" (31). Manovich offers a variation on this rhetoric when he argues that such new media also "redefine the very identity of

cinema" (293). In 2010, Gabriel F. Giralt returns to this same point in order to discuss questions of what it means to be realistic in the age of CGI, arguing that

> the film emulsion that once served as the moulding for the realism of the concrete in the quest to capture nature's spontaneity is now pushed aside by the conscious abstraction of a numerical code that finds no need for the objective presence of nature (15)

Following on from this, Giralt argues that the lack of indexicality necessarily encourages a "new breed of film director" (3), for whom "reality is not seen as something to be captured in the purest way possible by the camera lens but rather as something to be constructed". Like Manovich and Mitchell before him, Giralt extrapolates a broader, more contentious point about the future existence of cinema as it is currently understood from the simple observation about the loss of a static and indexical image. What links Mitchell, Manovich, and Giralt and several other critics[15] is both their focus on digital animation as the definitive form of digital filmmaking, and, especially in the case of Manovich, a sweeping statement about the ramifications of this ontological change for cinema as medium more generally. Such is the ominous tone of these accounts that André Gaudreault and Philippe Marion (2013) call the tendency "'dead cinema' syndrome" (158).

On the one hand, this "syndrome" can be located within a broader scholarly tradition which deems indexicality[16] integral or essential to cinema's identity. This can be traced back to the work of André Bazin, who, in 1967, argues that indexicality undermines any question of there being a separation between the cinematic image and its object, the film-sign and signified. For Bazin, "the photographic image is the object itself" (14). As North puts it, "rather than explaining cinema as fully cultural phenomenon, Bazin tries to [define] its origins as a photographic form within an indexical relationship to its referent" (North 20).[17] For Bazin, deep-focus techniques were desirable because they facilitated supposedly unmediated access to the pro-filmic image. Bazin's ideas prove influential on the work of Kendall Walton and Gregorie Currie,[18] all of whom argue that it is the indexicality of the analogue process by which cinematic images gain a sense of being

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[15] In addition to the claims critiqued here, Stephen Prince (2012, 149) also identifies this tendency in the work of Barbara Savedoff (1997), Steven Shaviro (2007), Keith Griffiths (2003), and Berys Gaut (2010).

[16] This conception of indexicality has its roots in the work of C.S. Peirce, in particular his 1897 article "Division of Signs". For a broader discussion of indexicality, see the special Spring 2007 issue of *differences* edited by Mary Ann Doane.

[17] At the same time, North notes the paradox of digital cinema, which on the one hand, "would indicate that that Bazin was mistaken, that cinema's cultural identity is more enduring than its technical make-up", and on the other hand, aspires towards the 'properties of the photographic image". This paradox has also been noted by Manovich (*The Language of New Media* p. 200) and Giralt (2010).

[18] For a detailed exploration of the legacy of Bazin's approach in the work of Walton and Currie, see Chapter 2 of Katherine Thomson-Jones, *Aesthetics and Film* (London: Continuum, 2008).

"casual things of nature, rather than products of human artifice" (31). Thus, for Mitchell, the main significance of digital capture is ominously Saussurean: "the referent has come unstuck".[19] As Stephen Prince reminds us, these conceptions rely upon the "devotion to characteristics that the medium never truly possessed as dominant features of its style or structure" (2012, 51), such as Bazin's idealised deep-focus. Moreover, Prince argues, this preoccupation with indexicality is mistaken because "digital tools […] have created new sources of indexical meaning that were never possible with analogue photography" (51):

> Cameras record light, not objects […] Photography in both analogue and digital contexts remains a medium of translation. In the analogue world, a photograph is the output of the translation of luminous information by camera optics and then by the development bath and fixer. In the digital world, the translators are algorithms, and these need not be false or falsified (151)

For Prince, the movements of a digitally animated character, such as the eponymous protagonist of David Fincher's 2008 *The Curious Case of Benjamin Button* are indexical in the sense that they refer to the pro-filmic facial expressions of Brad Pitt, captured volumetrically by the Mova Contour Capture system (Seymour 2009). Rather than being seen as new forms of indexicality, however, such creative applications of digital technologies have been framed as threats to Bazin's prescribed signifiers of cinema's 'true' identity.

Indeed, this preoccupation owes as much to the specific historical/industrial context of digital technologies being incorporated into filmmaking as it does to the critical lineage of Bazin onwards. From the early 1990s, increasingly photorealistic computer-generated imagery became more pervasive and prominent in Hollywood feature films, framed as a spectacle of technological achievement and harbinger of the cinema to come.[20] In compiling his own "state of the art genre" (which features *Terminator 2, Jurassic Park* and *Flubber*), Manovich argues that such instances of digital compositing draw attention to their own technological achievements, namely their ability to convincingly meet a historically specific understanding of photorealism, or otherwise produce images that, while never actually witnessed in reality, exude a similar sense of verisimilitude (194).

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[19] In doing so, Mitchell traces a critical lineage of indexical thought that includes "Bazin, [Roland] Barthes and [John] Berger, [Susan] Sontag and [Roger] Scruton" (31).
[20] Angela Ndalianis (2000) makes similar suggestions about the ways in which "contemporary cinema asks its audiences to be astonished at its special effects, and to reflect on the way special effects in films have become venues that display developments in new film technology" (256-9).

In addition, the late 1990s witnessed a number of prominent experiments with digital cameras which suggested a new frontier of narrative possibility. Alexander Sokurov's *Russian Ark,* for example, which consists of a continuous 96-minute take captured on a Sony HDW-F900 camera, collected a slew of awards and nominations from international film competitions. In 2001, Manovich himself discusses experimental narrative films such as Mike Figgis's *Timecode* (2000), which divides the cinematic frame into four quarters which display four simultaneous and uninterrupted, digitally-captured 90 minute takes. Manovich's next major project, *Soft Cinema*, concerns itself with screen-based media installations in which "software edits movies in real time by choosing the elements from the database using the systems of rules defined by the authors" (2002b). This publication was followed in 2005 by a DVD of examples "soft cinema", which, as Jan Baetens has noted, is notable for how its relatively conventional films fail to "offer us what soft cinema promises to do" (2005). As its title would suggest, then, *The Language of New Media* is concerned with a wide range of emerging visual media at a certain moment in time. Cinema is thus imagined as something soon to be revolutionised by the potential of its newly digitised ontology.   With hindsight, it is easy but nevertheless germane to emphasise that this has not yet happened.

Figure 3: A shape of cinema yet to come? *Timecode* (Mike Figgis 2000)
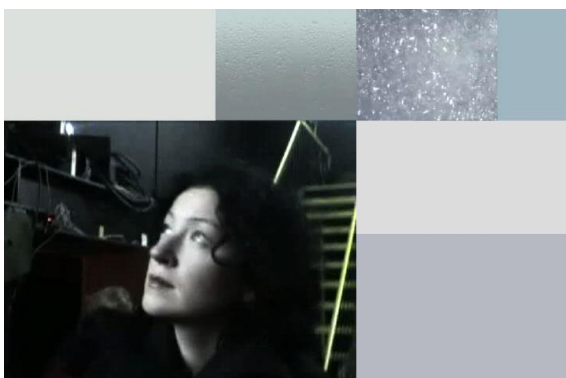
Figure 4: *Mission to Earth* from Manovich's *Soft Cinema*

Moreover, the critical focus on experimental film is revealing, as Manovich seeks out contemporary examples of a possible formal trajectory for a cinema liberated from certain ontological and/or technical restrictions. However, this approach runs the risk of ignoring the more subtle implications for films which fail to deliver on these promises, and, by extension, the reasons as to why digital cinema might not be the revolutionary new medium that is imagined to be. The contrast between the socioeconomic origins of the Soft Cinema project, commissioned by the ZKM Centre for Art and Media in Karlsruhe, and the predominantly Hollywood film industry that funded, produced and distributed the majority of the films under consideration in this thesis, hints at the constraining and shaping factors at play. While public funds and interdisciplinary art exhibitions nurture films which radically stretch concepts of narrative, digital capture, animation and compositing are incorporated into formal structures with a long held track record for cultural resonance and commercial appeal.

To focus on this context is not to deny that digitisation has no implications for cinematic ontology; rather, it is possible to take a more restrained and ultimately more revealing approach to the topic. Just as his definition of a medium allows for a more nuanced interpretation of technological change generally, Rodowick's assessment of the digitisation of cinema proves far more dynamic. Considering the same historical episode as Mitchell, Manovich, and Giralt, Rodwick agrees that the "the disappearance of film does matter and has had profound aesthetic and historical consequences" (viii, emphasis added). Rodowick subtly reconfigures this debate to emphasise the shared artifice of both analogue and digital processes (9). While he may be concerned with the significance of digitisation for the identity of cinema, Rodowick instead characterises the impact of this technological transition as a "subtle shifting of gears" rather than an ontological revolution (98).

Rodowick suggests that, while a particular set of analogue production techniques may well be in the process of being superseded, or at the very least, marginalised, by their digital counterparts, the narrative structures and phenomenological norms common to cinema remain broadly the same. "While film disappears", Rodowick argues, "cinema persists" (i).[21] While these technological constituents change, a formal constituent remains constant: "a certain mode of psychological investment – a modality of desire" (22).[22]

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[21] It is important to clarify that I use the word "film", both by itself and accompanied by the potentially paradoxical prefix "digital", throughout this to refer to an individual cinematic text. Though this is somewhat confusing, given the association between "[cine] film" and analogue technologies, it is preferable than the more informal "movie".

[22] Rodowick adds that "with respect to digital technologies, cinema is reinventing itself – just as it has done in previous periods of technological transition – by producing stylistic innovations while respecting narrative continuities" (30).

Indeed, Rodowick is not alone in this assessment; North also argues that "cinema's identity is more enduring than its technical make-up" (20).[23] Imagining this process not as "substitution of one form or substance for another", but as "a series of displacements in the relationship between the formative and constitutive elements of moving-image media" (Rodowick 80), enables a more nuanced focus on particular instances of digitisation, as well as, pivotally, exploring how formal constituents actively respond to technological change.[24]

1.1.6 *The fallacy of digital immateriality*

Critical claims like Manovich's are not problematic merely because of their reductive interpretation of digitisation, but also because they run the risk of imagining digital technologies and media as if they are immaterial. In drawing closer attention to the industrial practices of digital cinematographers, Flaxton aims to "prompt the reinvestigation of the academic trope of thinking of digital information as being immaterial":

> Many data labs have now grown up around the world to handle the tsunami of data being generated by the attitude of DPs towards their craft. A major argument for the digital as being material resides in the fact that people are employed in its handling –like any other material– its commodification is a sign of its existence (121)

For Michael Betancourt, a cultural theorist and digital artist, this is a consequence of the way in which digital media, based upon discrete processes, aspire "towards the state of information" (2006). A consequence of this aspiration is that digital media are erroneously imagined as constituting 'pure' information outside the limitations of physical production:

> The aura of the digital describes the occlusion of the real conditions of physicality from considerations of the apparently immaterial realm of the digital. These constraints and limitations are inherently imposed on all digital technologies, objects and systems. Yet because of the specific ways that the digital aspires towards the state of information, producing the illusion of completeness, and poses as

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[23] Expressing this in terms of "identity", for reasons discussed above, however, is unfortunate.
[24] Rodowick extrapolates a broader lesson from this insight, namely that "it is useless to want to define the specificity of any medium according to criteria of ontological self-identification or substantial self-similarity. Heterogenous and variable both in its matters of expression and in the plurality of codes that organize them, the set of all films is itself an uncertain territory that is in a state of continual change. It is itself a conceptual virtuality, though populated with concrete objects, that varies unceasingly, and therefore, to extract the codes that give this sense narrative and cultural meaning is a process that is […] interminable" (19). The work of this thesis works to extrapolate this model of the medium with specific regards to cinema.

independent from material reality, the digital, paradoxically, emerges as an immaterial physicality—spectral, it is both immanently present and creates the pretext of lacking a substantial, material link to reality. This supposed rupture—in the form of a penumbral immateriality—is the specific illusion that defines the aura of the digital: the denial of immanent physicality in the face of apparent and structural physical limitations and material basis. The confusion of our ability to identify the falsehood that is the digital immaterialism reflects this aura in action. It is precisely because of the confusion of physical and immaterial that the aura of the digital is pervasive.

The chapters that follow identify instances in which films and the discourses that orbit them perpetuate this logic, while also pointing out how traces undermine this aura and draw attention to the "real conditions of physicality". Digital technologies dependent on silicon, lead, and beryllium, are in this sense as material as the silver halide, polyester and gelatine colloid of raw film stock. Moreover, the digital storage and representation of data is reliant upon electricity, a phenomenon that, as any lightning storm will attest, is profoundly physical. "Electromagnetic space", as architect Usman Haque notes, is both "physical and nonvirtual", located "just beyond our familiar perceptual limits" (in Bullivant 2005, 10).[25] What this fallacy appears to do, then, is confuse a lack of tactility and visibility with immateriality. Unlike raw cinefilm, negatives and finished prints, the discrete digital systems operating within concealed circuitry of computers cannot be touched or easily seen. What can be seen, however, is the screened digital image itself. As such, the digital image is at once physically dependent upon its underlying technologies (a digital image can only permanently exist in one form and location if that particular form is reproduced via analogue means, such as a computer printout), and yet potentially received as being somehow dualistically distinct from them. While changes to digital data lead to visible alterations in the screened image and thus testify to its materiality, the popularly held ambiguity about 'where' this digital data physically resides at any one time leads to a similarly held vagueness about the physicality of the digital image itself.

So as to avoid falling for, or contributing to, this rhetoric of a digital "aura", it is pivotal to stress the materiality of the technological trace. As such, ensuing chapters demystify the digital image, paying close attention to the technological constituents of cinema and offering careful and considering reflections upon their significance for its formal constituents. As Utterson notes, film historians and theorists have attempted to

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[25] Haques' comments echo a larger body of work on the nature of electromagnetic –or "hertzian"– space. See Dunne 2005 and de Vincentre et al. 2011.

"[account] for the forces that shape and determine their form and function", and that the most satisfactory of these efforts concern "a range of social, cultural, political and other contexts likewise steeped in technology" (2).[26] In terms of one of this thesis's central questions –why the kind of transformations imagined by Manovich have not as yet taken place– the most important context to consider is industrial.[27] The Hollywood studio system which popularised the "distinct mode of film practice" (Bordwell, Staiger and Thompson, xiii) did so via a model of production, which, as Grant notes, sought "maximum acceptance at the box office through the repetition and variation of commercially successful formulas" (7). Though the institutional arrangements of both Hollywood and other film industries have changed considerably since the days of the studio system,[28] Grant's observation remains relevant. Genre provides "a cost-effective equivalent to lines and ranges, producing a demand for similarities within the variety of product on offer and therefore minimalizing the degrees of difference involved" (Neale 2000, 231). If narrative film itself can be thought of as a genre (Ryall 1998), and one of the economic roles of genre is to "regulate demand and the nature of its output in such a way as to minimize the risks inherent in difference", then any change of technological constituents, no matter how ontologically radical, is likely to be counteracted by the arrangements which meet exist economic and cultural demands.[29]

These observations go some way to explain differing concerns of Manovich on the one hand and the interviewees of *Side by Side* on the other. The experimental visual art and narrative films which Manovich discusses differ not only formally, but also in their economic and cultural contexts. While it is important not to erect reductive boundaries between 'experimental' and 'commercial', or 'radical' and 'conservative' cinema, a consideration of the economic and cultural arrangements which restrain such experimentation is still important when explaining which formal constituents of digital cinema are varied and which are repeated. In the case of the found-footage genre

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[26] Indeed, in getting to this point, there are several theoretical approaches which need to be avoided. Firstly, there is the teleological view of cinema's history, whereby the development of the medium is read as an inevitable refinement of moving image technologies toward complete transparency that is indistinguishable from non-mediated human perception. This is the view put forward by Terry Ramsaye (1926) and Martin Quigley Jr (1953), whereby cinema is imagined as realising some predetermined aesthetic ambition. Bazin's now familiar notion of cinema as the definitively indexical medium also incorporates this kind of history, positing the emergence of the form as the realisation of a totalising representation of the natural world, "unburdened" by artistic perception (Bazin 31). C.W. Ceram (1965) offers a slightly distinct, but equally problematic, account of film development along evolutionary lines, arguing that histories of cinema should focus only on the filmmaking technologies which become institutionalised or otherwise popular. Countering both teleology and "cinematic Darwinism", Douglas Gomery (1985) observes that this fallacy arrives from constructing history "backwards from the present –tracing the evolutionary chain of events and great individuals that recede from today to the nineteenth century and beyond" (11).
[27] By the same token, I accept Janet Woollacott's (1987) caveats and seek to avoid the crude determinism that characterises Classical Marxist accounts of film production (177).
[28] Neale provides an introductory bibliography to work on the post-studio system (2000, 256)
[29] For a discussion of the way in which economic factors shape genre, see Belton 1994, Neale 1980.

discussed in Chapter 2, the lowering of production costs enabled by DV cameras (it has been claimed that *Paranormal Activty* is the most profitable film ever made in terms of the ratio of its production costs to its box office returns)[30] and the quickly-established generic conceits prove particularly amenable to the demands of the Hollywood film industry. As such, it is unsurprising that the genre's more radical experiments with perspective prove less influential than the basic narrative conceit itself, given the economic and cultural incentives not to stray too far from a commercially viable formula.

While, for scholars like Murray Smith (2001), historical and philosophical concerns constitute two, broadly separate, strands of film criticism,[31] the discussion thus far has assumed that a satisfactory account of digitisation requires that one approach is brought to bear upon the other. Indeed, the very terms that I borrow from Flaxton to periodize the films considered in the ensuing chapters –late analogue/paleo-digital, meso-digital, and neo-digital– are defined in terms of perceptible shifts in the ideological status of particular technologies or technological processes. Though Flaxton's original article does not outline the precise meanings of, or indeed rationale behind, his three terms, their general meaning can be inferred from the use of suffixes.[32] The period of "late analogue" can be imagined as the cultural dominant of the late 1970s and 1980s.[33] Experiments with digital image capture and digital animations were made and displayed in the narrative cinema of this period,[34] but constitute neither a culturally nor an industrially dominant phenomenon; this is coterminous with a broader "paleo-digital" period, which Flaxton argues can be traced back at least as far as the coinage of the term "byte" by computer scientist Werner Buchholz in 1956 (Flaxton 2014). Following from this logic, the meso-digital age is the period in which digital technologies are initially adopted and institutionalised, beginning in the late 1980s. For Flaxton, the defining aspect of the meso-digital age is the limitation of the amount of data that can be stored at the stage of image capture without requiring compression.[35] This is reflected in image resolution of digital video (720 x 576 pixels), Standard HD or "2k" (which, depending on the aspect ratio and/or broadcasting medium, consists of 1920 x 1080, 2048 x 1080, or 2048 x 1536 pixels). The Red Corporation's

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[30] Based on a production budget of <\$15,000 (Frankel 2009) and global box office gross of \$107,113,212 (Anon., *The Numbers*).

[31] Smith's article is worth consulting to see which theorists are placed within which tradition, as well for its overview of wider philosophical discussion of film as art form (or, as the case may be, not).

[32] I have confirmed these interpretations with Flaxton via email correspondence.

[33] This periodisation is implied by Flaxton's anecdotes about his "first encounter with video tape [...] in 1976", and his experiences as the manager of a video editing studio in London in 1982, in which he was introduced to the concept of digital interlacing. As Flaxton and his colleagues experimented with digital tools throughout the decade, he argues, they "groped our way through the late analogue age" into the digital age (121).

[34] See timeline.

[35] Flaxton explains that "the highest form of 2k HD image capture requires recording onto hard discs – and not just any hard disc, but a Redundant Array of Independent Discs – a RAID (the exception is Sony's SR deck, which records data on tape). If you want to record 1920 x 1080 pixels uncompressed, then you need read and write speeds of over 440 Megabytes (MB) per second. The average hard drive reads and writes at around 35 Mb – hence you need a few of these" (115).

release of the 4k Red One digital camera in 2007 marked the transition toward a "neo-digital" age of [relatively] cheaply available wavelet-based[36] technology:

> The introduction of 4k was a moment of industrial reorganization. This new technology allows new people, who previously would not have had the opportunity, to enter into the industry at a high level. This shift in the industrial hierarchy is part of a cyclical phenomenon that comes in waves about every five years. Overtly it looks like a change in technology; covertly it's a change in employment functions. In the end, 4k is as relevant as everything that follows it – 8k, 16k, 32k, 128k – up to the data rate of the dominant hemisphere of a moderately intelligent person at 1GB per second (121)

Factitiousness aside, what is significant about this passage is that it demonstrates how Flaxton sees a "change in technology" as a covert "change in employment", and, moreover, how his periodisation consists of more than mere camera resolution. Technological innovation, changing production and distribution patterns, and adjustments in aesthetic ambition are seen as interconnected; in other words, the cultural dominants that Flaxton maps out also allude to the intersection of aesthetic, industrial and ideological factors.[37]

Flaxton is by no means the only practitioner with whom I seek to engage. As the opening of this chapter illustrates, filmmakers themselves also make important contributions to the discourses surrounding digital cinema, their comments playing a key role in shaping the reception of the digital cinematic image. While, as I demonstrate in Chapter 3, such commentaries can indeed reinforce problematic ideas about the significance of digitisation for cinema, it is not necessarily the case. Directors such as Zack Snyder and *Last Broadcast* creators Lance Weiler and Stefan Avalos display a sophisticated and critical understanding of some the misconceptions about digital cinema, and feed these into their public declarations about their own work and the work of others. If Flaxton's intervention reveals how certain academic pronouncements on digital cinema appear out of touch when compared with the practical reasoning of digital film artists themselves, it would do no harm to try and further mend this link between scholarly and professional

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[36] The industry standard software for HD cameras is based upon the principles of discrete cosine transforms (DCTs), which, as Flaxton notes "breaks up the image data into tiles, so that each can be treated independently" (116). By contrast, wavelet transforms "interrogate the data coming through them and find the best response from within their algorithm". Flaxton surmises that wavelet transforms "intelligently address the data to get the best out of it, while using less computational power" (117). For more on DCTs versus wavelets, see Graps, 1995.

[37] While Flaxton's focus on greater resolution, and his speculations on what the meso-digital age might hold, undoubtedly echo Bazin's problematic history of film as an inevitable realisation of human artistic endeavour. However, Flaxton's insight is more sophisticated than such a teleological view, arguing that realising the capabilities of digital image production is not guaranteed, but is nevertheless essentially a "question of resolution, and that in turn is a question of processing, compression and latency" (123).

debate by engaging seriously with the comments of directors, FX artists, and other industry professionals, particularly film journalists. If nothing else, this approach presents the opportunity to gain a broader sense of how the status of digital cinema and digital cultures more generally is policed and critiqued by those involved in its production, distribution, and reception.

Before moving on, it is worth summarising the claims I have made thus far. I have argued that the discussion of digital cinema's significance solely in terms of an existential crisis is understandable when placed in historical context, and remains relevant in the sense that it entertains the possibility of the emergence of digital narrative visual media which are formally and stylistically remote from what would be deemed 'cinema' in the present day. However, I have demonstrated how this also needs to consider the persistence of cinema as a series of formal conventions and phenomenological experiences, despite the impact of digitisation. I have suggested that this is because an approach which discusses cinema in terms of an 'identity' is insufficiently precise, and thus cannot explain how several factors might impact upon the formation of the ontological consensus of a medium.

So as to allow for a more satisfactory account, I imagine digital cinema as a series of formal and technological components that are subject to industrial, ideological and aesthetic forces. Through this approach, I can explore how and why formal constituents of the cinema medium reaffirm their place alongside their changed technological counterparts. In addition, I stress the importance of tracing the institutionalisation of digital cinema and development of its aesthetics in relation to the changing cultural status of digital technologies more broadly, thus shedding more light on how techno-ontologies might be shaped by a plurality of voices. In other words, my account recognises the importance of historicising cinema technologies not in crude terms of 'Before Digital' and 'Anno Digital', but via a series of eras more closely attentive to industrial, social and ideological change. Moreover, I seek to incorporate and assess the discourses that surround digital cinema –the opinions of directors, technicians, journalists, and fans– so as to build a broader portrait of how notions of digital ontology are constructed and contested. Finally, considering both how far these ruptures can or do go, as well as the completeness of their recuperation, foregrounds the economic and cultural imperatives that shape the impact of technological innovation. The visible digital trace, the, becomes the locus through which to explore these multiple concerns.

1.2   Contextualising Cinema in a Broader Digital Culture

> "It would take something wrenchingly huge to sweep [postmodernism] away; I believe digital technology, essentially, is that something"
>
> -Alan Kirby, *Digimodernism.* 2009.

Most of what I have argued up until this point has served the purpose of establishing how key strands of the existing scholarship on digital cinema are bound up with either problematic reactions to digitisation, restrictive definitions of a medium, or both. By engaging with these critics, I have outlined an alternative approach to theorising digital cinema. However, such interventions in these theoretical debates do not constitute the entirety of my focus. Indeed, my primary motivation in embarking upon this project was to provide an *expressive* account of digital cinema, particularly with regards to how such films respond to other contemporaneous digital visual technologies. In other words, my initial desire to explore the technological histories and ideologies of digital cinema is bound up with questions of how such films might be best reconciled with the CCTV cameras,[38] webcams,[39] camera phones,[40] and the visual practices of social networking[41] that have proliferated across broadly the same historical period. Thus, while I frame my research in terms of its interventions in debates about the ontology and mediality of cinema, I also explore how and why digital cinema incorporates traces of these other media.

In establishing this wider context, I appeal to the work of Alan Kirby, whose claim that digital communications technologies have facilitated the formation of a cultural paradigm distinct from postmodernism offers a way of further conceptualising my period of study. Unlike Flaxton's technological "eras", which, though useful, rigidly refer to paradigms within the film industry, Kirby's claims are at once more far reaching and more nuanced, offering an account of not only digital culture but also the theoretical underpinnings with which to understand recent technological and cultural shifts. Kirby proves to be the most appropriate critic to inform this aspect of my conceptual framework, as although he frames his work as an intervention in the "post-theory" debate, his work, is ultimately concerned as much with the relationship between aesthetic, ideological, and technological change as it is paradigms of scholarly interpretation.

1.2.1 *Digimodernism*

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[38] See: J Macgregor Wise 2013*.* Scholarly work specifically focused on CCTV tends to consider the ethics of surveillance (Norris and Armstrong 1999, von Silva-Tarouca Larsen 2011) rather than broader questions of visual aesthetics.

[39] For a history and theory of webcam performativity and spectatorship, see Michele White's *The Body and the Screen: Theories of Internet Spectatorship* 2006.

[40] Lee 2013, Knight 2013.

[41] Hjorth 2013, Mitra 2013.

Moving beyond a narrow critical preoccupation with digital cinema's ontological status should not downplay the cultural significance of digitisation. Indeed, the period 1980-2013 can be categorised not just in terms of changes in the film industry (as per Flaxton's aforementioned eras), but in terms of an ongoing shift towards a new cultural dominant rooted in digital technologies. It is in this respect that I am indebted to Kirby's ideas of digimodernism. In *Digimodernism* (2009), Kirby makes the bold claim that digitisation facilitates the development of new media which demonstrate a reconfigured sense of textuality. This in turn, he suggests, builds towards the formulation of a new cultural paradigm. Kirby argues that postmodernism, tentatively understood as the cultural dominant of the late twentieth century, has been effectively superseded by a new cultural logic –"digimodernism"– which "owes its emergence to the computerisation of text" (1). For Kirby, the computerisation of text "yields a new form of textuality characterised in its purest instances by onwardness, haphazardness, evanescence, and anonymous, social, and multiple authorship". Digimodernism thus has a double meaning, concerned both with a digital or digitised modernism, and with "fingers and thumbs (the digits) clicking and keying and pressing in the positive act of partial or obscurely collective textual elaboration". In other words, the technological constituents of digimodernist media allow for varying degrees of intervention, by which their formal or stylistic constituents may be rearranged, added, or deleted.

Kirby mounts his argument with a number of provisos, the most obvious being the ongoing prevalence of cultural postmodernism. Digimodernism is thus located as a "successor" of, a "borderline" with, a "reaction against", a "logical effect of" and demonstrating a "modulated continuity with" postmodernism (2). "These versions of the relationship between the two", Kirby suggests, "are not incompatible but reflect their highly complex, multiple identities".[42] Moreover, while Kirby's claim that digital technology can "sweep away" postmodernism is technologically deterministic, his understanding of digimodernist textuality as a *potentiality* is intrinsically linked with human agency, or "obscurely collective textual elaboration" as he puts it. This important nuance in Kirby's thought complements Rodowick's notion of technical and formal constituents subject to creative reorganisation. Thus, when Kirby suggests that "the digimodernist text relies on its technological status: it's the textuality that derives from digitisation; it's produced by fingers and thumbs and computersation" (53), he can be seen not so much as attributing a definitive quality to a particular medium as identifying the technological constituents shared across media, from which, to revisit Rodowick, "creative acts may unfold". That Kirby's arguments can be easily translated into Rodowick's

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[42] For more on this historical and theoretical reconciliation, see *Digimodernism,* "Chapter 1: The Arguable Death of Postmodernism".

terminology in this way suggests that there is no immediate methodological contradiction in drawing upon the two theorists. Though Rodowick's background is in film studies and Kirby's in literary criticism (Kirby 2013), their work shares a broader concern for mediality or, in other words, the philosophy of the text.[43] As the two epigraphs of this chapter attest, Rodowick and Kirby prove to be the two major influences in forming an account of digital cinema as a medium and its wider historical and cultural context.

For Kirby, key sites of digimodernist "material textual elaboration" (51) include digitally-shot and edited reality television programmes which rely on audience phone-voting; wiki-based online encyclopaedias; blogs; and seventh generation game consoles. While Kirby offers these as "fairly pure" examples of digimodernist texts, he adds that "digimodernism is not limited to texts or even to such a textuality; rather it is more easily expressed as the *rupture*, driven by technological innovation, which permits such a form" (ibid., emphasis added). Ruptures are a recurring theme in this thesis, and, in this instance, refer to a historical break; the emergence of a set of technological constituents shared across media which themselves constitute creative potentialities. This is, of course, a different understanding of "rupture" than that entertained in this thesis, but it nevertheless proves to be a useful way of exploring the significance for cinema of this change in cultural dominants. Kirby suggests that digimodernism can be understood in terms of "primary and secondary elements, causative and symptomatic factors, and central and peripheral areas" (102). Digital cinema belongs in the periphery of a new cultural dominant, not merely responding to it in salient but necessarily superficial ways, but surviving as a living medium in a cultural context dominated by different textual sensibilities.

Perhaps because he figures cinema as a peripheral concern, Kirby's own ruminations on the state of the medium in the digimodernist era prove somewhat limited. In "sketch[ing] links horizontally across a culture" (2013), Kirby turns his attentions to cinema, but focuses primarily on one of the most salient manifestations of digitisation in the medium: CGI. Kirby identifies three major uses of CGI technology to realise apocalyptic scenarios, historical epics, and popular mythology (181),[44] uses which he argues are

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[43] Indeed, in *The Virtual Life of Film*, Rodowick claims that his "principal interests are philosophy and contemporary visual culture, with cinema as the decisively central element of study" (3).
[44] Though revealing in their own right, these insights are perhaps not the most intriguing in terms of the cinema medium and its wider digital context. For a more rigorous history of the technology and its cultural status, see Michele Pierson's *Special Effects: Still in Search of Wonder* (200), which provides an account of "the role that cultures of appreciation have played in the cultural reception" of computer generated visual effects. In Chapter 3, I return to Pierson's insights as part of my own assessment of the digital backlot cycle. Ironically, this includes critiquing Kirby's own problematic comments about these kinds of film.

indicative of the waning of postmodern irony as a dominant narrative tendency.[45]
Arguments such as these, while intriguing, are hardly the most revealing application of
digimodernist theory to digital cinema; as such I do not intend to devote much effort to
rebuking or defending them. More problematic, perhaps, is how, outside of this discussion
of CGI's thematics, Kirby largely repeats the arguments that I have thus far challenged; for
Kirby, it seems, the "real revolution" of CGI "is ontological" (183). Though this claim is
barely substantiated, his qualification that "CGI embodies neither the contents of the mind
nor of the world, neither idea nor substance", appears to evoke the now familiar logic of
indexical essentialism. This is particularly disappointing, given that Kirby observes
elsewhere that

> there are two ways of considering the impact of "computerisation" or digital technology
> on film: superficially in terms of CGI [...] or digital experimentation; and more broadly
> as a putative redefinition of the nature or the "possibilities" of cinema itself (173).

Over the course of his discussion of cinema, Kirby fails to interrogate the assumptions of
either of these interpretations, and, indeed, proceeds instead to confirm both of them
through his claims of CGI earnestness and ontological "revolution", respectively. Despite
this, his broader insights remain highly relevant, if not pivotal, to the contextualisation of
my own claims about the medium. Thus, while I share David Bordwell's lack of affinity
with what might be termed "screen theory",[46] I suggest that a less dogmatic and more
textually attentive work of cultural theory such as Kirby's is needed to properly
contextualise the formal and technological changes experienced by cinema in recent
decades. Indeed, part of the appeal of Kirby's work is that its own questioning of the
relevance of postmodernist criticism is carried out not only in the name of a reinvigorated,
historically relevant cultural theory, but as a rebuke to the "anti-theory arguments in
disguise" found in the "after theory" debates, which he explicitly attributes to David
Bordwell and other formalists (29).

Part of the work of the ensuing chapters, then, is to put Kirby's theory to more
productive use with regards to digital cinema. Rather than focus on relatively superficial
matters of CGI, I consider instead how found footage films, shot with, and themselves
foregrounding, digital cameras, reflect digimodernist aesthetics (139) and react to the
perspectival strategies of digimodernist technologies such as computer games and CCTV
cameras. In passing, Kirby suggests, albeit problematically, that in digital backlot films,

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[45] This move toward "earnestness" is reflected in, for example, the CGI-realised universe of Peter Jackson's
Lord of the Rings trilogy (2001-3).
[46] Also known as Bordwell's straw man of 'SLAB theory': 'Saussurean semiotics, Lacanian psychoanalysis,
Althusserian Marxism, and Barthesian textual theory' ('Historical Poetics of the Cinema', 385).

"cinema itself is surrendered to digitisation" (183); in Chapter 4, I interrogate this logic and offer an alternative reading. In exploring the presence of digital glitches in cinema, I consider how glitch art and its cinematic counterparts constitute a digimodernist mode. It is through specific applications such as these, as well as a broader adoption of Kirby's aesthetic insights, that I assess cinema's relationship with other digital media, rather than narrowly defining digital cinema in terms of CGI. Moreover, the notion of a distinct cultural dominant emerging during the late 1990s and early 2000s offers an additional level of periodisation to inform, and be interrogated by, this thesis's industrial histories. The era of filmmaking which Flaxton calls "neo-digital" as approximately concurrent with the emergence of digimodernism allows for a more multifaceted contextualisation of digital films and their visual features.

1.2.2 *Other expressive accounts*

Of course, I am not alone in my interests in this regard, and my approach is not without precedents. In *Post-Cinematic Affect* (2010), Steven Shaviro provides an expressive account of recent films[47] whose form and style reflect an affective state shaped by "digital technologies [and] neoliberal economic relations" (2). In discussing at length three films and a music video[48] which allegedly "express and exemplify" a "structure of feeling" which he terms "post-cinematic affect" (1), Shaviro attempts to achieve nothing less than an expression of "what it feels like to live in the early Twenty First Century". Over the course of this project, Shaviro occasionally turns his attention to the visual traces of technologies –albeit not necessarily cinematic ones– in the cinematic frame, as the following description of *Southland Tales* attests:

> The film bathes us in an incessant flow of images and sounds; it foregrounds the multimedia feed that we take so much for granted, and ponders what it feels like to live our lives within it [The diegetic space of the film] is filled to bursting with handheld videocams, mobile phones, portable screens, 24-hour cable news channels, YouTube clips, MySpace pages, automated response systems, and celebrity-tracking paparazzi [...] in *Southland Tales*, traditionally 'cinematic' sequences are intermixed with a sensory-overload barrage of lo-fi video footage, Internet and cable-TV news feeds, commercials, and simulated CGI environments (68)

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[47] Though not all of these are instances of digital cinema however; *Southland Tales* was shot on cinefilm.
[48] *Boarding Gate* (Olivier Assayas 2007), *Southland Tales* (Richard Kelly 2007), *Gamer* (Brian Taylor 2009), and the music video for Grace Jones' song "Corporate Cannibal" (Nick Hooker 2008).

Whether visual media technologies are quite as ubiquitous in the diegesis of *Southland Tales* as Shaviro's prose would suggest is moot; to criticise his analysis as too excitable or heady would be to miss the point of his methodology. Nevertheless, it is this favouring of "effects" over "causes", of "evocations rather than explanations", (2) which shows how Shaviro's affective study mines a different conceptual seam than that of this thesis. Rather than figure cinema has litmus by which to express "what it feels like" to exist as an atomised agent within a neoliberal digital culture, this thesis is concerned primarily *with* the medium of cinema itself, and as such, figures this wider digital context and its attendant affective states secondary issues.[49]
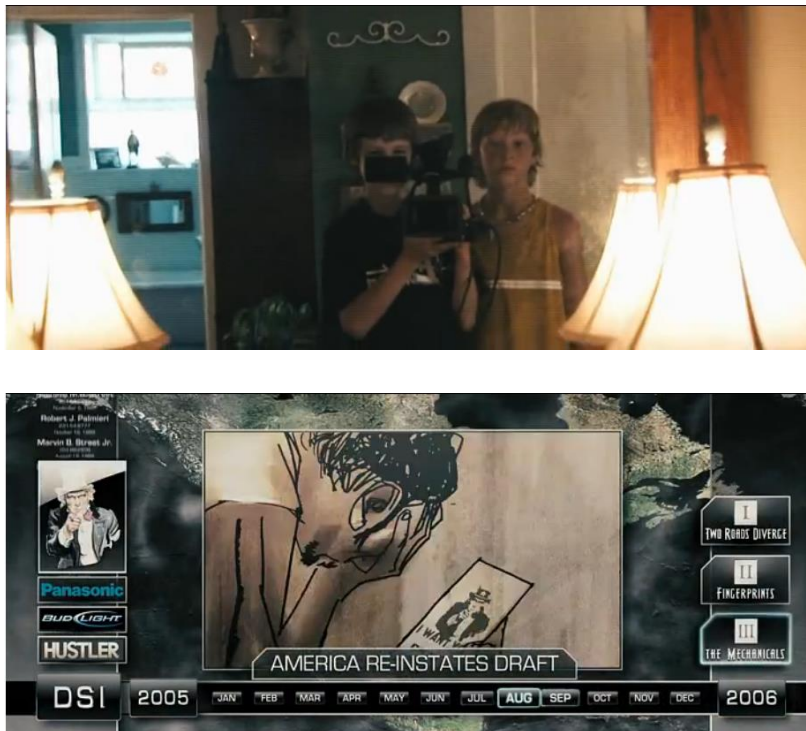
Figure 5: Technological traces in *Southland Tales.*

Nicholas Rombes' focus, by contrast, proves much closer to my own. Indeed, in the unambiguously-titled *Cinema in the Digital Age*, Rombes sets out to map the stylistic and formal state of digital narrative cinema, focusing on its most salient deviations from analogue film. Refreshingly, Rombes avoids a focus on CGI or visual effects more generally,[50] instead considering questions of shot duration, editing techniques, perspective, and image quality. Inspired by the theory-communiques of Guy Debord and Susan Sontag, as well as the "logic" of digital cinema itself, *Cinema in the Digital Age* is arranged into a series of forty-

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[49] In Chapter 4, for example, I make reference to Aymar Jean Christian's work (2010) on the relationship between lo-fi DV imagery and questions of technologically mediated intimacy.

[50] For accounts of digital visual effects, see the aforementioned Pierson (2002)and North's *Performing Illusions.* Prince's *Digital Visual Effects in Cinema* provides a detailed history of the development of computer generated images and their gradual adoption by filmmakers (23-31). Interestingly, the latter two accounts stress the continuities with the principles of analogue film effects; this thesis frequently echoes their insight.

three alphabetically-ordered ruminations "in such a way that corresponds, in spirit and metaphorically, to the database structures of the digital system" (11). Some of these reflections (the relationship between the long take and CCTV relay footage; digital errors; the lingering presence of 'redundant' analogue technologies) resonate with my own concerns, and I draw and build upon Rombes' reflections in my case studies, while others (databases and archives, digital retrieval) do not emerge from my own particular points of focus. Beyond these specific concerns, the value of *Cinema in the Digital Age* here lies in its pioneering exploration of this digital cinematic aesthetic; Rombes identifies and ponders a series of fertile creative developments in digital filmmaking in a largely isolated manner, and in so doing, invites others to engage with and draw together some of these conceptual strands.

1.2.3   *Rupture and recuperation*

In addition to the specific relationship between cinema and other digital media, the broader question of how one medium might relate to another, with its particular focus on the imitation or inclusion of components from other media, is one that has been articulated by scholars before.[51] Perhaps the most influential is Jay David Bolter and Richard Grusin's concept of "remediation". First outlined in their 1999 text *Remediation: Understanding New Media¸* Bolter and Grusin's theory accounts for the cultural status of emerging digital media by appealing to a broader theory of a media ecosystem. For Bolter and Grusin, it is the novelty and uncodified status of emergent media which imbues them with a sense of transparency allegedly lacking in existing, conventional forms. This is exemplified by the role of "lo-fi" versus "hi-fi" media technologies in the discourses surrounding the supposed truthfulness of "citizen journalism" over network broadcasting, whereby the amateur eyewitness armed with a smartphone is often figured as somehow more reliable, questions of bias or agenda aside, than their professional counterparts. The paradox in this regard is how the markers of the medium itself –in the smartphone example, the lower image resolution than that afforded by professional grade television cameras– function as the markers of this supposed new veracity. Bolter and Grusin call this contradictory phenomenon "the double logic of remediation". On the one hand, the imperative of media, especially emergent forms, is towards immediacy: the code that, as Bolter and Grusin put it, "dictates that the medium itself should disappear and leave us in the presence of the thing represented" (6). On the other, the visual signifiers of the medium itself –its "hypermediacy"– constitute evidence of this supposed immediacy.

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[51] Andrew Shail (2010) offers a detailed overview of this topic.

If, according to this theory, an emerging digital medium "promises to reform its predecessors by offering a more immediate or authentic experience", it follows that older media are compelled to respond to this challenge, and do so by incorporating aspects of these emergent forms into their own structures. Similarly, new media often replicate formal aspects of pre-existing media, such as news website which imitate the headline and column layout of print newspapers.[52] It is this process, of media "continually commenting on, reproducing, and replacing" (9) one another's constituent parts, that Bolter and Grusin call "remediation". The relevance of this theory for digital cinema is clear; cinema remediates features from emerging digital media so as to respond to the threat of greater immediacy and transparency. Though appealing, this reading is problematic for two reasons. Not only are Bolter and Grusin vague in their definition of a medium, thus running the familiar risk of assuming that a medium has an essential character, they also fail to distinguish between the formal and technological constituents of a medium, though the majority of their research focuses on formal components shared across media.[53] Despite the similarities of our respective insights into digital cinema, and despite remediation being applied by other film scholars,[54] it is for these reasons that I privilege my own terminology of rupture and recuperation over Bolter and Grusin's.

Rupture and recuperation, then, is the language with which I bring this conceptual framework to bear upon particular instances of industrial and aesthetic change. As a conceit, rupture and recuperation reconciles the minutiae and generalities necessitated by a rigorous scholarly engagement with the development of digital narrative cinema. It does this by focusing on how the medium and the practitioners who work within its parameters respond to, and engage with, wider technological and industrial forces. Recurring claims of 'rupture', then, are not so much pronouncements about the impact of the digitisation of once analogue technical constituents upon their formal counterparts, as much as they are reflections of the way in which these changes are framed by both the creators and consumers of digital films. It is from this notion of rupture –an assessment of the discourses which orbit individual films as much as their own implicit textual claims– that I extrapolate an account of the cultural status of digital filmmaking technologies. Visual traces of digital technologies form the evidence for my claims about these developments,

[52] Bolter and Grusin offer an example of clear remediation between print editions of *USA Today*, It is revealing –and favourable for their theory– to note how, since the late 1990s when *Remediation* was first published, news websites have developed their own formal and stylistic features which depart from those of their print counterparts.

[53] This critique –of the potential vagueness of remediation theory– first emerged from my correspondence with Bob Rehak about my research (2013), and in this regard, I am indebted to his input.

[54] In addition to work by Jan Simmons (2008) and Lisa Bode (2010), both of which make passing reference to remediation, there are three notable applications of Bolter and Grusin's work in film scholarship. Dan North (2010) considers the hypermediacy of DV cameras in *Cloverfield*, Lorrie Palmer (2012) reads hypermediation as a dramatic technique in recent action cinema, and Allan Cameron (2012) draws together of themes of the living dead in zombie cinema and the remediation of faulty digital technologies.

and their changing formal contexts are mapped across delineated periods so as to give a sense of the second part of my insight: recuperation. Recuperation captures how these visual traces, and by extension, the technologies which they represent, become settled constituents of the cinema medium. Visual traces that were once framed as the harbingers of ontological and/or formal revolution become fixtures of the cinema medium, and are established as creative potentialities for those working within its parameters.

In my three major case studies, I map trajectories of rupture and recuperation through different industrial and generic contexts which share broad historical and industrial space.[55] A different technological trace forms the object of study of each of these chapters and its application –and interrogation– of this rupture and recuperation conceit. The three case studies focus on instances in which digital technologies are salient visual features of the cinematic frame, and avoid examples which have previously drawn the attention of film scholars, such as CGI, motion capture and stereoscopy.[56] These take the form of a physical tool (the DV camera), a popularly discussed style of filmmaking (the so-called "digital backlot"), and a symbol of underlying technological process (the digital glitch). As such, I not only expound a particular intervention in the study of digital cinema, but also discuss a series of films, genres, and related phenomena that have themselves received little to no scholarly attention.

In Chapter 2, "The Digital Camera and Found-Footage Transparency", I take the DV camera as my primary technological trace. In mapping the correlation between the proliferation of cheaply available DV cameras and the explosion of the "found-footage film" genre, I argue that the pervasive notion that digital technologies are somehow more transparent or immediate than their analogue precursors is central to the formation and development of the genre's key narrative device. I term this device "diegetic camera perspective"; the phenomenon by which the camera that actually captured a film's pro-filmic event is also a prop within, and window onto, its fictional story space. By paying close attention to narrative strategies, I trace the ways in which early instances of this device, such as 1999's *The Blair Witch Project* and 2007's *Paranormal Activity*, are framed as formally disruptive, before exploring how later iterations of the genre, such as the *Paranormal Activity* sequels, incorporate diegetic camera perspective into more conventional narrative structures. I note how a growing familiarity with digital cameras and their often low-fidelity images, both within the film industry and outside of it,

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[55] Over the course of the thesis, particularly in the Conclusion, I consider how the variation in production and distribution contexts might complicate the rupture and recuperation conceit.
[56] See Ray Zone's 2012 *3-D Revolution: The History of Modern Stereoscopic Cinema* and Chapter 5 of Prince's *Digital Visual Effects in Cinema*, as well as Sandifer 2011, Higgins 2012, Casetti and Somaini 2013.

correlates with, and is likely partly responsible for, the waning ruptural power of digital diegetic perspective as a radical narrative strategy. Though this chapter constitutes the first study of the found-footage genre as an entity, my focus extends beyond these technological, formal and industrial issues. In particular, I suggest, while the films that inaugurate the genre, such as *Cannibal Holocaust,* display a distinctly postmodern literary sensibility, the purest instances of diegetic camera perspective resonate much more closely with a digimodernist aesthetic. Later films, however, constitute a return to an ironic postmodern reflexivity, suggesting the limitations of cinema's experimentation with the digimodernist aesthetics with which it is nonetheless fascinated.

Remarkable uses of chroma key technology form the focus of Chapter 3, "The Digital Backlot in 'Hybrid' Cinema". In this Chapter I consider a series of films released in the mid-2000s, such as 2004's *Sky Captain and the World of Tomorrow* and 2007's *300*, which set live-action performances against digitally-animated backdrops. I demonstrate how the chroma key technology (also known as green screen) used to realise these films not only builds upon a series of analogue forbears, but follows a long-established cinematic tradition of building composite images out of live performances, sets, models, and paintings. The most significant difference between these particular films and others is the highly stylised nature of their animated environments, which do not appear to aspire toward commonly held standards of verisimilitude. I argue that these stylised digital environments are best understood as reflexive demonstrations of the digital backlot's potential. Many of these particular films are adaptations of comic books and cartoons, and use various digital post-production techniques to imitate or reference the aesthetics of their respective source material. In interrogating the popular observation that these films are somehow "hybrids" of comic book and film, I explore the ways in which digital filmmaking technologies are framed as transformative and ruptural, and in response, offer my own account of how they are in fact recuperative.

In Chapter 4, "The Glitch", I focus on traces of computational and electrical processes in the form of the glitch. The signifier of momentary malfunction, the glitch is most frequently encountered as a passing inconvenience; the juddering, crackling reminder of the electric materiality which underpins our engagement with digital technologies, technologies which are themselves touted as the harbingers of seamlessly efficient, immaterial forms of communication. Deliberately triggered glitches became the aesthetic objects of experimental visual artists in the 1990s, figured as the symbol of an ideological opposition to the commercialised techno-utopianism which accompanied the proliferation of digital media technologies in the same period. I argue that *The Last*

Broadcast, the first feature-length narrative film shot and edited entirely with digital technologies, appears to echo this disruptive use of glitches, figuring digital malfunctions as ruptures in narrative flow. Just as the glitch was seized upon by commercial designers in the early 2000s, however, I argue that so too is the cinematic glitch recuperated as a narrative device, with the culmination of this process being the 2012 Disney release *Wreck-It Ralph*, in which a glitch is personified as a child-friendly protagonist.

As these summaries demonstrate, these case studies do not necessarily balance considerations of industrial, aesthetic and ideological factors in a uniform manner; considerations of production costs, work flow methods, and production chains, for example, figure more prominently in Chapters 2 and 3 than they do in Chapter 4, just as Chapter 4 pays greater attention to the ideological resonances of glitches across digital culture than Chapter 3 does to the significance of composited images. Nor do the case studies seek to impose a uniform understanding of rupture and recuperation onto their respective objects of study. For example, in Chapter 4, glitches are ruptures which, in deliberately drawing attention to the materiality of digital processes, stress the similarities with analogue cinema; narrative rupture ultimately stresses the formal continuities that remain in the cinema medium as a whole. In the case of the DV diegetic camera perspective analysed in Chapter 2, however, digitisation is indeed framed as an unprecedented ontological and formal rupture, at least in its initial iterations.

Moreover, as previously mentioned, the definitions of 'traces' in each chapter also differ. As will become apparent, the phenomena described as 'traces' fall under two main categories. Firstly, are those instances in which the digital trace is fetishized, championed, or otherwise explicitly framed as an object of inherent aesthetic and artistic value. Both the glitch and the digital-backlot fit this category. Secondly, are instances in which technological traces serve to support an aesthetic of verisimilitude, representing a broader gamut of techno-social practices signified by low-fidelity digital imagery. The found-footage genre largely fits this category, using technological traces to support its realist ambitions. However, the found-footage genre also demonstrates instances in which technological traces are mined for aesthetic beauty in their own right. These are quite distinct, albeit not necessarily discrete, phenomena; as I will demonstrate, these contrasting types of 'traces' embody the tensions of a medium at a particular technological juncture, at which new processes threaten and reinforce existing formal structures and industrial models.

As such, it follows that these case studies find their subjects experiencing different degrees of recuperation at different times. The digital-backlot film, for example can be seen as vivid but brief moment of rupture followed by a since uncontested period of complete recuperation, in which digital chroma key technology is once again established as a means of producing seamless composite images, rather than more unconventional stylistic experiments. In Chapter 2, I use Slow Cinema as an example of what alternative trajectories might have emerged from the rupture of digital data dumping were it not for the predominance of particular narrative structures and economic imperatives. In Chapter 4, I focus on the agendas and values attached to the glitch within experimental art circles versus those in the commercial design and film industry in order to consider the socioeconomic and ideological factors which nurture ruptures versus those which constrain them.

What these case studies generally share is an appreciation for the flexibility and relativity of the cinema medium, and a methodology which can entertain and capture a sense of the complex interaction of factors which drive and, importantly, restrict its technological and formal change. In the next few chapters, I demonstrate multiple ways in which discussions of technological traces can draw together and reconcile aesthetic trends, production patterns and discourses of the digital. Specific films, such as *The Last Broadcast*, are read not simply as reflective of pre-existing ideological assumptions, but as actively contesting notions of digital ontology. "Digital backlot" films, for example, are located within multiple contexts so that formal continuities with the analogue travelling matte can be brought to bear upon similarities with the perspectival strategies of seventh generation computer games. The rhetorical arc of rupture and recuperation, reiterated across overlapping periods of time and artistic activity, helps to navigate a much more complicated intellectual terrain.

Chapter 2: The Digital Camera and Found-Footage Transparency

The Blair Witch Project **(1999),** *[REC]* **(2007),** *Paranormal Activity* **(2007),** *District 9* **(2009),** *[REC] 2* **(2009),** *Troll Hunter* **(2010).**

> "I was coming back from a football match in Copenhagen, and I had a Sony PC3 [...] I was just learning how to play with it and I whipped it around [to film the scene] and I got this weird moment of *immediacy*: of lightness and immediacy"
>
> (Anthony Dod Mantle, qtd in Kenneally 2012, emphasis added)[1]

One of the most conspicuous examples of technological traces in recent cinema is that of the consumer-grade digital camera in the story space of "found-footage" horror films. In this chapter, I offer a strategic account of the genre's development, and discuss its reliance upon a narrative conceit that I term "diegetic camera perspective", which insists that the camera used to capture the pro-filmic event is also an object in the fictional world of the film. I demonstrate how the handheld DV camera is framed as a window onto story action, and, in so doing, explain the significance of the paradoxical association that the genre makes between traces of digital technologies and narrative immediacy. I suggest that, following the commercial success of *The Blair Witch Project* (Daniel Myrick and Eduardo Sanchez 1999), an initial run of digitally-captured films, particularly *[REC]* (Jaume Balgueró and Paco Plaza 2007) and *Paranormal Activity* (Oren Peli 2007), frame the perspective of the digital camera as a jarring 'new' way of seeing which aspires to transparently access story space. The implication of this logic, I suggest, is that the use of hand-held technology facilitates a rupture of narrative convention. With this in mind, the preoccupation with DV perspective and attendant thematic links between "techno-social" consumer goods and horrific invasions of public and domestic spaces are symptomatic of the cultural status of the digital camera during this period; a period which witnessed the rise of two key tools of a nascent digimodernist culture in the form of amateur and prosumer cameras.

However, in focusing on later uses of diegetic camera perspective, I demonstrate how DV cameras are recuperated into more conventional narrative structures. As the found-footage genre proliferates, the narrative cues of subsequent instalments reveal the pace at which this once disruptive digital way of seeing becomes familiar and unremarkable. *Cloverfield*, *District 9*, *Troll Hunter*, and the sequels to the *[REC]* and *Paranormal Activity* franchises incorporate multiple perspectives which appear to restate

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[1] The Sony DCR-PC3 Handycam is compact, handheld MiniDV digital camcorder first released in 1999.

the tropes of conventional omniscient narration, as well as spectacular CG imagery that contradicts the genre's assumed realist aesthetics, and references to films that betray a shared knowledge about the tropes of the found-footage genre and the artifice of cinema more generally. Through their foregrounding of the digital camera, these found-footage films constitute an explicit commentary on the more general but subtle adoption of digital cameras in the film industry across the same period; in other words, they allegorise the replacement of a particular technical constituent of the cinema medium. The discourses of "immediacy" which encircle these films pay testament to the interpretation of this technical change as something more profound. Consequentially, familiarity with this new technical constituent correlates with the recuperation of formal experimentation into more conventional narrative structures. Rather than bringing about the transformation of cinema into a new, fundamentally digimodernist medium, then, the digital found footage cycle can be read as an instance in which cinema comments upon its own changing technological components, as well as emergent digital visual media and cultural dominants, before ultimately reaffirming its own formal and stylistic conventions.

Over the course of the chapter, I engage with the work of film scholars David Banash (2000), Chuck Tryon (2009), Dan North (2010), and David Bordwell (2012), all of whom discuss particular films included in this chapter, and, in the case of North and Bordwell, make reference to found-footage cinema as a whole. With regards to wider digital cultures, I make reference to Alan Kirby, Terry Flaxton, and Nicholas Rombes, as well as James Cascio's ideas of digital self-surveillance (2005), and the work of Hito Steyerl (2009) on the proliferation of low-resolution digital imagery in recent cinema.

2.1   Defining found-footage

Undertaking this work, however, requires a satisfactory definition of "found-footage cinema". Bordwell (2012) is correct to point out that, in describing narrative fiction films which purport[2] to consist of genuine recovered material, the adjective "found" is misleading. Unhelpfully, the phrase suggests, and has indeed been used by scholars to describe, the salvaging and repurposing of pre-existing film footage for new creative purposes (Cecilia Hausheer, Christoph Settele, 1992; William C. Wees, 1993). This is a

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[2] This is not to say that found-footage films attempt to pass as genuine recovered material; in other words, they are not hoaxes. Despite this, there are instances in the history of the genre in which the "truth claim" conceit of some particular films have been seriously entertained. Before multimedia tie-ins became commonplace in Hollywood marketing, the use of the Internet to expand the fictional universe of *The Blair Witch Project* fuelled rumours that the film depicted real events. The murder charges brought against director Ruggero Deodato by Italian authorities for killings depicted in his film *Cannibal Holocaust*, encouraged by his decision to ban his actors from publically confirming their safety, provides a much more sinister precedent for this (Gelend 2003).

markedly different artistic tradition from that covered in this chapter, the latter of which, for all of its appeals to the imagery of screen-based techno-social consumer goods, is in fact rooted in the tropes of narrative horror cinema. So as to avoid confusion, Bordwell offers the term "discovered footage", which, though well-intentioned, does little to distinguish the fictional conceit from the experimental practice, nor indeed impart any specific information about the former. Moreover, Bordwell's attempt to coin a more appropriate name appears all the more futile given that "found-footage" has become the *de-facto* term used in newspaper reviews, blogs, and discourse-forming *Wikipedia* entries. Fortunately, the two uses of the term can be distinguished with little inconvenience; the older use of "found-footage" refers to a creative process that might be used in a broad range of filmmaking disciplines, while the more recent definition refers to a *generic fictional conceit* to be found predominantly in horror fiction film, a difference that can be marked by the simple addition of "genre" to the latter usage.[3] As such, the "found-footage genre" (though often just "found-footage" in this chapter) can be defined as referring to fiction films whose story action (syuzhet) is presented as raw footage captured as part of a documentary or personal recording and then later found, salvaged and presented by an often unnamed diegetic agent.

That this definition refers to a fictional conceit found predominantly in horror cinema will also prove relevant. It is hardly an original point to make that horror cinema has regularly mined social anxieties about technological change and application, be it the nuclear radiation of Ishirō Honda's *Godzilla* (1954) or the genetic research of David Cronenberg's *The Fly* (1986). It is perhaps more worthwhile to note that such explorations are often accompanied, and indeed partly facilitated by, innovations in filmmaking technologies. When William Castle's 1959 film *The Tingler*, was originally screened, for example, some movie theatre seats were fitted with Castle's trademark "Percepto!" vibrating device to strategically enhance the horrific spectacle of a parasite that resides within the human spinal column. More generally, the association between a monstrous and intrusive presence and novel techno-social consumer goods, as Jeffrey Sconce (2000) points out, has a history stretching back at least to the proliferation of electrical telegraphy and spiritualism in the mid Nineteenth Century. As I will later demonstrate, the found-

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[3] It is also important to distinguish between the found-footage genre film and the mock-documentary, or "mockumentary". Jane Roscoe and Craig Hight (2001) have argued that *The Blair Witch Project* should be considered a mock-documentary (187), and Bordwell has offered an aesthetic genealogy of recent found-footage films that ignores early examples of the genre in favour of "the pseudo-documentary fiction film" (2012). That some of the films under consideration in this chapter fit both categories does not mean that "mock-documentary" can be used interchangeably with "found-footage" as a descriptive term, even if the narratives in question depict professional or amateur documentary crews. While the mock-documentary imitates a *finished presentation* of material, the found-footage film imitates *raw footage*; these films do not imitate, or aim to imitate, the polished, multiple-address style of the conventional documentary.

footage *horror* film proves a useful locus for considering how the technological constituents of a medium can provide a reflection upon technological change itself.

Although *The Blair Witch Project*'s box office success[4] could be read as a precedent for the belated explosion of the genre in 2007, it is by no means the first film to demonstrate the genre's narrative cues. Rather, the 1980 Italian exploitation film *Cannibal Holocaust* (Ruggero Deodato) has been cited by academics (North 2010) and popular writers[5] alike as the most likely originator of the genre. In addition to this frequent citation, discussions of particular found-footage films (Manovich 2001), and the genre as a whole ("Top 20 Found Footage Horror Movies (so far)"), routinely refer to a number of film cycles, movements and styles that share superficial aesthetic similarities such as semi-improvised dialogue and low-budget production values. These allusions include the French New Wave [*La Nouvelle Vague*], Direct Cinema,[6] Italian Neorealism,[7] and the Dogme 95 movement, but most often consist of vague appeals to *cinéma vérité*, as if this were a defined style rather than a historically specific cycle of films. The generic trope which these disparate examples most obviously share is the wobbly, often blurred effect resulting from a lack of camera-steadying technologies.[8] Nevertheless, given the somewhat reductive nature of these comparisons, I hesitate to draw associations between found-footage and these other moments in film history unless they merit a specific comparison.

The reason for this ambivalence is because, though the function of technological traces within the found-footage genre broadly echoes the realist ambitions of these other cycles and styles, there is a specificity to lo-fi digital imagery and handheld cameras that cannot be characterised solely as a realist project. As I will demonstrate, within the found-footage genre there is a recurring appeal to the more complicated cultural status of the digital image, particularly with regards to techno-social practices. Thus, while the genre relies partially on verisimilitude, its traces cannot be exhausted by this reading. The lo-fi digital trace evokes anxieties surrounding the role and abuse of emerging consumer

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[4] *The Blair Witch Project* - estimated budget $60,000; total worldwide gross $248,639,099; budget to gross ratio 1: 4,144. *Star Wars: Episode I-The Phantom Menace* - estimated budget $115,000,000; total worldwide gross $506,618,295; budget to gross ratio 1:4.4.
[5] See: "The Most Controversial Movies Ever"; "Top 20 Found-Footage Horror Movies (So Far)"; Haglund 2012.
[6] Even within this category, there are considerable aesthetic and industrial differences between the American and Québécois cycles to which the label is attributed (Michael 2004).
[7] In the sense that *Cannibal Holocaust*'s director Ruggero Deodato has cited the stylistic influence of his mentor Roberto Rossellini, the found-footage genre can be argued as possessing a tenuous heritage in Italian Neorealism (Gelend 2003).
[8] The term "shaky cam" was coined by filmmaker Jonas Mekas in 1962, in relation to dismissive reviews of the contemporary US experimental cinema scene of which he was a part. Mekas argued that "even the mistakes, the out-of-focus shots, the shaky shots, the unsure steps, the hesitant movements, the over-exposed, the under-exposed bits, have become part of the new cinema vocabulary, being party of the psychological and visual reality of modern man" (68). Given Mekas's preoccupation with mistakes and technological traces, this is perhaps one example of a useful comparison between the found-footage genre and earlier movements.

technologies, and allegorises the technical changes taking place within the film industry itself.

A brief synopsis of *Cannibal Holocaust* demonstrates the central premise of the found-footage genre: story action presented in the form of recovered footage that necessarily pre-supposes an ill-fated film crew. *Cannibal Holocaust*'s narrative follows anthropologist Harold Monroe, tasked by the Pan American Broadcast Company to discover the fate of four American filmmakers who have disappeared in the Amazonian rainforest while shooting *Green Inferno*, a documentary about the indigenous Yacumo people. Finding only the grisly remains of the filmmakers, as well as their reels of film, Monroe duly hands the recovered footage over to Pan American for editing. When Monroe is invited to review some of the footage (as well as the crew's previous film, *The Last Road to Hell*), he discovers that they have instigated several violent scenes during the filming for *Green Inferno* that culminate with them raping, murdering, and mutilating a Yacumo girl, an act which ultimately incurs the vengeance of her community. Incensed by Pan American's plan to edit choice scenes into a documentary, Monroe forces its executives to watch the raw footage of *Green Inferno* in its entirety, footage that culminates in the four crew members being killed, mutilated and eaten by the Yacumo.

Moreover, *Green Inferno* employs the narrative trope which becomes central to the found footage genre: raw footage shot from the perspective of the diegetic camera operator. As if to acknowledge its novelty as a storytelling device, one of Pan American's employees explains to Monroe (and *Cannibal Holocaust*'s audience) that what ensues "is a very rough cut, almost like watching rushes", conveniently distinguishing its stylistic rules from those of narrative cinema, documentary and mockumentary, as well as declaring the phenomenology of the found-footage genre. However, what the critical commentaries that identify *Cannibal Holocaust* as the precursor to *The Blair Witch Project* overlook is how *Green Inferno*'s found-footage is ironically framed within a series of shifting modes of address. The diegesis of *Cannibal Holocaust* is cued via two types of perspective: the omniscient point of view common to conventional narrative cinema, and assorted mediated footage. This approach frames one perspective within another, with each successive perspectival shift qualifying or undermining its predecessor. For example, while graphic footage of staged executions in *The Last Road to Hell* satirises the Italian "mondo" film *Africa Addio* (Gualtiero Jacopetti, 1966), Monroe's closing interior monologue ("I wonder who the *real* cannibals are?") recalls the glib voiceovers that seek to justify the sensationalism, racism and titillation of the mondo movie genre to which

Cannibal Holocaust is ultimately indebted.[9] With this in mind, there is a limit to the extent that *Cannibal Holocaust* in its entirety can be read as a found-footage film. Found-footage is just one of several modes of address used in *Cannibal Holocaust* in order to reflexively explore and obfuscate its own relationship with the conventions of the exploitation film, an overtly playful approach to the found-footage conceit which is tellingly absent in its early initial digital iterations.

Moreover, the *Green Inferno* sections of *Cannibal Holocaust* do not quite anticipate the perspectival strategies of found-footage cinema, given that it employs the point of view of two separate camera operators. Pan American's editor reveals that he has already begun editing footage from the two reels together, conveniently allowing *Cannibal Holocaust* to construct a sense of space and perspective that is not far removed from that of conventional narrative cinema. When the *Green Inferno* crew arrive at the Yacumo village, for example, Jack films a side-on, long shot of Alan intrusively pointing his camera in the face of a Yacumo man, before the edited footage cuts to Alan's perspective: a close-up of the intimidated villager (see Fig. 6). Not only does this eye-line match betray an editor's hand, it speaks to the visual pattern of voyeurism that runs through the film. In this instance, the Yacumo man returns the gaze, drawing attention to *Cannibal Holocaust*'s artifice in a way uncommon for the initial run of more fully-formed digital found-footage films. As such, it suffices to note that, beyond offering the central narrative premise of the found-footage genre, *Cannibal Holocaust*'s most important contribution is the trope that the incapacitation of the camera operator necessarily ends the syuzhet (see Appendices B). North also identifies this trope (2010, 88), and it is his account that turns this discussion to a repeatedly overlooked but formally pivotal found-footage film.

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[9] In *Killing for Culture: an Illustrated History of Death Film, from Mondo to Snuff,* David Kerekes and David Slater discuss violence in *Cannibal Holocaust* (68) and *Man Bites Dog* (98), noting the connections between mondo movies and the former.

Figure 6: Conventional two-camera space in *Cannibal Holocaust.*

84C MoPic (Patrick Sheane Duncan, 1989), a tale of a disastrous reconnaissance mission by US forces in North Vietnam during the Vietnam War, contributes several other important tropes[10] to the genre: an initial frame suggesting the alleged provenance of the footage;[11] the camera operator establishing the beginning of the syuzhet by announcing to his first subject that the camera is recording;[12] a dramatic structure that favours suspense and character establishment over more complex narrative structures (the first skirmish takes place an hour into the film's 90 minutes); and the awkward, often embarrassed subject familiarising themselves with their constant documentation. Most importantly, however, the film firmly establishes the rule of diegetic camera perspective, to the effect of limiting audience knowledge. In the film, the camera lens that actually captured the staged

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[10] Despite this, the film is missing from North's account of found footage and relevant scholarship more generally; this is perhaps due to the film's relative obscurity when compared to the controversial reception and cult status of *Cannibal Holocaust* and the critical acclaim enjoyed by *Man Bites Dog* [*C'est arrivé près de chez vous- lit. It Happened in Your Neighbourhood*] (Rémy Belvaux, André Bonzel, and Benoît Poelvoorde, 1992). *Man Bites Dog,* which depicts the fatal infatuation of a film crew for their serial killer subject, similarly follows these rules, but does not contribute any tropes to the found-footage formula that cannot be found in either *Cannibal Holocaust* or *84CMoPic*. Although, as it is shot in monochrome 16mm, *Man Bites Dog* is visually similar to the black-and-white CP-16 segments *The Blair Witch Project*, although Myrick and Sanchez have never suggested an explicit influence on their technological aesthetic.
[11] In the case of *84CMoPic* this consists of a Society of Motion Picture and Television Engineers film leader, suggesting the footage's professional context as part of a US Army 'Lessons Learned' programme. More commonly, these markers take the form of a documentary intertitle. See Appendices A.
[12] See also: *The Blair Witch Project, REC, Paranormal Acitvity, Cloverfield, The Troll Hunter.*

pro-filmic event is presented as a prop in, and window into, the fictional world of the film. This is evinced by the film's name; "84CMoPic" is the service number of the **Mo**tion **Pic**ture Specialist who serves as camera operator for almost the entirety of the syuzhet.[13] Perspective is limited to one camera, with the lens itself seemingly subsuming the agency of the character that operates it (MoPic, as the camera operator is known throughout the film, confirms as much by telling another soldier "don't look at me, look at the camera"). As such, the audience are presented with only the unedited raw footage, with breaks in the story action dictated by MoPic's decision to turn off the camera.

The camera perspective of the found-footage film, then, does not correspond to an "imaginary observer"[14] or an omniscient "ideal spectator",[15] but that of the diegetic camera itself, and to a lesser extent, the perspective of the character that the narrative insists is carrying the camera and looking through its viewfinder. Rather than the mimetic conception of narration located in the camera, then, this is a conceit that operates as if the real camera and diegetic camera are one and the same. As such, it is not quite the case that, as Rombes argues, found-footage films feature the "camera as *narrator*" (2013), given that found-footage films do not "speak" or "tell" their narratives, but instead have their narratives decoded by the viewer through inferences based on the perception of various cinematic techniques.[16] This perspectival restriction allows both space and time to be conveyed to the audience in a manner close to the way that it is conveyed to MoPic himself: spatially in that the purview of the camera is restricted to the unit's claustrophobic single file route along the booby trap-laden Ho Chi Minh trail, and temporally in that the audience only glean knowledge of wider developments in the war as and when the unit does, via a radio.

In terms of technological traces, both *Cannibal Holocaust* and *84C MoPic* display the visual markers of analogue processes: in both films, the death of the camera operator is accompanied not only by the end of syuzhet, but also by the deterioration of the film stock. When one of *Green Inferno*'s crew is mutilated and eaten by the Yacumo, the grisly footage is interspersed with film burns and flashes, while MoPic's death in the moments after he has put the camera down on the deck of the helicopter is immediately followed by the running out of the reel, as indicated by the footage giving way to unexposed blue film

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[13] Another member of the unit momentarily hijacks MoPic's camera, and the final shot of the film is achieved by MoPic placing his camera on the passenger bay of a helicopter, so that he can run back and help save another soldier.

[14] This is how Soviet film theorist V.I. Pudovkin conceives of mimetic narration in his 1929 *Film Technique and Film Acting* (1970, 70-1).

[15] As Ivor Montagu, responding to Pudovkin, imagines the camera (1964, 141).

[16] As Bordwell argues in his cue-based theory of narration (1985, 100). Indeed, the conceit that the camera used to capture the pro-filmic event is also part of the diegesis of the film becomes a narrative cue in itself, and one that is subject to appropriation and deconstruction.

stock. These associations further tie together the ontological status of the fictional character and the actual technologies used to create this fiction: when a fictional camera operator meets their end, so too does the film's underlying mechanical processes.[17] In *Cannibal Holocaust,* the crew's hand-held cameras are both clearly shown via respective medium shots of one another, as is an editing table and monitor, and, in a particularly striking shot, the found-footage itself (see Fig. 7). Perhaps more subtly, *84C MoPic* integrates a concern for recording materials into its central premise. When the reconnaissance unit turn the camera on MoPic and enquire why he has exchanged the relative safety and luxury of the developing room for the field, he explains:

> I was working in the lab, back in the rear: post production. Sometimes we get these cans of film in, you know? There's no camera man, just the reels of film, and you hear he got shot, or [died] or something. But the spookiest thing is waiting for that film to develop, man, because you don't know what you're going to see. Sometimes you saw nothing. Other times [*laughs*] it's really spooky.

MoPic not only foreshadows his own fate ("you hear he got shot, or [died] or something"), but also touches upon the uncanny experience of viewing recovered footage. As *84C MoPic* self-consciously demonstrates, this viewing experience is something that the found-footage film attempts to mimic through its departures from the cinematographic and editing conventions of narrative cinema. Revealingly, these instances of reflexive concern for technologies, perspective and narration, occurring both subtly and not-so-subtly in *Cannibal Holocaust* and *84C MoPic*, are noticeably missing in the more earnest, early instances of digital found-footage films.

Figure 7: Technological traces of found-footage: the film reels that become *Green Inferno* in *Cannibal Holocaust.*

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[17] See Appendices B.

2.2   Digital found-footage and the turn toward transparency

The question remains as to how this generic history is relevant for a thesis principally concerned with digital cinema. Indeed, one could argue that, as valid as these observations may be, there is nothing about them that is specifically or inherently 'digital'. Following on from this logic, one could offer an analysis of the form and style of found-footage films that bypasses these considerations altogether, as Bordwell does with a blog post in which he discusses the *Paranormal Activity* franchise as part of a creative "ecosystem" (2012). To do so would be misguided, however, as the transition to digital technologies in the production of found footage films in the 2000s tellingly coincides with an initial turn towards transparency. While *Cannibal Holocaust* and *84CMoPic* explicitly play with modes of address, early instances of digital found-footage films, such as *[REC]* and *Paranormal Activity*, avoid such knowing reflexivity. Instead, the perspective of the digital camera is framed as both transparent and constitutive of immediate dramatic engagement with horror.[18] As Banash notes, the alleged immediacy of this DV footage was a "major obsession" of the commentaries produced upon the release of *The Blair Witch Project* in 1999, with reviews claiming that "the film somehow by-passes technology altogether, returning us to an authentic psychological […] horror" (para 1). *The Blair Witch Project* itself, like its descendants *[REC]* and *Paranormal Activity*, echoes the sentiment of its reviewers. Far from offering, as Tryon suggests, an "ambivalent, critique of electronic media" (42), *The Blair Witch Project* reverently presents the consumer DV camera as a tool with which to 'access reality'.

One of the reasons why grainy DV footage proves to be an appropriate signifier in such a realist aesthetic is because its low resolution is evocative of a wider gamut of poor quality digital imagery, from lossy JPEGs to 240p *YouTube* videos, which are themselves more representative than cinema of the techno-social practices that emerged in the late 1990s and early 2000s. Such grainy footage emerges at the same time as what Flaxton calls the "meso-digital" period, in which digital technologies had begun to become institutionalised in various aspects of the Hollywood film industry but the image quality of digitally-captured films had not yet met that of 32mm cinefilm. Indeed, this question of the digital image as grainy novelty versus indistinguishable from analogue will prove useful in tracing the recuperation of diegetic camera perspective in later iterations of the digital

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[18] *The Blair Witch Project* consists partially of digital video, shot with an RCA Hi-8 handheld camera (the other footage is 16 mm film captured with a Cinema Products Corporation CP-16), and as so could be regarded as characteristic of the genre during digital video's initial emergence. For Rombes it "acts as a splice between the analogue and digital eras" (Rombes 16-17), while Kirby characterises it as a "borderline text" between the postmodern and digimodern (142).

found-footage film; for now, it is worth merely observing how DV imagery in the "meso-digital" period is discursively and aesthetically framed as a second-class citizen. Indeed, for Hito Steyerl, the lo-fi digital image is the "itinerant image" of a digitally networked consumer society (2009, para 2), its low resolution testifying to the degradation incurred by file compression and reproduction through informal distribution networks. While the inclusion of such lo-fi imagery in cinema has not gone unnoticed (Casetti and Somaini 2013), its appeal arguably lies in its evocation of the quotidian and pedestrian navigation of digital information, and the associations of immediacy that this in turn brings with it.[19] This lo-fi imagery also evokes a key digimodernist aesthetic, which Kirby terms the "apparently real". For Kirby, the apparently real is an aesthetic tendency in film and television fiction that, in contrast to postmodern literature's preoccupation with contested notions of reality,

> seems to present no such predicament. It proffers what seems to be real … and that is all there is to it. The apparently real comes without self-consciousness, without irony or self-interrogation, without signalling itself to the reader or viewer (141)

As Kirby notes, the reception of the news that BBC documentary makers had manipulated the ordering of footage of photographer Annie Leibovitz' portrait session with Queen Elizabeth II to make it appear as if the monarch had walked out in anger, is telling. While print newspapers reported the events with outrage, "TV insiders explained that this aesthetic's reality was only *apparent*, as it is name suggested, not absolute". Rather than outrage, viewers met the news with ambivalence, betraying how "the apparently real is, then, the outcome of a silent negotiation between viewer and screen: we know it's not *totally* genuine, but if it utterly seems to be, then we will take it as such". This relatively unselfconscious presentation of footage characterises these early instances of digital found-footage films, and, as will become clear, its abandonment can be related back to Kirby's historicisation of these particular textual epochs.

Moreover, the genre engages with digimodernist techno-social practices and their attendant anxieties around questions of intimacy, privacy, and memory. Given the central conceit of the found-footage genre, it is unsurprising that the theme of self-documentation proves to be the most poignant of these concerns, and of course, the diegetic camera operators of *REC 3, Paranormal Activity, Paranormal Activity 2, Paranormal Activity 4* and

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[19] This resonates to an extent with Bolter and Grusin's notion of "hypermediacy", which captures how the layering of different levels of address in a particular medium attempts to explicitly fulfil the desire for mediated information. Emerging digital media, Bolter and Grusin note, "oscillate between immediacy and hypermediacy, between transparency and opacity" (19). Bolter and Grusin, however, are concerned with the appearance of formal components of one medium within another, rather than the connotations of salient traces of a medium's own technological constituents.

Cloverfield are amateurs. Indeed, the very plausibility of the amateur camera operator premise depends upon the acknowledgement of this trend as an 'everyday' techno-social practice. Regardless of the demons, aliens, or 350-foot-tall monsters that might appear in the found-footage film, the events in its opening scenes are frequently pedestrian: a leaving party (*Cloverfield*); the installation of home security technology (*Paranormal Activity, Paranormal Activity 2*); the making of home movies (*Home Movie*); a wedding (*REC 3*); a webcam video chat (*Paranormal Activity 4*). Again, it is here that found-footage's broader inheritance from the horror genre proves germane. New technologies, monstrous in their intrusion, are not only constitutive tools but rivals to the aforementioned demons and aliens in their own right.

Hille Koskela argues that the type of surveillance associated primarily with authoritarian governments – what she terms "protective voyeurism" (89) – is also reflected in private security systems, a shift which Gareth Palmer (2006) argues is indicative of a neoliberal internalisation of this policing logic. Variations upon this theme of semi-formal, semi-improvised surveillance (tripod-mounted prosumer cameras, professionally installed CCTV, strategically placed laptops) is the variation that lends each new instalment of found-footage its novelty. Indeed, the 'fan-cam' perspective of *Paranormal Activity 3* (see Figs. 14-15), in which a camera is attached to a rotating mechanical fan, represents the most striking of these examples, precisely because its crudeness denotes a personal, domestic touch.

That said, the way in which evidence of the preternatural is revealed in the franchise is more indicative of what Koskela calls "banal voyeurism" (92), in which "people seem to desperately search for meaning – from anywhere". Traces of the demon are discovered by spotting a tiny detail when reviewing recorded footage on a laptop computer. Whether it is a botched sex-tape (*Paranormal Activity 3*) or unsolicited webcam footage of a sleeping girlfriend (*Paranormal Activity 4*), discovery of the demon is facilitated by a drive not just to document the banalities of everyday life, but to pore over the resultant image. In *Paranormal Activity 4* the use of such technologies in the familial sphere echoes the general theme of malign forces invading the home. As her parents fail to discuss their estrangement from one another and their children, the teenage Alex turns to the webcam as a source of communication beyond the house, keeping in constant contact with her boyfriend Ben. Echoing this, an Apple MacBook serves as the bath-time guardian for Alex's five year old brother, Wyatt. While Alex initially chides Ben for recording their webcam sessions ("totally an invasion of privacy"), she is willing to install hidden cameras to explain strange goings on, despite the fact that, as Ben points out, she would be "spying on your whole family". As such, the *Paranormal Activity* franchise displays a conflicted

reliance upon, and suspicion of, neoliberal voyeurism, both in its protective and banal forms.

Figure 8: Alex falls asleep after using a *Skype*-like video-casting service to speak to Ben, who records the live stream without her permission. He then records the laptop playback.

Indeed, it is worth considering to what extent the invisible demons stand in for the digitally facilitated techno-social change that is itself imagined as monstrous. The most striking example of this is found in *Paranormal Activity 4,* as the infrared motion sensors of the X-Box Kinect detect the presence of an otherwise invisible demon. Alex and Ben organise and film an "X-Box party" for Alex's younger brother Wyatt and his introverted friend Robbie, in which the Kinect's motion sensor is activated and the living room lights are dimmed. When this space is filmed, the digital camera's night vision setting reveals the mesh of infrared tracking dots which detect a gamer's movement, which also prove to be a cheap alternative to disco lights, even if they only appear in the playback footage. Reviewing the footage, Ben discovers that the sensors have traced an outline of a child sat next to Robbie, which cannot be seen with the naked eye, suggesting that Robbie's "invisible friend" Toby is indeed outside the threshold of human vision, but is certainly not imaginary. As will become clear, then, the found-footage genre's orientation toward digimodernist techno-social practice is somewhat anxious. Not only is the film medium by its very nature limited in its engagement with interactive digimodernist textualities, it also appears to over-emphasise the troubling social implications of these new technologies and practices.

Figure 9: Ghostly figures in *Paranormal Activity 4.*

It is this combination of factors that validates a reading of the found-footage genre along specifically digital lines. In addition to these ideological issues, the significance of digital technologies for the industrial forces which also shape the genre is worth considering. The major intersection between form and technology in this regard is the relative cheapness of digital consumer cameras, in comparison to professional-level filmmaking technologies and their associated workflows. As an indie-crossover sensation, *The Blair Witch Project* constituted a lucrative financial model for film production; unsurprisingly, over fifty films have been released since *The Blair Witch Project* that at least partly employ the found-footage premise.[20] Found-footage budgets are held down not only by the use of small casts of often unprofessional or early career actors,

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[20] This includes sequels to *Paranormal Activity* and *[REC]* (the former reaching its fifth instalment in 2013, the latter its fourth); the English-language *[REC]* remake *Quarantine* (John Ericke Dowdle, 2008) and non-canon Japanese sequel *Paranormal Activity 2: Tokyo Night*; mockbusters like *Paranormal Entity* (Shane Van Dyke, 2009) and *The Amityville Haunting* (Geoff Meed, 2011). More generally, the format has been employed in Bollywood cinema (Dibakar Banerjee's 2010 *Love Sex aur Dhokha*), independent British horror (Michael Axelgaard's 2011 *Hollow*), U-certificate family adventure (Sid Bennet's *The Dinosaur Project*) and the whimsical Orson Welles radio hoax-inspired *War of the Worlds – the True Story* (Timothy Hines, 2012), whose footage purports to be salvaged from 1900.

improvised, or "retro-scripted" screenplays[21] and on-location shoots,[22] but also by the use of consumer and "prosumer" digital cameras, all of which help to compensate for the lengthy editing sessions necessitated by the amassing of hours of improvised raw material. This represents a viable business model for independent and "mockbuster" production companies, while major studios are guaranteed a return from less than average box office performances, regardless of whether it has produced the film itself or merely secured distribution rights. Indeed, the model appeared so lucrative that following the success of *Paranormal Activity*,[23] Paramount founded Insurge Pictures, a branch of the studio dedicated to the independent distribution of "micro-budget" films. In 2010, Insurge secured $1 million to be spread across ten films (Eisenberg 2012), though it has thus far only produced the critically and commercially unsuccessful mockumentary horror *The Devil Inside* (William Brent Bell, 2012). Whether the uncertain future of Insurge is indicative of the genre's fate itself is unknown, though releases of found-footage films have begun to fall from their 2010-2012 peak. As will become clear, once the novelty of digital imagery begins to wear off (both in terms of techno-social practices and within the film industry itself), attention turns towards generating novelty through more imaginative editing and perspectival strategies which cannot help but depart from the earlier transparency conceit.

2.3   Early digital found-footage: immediacy

The initial-run digital found-footage films (*Paranormal Actvity* and *[REC]*) adhere to a strict set of conventions with regards to diegetic camera position and editing. As will be discussed, *[REC]* aspires to the raw footage format more than *Paranormal Activity*, but both films are marked by an attention to a set of realist conventions that support the conceit that audience knowledge is limited to what can be captured by the single camera. *[REC]* follows a two-person film crew – presenter Angela Vidal and cameraman Pablo – as they shadow a group of Barcelona fire fighters for the reality television programme *While You're Sleeping*. As with MoPic, Pablo and the camera are virtually physically inseparable: he places the camera on the ground just once, and only abandons it when he dies at the very end of the film. As such, camera access to the diegesis is limited to Pablo's physical position; this is mined for suspense when the crew become quarantined inside an apartment building whose inhabitants have succumbed to a rabies-like virus. As per the conventions of the zombie film, the limited knowledge of the protagonists correlates with

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[21] *The Blair Witch Project* and *Paranormal Activity* both employ this technique, especially the latter.
[22] *Paranormal Activity* director Oren Peli used his own San Diego house as the sole location for filming, for example.
[23] Total global box-office gross $193,355,800. Production budget: $15,000, US rights secured by Paramount for $350,000. ("Paranormal Activity" 2013).

the limited knowledge of the audience; an outbreak has taken place, but no explanation is immediately available. Diegetic camera perspective, however, limits this further to what can be seen. As with *84CMoPic*, the sense of space constructed as Pablo's camera is forced into narrow corridors is a claustrophobic one, leaving the audience to rely on Angela's commentary to expand their knowledge of the building and its contents beyond that which falls into the lens's purview. This scenario is reversed when Pablo films a clandestine examination of the infected by a hazmat-suited doctor. As the camera pokes through a small gap, Angela is heard off-screen, asking "Pablo what's happening?", further tying together the perspective of the camera and its operator.

The notion that perspective somehow resides in the digital camera is further exploited for suspense when Angela and Pablo find themselves in the penthouse of the building. The pair discovers that the apartment is the laboratory of a Vatican agent tasked with researching a virus purported to be the real cause of demonic possession. The agent keeps a 'possessed' girl in the penthouse for use as a guinea pig. When the virus mutates and makes the girl infectious, he chains her in the attic and flees, leaving her to starve to death. When the door to the attic opens, Pablo decides to ascend and film, and gingerly pushes the camera upwards into the darkness (see Fig. 10). Slowly rotating the camera to obtain a 360-degree view of the attic, Pablo initially reveals nothing. Just after the rotation has completed its circle, however, an infected child appears in the foreground of the shot and lashes at the camera, breaking its light (a scenario that is revisited in *[REC] 2*). After Pablo switches to night vision mode, the camera's field of vision becomes even more limited, reduced to a green circle corresponding to the shape and size of the lens. It is at this point that Angela and Pablo realise that the girl left behind by the Vatican agent has not died: in the background of the shot, the camera picks out an emaciated figure stumbling in the darkness.

The climax of horror suspense is thus intimately tied to the most limited and mediated perspective in the film. Pablo and his camera have become associated with one another within the diegesis itself, but that is not to say that his vision up until this point has relied on the camera. If he had wanted to, he could have observed the occurrences in the apartment with his own eyes. This is not the case in the pitch black of *[REC]*'s final scene. In this scene, the diegetic perspective can only be that of the camera itself. The green glow of the low-light image intensifier betrays how what Pablo sees first hand in the diegesis of the film (and what the audience thus sees second hand) is technologically mediated. Pablo is seeing the girl mediated not only through a glass viewfinder, but also through a lens, a photocathode, a phosphor screen, and a viewing screen. The result of this "night vision" mode (as per the conventions of the genre, the pro-filmic event is actually

captured via this low light technology) is that even more is required of the audience to discern the whereabouts of the possessed girl. Of course, this squinting is demanded at precisely the moment at which audience members are likely to find viewing most unnerving. As such, digital imaging technologies pertaining to the actual cameras used to capture the pro-filmic event encourage the desired identification with diegetic perspective and character predicament.
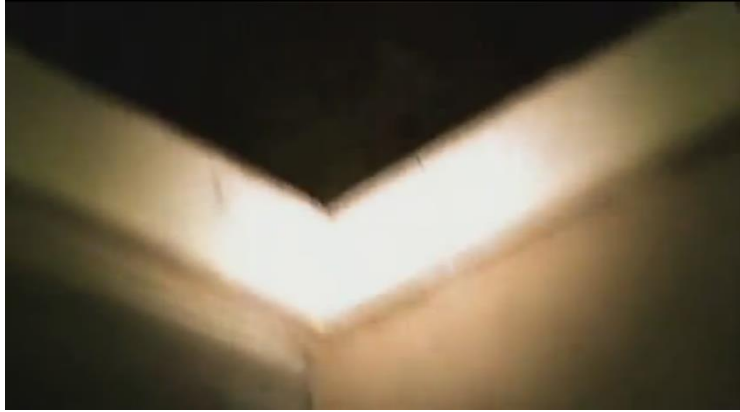
Figure 10: Venturing into the attic in *[REC]*.

Figure 11: 'Night vision' and mediation.

A singular diegetic camera perspective has particular implications for notions of space, when contrasted with more conventional narrative cinema. Even Ridley Scott's *Alien* (1979), which uses low-key lighting and low-angle shots to convey the claustrophobia and dread aboard the Nostromo spaceship, nevertheless places cameras in the corner of gangway intersections so as to afford a modicum of omniscient spatial awareness. In a single take of one such gangway, Ripley is shown running from the background of the shot into the foreground. As she reaches the junction, the camera pans to let the audience see the next tunnel before she does. As she runs down it, a match-on-action cut to the other end of this new tunnel places her as a small figure in the background of the shot, again affording the audience time to calculate the size of this new area of the ship. In *[REC]*, diegetic camera perspective grants no such spatial privileges.

The audience must learn the dimensions of the infested apartment building as Pablo does. As such, there is a greater incentive for the audience to memorise Pablo's route (that there is an underground escape route via a locked workshop door; that there is a key in the penthouse, itself accessible via a narrow, shadowy spiral staircase; that there is an attic within the penthouse) as these narrative facts are not established through omniscient perspective. Rather than panoramic and omniscient, the construction of space in *[REC]* is thus nonlinear, agent-specific and algorithmic (that is to say, step-by-step). This proves significant for later examples of digital found-footage films that attempt to construct space via techniques closer to the multiple camera/high-angle establishing shots of conventional narrative cinema.

Paranormal Activity uses the same hand-held device, but is less strictly tied to one character. When Katie moves in with her fiancé Micah, she reveals that she has been intermittently pursued by a sinister paranormal entity her entire life, one which appears to have followed her to the young couple's home. Micah purchases an expensive "prosumer" digital camera (likely to be the high-definition Sony HDR-FX 1 Handycam) to document any potential occurrences. As in *[REC],* initial shots[24] aim to establish that the recovered footage is comprised of an unedited stream of chronological recordings that are structured only by the character turning the camera on and off. The narrative value of the opening shot of the couple's television lies solely in its suggestion that this is the first time that Micah has pressed "record" since taking the Handycam out of its packaging, and is more concerned with whether it works than the camera's subject. Just as *[REC]* opens with a series of bloopers before Angela and Pablo finally manage to film a flawless introduction to *While You're Sleeping* (the pair also discuss framing and distracting background noises), shots of Micah scrutinising the reflection of the camera in the mirror further contribute to this notion of spontaneous, unedited raw footage. Ensuing segments of romantic self-documentation (Katie's poolside filming, Micah's failed attempts at making a sex-tape) further contribute to this notion of an unordered digital file, while also creating a sense of domestic security to be undermined once such segments are interspersed with footage of inexplicable or sinister occurrences. Indeed, the use of the camera to document this activity is specifically established. In one segment, the camera is placed a few feet away from Micah as he sits on the sofa playing a guitar. Katie's scream is heard off-screen, and Micah rushes out of the frame to find her. He then reappears in the frame to pick up the camera in order to film whatever it is that has frightened Katie: it transpires that it is a

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[24] "Scene" is perhaps not the most useful term to discuss the episodic nature of the genre, even if they *are* ultimately scenes; perhaps "segment" is a term closer to the spirit of the found-footage conceit.

spider. The horror trope of the Lewton's bus[25] thus justifies the presence of the camera for later episodes, and is even explicitly framed as such when Katie incredulously asks Micah "did you go and get the *camera* first?"

As such, there is a clear sense in which the editing strategies of *[REC]* and *Paranormal Activity* are under-emphasised. Rather than explicitly divide the narrative into complete, clearly delineated sections, these single-take segments of varying duration, often connected via disruptive jump cuts, aspire towards the conceit of raw footage, in these cases recovered digital files. Both of these films display formal aspects that flout this conceit. In *[REC]*, the flouting is minimal and moot: Pablo films an infected woman being gunned down by a security guard, Angela then requests that the footage be rewound. The frame is then consumed by footage being digitally rewound, and replayed, with Angela's shocked commentary heard off-screen. Editing strategies raise an awareness intrusive question of plausibility, namely: if a camera operator were filming something, and then rewound what they had just recorded and viewed it on the digital display, while still recording, what would be shown on the digital file itself? In the real world, this depends on the features of the digital camera itself, leaving two possible readings. Firstly, that the on-screen rewinding is an instance of poetic licence on the behalf of *[REC]*'s creators, or that it is a plausible phenomenon that could indeed appear in the unedited, recovered file that *[REC]* purports to be. Given the short duration of the scene, the former explanation is hardly detrimental to diegetic camera perspective as a narrative cue. In *Paranormal Activity*, two narrative strategies raise similar questions. Firstly, as an exhausted Katie recovers from having been attacked by the invisible demon, she rejects Micah's suggestion that they leave the house, calmly stating that "I'll think we'll be okay now". Micah accepts this answer, and the footage leaps to later on in the day. The camera, however, captures a sinister clue that Micah missed. When Katie says "I think we'll be okay now", the sound of her voice is subtly distorted, hinting that she is already possessed and enacting the whim of the demon, keeping Micah in the house in order to murder him. As it has already been established that demonic presence is registered via digital technologies[26] it is thus implied that it is the camera, and not its operator, that detects the sound. This dramatic irony (the

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[25] The term was coined by Mark Robson, editor on Val Lewton's *Cat People* (1942). Robson explains that "it derives from a sequence in *Cat People* in which a girl was walking through the transverse in New York's Central Park, imagining that she was being followed by somebody or something one supposed could be a cat of some sort, a leopard possibly [...] From the other side of the park a bus came by, and I put a big, solid sound of air-brakes on it, cutting it in at the decisive moment so that it knocked viewers out of their seats" (qtd. in Newman, 562).

[25] One reviewer asks whether the explicit use of the motif in later *Paranormal Activity* films is indicative of the franchise being "tired of its own fans' expectations" (Maddison 2013).

[26] Earlier in the film, Micah holds a microphone to the room and asks, "do you want to communicate through the Ouija board?" to no discernible reply. When he views the recording through audio editing software, he sees visualisations of two sound waves. One represents his speech ("do you want to communicate through the Ouija board?"), the second a small clicking sound, unheard at the time of recording, which Micah interprets as a supernatural riposte.

camera, and thus the audience, knowing what Micah does not) is more in keeping with the tropes of horror cinema, and thus undermines the broader aesthetic of the film, betraying its genre features over its found-footage premise.

More important is the way in which the static "night-vision" segments are offered as reviewed, edited footage. These sequences in question feature in every film in the *Paranormal Activity* franchise, and are always used to relay night time occurrences. In the first film, these long takes are captured by the static, tripod-mounted Handycam placed in Micah and Katie's bedroom (see Fig. 12); in the three sequels, they consist of surveillance loops of multiple cameras placed at strategic locations in the house (professionally installed CCTV cameras in *Paranormal Activity 2*; synced video cameras in *Paranormal Activity 3*; laptop-embedded cameras dumping to hard drive in *Paranormal Activity 4*). In each film, these sequences not only punctuate but contrast with the handheld daytime footage as a narrative strategy: the night shots keep the audience ahead of the haunted protagonists by showing them what the demon does while the hand-held camera operator sleeps. Moreover, they are catalogued: captions appear on-screen stating the date of the evening, as well as numbering them. Given that not all the nights feature, this suggests that either the film being viewed has been compiled for the benefit of an audience by an unseen editor who decided that some nights should be omitted, or the same editors have not removed or re-ordered any footage, but merely determined which days the footage represents via extensive research. The hand of an unspecified editor is further evinced by the fact that the night footage is speeded up and only played back at normal speed to demonstrate a peculiar occurrence. As the fast-forwarded material returns to its normal playback speed, it gradually slows down, and this decrease in speed becomes an ominous form of narration, indicating that the audience are about to be shown something disturbing.

Unlike the fast-forwarding in *[REC]*, this narrative device cannot be explained away by a reference to the diegetic camera's fictional world. A reading that retains the fictional conceit of the film would have to argue that the handheld footage has not been edited, and that the "night vision" segments are manipulated solely to show strange behaviour or events. As Bordwell (2012) notes, regardless of explanation, these narrative devices nevertheless imply an editorial consciousness operating above and beyond the diegetic camera operator. Distracting questions abound: who are the editors of this raw footage, and to what extent have they reorganised or otherwise manipulated the presented footage? This anticipates a revealing correlation found in later digital found-footage films, such as *[REC] 2*, *Cloverfield*, and *District 9*, that the presence of the retrievers becomes

more salient[27] as the immediacy effect of digital presence wanes, and becomes appropriated into more conventional narrative strategies.

While they may conflict with the conceit of the digital found-footage film, these night segments nevertheless encourage viewing strategies uncommon in much contemporary narrative cinema. Bordwell argues that the *Paranormal Activity* franchise is remarkable as a contemporary Hollywood film that employs the long duration take as a trademark trope. As Bordwell notes, this "impersonal" perspective is pivotal in the construction of suspense. Often, the first few sequences are merely uneventful long takes of sleeping protagonists, and empty living rooms and kitchens. These segments serve to familiarise the viewer with the details of the frame, so that, in subsequent segments, subtle sound effects and tiny movements increase suspense. The night shots from *Paranormal Activity*, for example, consist of the following sequences:

Night 1, Sept 18th

Subsonic rumble, dull sound of footsteps, sound of keys dropping. Katie's keys are found on the kitchen floor the following day.

Night 3, Sept 20th

Rumble, creaking door sound; door moves slightly; gurgling sound.

Night 5, Sept 22nd

Rumble, Katie awakes from a night terror.

Night 13, Sept 30th

Katie and Micah are woken by a thud. Shortly followed by a demonic scream and a crashing noise.

Night 15, Oct 2nd

Rumble. Apparently sleepwalking, Katie stands upright for two hours beside the bed then leaves the bedroom. Micah wakes, finds her sitting in the garden, still in a slow wave sleep stage. Micah returns to the house, hears a bump, and finds that the bedroom television has been switched on and is tuned to static.

Night 17, Oct 4th

(Before they go to bed, Micah lays salt on the floor of the hallway and bedroom)

Rumble, sound of footsteps. Katie and Micah wake up, find three-toed footsteps in the salt on the bedroom floor. They then discover that the hatch to the attic is open. Micah explores and finds a burnt childhood photograph of Katie in the area of the attic directly above their bed.

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[27] See, for example, *Cloverfield*'s intertitle [Appendices A..vi] that declares the ensuing footage to be property of the US government.

Night 18, Oct 5th

Living room light switches on, sound of footsteps. Light switches off, bedroom door slams shut.

Night 19, Oct 6th

Rumble, knocking sound. A gust of air causes the bed sheets to ripple. Katie's foot twitches, perhaps tugged. Later in the night, the living room light switches on. Sound of knocking, light switches off. Katie wakes, claims to feel something breathing on her.

Night 20, Oct 7th

Katie is dragged out of bed; the bedroom door slams behind her. She screams from downstairs, Micah runs to her rescue. Sounds of an altercation between the two followed by silence. Sounds of steady footsteps up the staircase, then silence. Micah's corpse is hurled from the end of the hallway into the camera, causing it to fall to the ground. Katie, covered in Micah's blood, walks into the bedroom.
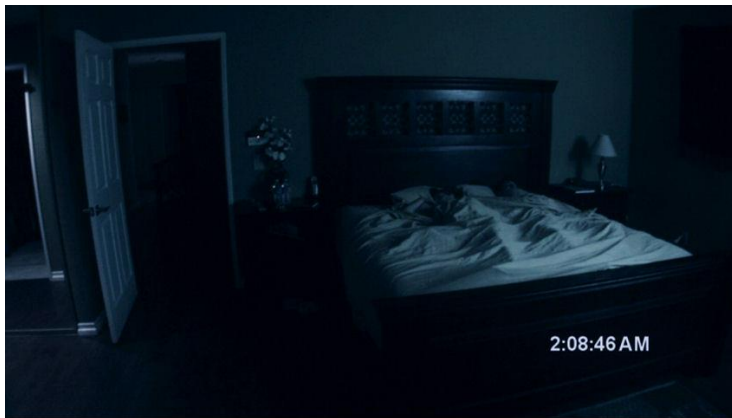
Figure 12: Tripod-mounted Handycam perspective from *Paranormal Activity*.

Each time the tripod shot returns, then, it becomes more significant in relation to the strange events that Micah and Katie discuss in the interim. As it becomes more familiar, areas of the frame present themselves as potential sites of information, in particular the mirror in the far left of the frame and the open door leading to a landing whose rear wall cannot quite be seen. The latter area of the frame specifically invites speculation: not only does the open door symbolise an invitation to the demon to enter the bedroom, the corridor functions as the visual focal point for the off-screen sounds that emanate from the darkness downstairs. As the narrative progresses, this viewing pattern is exploited by the flicking on and off of lights that can be seen through the doorway and the residues of an invisible agent. Together, these convince the viewer that as they look into the corridor, something might be looking back. The lack of respite via cutting or camera movement from this single perspective contributes to the suspense, reaching its climax when the off-screen tussle between Micah and Katie falls to silence, and slow footsteps are heard coming up the staircase.

While this has particular applications for the horror narrative, Bordwell argues that, more generally, the stillness of such shots

> encourages us to scan these spacious frames for hints about what will happen next. The impersonal lens often lingers on bare spaces, and when something of interest happens we won't be given a cut [...] Instead of the barrage of close-ups and rapid shot changes we get with today's intensified continuity style, we get lengthy, static, often indiscernible images we have to scour for clues.

Bordwell might expand his observations to note how these impersonal shots also exploit depth of field to similar narrative ends. In *Paranormal Activity 4*, Alex places a camera-equipped laptop in her parents' kitchen. Roughly two-thirds of the frame is occupied by the kitchen cabinets, leaving a third of the frame free to offer a deep-focus view through the kitchen and into the open-plan living room. If anything were to appear in the background of the frame, it will be gleaned through this tunnel. Through a series of pedestrian segments from this camera perspective, it is established that, when the refrigerator door to the right of the frame is opened, it completely obscures this tunnel, the implication being that if something were to appear behind the fridge door while it was open then the camera would not be able to detect it. At the film's climax, Ben arrives at an ostensibly empty house, unaware that Alex's mother has been murdered and her brother abducted by the possessed Katie. The kitchen camera shows him open the fridge door and help himself to a drink, implying that when he closes the door, Katie (or something equally sinister) will have joined him in the frame. This, however, does not happen; there is only an anti-climax. This is not just a Lewton's bus, but a reflexive call back to the franchise's own tropes. Over the course of the *Paranormal Activity* series, then, the use of the long duration take and deep-focus trains its audiences into expecting certain narrative tropes to the point that it can promise and deny them to either push suspense to ever higher degrees, or exploit them for comic relief.

For Rombes, the long duration take facilitated by direct-to-hard drive data dumping echoes that of CCTV. These kinds of perspective, Rombes argues, "constitute an alternate cinema of the neo-liberal, post-9/11 age, when the extension of the market globally depends upon an unprecedented campaign of information awareness". Moreover, the long take reminds the viewer that, "as humans we can never approximate or replicate the camera eye which does not blink, but rather captures a steady stream of information", and, as such, "long takes are techniques we can never truly experience as long takes" (40). The loops of static surveillance shots that permeate the *Paranormal Activity* sequels perhaps serve to compensate for this relative imperfection, cutting from one camera perspective to another after a few seconds so as not to undermine the capabilities of the

human gaze. Moreover, this cutting finds a way of incorporating these into conventional narrative structures, as particularly symbolic technological traces become reorganised into serving more conventional formal roles. However, there are other narrative devices that are afforded by this surveillance loop effect. A broader sense of space in the haunted houses can be constructed from strategically placed cameras while still limiting the viewer's spatial knowledge.

In this sense, the data-dumped long take can be seen as the closest that the found-footage genre comes to the digitally-facilitated temporal rupture of the so-called "Slow Cinema" genre. In contrast to Hollywood's tendency in recent decades towards reduced average shot duration (Bordwell 2005, 26), the digital works of directors such as Tsai Ming-Liang, James Benning and Ernie Gehr witness shot durations of fourteen minutes (Ming-Liang's 2013 *Stray Dogs*) right up to 60 and 90 minutes (Benning's 2009 *Ruhr* and 2011 *Nightfall*, respectively); as Blake Williams (2013) notes, shots endure in these films for "as long as a hard disk will allow". In so doing, gesture and dialogue enjoy a greater narrative responsibility, as continuity editing becomes an almost absent formal constituent. This greater emphasis on performance, for those who place the language of continuity editing as a cornerstone of cinematic 'identity' thus demonstrates a potential ruptural trajectory for digital cinema; the displacement of dominant formal and technological constituents to the point at which the medium is no longer recognised as sharing enough definitive similarities with its earlier iterations. As such, the bedroom shots in *Paranormal Activity* can be read as the furthest that found-footage moves with regards to formal and technological rupture, with Slow Cinema representing what the next stage on this trajectory might look like.

2.4   Later digital found-footage: recuperation

Unlike Slow Cinema, however, subsequent films in the *Paranormal Activity* series introduce continuity editing strategies into the surveillance shot. In *Paranormal Activity 2*, the surveillance loop consists of high-angle perspectives on: 1) the front porch, 2) the outdoor swimming pool, 3) the kitchen, with the back of sofa in the background, 4) the sofa in the forground and kitchen in the background, 5) the staircase, and 6) Hunter's bedroom. When the possessed Katie breaks into her brother-in-law Dan's house, as he sits on the sofa watching television, she appears in the background of the sofa-facing shot, but when the loop returns to perspective 4, and Dan turns around, she has vanished (Fig. 13). In the final loop, she is first seen in the background of the kitchen shot, standing directly behind Dan, before a cut to the living-room shot shows her breaking his neck. In *Paranormal Activity 3*, a similar device is used via a single camera attached to a rotating fan in the corner of an open-plan living room-kitchen (see Figs. 14 and 15). As the fan

pivots along an acute angle, it offers a view of the living room doorway (to the left of the route) and kitchen area (to the right of the route). In one scene, a girl sits at the kitchen work surface with her back to the living room. As the camera begins its left-to-right route, a small figure draped in a white sheet appears in the background of the shot; when the camera has completed its route back to its starting position, the figure is gone. When the camera then pans rightward again, the figure is stood directly behind the girl. The sheet then falls to the ground as if there were nothing beneath it. The fan-camera is used to similar effect later in the film when Julie finds that the entire contents of the kitchen have disappeared in the time it has taken her to walk from the kitchen work surface to the front door and back again, which is of course the same amount of time it takes for the fan-cam to complete a loop of its trajectory. It transpires that the missing contents have been levitating on the kitchen ceiling when they come crashing to the floor.[28]

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[28] This device has a precedent within the ghost story tradition. The 1904 M.R. James story "The Mezzotint", for example, tells the story of a mezzotint engraved with a manor-house scene, whose figures appear to move position between glances from observers. The construction of perspective via diegetic cameras echoes the dramatic function of the mezzotint, whereby a fictionalised object becomes an inconsistent witness (or perhaps, physical host) to an antagonistic force, with this very inconsistency structuring narrative suspense.

Figure 13: Katie and the surveillence loop.

Figure 14: *Paranormal Activity 3* and the moving sheet.
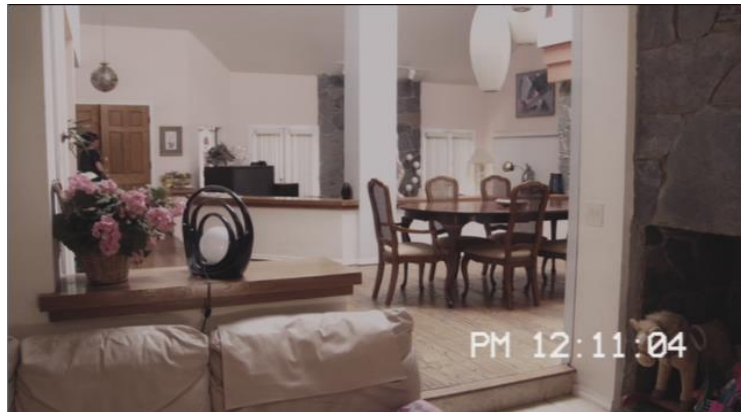
Figure 15: *Paranormal Activity 3* and the disappearing utensils.

These editing strategies indicate how the notion of a limited construction of space via diegetic camera perspective becomes stretched or undermined. While, unlike the surveillance loop of *Paranormal Activity 2*, the fan-cam is physically rooted to its environment, its automatically panoramic view nevertheless edges towards constructing a broader spatial perspective than what is offered by the handheld camera. In *Paranormal Activity 3*, Dennis takes his camera on a walking tour of the house, giving the audience an algorithmic sense of space, but this is less digestible than the surveillance loops offered later on in the film, and indeed in *Paranormal Activity 2*. Whereas, in these initial digital found-footage films, the mere presence of the digital camera is sufficient to achieve a degree of jarring immediacy, in subsequent films this conceit appears exhausted of its novelty. These films appear less concerned with the immediacy-effect of the diegetic

camera perspective, and more with the satirical potential of recuperating these technologies into more conventional forms of narration which, in some cases, recall the way in which *Cannibal Holocaust* creates a satirical commentary out of multiple contrasting perspectives. Focusing on the later films in the *Paranormal Activity* franchise, Bordwell similarly notes that "by this point in the development of the cycle, these marks of authenticity can be omitted" (2012). Bordwell imagines these cues as constituting "limited but genuine experimentation within mainstream conventions". This can be extended to argue that these films incorporate new technologies into conventional narrative structures, offering a model of appropriation and assimilation.

In later digital found-footage films, then, although the hand-held perspective is largely retained, it is employed alongside other narrative cues so that audience knowledge is not limited or mediated solely by the single, diegetic digital camera.[29] *Home Movie*'s chronology, for example, is foregrounded by chapter titles, such as "Happy Easter", representing individual movie files stored on a DV camera (Fig. 16). A main menu displaying the files is navigated by an unseen user, unveiling the narrative in the process. The identity or intent of this user is never revealed, but nevertheless suggests a certain degree of self-awareness on the part of the film as a whole. *[REC] 2* displays a similar aesthetic through more formally ambitious methods. The events of *REC 2* take place immediately after those of the first film: as soon as Angela is dragged away from Pablo's camera, a helmet-mounted camera worn by a Special Group of Operations officer (Grupo Especial de Operaciones/GEO) en route to the same apartment building is activated. Given this premise, one might assume that diegetic camera perspective in *[REC] 2* is both more distinctly digital in character, given that such technology requires miniaturization, and is more limited to the perspective of the particular GEO operative, given that the operative is less likely to remove their helmet in the dangerous scenario than a film crew camera operator is likely to surrender their equipment. Indeed, it is the perspective of the helmet-mounted camera itself, rather than the GEO operative wearing it, that is emphasised when its "still mode" is activated, allowing the officer to photograph the Vatican agent's department (Fig. 17). However, when another member of the GEO team, also wearing a helmet-camera, climbs into the ventilation system, the perspective shifts to this new camera so as expand the audience's visual knowledge beyond that of the single character. Rather than a rigid conceit, in these later films the limitation of visual knowledge to a single diegetic digital camera thus becomes a temporary strategy, to be complemented or subsumed by other narrative cues. Following on from the crude omniscient narration of

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[29] Although the technique may become more familiar as it is stylistically normalised, it still remains perceptually jarring, given that the act of viewing shaky-cam footage will *always* subject the vestibular and visual systems to conflicting information, so much so that NHS England cite "watching a film recorded on a shaky camera" among causes of motion sickness ("Motion Sickness").

the surveillance loop, the multiple hand-held perspective extends the audience's field of vision and thus its knowledge. Pivotally, one cannot appeal to *[REC] 2*'s fictional world for an explanation for these cues. Whereas the "still mode" and the visible rewinding in *[REC]* could be attributed to the diegetic digital camera in question, no information is given to suggest that the raw recovered footage that comprises *[REC] 2* is a live relay of multiple GEO operatives viewed by a remote observer, who can shift between these cameras when desired. As such, these cuts can be read as a form of continuity editing made by non-diegetic editors for the benefit of the audience.

Figure 16: Interactive chapter display and chronological narrative in *Home Movie*.

Figure 17: "Still mode" feature in *[REC] 2.*

Returning to Flaxton, it is worth noting how the turn away from strict diegetic camera perspective, with its association between digital graininess and narrative

transparency, coincides with the inauguration of the so-called "neo-digital" era of 4K digital resolution.[30] In other words, as digital cameras become acceptable alternatives to, and potential long-term replacements for, digital cameras at an industrial level, digital imagery in narrative cinema loses some of its inverted prestige. The digital does not just signify Steyerl's "itinerant image" and its attendant discourses of immediacy, intimacy, and consumer technologies, but also those of professionalized craft and industrial production. Moreover, this move away from diegetic camera perspective can be seen not just in terms of a transition from meso-digital to neo-digital eras, but postmodern and digimodern. Indeed, while this change in narrative technique could be read as indicative of how traces of the DV image might no longer be imbued with the same disruptive power, this switching could also be viewed as an experiment in appealing to the perspectival strategies of the digimodern computer game. When perspective shifts from the helmet camera of one GEO operative to another, the new relay appears first as a smaller frame within the pre-existing one (see Fig. 18), before increasing in size to consume the previous frame. In addition, this new camera perspective also displays the name of the GEO operative in the top right hand corner of the frame, along with a spectral imaging graphic in the bottom left hand corner of the screen, evoking the perspective of a first-person shooter game. This conceit has implications for narrating simultaneous strands of story action. Cornered in a small bathroom by one of the infected, a GEO operative called Larra commits suicide. Soon after this, his helmet-camera shuts down and the perspective returns to that of the GEO operative from the start of the film, echoing the familiar "game over" experience of being sent to the most recent checkpoint after one's character has been killed. Indeed, a second narrative strand involving a group of teenagers breaking into the apartment building does in fact begin when the camera of one of the other GEO operatives is damaged following an altercation in a corridor: as the helmet-camera vision falters, a cheap, hand-held DV camera, set up by the teens outside the building to document their tomfoolery, activates. When the teenagers meet up with the GEO operatives, perspective shifts back to the first GEO officer and brings their parallel narrative strand to its end. That little has developed in the corridor since it was last seen implies that the teenagers meet the GEO operatives immediately after the events of the most recent helmet-camera cut-out. As with the computer game, the death of a character leads to a move backwards through the chronology of the syuzhet.

That is not to overstate these similarities; perspective does not return to a resurrected Larra, as it might in a game, and the comparison between film and game is greatly complicated by questions of the significance of narrative in the latter medium, and

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[30] That is, image quality that can be seen to compete or outperform that of cinefilm. See Chapter 4 for more on 4K and higher resolutions.

of interactive or ludic potential of the former.[31] Instead, it suffices to note that the incorporation of visual tropes from gaming constitutes a novel technological trace in the found-footage genre, as another technology (the DV camera) becomes less distinct from more established cinematic techniques. Computer games are a digimodernist form, indeed, for Kirby, they are nothing less than the "formal exemplum" of digimodernist culture (167); in "producing meaning by their use", he suggests, computer games "are onward, haphazard, digital/manual, consumer-productive, usually anonymously authored […] and evanescent in the sense of being permanently superseded" (171). *[REC] 2*'s limited engagement with computer games is even more notable in that these novel point of view techniques are enabled only by abandoning diegetic camera perspective, a conceit which itself was evocative of the digimodernist aesthetic of the apparently real.
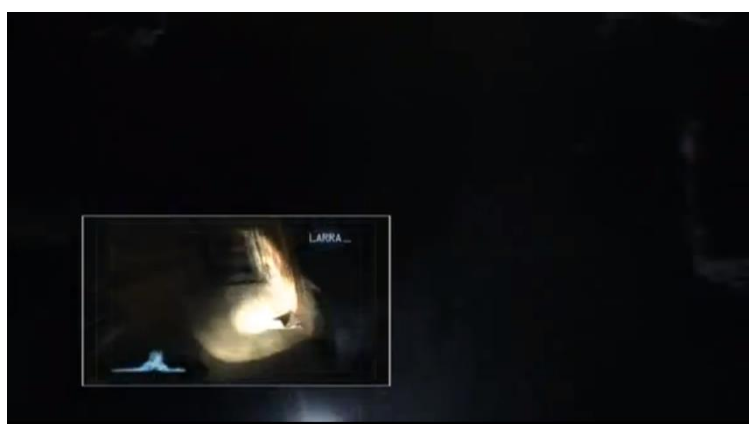
Figure 18: Switching between character perspective via on-screen graphics.

Whereas *[REC] 2* can be read as either appropriating diegetic camera perspective as part of a broader, more conventional narrative approach, or offering a new form of digital presence, *[REC] 3* is much clearer in its narrative strategies. Two diegetic camera perspectives are initially offered, in the form of digital cameras wielded by guests attending the wedding of the film's protagonists. These two points of view are complimented by momentary cuts to additional diegetic camera perspectives, such as the camera phone shot of the married couple leaving the church (see Fig. 19). *Cloverfield* features a similar moment. Fleeing a ravaged Manhattan, Hud finds himself trudging amongst thousands of others across the Brooklyn Bridge. At the instruction of another refugee, Hud turns the camera away from the bridge and out to the harbour, zooming to

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[31] Kristen Daly (2010), for example, is guilty of overstating the possibilities of film remediating visual features from games. While Daly does not suggest that 'Cinema 3.0' constitutes a movement, she nevertheless argues that a series of disparate characteristics should be considered indicative of a fundamental shift towards new forms of networked, active spectatorship. Her consideration of multimedia promotion as a form of intertextuality (like North, she considers the online promotion of *Cloverfield* as an example) is convincing, albeit framed as part of a more tenuous wider argument. However, her claims that the work of Quentin Tarantino is a form of 'remix cinema' (88) and the television series lost 'Sudoku' television (90) appear tenuous attempts to appropriate non-cinematic terminology to describe characteristics of films that could easily be understood via pre-existing cinematic concepts.

discover a flaming, overturned ship. Hud then pans back to see another camera operator in the crowd pointing their lens directly into his own (Fig. 20). Just as the helmet-camera device in *[REC] 2* suggests how digital presence might facilitate a non-chronological, multi-story syuzhet, the ubiquity of cameras in *[REC] 3* and *Cloverfield* suggests multiple, simultaneous entry points into the same core sequence of events. Director Matt Reeves has confirmed that this was the intention of the scene (2008). In the case of *[REC] 3*, however, these multiple diegetic camera perspectives are subsumed by conventional narration; when the virus outbreak actually occurs, the perspective switches from that of cameras belonging to the fictional wedding guests to the transparent omniscient narrative mode favoured by Hollywood cinema. For the remainder of the film, diegetic camera perspective is almost entirely abandoned in favour of this approach, replete with expected horror tropes like an instructive orchestral underscore. In *[REC] 3*, then, diegetic camera perspective features as one device in a broader stylistic palette, the reverence once displayed to the consumer-level digital camera seemingly diminished.

Figure 19: Mobile phone camera and infinite entry points in *[REC] 3.*
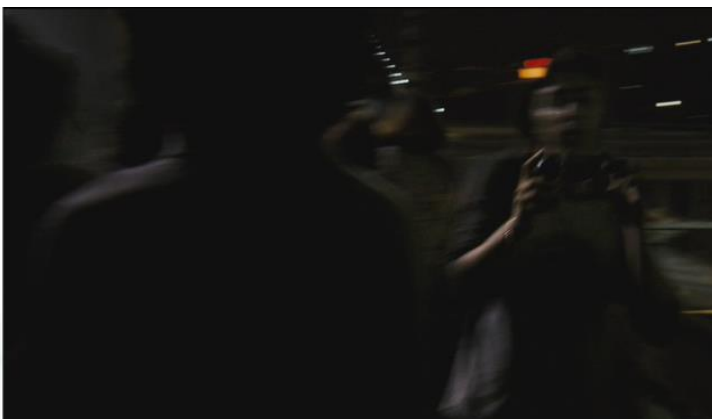
Figure 20: Another camera operator, another (parallel) narrative?

2.5   Recuperation as satire

The cases of *[REC] 2* and *3* and *Cloverfield* suggest that diegetic camera perspective is easily appropriated into the conventions of narrative cinema. This is also the fate of diegetic camera perspective in *District 9*. But rather than simply employ diegetic camera perspective as a stylistic device, *District 9* uses found digital footage as part of a wider visual pattern to satirise the status of particular media technologies. *District 9* initially takes the form of a mockumentary about the disappearance of Wikus van de Merwe, a bureaucrat working for private paramilitary contractors Multinational United (MNU). Via talking heads, archival footage, and recent news coverage (see Figs. 21 and 22), the documentary explains how a large spacecraft, housing thousands of malnourished aliens, appeared above Johannesburg in 1982. The alien population are confined to a refugee camp called District 9, and human/non-human segregation is enforced as social unrest grows. In 2010, the South African government outsource the relocation of the aliens to MNU, and de Merwe is charged with overseeing the project. Wikus's first on-screen appearance is via official MNU footage of the relocation incorporated into the documentary (see Fig. 23). The MNU logo in the bottom right hand corner of the frame suggests that the corporation has co-operated in the making of the documentary, but it is clear from the comments of the talking heads that MNU is believed to be implicated in the disappearance of Wikus. As such, the official MNU footage ('acquired', rather than found, perhaps) is framed as less reliable than other forms of address. Such footage may depict what happened to Wikus in the camp, and indeed depict the abhorrent behaviour of MNU mercenaries,[32] but is ultimately subject to censorship by the company before it is handed over to the fictive documentary makers. The caption "Wikus van de Merwe/MNU Alien Affairs", in the typeface used throughout the fictive mockumentary, reflects this layering of mediation (Fig. 23), with the two opposing graphics symbolising a clash of truth claims.

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[32] This premise proves eerily prescient of leaked digital camera footage depicting the torture of prisoners in Manguang Prison in South Africa, run privately by the British security services company G4S. The evidence was used to support prisoners' claims of electrocution and forced injections (BBC 2013).

Figure 21: Mockumentary address in *District 9*: talking heads...

Figure 22: ...and illustrative news footage.
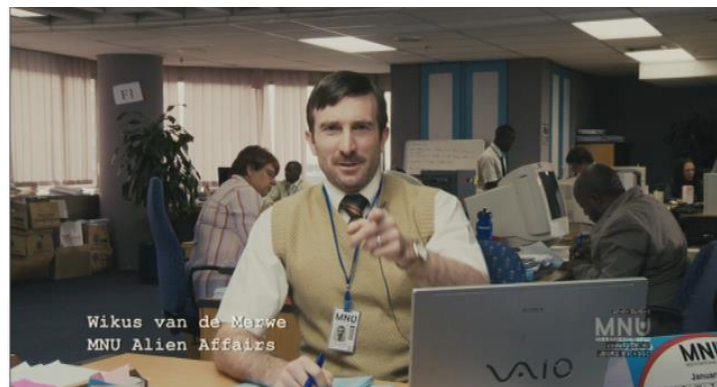
Figure 23: Official MNU footage and conflicting captions.

As with *[REC] 3*, however, once *District 9*'s narrative introduces the complicating action, this footage is abandoned in favour of conventional Hollywood perspective; Wikus is exposed to a mysterious liquid while overseeing the eviction process and begins to mutate into an alien, making him an invaluable asset for MNU's genetic research programme, and thus a wanted man. As such, this fugitive scenario not only demands a more conventional narrative with which to easily convey the pursuit of Wikus across Johannesburg, but also acts as an ironic counterpoint to the aspersions of the documentary makers, whose central concern, after all, is Wikus's contested fate. Conventional narration offers *District 9*'s audience the omniscient perspective to judge Wikus's actions in a

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manner that is denied to the fictive documentary makers or authorities. In other words, Hollywood perspective is favoured as the most 'truthful' way of seeing. Indeed, contrasts in perspective produce several dramatic ironies. A scene depicting Wikus ordering food from a takeaway while on the run is constructed via conventional perspective. A television in the restaurant shows a news report stating that Wikus is a dangerous fugitive who has contracted a contagious disease through sexual intercourse with an alien, accompanied by a clearly doctored photograph that duly depicts the alleged act of miscegenation. Other customers in the queue recognise Wikus from the television, and the perspective of a CCTV camera in the restaurant shows them backing away from him in fear and revulsion. The events that the audience have witnessed via conventional Hollywood perspective undermine MNU's attempts at slander, and the doctored image confirms that the corporation is indeed capable of manipulating footage.

When the mockumentary talking heads return at the end of *District 9*, they refer to time-stamped footage recovered from an MNU helicopter as "the last-known footage" of Wikus (see Fig. 24). The footage reveals that, while his left arm has mutated into an alien claw, he still appears to be mostly human. However, the real fate of Wikus is revealed through an ironic contrast of conventional narrative perspective and mockumentary address. After the talking heads speculate as to his whereabouts, Wikus's wife Tania shows the documentary camera crew a rose made from folded scrap metal that she found on her doorstep after her husband had disappeared. Tania imbues the rose with little import, but the immediate jump cut insists otherwise; a long shot in the conventional Hollywood perspective depicts an alien fashioning the rose, implying that Wikus is now fully mutated and living in District 9 (see Fig. 25). The notion of the camera as the "ideal observer" reasserts itself, thus framing the diegetic camera perspective as a temporary restriction of knowledge. These technological traces, by extension, are a stylistic tool, rather than a more profound way of seeing. Instead of a transparent or immediate window into the diegesis, the presence of the camera is satirically framed as a malleable and untrustworthy visual mode, a tool of neoliberal elites as much as it is of its ordinary subjects.

Figure 24: The "last known footage" of Wikus, according to *District 9*'s mockumentary makers...

Figure 25: contrasts ironically with the last image of Wikus afforded to the audience, via conventional perspective.

However, the use of these different modes of address is not as simple as this analysis would suggest. Even in the majority of *District 9*'s narrative, presented via conventional Hollywood perspective, key moments are shown from the point of view of mediating technologies. When Wikus is captured by MNU, the corporation's research scientists subject him to a vivisection in order to unlock the secrets of the recovered alien technology. While the majority of these scenes are narrated via conventional perspective, continuity editing is interspersed with surveillance and research footage (see Figs. 26 and 27). A four-way CCTV split-screen of Wikus on the operating table implies the perspective of MNU's surveillance officers, and an infrared aerial shot of the same procedure suggests the intense scrutiny that subsequent research scientists will pay the footage. In relation to *District 9*'s narrative strategy, however, it is important to point out that this is not MNU footage that has been publically disclosed. Indeed, these shots are not authenticated by the MNU logo in the same way as the footage that the corporation presumably disclosed to the documentary crew, and as such these clandestine perspectives function as a continuation of the omniscient conventional narration used throughout the film to expand the audience's knowledge of Wikus's fate beyond the speculation of documentary participants and the misinformation of MNU. The ability of the "ideal observer", then, apparently extends to other diegetic cameras. In other words, conventional perspective can

momentarily access, perhaps even enter, CCTV or infrared cameras and leave them again so as to expand its visual terrain. Again, this is contrasted with diegetic camera perspective in *The Blair Witch Project*, *REC*, and *Paranormal Activity*, whereby the digital camera is largely presented as a sealed window into story action.

Figure 26: MNU footage in *District 9.*

Figure 27: An infrared view of the operating table.

This more permeable, less reverant treatment of diegetic camera perspective as narrative cue, and the attitude that it implies towards the truth-telling capabilties of digital technologies, is more closely illustrative of the arguments of Banash and Tryon. Though their shared assertions that *The Blair Witch Project* is overtly satrical in its hypermediated form might prove unconvincing, they nevertheless anticipate the use of digital technologies in *District 9*. The ambigous boundaries between transparent and mediated perspective, between mockumentary address and conventional narration, reflect the more general obfuscation of knowledge wrought by neoliberal privatisation depicted in the film, as questions of incentives and accountability are distorted. It is difficult to pinpoint when the mockumentary conceit is intially discarded, and thus when found-footage becomes the stylistic tool of conventional omniscient narration. The MNU footage of Wikus supervising the eviction process is framed as being used within the documentary. However, the scene

itself is constructed from several shots that are clearly not captured by a diegetic film crew.

Moreover, the scene unfolds for several minutes without returning to the guiding commentary of talking heads. When an MNU helicopter footage shows a mercenary murdering an alien, it thus remains ambiguous whether this is broadcast documentary footage confirming public suspicion about wrongdoings in the refugee camp, or *District 9*'s stylistic cue for conveying MNU's systematic abuse: rather than footage that is disclosed, this perspective conveys the conspiracy to surpress and destroy such footage. Through its use of multiple forms of address, *District 9*, like *Cannibal Holocaust* before it, associates (private) accountability with the (publicised) account, and relates the content of footage to its status as property. Wikus assumes that the collectivist aliens "don't really understand the concept of property", ironically foreshadowing how his own alienation[33] from humanity will result from his employers claiming ownership not only of the fruits of his labour, but eventually his body and agency. As such, *District 9* is a suitable candidate for what Roscoe and Hight call the "deconstruction" mockumentary: those which "examine, subvert and deconstruct factual discourse and its relationship with documentary codes and conventions" (73). Indeed, *District 9* is as much a satire of the found-footage genre as it is of outsourcing, apartheid and private paramilitaries; in paying little respect to diegetic camera perspective, *District 9* develops a series of cues with which to explore more complex notions of truth, spectatorship, and perspective.

In addition to continuity editing, this self-conscious recuperation takes place in the construction of the digital image itself. *Cloverfield*, for example, while strictly adhering to the diegetic camera perspective of *REC* and *Paranormal Activity*, incorporates CGI in order to expand the narrative capabilities of such cues. North argues as much, noting that

> special effects are self-reflexive devices that draw attention to visual deception, and bring into play an entire meta-narrative about media technologies and illusion [...] but *Cloverfield* seems to complicate all of its spectacular opportunities, delaying any clear view of its central special effect (North 2010, 75-6)

From this, it is clear that the appeal for North derives from *Cloverfield*'s implications for illusionism, rather than for the found-footage genre itself.[34] Nevertheless, there is a sense in which these observations might be reversed in order to inform an analysis of CGI and its use as a narrative cue alongside diegetic camera perspective. What is remarkable for North is

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[33] A process that his physical metamorphosis –of literally becoming an alien- comes to symbolise

[34] Indeed, North does not turn his discussion to the genre itself until the final section of the article, which is understandable given his primary concerns, and that the article serves in part to build upon earlier observations on digital special effects, namely *Performing Illusions: Cinema.*

how *Cloverfield* uses the cues of found-footage to offer a restricted and limited perspective of computer-generated images that are conventionally the reserve of unobstructed, spectacular framing. In particular, North contrasts the aerial "God's-eye-view" of CG disaster scenes with the low-angle, partially obscured point-of-view afforded by diegetic camera perspective (2010, 86). Of greater interest to this chapter is the contradiction that *Cloverfield* is willing to entertain: that the found-footage trope, which aspires towards a certain degree of verisimilitude, is combined with CG images of fantastical figures like monsters. This should convey Gabriel Giralt's claim that "the film image, whether it has an indexical referent or not, does not detract from the viewer's acceptance of its realism", but in the case of *Cloverfield* these two cues work to contradict one another (2010, 3). As the fantastical CG is an undeniable mark of post-production influence, it cannot help but undermine diegetic camera perspective as a conceit, given that not everything in the frame has been captured by the actually existing camera.

Thus, the pro-filmic image captured by the actor, and the diegetic image captured by the character, are separated. In one sense, this reflects a broader irreverence towards diegetic camera perspective as a cue, evinced by the use of conventional title credits in *REC 2*, and the caption in *Paranormal Activity 2*, placed at the moment when Micah makes a brief appearance, that references his death in the previous film. The in-joke that both camera operators in both *REC* films are called Pablo Rosso (Rosso is the head of cinematography, and thus the principal camera operator, in both), demonstrates a further disregard for strict realist codes. Indeed, regardless of CGI, even *Cloverfield*'s diegetic camera perspective is misleading, in that the camera that the characters are implied to use, and the actual camera used by the actors, are different. *Cloverfield*'s intertitle claims to have recovered the footage from a secure digital (SD) card, and the camera itself is implied (and confirmed by promotional shots) to be a small, hand-held DV camera. In actuality, *Cloverfield* was shot using the Sony CineAlta F23 HD camera, a professional model costing $100,000-200,000. As has been pointed out, it is impossible for footage of the duration and frame rate[35] of *Cloverfield* to be stored on an SD card uncompressed; the actual footage is likely to have been dumped to a large portable video processor (Wilson 2008). The stretching of the found-footage, diegetic camera conceit adds further weight to North's argument that *Cloverfield*, perhaps "inadvertently", constitutes "a commentary on the illusionism of spectacular cinema" (86).

Whereas the CG monster in *Cloverfield* is mainly presented through blurred glimpses and fragments, in keeping with the film's "hide and seek" aesthetic (North 2010, 75), *Troll*

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[35] Wilson observes that the recording speed of an SD card is 20MB/s, versus the Sony SRW-1's 110MB/s, making the SD card incapable of rendering full colour rate image.

Hunter displays its digitally animated trolls in full view. Rather than an inadvertant commentary on illusionism, this use of CGI parodies the conceit of the found-footage genre for comic effect, by emphasising the impossibility of its own image, all the while rigidly adhering to diegetic camera perspective. Moreover, the technical acheivements of *Troll Hunter*'s animators, and the artistic references that they make appear to be foregrounded at the expense of any serious commitment to the realist ambitions of the genre. Indeed, while the film wryly follows the found-footage conceit (in Norway, a group of film students make a film about Hans, an environmental officer employed by the Norweigan government to keep the existence of trolls a secret), it diverges from many of the stylistic tropes typically employed in the genre.

When a three-headed troll emerges from the forest, the filmmakers activate their camera's night-vision setting to capture it, masking the CG figure behind a layer of green lo-fi mediation. However, the film's mythology dictates that trolls become calcified when exposed to sunlight; in the line of duty, Hans duly points a UV-emitting gun at the troll and turns it to stone. In the process, the CG troll, far from being obscured by darkness, is bathed in light, and the efforts of Storm Studios effects company are also momentarily illuminated (with digitally animated light, of course). The following morning, the film crew gaze upon the calcified troll before Hans destroys it; standing like a public statue, the stone figure ironically alludes to the audience's appreciation of the artistic skill displayed in the previous scene, evoking Manovich's proclamation that "if our civilization has any equivalent to Medieval cathedrals, it is special effects Hollywood films" (181). Not content with the literal and figurative "exposure" that the film itself offers of the three-headed troll, Storm have released post-production footage of the same scene with the night-vision effect removed (Fig. 28). Moreover, director André Øvredal acknowledges the illustrations to Peter Christen Asbjørnsen and Jørgen Moe's *Norwegian Folk Tales* (1841) [*Asbjørnsen og Moes norske folke-og huldre-eventyr*] a copy of which was given to *Troll Hunter*'s animator as a key reference point (Eggersten 2011). The illustrations of John Bauer are also evoked by the trolls' design, suggesting that the primary object of the reverence displayed towards digital technologies is not the truth-revealing properties of the consumer camera, but the achievements of two relatively small effects companies to combine the aesthetics of cinematic photorealism and Norwegian children's illustration.
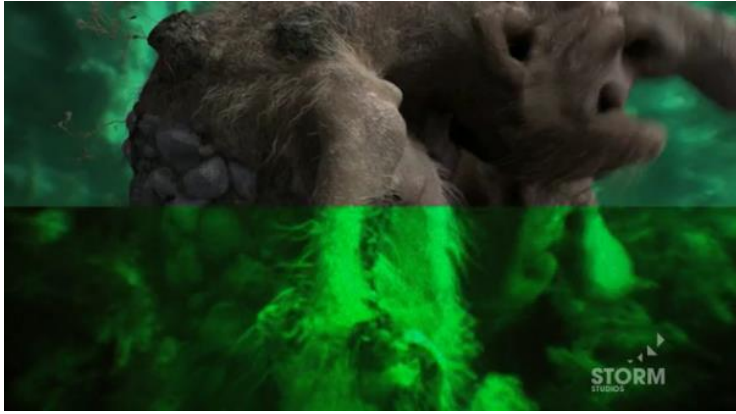
Figure 28: The three-headed troll, with and without night-vision effect.

Digital lighting also proves important for Gimpville, the second Norwegian effects company tasked with realising the Jotnar, a giant troll whose placation forms *Troll Hunter*'s climax. Taking place in the snowy open spaces of Western Norway, the altercation between the crew and the Jotnar is set against a background that evokes notions of the natural sublime. Indeed, in contrast to the claustrophobic construction of the wilderness seen in *The Blair Witch Project*, with which it shares a 'two male, one female film crew pursuing rural folklore' plot, *Troll Hunter* is characterised by open frames that complement exposed rural space. Recurring establishing shots of passing natural beauty, captured from a car window (see Fig. 29) thus prove an ironic counterpoint to the Jotnar, a digitally animated creation of sublime scale (Fig. 30). Christian Korhonen, the technical director at Gimpville, notes how matching artificial light conditions to those of the actual shoot proved pivotal in delivering a photorealistic composite, as did the use of animation software *Houdini*'s smoke networks and particle systems in conveying the scale of the Jotnar as it creates clouds of upturned snow ("Storm Studios…"). As such, the interweaving of nature photography with technologies that aim to best imitate chaotic or complex natural systems, and subsequent presentation as composite found-footage, constitute an elaborate visual prank. Indeed, *Troll Hunter*'s intertitle speculates as to whether the footage is itself a "joke", a sentiment rendered all the more ironic by the suggestion that an amateur film crew could raise the capital to create such photorealistic digital composites.[36]

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[36] The intertitle captions of *Apollo 18*, whose found-footage purports to reveal a cover-up of a failed clandestine NASA mission, similarly alludes to the well-established generic conceit by declaring that "this film is edited from [recovered] footage", acknowledging the impossibility of footage recovered from multiple 16mm cameras surviving the outer space collision of the film's climax.

Figure 29: The pro-fimlic natural sublime *Troll Hunter…*

Figure 30: …combined with an animated sublime.

Explicit allusions to *Jurassic Park* (Steven Spielberg, 1993) reflect Øvredal's desire to mimic Spielberg's presentation of CG dinosaurs, itself ironically evoking *Jurassic Park*'s narrative of technologically reconstituted spectacle (Eggersten). Hans' use of a goat to lure a troll alludes to the bait used to attract the Tyrannosaurus Rex in *Jurassic Park*, and a close-up shot of a troll reflected in a rear view mirror as it pursues Hans' car explictly refers to the similar scene in Spielberg's film, itself again a loaded image: a "reflection" in a pro-filmic mirror of a figure created in post-production, the illusion highlighted by the mirror's warning of another opitcal illusion - that "objects in mirror are closer than they appear" (See Figs. 31 and 32). Other allusions reflect *Troll Hunter*'s parodic relationship with found-footage conceits. One of the student filmmakers mentions Michael Moore, a documentary marker often charged with inaccuracy and sensationalism, while its narrative of changing practices of dealing with large beasts evokes the Québécois Direct Cinema film *Pour la suite du monde* (Michel Brault, Marcel Carrière, Pierre Perrault, 1963), in which a documentary crew descend upon a small village and request that the local community re-enact their traditional beluga whale hunt for the cameras. Similarly, in *Paranormal Activity 4*, a static camera perspective of Wyatt riding his tricycle alludes to a similar scene in Stanley Kubrick's *The Shining* (1980), which was famously achieved via one of the earliest uses of

Steadycam technology, while the protagonist of *Home Movie* recreates the low angle "shark-cam" perspective from Jaws (Steven Spielberg, 1975) while singing John Williams' theme. North has noted how *Cloverfield* alludes to several of its 'monster movie' precedents via the insertion of single frames from *King Kong* (Merian C. Cooper and Ernest B. Shoedsack, 1993), *Them* (Gordon Douglas, 1954), and *The Beast from 20,000 Fathoms* (Eugène Lourié, 1953) when the diegetic camera is struck. North argues that these inserts

> imbed their acknowledgements of the genre's precedents like a subtle encryption that implies that they are part of the new film's underlying structure, but still technologically distant, superseded

North might have also mentioned a subtle allusion to *Lost* (ABC, 2004-2010) the television series with which *Cloverfield* shares a producer in JJ Abrams (*Cloverfield*'s intertitle briefly bears the logo of the 'Dharma Initiative', the organisation that features heavily in *Lost*). Rather than simply acknowleding its own artifice in relation to other influential films, *Cloverfield* is subtly stamped as the work of Abrams, again undermining the broader realism upon which the diegetic camera perspective rests. Similarly, in *REC 2*, the mythology of the franchise is extended so that the demonically possessed girl can only be seen in darkness. This introduction of a supernatural rule that plays upon what is presented as pure circumstance in the previous film – Pablo's camera being damaged so that it can only record via night vision – again displays a playful disregard for the realist assumptions of diegetic camera perspective as a narrative cue.

Figure 31: Intertextual allusion in *Troll Hunter*...
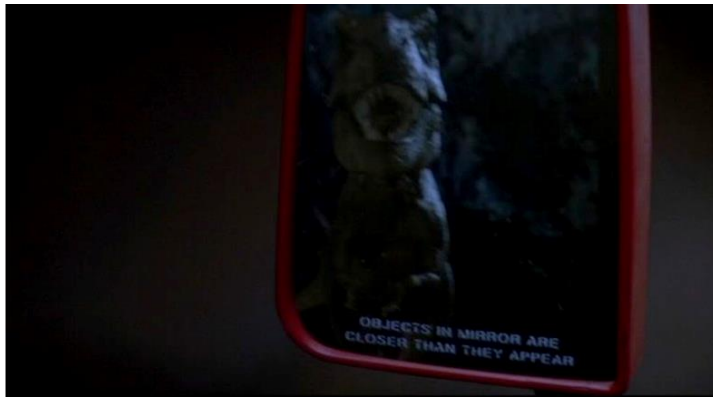
Figure 32: …to *Jurassic Park.*

2.6   Conclusion

These transitions –from natural to supernatural, earnestness to irony, formal agreement to anti-realist contradiction– are all indicative of a shift away from a ruptural use of consumer level digital cameras towards multiple strategies of recuperation. Following its emergence in exploitation and independent cinema, diegetic camera perspective as a narrative cue is initially employed in strict adherence to a broader set of assumptions regarding realism and plausibility. These assumptions in turn imply an attitude of reverence towards or fetishisation of digital technologies and their ability to access an immediate reality. To return to Alan Kirby's notion of a digimodern cultural turn, this is not perhaps the expected trajectory. With their self-awareness and ironic play, these later digital found-footage films could be read as postmodern texts, rather than displaying the digimodern traits of the "apparently real". If, as Kirby suggests, *The Blair Witch Project* was a hybrid text, part postmodern and digimodern, these more recent films could be construed as a cultural anachronism in Kirby's terms. *Troll Hunter* especially represents the ironic postmodern text dressing itself in the clothes of the digimodern; what could be seen as an *apparently* "apparently real".

However, considering that all of these films are underpinned by what is merely a change in a technical constituent – a change from cinefilm to digital image sensor – it is unsurprising to find that they ultimately owe more to the cultural logic of postmodernism than that of digimodernism. While the digital camera also carries attendant cultural baggage of immediacy, its adoption is not accompanied by any other meaningful changes in the formal constituents of the cinema medium. As such, a change in camera type, regardless of the consequences for image quality and subsequent cultural connotations, is not enough to solely engender the broader formal changes that would radically alter the understanding of 'cinema' as a whole. To digitise one aspect of cinema's technical underpinnings does not facilitate the kinds of textuality that characterises the digimodernist text. Despite their

preoccupation with emergent technologies and practices, the digital found footage film cycle remains only superficially moulded by digimodernist forces. Generic tropes, such as characters helpfully identifying strange fragments of the digital image and camera operators staring at their reflections, prove all the more profound given that the genre as a whole displays its own, ultimately ineffectual, infatuation with an emerging cultural dominant. Moreover, once this digital imagery loses its novelty, the conceit which rests upon it loses its realist currency. Thinking of the found-footage genre in industrial terms, then, it is unsurprising that, once the immediate "immersive" appeal of a perspectival mode wanes, that more ambitious and reflexive incorporations of techno-social media would prevail in an attempt to secure audience loyalty. In the case of the *Paranormal Activity* franchise in particular, the switch from a relatively strict adherence to diegetic camera perspective to a series of playful experiments with webcams and games consoles, reflects the influence of commercial incentives,[37] perhaps at the expense of a degree of aesthetic 'purity'.

Comparisons between *Paranormal Activity* and its sequels, as well as *[REC]* and later found-footage films, have demonstrated a significant degree of recuperation. However, while these traces have clearly been recuperated at the level of narrative and style, that they are still visible suggests that they are not fully recuperated in the sense that, as traces of new technologies, they continue to exude a salient presence in the cinematic image. This raises the question of whether the DV camera can lo-fi imagery *per se* can ever be fully recuperated so long as they still symbolise emergent and demotic visual technologies which contrast strikingly with those of Hollywood cinematography, be it analogue or digital. Though digital cameras have over this same period largely replaced their analogue predecessors as the industry standard technology, they have done so by meeting and subtly surpassing the image resolution of 35mm cinefilm. In other words, it is the high resolution digital image that has become "fully" recuperated by not only being institutionalised as aesthetic preference and industrial standard, but by ceasing to display any visual markers of artifice that in turn would symbolise technical insurgency. At the beginning of this chapter, I suggested that the found-footage genre could be read as an allegory for the digitisation of cinematography. With this in mind, it makes sense that the lo-fi digital image can only be partially recuperated as a stylistic tool because it is acting out a related, and much more complete, recuperation of digital cameras at the broader industrial level.

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[37] As of writing, a fifth instalment of the franchise is planned for 2016 (*Bloody Disgusting* 2014), with an eventual ending planned for the series (Lussier 2014).

By contrast, the "digital backlot", which forms the focus of the next chapter, is a much more straightforward example rupture and recuperation; a technology is pioneered in an experimental, highly stylised and thus disruptive manner, before becoming a commonplace and largely seamless filmmaking tool, in keeping with its analogue predecessor, the matte painting. Because this trajectory of rupture to recuperation is both less complex and more complete than that of the found-footage genre, the following chapter focuses on the moment of rupture rather than the shift toward recuperation, discussing a small cycle of films that use the technology is disruptive was, rather than the subsequent scores of movies where the backlot is used imperceptibly. This is not just for practicality's sake; the digital-backlot film cycle, though building upon a well-established tradition of compositing techniques, is nevertheless framed and received as being unprecedented and significant in its implications. As such, it makes sense to focus on a historical moment which reveals much about the particular cultural status of digital technologies as it does about their creative applications.

As I demonstrate, the heady rhetoric of directors such as Robert Rodriguez suggests that digitisation has somehow dissolved the boundaries between cinema and other visual media such as comic books, bringing with it new possibilities for multimedia "hybrids". The language of digitisation is pivotal in this regard, as the ideal of media reduced to a universal binary code[38] allows for poetic flights of fancy about the nature of existing cinematic texts. In the imaginations of figures like Rodriguez, then, the expanded stylistic palate is touted as the harbinger of something far more profound. The notion that digitisation facilitates "hybrid cinema" speaks to a digimodernist ambition to reconfigure traditional concepts of reader/author, transforming the passive comic book fan into a digitally empowered director. Or, as Rodriguez himself puts it: "I picked up my *Sin City* book, and I went, 'I know how to *do* this now'" (int. Kenneally 2012). Just like the found-footage genre, however, the digital backlot film, I will argue, is more digimodernist in its discursive preoccupations than its own textuality. In other words, ruptural rhetoric reflects recuperative practice.

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[38] What Betancourt, to revisit Chapter 1, would call "the aura of the digital".

Chapter 3. The Digital Backlot in "Hybrid" Cinema

Immortel (ad vitam) [Immortal] **(2004),** *Casshern* **(2004),** *Sky Captain and the World of Tomorrow*
(2004), *Sin City* **(2005),** *300* **(2007).**

> "It deliberately looks 'drawn' and artificial. There is no attempt here to fuse the CGI with the naked-
> eye universe; cinema itself is surrendered to its digitisation"
>
> Alan Kirby, on Zack Snyder's *300* (2009, 183)*.*

> "I picked up my *Sin City* book, and I went, 'I know how to do this now.'"
>
> -Robert Rodriguez, *Sin City* director.

The mid-2000s saw the release of a series of "digital-backlot" films: composites of
live-action performances and digitally-animated environments that, unlike much visual
effects work at the time, were openly framed as artificial. Their release was accompanied
by a media discourse that characterised these technologies as ushering in a radical new
form of 'hybrid' cinema: an alleged blend of man and machine, film and animation, cinema
and comic book. In this chapter, I explore this moment by focusing on *Immortel (ad vitam)*
[*Immortal*] (Enki Bilal, 2004), *Casshern* (Kazuaki Kiriya, 2004), *Sky Captain and the World
of Tomorrow* (Kerry Conran, 2004), *Sin City* (Robert Rodriques, 2005), and *300* (Zack
Snyder, 2007). I initially consider how these technologies enable the supposed
appropriation of stylistic features from the comics and animated cartoons that constitute
their source material,[1] but go on to suggest that, contrary to rhetoric, it is the trace of the
technologies themselves rather than features from non-cinematic source material that
maintains a significant presence within the final image.

These vivid traces of digital filmmaking technologies can be read as demonstrating
the expanded 'cinematic-ness' of cinema, defined *against* comics and cartoons. With this in
mind, I argue that this alleged "hybrid cinema" needs to be historicised in a manner which
is underpinned by the observation that the cinematic image has been a technological
hybrid since long before the development of the digital backlot. Digital backlots have
merely replaced and extended the role previously performed by matte paintings and can
be located more broadly in the cinematic tradition of using 2D paintings, purpose-built
miniatures and sets, location photography and live-action performances to form
composite images and spaces. If cinema has always been a hybrid, then this cycle of
digital-backlot films can be read as a moment of temporary rupture which is followed by a

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[1] 'Comics' is favoured for its simplicity over terms such as 'graphic novel', 'illustrated novel', or Will Eisner's
more general term, 'sequential art', although 'comic book' is also used when necessary. When quoting from
sources that use alternative names for the medium, I leave these unchanged.

full recuperation, as these digitally updated chroma key processes are subsequently institutionalised and made imperceptible.

In the second part of the chapter, I build upon this assertion to consider the significance of performance, editing, cinematography, and aesthetics to contest the notion that these films build novel "hybrid spaces". I argue that, while the discourses surrounding the digital backlot invest technology with ruptural potential, the reality has far more modest implications for questions of mediality, space and the representation of movement than their attendant rhetoric might suggest. Alan Kirby's observation, quoted in this chapter's epigraph, is thus not quite correct in its assertion. Rather than exemplifying cinema "surrendered to its digitisation", the digital backlot film and its attendant discourses are indicative of the *desire* to surrender cinema to its digitisation. This chapter demonstrates how this digimodernist desire, though revealing in itself, appears as-yet unfulfilled.

In arguing this, I engage with the work of scholars concerned with comics, adaptation, and the specific films listed above. Paul Atkinson's (2009) work on movement in the comics medium proves a useful source, as does Drew Morton's (2010) intervention in the debate surrounding the relationship between comics and cinema. My discussion of *300* engages with Michael Williams' (2009) observations on the film's aesthetics, and Drew Ayers' (2011) discussion of the film as an example of "digital materialism". My discussion of hybrid spaces in *Sin City* draws from Mike Jones' (2007) work on digitally staged camera perspectives. My primary scholarly interlocutors, however, are Jay David Bolter (2006), Costas Constantinides (2011), and Lev Manovich (2013). Bolter makes passing reference to the allegedly "different visual order" of "hybrid" digital cinema (24), and places *Sky Captain and the World of Tomorrow* and *Sin City* in this category; this chapter qualifies and tempers these assertions. In his study of film adaptation, Constantinides argues that the formal features of comics are "remediated" within *300* at specific moments. Manovich correctly typifies these films as examples of hybrid technical processes, but mistakenly locates them as unprecedented aesthetic hybrids. Through close comparisons of *300* and its source material, I contest this claim, arguing instead that *300* constitutes a dialogue between cinema and comic contingent upon particular digital filmmaking technologies.

3.1 "Hybrid" cinema

The way in which film journalists describe the stylistic properties of these films forms part of a wider discourse[2] which frames them as not just technologically unprecedented, but also formally and ontologically radical. Upon its release, *Sky Captain and the World of Tomorrow* was equally hailed as "a wholly synthetic digitised universe" (Smith 2004), "a luminescent world of mildly de-saturated colour" (Jones 2004), and panned as "an artistic disaster" (W.H. 2004) and "so much cinematic wallpaper" (Smithy 2005). Similarly, *Casshern* was described as "a fascinating world that fits squarely between the worlds of live-action and anime" (Dequina 2007), and *300* is "an evolution in 'virtual' cinema" and "a living canvas" (Bennett 2007). Even in stressing continuity over exception, journalist A.O Scott's comparison between *Sin City* and *Who Framed Roger Rabbit?* (Robert Zemeckis, 1988) rehearses this logic of a radically transformative technology (Scott 2005). In comparing the animated environments of Rodriguez's adaptation of Frank Miller's comic series with the rotoscoped[3] cartoon characters of *Roger Rabbit*, Scott claims that the "computer-generated imagery has made distinctions […] between flesh and ink, between the photographed and the drawn - all but obsolete" (2005).

What these pronouncements share is their uneasy pursuit of terminology which can accurately capture the digital backlot's peculiar aesthetic. Appeals to both the abstract ("universe", "luminescent world") and the tangible ("wallpaper", "canvas") reveal an attempt to make sense of what must seem a curious materiality. Rob Legato, visual effects supervisor for *Titanic* (James Cameron, 1997), makes the assumptions of these accounts explicit when he argues that that *300* is not "photoreal or cartoon, or CG totally, it's sort of a *hybrid*" (2007, emphasis added). Similarly, film critic Roger Ebert's conceit that *Sin City* is "like a comic book brought to life and pumped with steroids" (2005) echoes the self-assessments of the filmmakers explored later in this chapter, in particular the focus on the supposed hybridised or intermedial qualities of these composites. Of course, one could dismiss these comments as whimsical or even lazy journalism, unworthy of serious interrogation. Whether these comments are well-considered or not, they nevertheless reveal the cultural status of a form of digital filmmaking technologies, demonstrating how "hybridity" is understood in such discourses not just as a meeting of live-action

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[2] As will become clear, academic criticism, comments of filmmakers and studios also contribute to this discourse.

[3] Mark J. P. Wolf defines rotoscoping as the "production of animation through the tracing of live-action reference footage […] frame by frame" (2003, 52).

performance and digital animation; it is also figured as a meeting between cinema and other media, namely the comic and the animated cartoon. [4]

Figure 33: *Sky Captain and the World of Tomorrow* is "a luminescent world of mildly de-saturated colour"...

Figure 34: ...while *Casshern* sits "squarely between the worlds of live-action and anime"...

Figure 35: ...and *300* is "living canvas".

This discourse is not limited to film journalism. Bolter describes both *Sky Captain and the World of Tomorrow* and *Sin City* as constituting a "hybrid" cinema where "traditional

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[4] In one sense, the responses of these journalists are not unique. Since at least the instantaneous photography movement in the mid-19th century, intertwined technological and artistic developments and their implications for established aesthetics of perception have polarised critical opinion. It is worthwhile, then, to note the similarity between the mixed reception of the films considered above and the critical response to this early photographic movement, whose work was "accepted by some as instantaneous wonders but criticized by others as false or unconvincing" (Prodger 26).

live-action and animation meet", going so far as to suggest that *Sin City* is a "remediation of a comic book" (24):

> A new style may be emerging in films that situate live actors in a space that is frankly acknowledged to belong to a different visual order. Two recent examples are *Sky Captain and the World of Tomorrow* and *Sin City*, in both of which actors perform in front of blue screens or on minimal sets and computer graphics fill in the world. There is no attempt to convince the viewer of the authenticity of the worlds depicted: these are highly stylised spaces drawn from the pages of comic books. (24).

Evocations of hybridity aside, Bolter is right to identify how these films display a "highly stylised space" which declares its own distinctiveness. In this chapter I tease out and explore this aspect of the digital backlot to explore how it might problematize the cinematic hybrid.

Lev Manovich (2013) explicitly echoes this language of hybridity in a similarly brief discussion of these films. Observing a "growing number" of films which "feature highly stylized aesthetics that would have previously been identified with illustration rather than filmmaking", Manovich characterises *Immortal, 300* and *Sin City* as both "the result of a hybridisation process" and a new aesthetic "species" (259). This chapter posits that the first part of Manovich's statement is correct: these films are indeed *technological* hybrids, just as all films are, to varying extents. Only the particular technical constituents which form this hybrid are changed, which, though significant in itself, nevertheless represents something of an affinity with analogue cinema. The second of his statements, as this chapter will demonstrate, is flawed. This same logic can be found in the work of Costas Constandinides. As part of his broader study of film adaptations, Constandinides argues that comic book adaptations *300* and *Wanted* (Timur Bekmambetov, 2008) seek "to erase the limits of the medium of the graphic novel by replacing static images with exhilarating motion and blood spraying effects" (80), and that such moments are "neither filmic [...] [n]or static". This is problematic, not just because it is based on a limited analysis of the formal nature of the adaptations themselves, but because it conflates imitation or inspiration with incorporation.[5] Thus, when Constandinides argues that these films "purposefully lose their identity or reference to a specific media ontology", he conflates the existence of "a new mixed discourse" with the actual films themselves, which are not 'mixed' in any significant manner. Again, such rhetoric reveals the desire to surrender

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[5] What Werner Wolf calls "intracompositional intermediality", in which there is "a direct or indirect participation of more than one medium in the signification and/or structure of a given semiotic entity" (2005, 253).

cinema –as a critical construct, at least– to digitisation. While digitisation does indeed mark chroma key apart from its predecessors in a narrow technical sense, for Constandinides this process ruptures the very divides between cinema and other narrative media, creating a new and quintessentially digimodernist medium. My analyses will demonstrate, however, that such an approach is rooted in the mistaken identification of a marginal product of the digimodernist era as something more central.

3.2   The Digital Backlot

In one sense, of course, digital backlot films are indeed a hybrid of live-action and animation.[6] Such composites are achieved by the use of the chroma key process, whereby principal photography takes place in front of a monochrome backlot which is then digitally filtered (or "keyed") out and replaced at the post-production stage. It is this combination of a physical backlot and post-production alterations that gives rise to the common term for the process, which references the sets purpose-built by Hollywood studios: the "digital backlot". As the image sensors of digital cameras are most sensitive to the green colour spectrum, green screens are favoured for providing the "cleanest" visual "key" for removal (Anon *deStudio*). Alternatively, if the colour green is required as an element of the filmed subject, a blue screen is commonly used. While, as Stephen Prince puts it, the principles of these composite images are often considered "the provenance of the digital era, but in fact they emerged early in cinema history" (2012 160). The digital backlot has several precedents in Hollywood history, beginning with Norman Dawn's in-camera-matte-shot, first developed in 1905. Borrowing from the visual techniques of the mid-Nineteenth-century pictorialists, the "Dawn Process" produces a composite image of live-action and painted background. This technique is achieved by placing a painted glass plate in front of the camera lens, with black paint preventing light from the undesirable areas of the background scene from passing into the lens. This in turn causes these areas of the negative to remain unexposed, while leaving the desired live-action elements of the shot fully exposed. Using these negatives, as well as additional "normal" footage as a visual guide, a matte artist then produces a second glass plate, this time with the live-action

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[6] André Gaudreault and Philippe Gauthier (2011) suggest that all cinema is, strictly speaking, a "kind of animation" (87), in the sense that static images are projected at a rate so as to give the illusion of motion; they also note that Kristin Thompson (1980) and Paul Ward (2000) have both made similar observations. This definition is unable to explain the tendency of viewers to distinguish between 'animated films' and 'non-animated films', which is itself indicative of a manifest distinction between them. Thus, animation is best defined in opposition to live-action cinema: animation as any process whereby a moving image (that may depict figures moving within environments) is created from methods other than the recorded movement of live actors before a camera. Such a definition acknowledges that the capture of a pro-filmic event involving live-actors could also involve animation before the camera (i.e. rotoscoping), and indeed composite images of the kind discussed throughout. Alternatively, it accepts that a live-action performance can be treated to a variety of post-production animation processes, such as rotoscoping, whereby performance is only visible indirectly in the final image as a reference point for digital painting. Thus, importantly, animation is considered as a technique across media, not a medium itself.

areas of the frame blacked out with paint, and the desired artificial background painted in. This second glass plate is placed in front of the lens, while the partially exposed negative is run back through the camera. The two images thus combine to create a master shot of live-action seemingly taking place in a painted environment. By the 1920s, this static painterly technique had become superseded by the travelling matte which could cover moving figures,[7] making the matte painting a desirable and prevalent tool in the construction of diegetic space both in the Classical and post-Classical periods.[8]

The digitisation of chroma key from 1985 onwards[9] made this process more efficient by having computer algorithms detect and remove certain colours from the background of the digitally captured image, facilitating a compositing technique that simply requires a monochrome background and even lighting (to avoid shadows which add colour variation) at the principal photography stage.[10] As this brief history suggests, arguing for the novelty of "hybrid" cinema is problematic given that Hollywood cinema has an established tradition of combining pro-filmic live-action and sets with painted images, in the form of rotoscoping and latent image matte paintings.[11] According to Prince, "cinema is a combination of image types that have differing deviations" (155). Moreover, the more general notion of actors performing in 'anti-realist' environments that are explicitly influenced by other visual media can be traced back as least as early as the films of Robert Wiene's *The Cabinet of Dr. Caligari* (1920). That *The Cabinet of Dr. Caligari* was subject to a digital backlot remake in 2005 suggests a certain technological affinity.

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[7] For a history of the Dawn process, Williams process and Dunning process, see North 2008, p. 75-77. See also Prince 2012, p. 158.

[8] For an informal, fan-maintained archive of matte-shots, see the blog *Matte-Shot – a Tribute to Golden Era Special FX.*

[9] The first fully digital matte shot/sequence appeared in *Young Sherlock Holmes* (Barry Levinson, 1985). The same sequence also featured the first fully CG animated figure.

[10] While 2D digital painting is the closest to an equivalent of these analogue processes, the chroma key composites such as *300* and *Sin City* could not be realised with this technique alone. For these (almost) entirely digital environments, 3D modelling is used to create a wireframe mock-up of a "physical environment" that is then subjected to multiple layers of animation. An additional common element of the digital background largely absent from *300* and *Sin City* however, is that of the digital photograph. Digital photo archives are often key creative tools for the matte painter in the early stages of animation, their indexicality offering a useful timesaving way of creating verisimilar landscapes, either as reference points or simply as a base to be painted over. All of the films under consideration in this chapter involve varying combinations of digital painting, 3D animation and digital photography, though their wider production processes are much more varied

[11] Chapter 2 of animator and visual effects artist Mark Sawicki's *Filming the Fantastic* offers a detailed insight into this process.

Figure 36: Stephen Prince points out that digital environments have long-established predecessors. In John Cromwell's *Since You Went Away* (1944) Prince observes how "Claudette Colbert leans out of the upstairs window of a house that is entirely rendered as a matte painting" (160).

Figure 37: A tellingly similar moment in Robert Rodriguez's *Sin City. Since You Went Away* can be considered a greater recuperation of the backlot in the sense that it is less overtly artificial than the highly stylised world of *Sin City,* which revels in its status as a composite image.

3.3 "Invisible" chroma key – full recuperation

Since You Went Away is an example of a hybrid cinema that is rarely discussed as such; a fully recuperated use of matte paintings to produce seamless composite images which precedes the ruptural and heavily-stylised use of digital chroma key technologies. Following films like *300*, however, are countless instances in which chroma key is deployed in near imperceptible ways. In the espionage thriller *Tinker, Tailor, Soldier, Spy* (Tomas Alfredson, 2011), for example, digitally animated buildings have been subtly integrated into an otherwise photographic skyline (see Figure 38). This is an example of what Geoff King (2000) and Paul Ward (2005) term "invisible" post-production visual effects. From erecting Brutalist tower blocks to stripping away roadside greenery to create the environmental dystopia of *The Road* (John Hillcoat, 2009), imperceptible interventions

in the digitally captured mise en scène by definition constitute an almost unquantifiable[12] presence in contemporary cinema.[13] Thus, *Since You Went Away* and *Tinker, Tailor, Solider, Spy* are examples of fully recuperated compositing technologies which bookend the ruptural experiments of *Sky Captain* and its ilk.

Figure 38: "Invisible" digital painting in *Tinker, Tailor, Soldier, Spy*: a computer generated brutalist tower block is placed inside the courtyard of Blythe House. Other instances of digital composites in the film include shots in which elevator doors open onto a London street, and a long shot of a library, in which only the central aisle is a physical set.

Though the question of fully recuperated chroma key will resurface later in this chapter, the focus is on the implications of this much smaller cycle of ruptural films. Indeed, what marks these films as ruptural is the sense in which CGI and its integration with pro-filmic performances diverges from visual aesthetics that dominate Hollywood cinema; ostensibly, these films do not conform to what North calls cinema's "performance of 'photographic-ness'" (2008, 12). Instead, they seem to explore the very "subversive and liberated forms of animation" (North 12) from which more commonplace uses of CGI retreat. As Bolter puts it, the environments through which live actors appear to move are "frankly acknowledged as belonging to a different visual order" (24). In such films, the pro-filmic live-action performance takes place in animated environments that, to varying degrees, abandon the aspiration towards verisimilitude, and perhaps even toward photorealism.

3.4   Variations on the digital backlot

Before considering the claims of filmmakers and the films themselves with regards to their supposed hybridity, it is important to sketch out the contrasting production

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[12] Nevertheless, there exists a VFX-industry based discourse of identifying and praising specific instances of seamless, subtle effects: See Ian Failes, "Incredible, Invisible Effects" and Steve Wright, "The Importance of Invisible Effects".

[13] It is this subtle version of the "digital backlot" which forms the focus of Prince's work on the subject (2012, 169-82).

processes. *Sky Captain and the World of Tomorrow* is most notable for recording its actors after the animation process was largely complete, and for their performances being influenced by these animations. *Immortel (ad vitam)* can be characterised by the minimal use of live-action beyond four actors, the corresponding use of synthespians for its minor characters, and for being designed by a games company that specialises in interactive drama games and photorealistic motion capture technology. *Casshern* employs comparatively larger physical sets than the other films under consideration, and yet involves sequences storyboarded by an anime artist, and *Sin City* and *300* follow the source material so closely that Miller's comics approached the function of a storyboard.

Sky Captain's digital environments were created before primary photography took place.[14] Director Kerry Conran's early experiments in animation took place on a Macintosh Iisi in 1994, and he would later combine this experience with the chroma key skills developed at the California Institute of the Arts. A six-minute serial produced by Conran using the Electric Image Animation System, Adobe After Effects Pro, and Adobe Photoshop formed the pitch that would attract independent producer John Avnet to the project. Avnet established a blue-screen shooting stage and a 100-person team of digital painters, modellers and compositors to accelerate the animation process in advance of principal photography. As technology journalist Joe Cellini notes, storyboard sketches were reproduced as digital 3D animatics, which Conran used to create grids which could be mapped onto the floor of the chroma key sets in order to act as a visual reference for mapping camera movements. Pivotally, digitally animated characters were also created to act as placeholders, with actors basing their navigation of the blue-screen set on the movements of their animated counterparts. Conran himself notes how "accurately the live-action follows the animatics, including how some of the live actors picked up mannerisms from the animated characters" (Cellini). The notion of physical movement being informed by animated figures will prove important in the discussion of motion and space later in the chapter. For now, the key insights into the creative process behind *Sky Captain and the World of Tomorrow* is that, as Conran observes, "we had an animated version of the film before we ever shot it" (Cellini); that is, because the animated sequences were prepared in advance of the principal photography, they constituted a form of source material for the pro-filmic event.

The source material for *Immortel (ad vitam)* is Enki Bilal's 1980 comic *La Foire aux Immortels* [*The Carnival of Immortals*], which would also be adapted into the 2008 'point-

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[14] Unless otherwise stipulated, this account is indebted to Joe Cellini's article "*Sky Captain* Flies to the Big Screen".

and-click' PC game *Nikopol: Secrets of the Immortals* (White Birds Productions).[15] While it is not clear whether the live-action performances were recorded before the animation took place, it is known that French game developers Quantic Dream, rather than a conventional animation house, provided the animations. Quantic Dream would go on to produce *Heavy Rain* (2010), the *Playstation 3* interactive drama game acclaimed for its photorealist graphics and characterization, as well as offering motion capture studio services to third parties.[16] Although only loosely based on its 1970s anime namesake, *Casshern* is linked to the medium through its creative process (Kiriya qtd. in *DSO*). The storyboards for the film's action sequences were designed by Shinji Higuchi, previously known for his anime storyboarding and visual effects work (Anon. 2004). Shooting took place over a two-month period, and according to director Kazuaki Kiriya, around "fifty to sixty percent" of the film was shot against a digital backlot. This was followed by six months of post-production, in which a relatively small team, overseen and joined by Kiriya, constructed the animated environments of the film on personal computers built from cheaply available parts.

Though *Sin City* and *300* may seem distinct from the other films considered in this chapter merely by dint of their much higher graphic adherence to their respective comic sources (see Figures 40-1 & 51-52), they are also distinguished by a number of procedural differences. Like the opening sequence of *Sky Captain and the World of Tomorrow*, *Sin City*'s prologue (adapted from the Miller story "The Customer is Always Right") was originally filmed and edited as a funding pitch by Rodriguez himself, although the remainder of the film was composited by three separate animation houses. After the principal photography for *Sin City* was completed, the raw green screen footage that represented the three main episodes in the film (based on the Miller "yarns" "The Hard Goodbye", "The Big Fat Kill" and "That Yellow Bastard") was sent to three visual effects companies: Café FX, The Orphanage, and the appropriately named Hybride, respectively.[17] Rodriguez was keen that the three animation houses refrain from collaboration, using the graphic novels rather than his own observations as the immediate reference point, so as to ensure the aesthetic primacy of Miller's illustrations. This unorthodox model of independent, isolated effects companies working on portions of a film, producing footage that would only then be unified at the mastering stage by the director, is not only unconventional in the sense that it appears to depart from the centralised model of a

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[15] Given that *Immortel (ad vitam)* and *Casshern* were, respectively, French and Japanese-language projects, there is far less Anglophone material detailing the production processes upon which to draw.
[16] Quantic Dream's next release, *Beyond: Two Souls*, features Willem Defoe and Ellen Page performing via motion capture technology, with an excerpt screened at the 2013 Tribeca Film Festival (Pinsoff 2013).
[17] This account is indebted to Tara DiLullo Bennett's article *"Sin City*: Bringing the Graphic Novel to the Screen-Literally".

senior director figure overseeing various collaborating companies and institutions (Rodriguez insisted that he be consulted only over major problems encountered), but also in the sense that it introduces and encourages a degree of spontaneity in aesthetic interpretation.

However, given the very specific narrative and visual demands of the source material and Rodriguez himself, it is unsurprising that in-house divisions of labour were in fact introduced. In the case of CafeFX, for example, the 42-minute segment required work on 650 shots, for which the company used 85 personnel. As visual effects supervisor Everett Burrell explains:

> I supervised half of it and [fellow supervisor] Jeff Goldman supervised the other half. We split it pretty evenly and then Dave Lombardi at our Santa Monica office handled the [guest-directed Quentin] Tarantino sequence, which was 35 shots […] Our teams would share ideas and techniques.

Nevertheless, the creative mandate of *Sin City* was still vague enough that both Hybride and CafeFX initially struggled to develop an appropriate production process. In particular, the task of producing a visual aesthetic along the way, rather than being given a specific set of post-production instructions, appears to have proved initially problematic. Daniel Leduc of Hybride, as well as Burrell, note:

> Leduc: The [raw footage was] all in colour, but in the compositing, they were finalized in black and white. Not knowing the final style, it was hard to plan everything ahead. We were trying to define things and environments in black and white and it was really, really difficult. At some point, we made the decision to do everything in colour because we are more used to it (DiLullo Bennett 2005).

> Burrell: When you shoot an all green screen movie, you tend to get really lost quickly because you don't have any point of reference. We had to develop north/south/east and west looks right off the bat […] From the get-go next time, we would blueprint the entire world and make a map of where we were in the city.

Revealingly, both comments touch upon the difficulties of treating raw live-action footage as a form of animation, even when their creative remit has been to do so. In the case of Hybride, the desired aesthetic was so far removed from the conventional requirements of compositing that mapping animated content onto the footage proved difficult, necessitating a treatment of the post-production processes as a live-action "touch-up", rather than the ambitious animation project demanded by Rodriguez. For CafeFX, however, what transpires is a desire to realise the animated worlds in which the live-

action footage is to be placed more fully. In Burrell's case, this entails the construction of extra-textual digital environments that expand the digital City's spatial identity, so as to create a reference tool for the animating team.

The production of *300* followed a similar, but less strict, approach to imitating Miller's aesthetic. Director Zack Snyder designed the film's storyboard from photocopied panels from the comic. As one journalist visiting the sound stage noted, "two panels from Miller's graphic novel were on the wall next to their respective storyboards, a picture taken of the scene on the green screen set, and then a final scene after the computerized visual treatment" (Douglas 2007). While some animatronics and minimal props were used, the majority of the sixty-day Montreal shoot involved a minimal blue screen soundstage that could be easily moved and arranged to create suitable spaces and shapes for the actors' performances. Ten effects houses were then tasked with producing the 1,300 effects shots[18] for the film, but unlike Rodriguez's *Sin City*, the companies were permitted to communicate via a specially designed website, and were provided with a PDF document detailing the film's desired aesthetic. Grant Freckleton further assured a sense of aesthetic consistency by designing the conceptual art for pre-visualisation and serving as visual effects art director during the considerable post-production process.

Filmmakers' comments: rupture and recuperation

The conceptualisation of these digital composites by their creators can be placed into one of two categories: a ruptural reading and a recuperative one. The ruptural reading regards this use of digital compositing as a transformative act which generates an unprecedented hybrid medium; this is further conceptualised as either a transitional stage 'between' cinema and the non-cinematic form to which it aspires, or an already existing hybrid. The recuperative reading, by contrast, understands these films as being influenced by, and attempting to resemble or evoke a sense of the aesthetic of, its source material. Conran rehearses this language of hybridity when he notes that he thinks of *Sky Captain* as "a live-action cartoon" (Axmaker 2004). He describes his method more specifically as harnessing post-production processes in order to subsume live-action into a more broadly defined understanding of animation (rather than an explicit composite or encounter between the two), by applying "the same principle that creates Bugs Bunny, using the computer to do for live-action what has been traditionally been done *[sic]* through cel animation." Conran's conceptualisation of digital compositing then, is a ruptural one, in which live actors 'become' part of an unprecedented form of hybrid cinema. This characterisation is peculiar in that the digital renderings of *Sky Captain*'s actors are

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[18] Of a total 1373 shots (Nasrin 2009).

composited into the final image with little to no changes to their digitally captured image. Similarly, Robert Rodriguez's reflections upon *Sin City* echo this ruptural rhetoric when the director suggests that the motivation behind the production was to "take cinema and make it into [a] book'" (Director's Commentary, Dimension/Miramax UK release). Indeed, Rodriguez attributes the apparent ease of the adaptation process to the notion that both cinema and the comic strip are "just snap shots of movements". This assertion of how the two media are united in their representation of motion will be interrogated through a direct comparison between Miller's comic and Rodriguez's film.

By contrast, Kaz Kiriya and Zack Snyder interpret their projects in analogous terms. Kiriya declares that, with *Casshern*, he "wanted to create a flat 2D world, intentionally ignoring […] perspectives *like* anime" (Anon. 2004, emphasis added). Similarly, Snyder implicitly characterises his film as an adaptation of Miller's comic, albeit one limited by its formal restrictions. Rodriguez's rhetoric imagines the function of the technological trace in a similar way to how it is envisioned by found-footage cinema; a radical signifier of cinema to come, and visual evidence of an insurrection of a media practice previously located outside cinema. In the sense that, for Rodriguez, the trace's ruptural power is partly down to its cultural significance, his interpretation proves somewhat resonant with the case of the glitch in *The Last Broadcast*. The key difference, however, is that the trace in the found-footage genre also serves a realist function as marker of a technological process within the story space of the film (diegetic camera perspective), whereas the technological trace in *Sin City* does the opposite. The digital backlot refers to the creative process outside of the world of the film – the feat of adapting Miller's comic to the cinema screen.

Snyder's comments, on the other hand, come closer to echoing the ambivalence discussed at the end of Chapter 2. Just as the lo-fi digital image is recuperated at the level of narrative and stylistic function, but still remains distracting because of its signification of commonplace techno-social imagery, the digital backlot for Snyder is not fully recuperated, even though it does not point the way towards a radical "post-cinema" either. For Snyder, *300* displays images that are strikingly *like* those of its source material, to the point of being a remarkable experiment and spectacle. However, they do not represent a full recuperation of digital chroma key technologies into the cinematic image. I will return to the question of what might constitute a full recuperation of chroma key at the end of this chapter.

3.5   *Sin City*: **Rupture**

Robert Rodriguez's own interpretation of *Sin City* is expressed via the language of digimodernist transformation, echoing Darin Barney's idea of the "hybridization of existing but otherwise distinct media formats and practices [...] representing a transitional moment" (qtd. in Shail 2007, 6). As such, the stylistic opportunities afforded by digital compositing are framed as ruptural, able to usher in a new kind of cinema that is 'part comic'. Rodriguez' assertion that both live-action cinema and the graphic novel are "just snap shots of movements" is central to his gambit. By suggesting that both forms construct an illusion of motion in the same piecemeal fashion, Rodriguez implies that all that is required to transform cinema into the comic is digital animation technology that can more closely imitate Miller's visual aesthetic. Moreover, this reveals the desire to "surrender cinema to digitisation" that Kirby identifies as characteristic of cinema in the digimodernist era. According to such rhetoric, digitisation is more than a change in data storage processes with implications for work flow and stylistic palate, but a revolutionary change which erodes boundaries between producer and consumer, text and reader, comic book and feature film. Despite his claims, however, Rodriguez's *Sin City* is still a film that merely resembles Miller's comics in some aspects. As with the DV found-footage film, a marginal cultural product of the digimodernist era strives to be received as something far more central.

The question of movement is a useful place to start in revealing the disparity between Rodriguez's discourse of the ruptural potential of digital technologies and the reality of the digital backlot's implications. Indeed, despite Bolter's aforementioned comments, the only actual incorporation of Miller's comic in *Sin City* takes place during its title sequence. Images of characters are directly taken from the graphic novel and placed alongside the name of the actor who plays their cinematic counterpart (see Fig. 39), establishing Miller's original aesthetic while framing the ensuing film (and its formal ambitions, perhaps) in relation to it. As such, the incorporation of Miller's illustrations demonstrates the film's claims to reproduce his comic more generally. Indeed, Rodriguez's ambition to "take cinema and make it into [a] book" is conveyed in the scene which immediately precedes the opening credits, in which a long shot casts the silhouettes of The Salesman and The Customer into high-contrast chiaroschuro (Figs. 40-51) in a close imitation of the corresponding panel from Miller's graphic novel. The major differences between the two, beyond the absence of speech bubbles, are in the film version's more detailed skyline and the rainfall that consists of animated rather than static lines. Unfortunately for Rodriguez, this close imitation of a panel from Miller's comic demonstrates the two fundamental differences between cinema and comics that

problematizes Rodriguez's rhetoric: firstly, that cinema relies on the optical illusion of motion, and, secondly, that it is an aural medium as well as a visual one. It is the former that will constitute the focus of the ensuing comparative analysis.
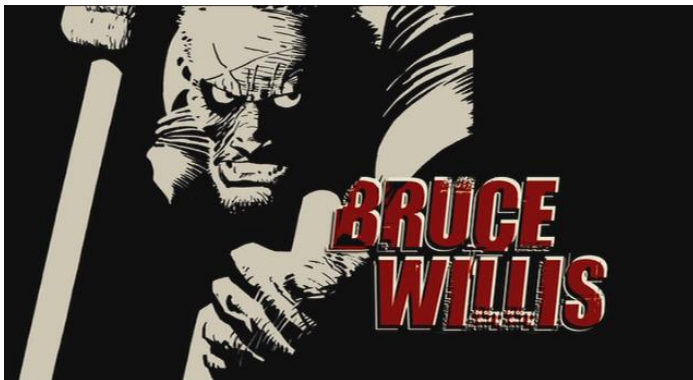
Figure 39: An incorporation of Miller's illustrations as a statement of ruptural intent?

Figure 40: Panel from 'The Customer is Always Right' from *The Babe Wore Red and Other Stories*, (Dark Horse, 1994)…

Figure 41: …and the corresponding shot from *Sin City*, minus speech bubbles, plus a more detailed background (Dialogue accompanying the shot: "The wind rises electric. She's soft and warm and almost weightless.").

Complicating this comparison is the fact that the 'non-cinematic' cues on which Rodriguez's film draws are themselves heavily influenced by cinematic style and form,

particularly that of film noir.[19] Miller's *Sin City* series imitates not only this specific film genre's high-contrast monochrome aesthetic, but also more basic narrative film devices like the shot/reverse shot. As such, the extent to which Rodriguez's film can be seen as drawing upon formal properties of Miller's comic is further complicated: one could simply argue that, beyond a superficial aesthetic and shared plot, Rodriguez's film merely employs those tropes originally appropriated from cinema by Miller. As the ensuing discussion shows, while it is not quite the case that Rodriguez uses Miller's comic as a storyboard, the original comic draws upon the compositional and spatial strategies of cinema to the effect that it can at times be said to 'resemble' one. Moreover, the storyboard itself draws upon formal features of both comics and film, further complicating matters. In his history of the film industry's use of storyboards, filmmaker John Hart similarly draws together the histories of cinema and the comic book, making reference to both George Méliès' *Le Voyage dans la Lune* [*Trip to the Moon*] (1902) and contemporaneous Sunday comics of American newspapers (Hart 2008, 1).

While the storyboard may indeed be a form of sequential art, then, it is designed to guide a variety of practices at the pre-production, principal photography, and post-production stages. Hart defines the storyboard in its most basic sense as a

> pre-visualisation tool designed to give a frame-by-frame, shot-by-shot series of sequential drawings adapted from the shooting script. They are concept drawings that illuminate and augment the script narrative and enable the entire production team to organise all the complicated action required by the script before the actual filming is done to create the correct look for the finished film (ibid.).

This might include directions for actor movement, camera angles, lighting, props, sets and special and visual effects: features that are obviously absent in the comic (Hart, 3, 111). In addition, the animated storyboard – or "animatic" – can employ "scans, pans, zooms and transitional devices", as was the case in the pre-visualisation process for *Sky Captain and the World of Tomorrow* (179), in place of gestural arrows or annotations. It is clear, then, that Miller's comics cannot fulfil the function of a storyboard in the pre-visualisation processes of *Sin City* and *300*; indeed, in the case of the latter, the aforementioned interviews with Snyder have confirmed as much (DiLullo Bennett). Instead, one can argue that the

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[19] Drew Morton traces the scholarly debate surrounding the contested formal interaction between comics and cinema, contrasting the accounts of Donald Crafton (1990), which argue that the two forms developed without significantly influencing one another, and David Kunzle's (1972) implication that formal properties of the comic strip may have influenced cinema. Morton's own conclusion is that "these opposing views, although illuminating in various ways, obscure the fact that the issue of aesthetic influence is nuanced beyond any monolithic conclusion", acknowledging instead Francis Lacassin's assertion that "it is more reasonable to suppose that comic strip and cinema have both separately drawn the elements of their respective languages from the common stock of the plastic and graphic arts" (Morton 2010, 296).

individual panels of Miller's comics dictate camera angle and frame composition. In comparing a sequence from the comic and its corresponding film scene, supposed hybridity can be interrogated even further.

Figure 42: Panel from Miller's *300* (Dark Horse, 1998).
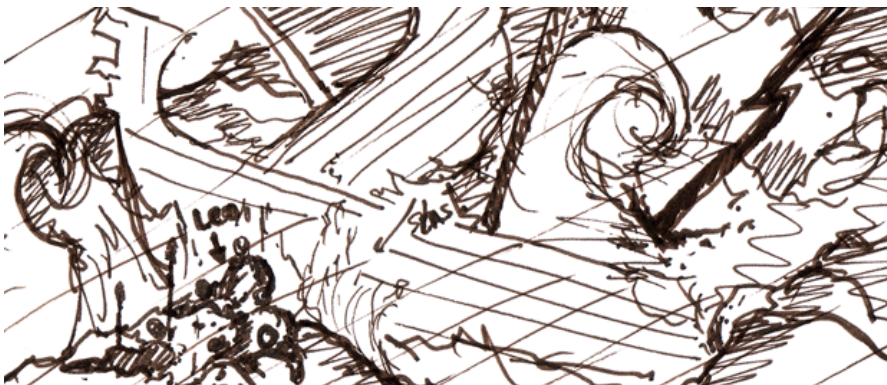
Figure 43: Conceptual drawings and storyboards.

The scene selected for comparison is adapted from Miller's yarn *The Hard Goodbye*, originally published in 1991-2. This excerpt is chosen because the sequence contains examples of establishing shots, dramatic continuity editing, and simple instances of the construction of movement. The scene in question depicts the yarn's vengeful protganist Marv as he hunts the killer of his lover Goldie. The hunt leads Marv to a church, albiet, as his narration admits, "not to pray" (*The Hard Goodbye*, 72-74). Sat in a confessional, Marv explains to the priest how he has established the padre's involvment in Goldie's murder, and demands to know the name of the person who ordered her killing. The priest obliges, revealing that the person in question was none other than Patrick Roark, a corrupt Cardinal and brother of Sin City's Senator. In stressing the political implications of purusing the Roarks, the priest asks Marv "whether that corpse of a slut is worth dying for"; Marv responds by shooting him in the head through the confessional grille. In Miller's graphic novel, the sequence takes place over three pages, although the first panel of page one depicts another scene. For ease of reference, the ensuing discussion uses the abbreviation 'P' to indicate the particular panel in question:

P1
THEN I GO TO CHURCH.

NOT TO PRAY.

AND WHAT HAVE BEEN YOUR SINS, MY SON?

WELL, PADRE, I DON'T WANT TO KEEP YOU UP ALL NIGHT-- SO I'LL JUST FILL YOU IN ON THE LATEST BATCH...

P2
...THESE HERE HANDS OF MINE, THEY GOT BLOOD ALL OVER THEM--I DON'T MEAN REALLY. I WOULDN'T COME TO CHURCH WITHOUT WIPING IT OFF.

P3
YOU'RE SPEAKING FIGURATIVELY.

P4
I KNEW THERE WAS A WORD FOR IT. YOU'RE ONE SMART GUY. MYSELF, I'M NOT SO BRIGHT. WHEN I NEED TO FIND SOMETHING OUT, I JUST LOOK FOR SOMEBODY WHO KNOWS MORE THAN ME AND I GO AND ASK THEM. BUT SOMETIMES I ASK PRETTY HARD.

P5
BY WAY OF A FOR INSTANCE, I KILLED THREE MEN TONIGHT. I TORTURED THEM FIRST.

P6
YOU MIGHT SAY I BEEN WORKING MY WAY UP THE FOOD CHAIN. THE FIRST TWO, THEY WERE MINNOWS, SMALL-TIME MESSENGERS-- --BUT IT WAS CONNELLY--THE MONEY MAN--WHO FINGERED YOU, PADRE.

P7
CHKCHAK

YOU KNOW WHAT THAT SOUND MEANS. SIT DOWN.

P8
DEAR LORD, MAN. THIS IS A HOUSE OF GOD.

P9
JUST GIVE ME A DAMN NAME.

P10
...ROARK.

P11
ROARK?. YOU ARE REALLY PUSHING YOUR LUCK, TRYING TO FEED ME GARBAGE LIKE THIS.

IT CAN'T BE THAT BIG...

P12
FIND OUT FOR YOURSELF, YOU SORRY BASTARD! THERE'S A FARM OUT AT NORTH CROSS AND LENNOX. IT'S ALL THERE. FIND OUT FOR YOURSELF--AND WHILE YOU'RE AT IT--

P13
--ASK YOURSELF IF THAT CORPSE OF A SLUT IS WORTH DYING FOR.

103

Figure 44: The church-going sequence from Frank Miller's *The Hard Goodbye* (Dark Horse, 1991-2)…

Figure 45: ...and the corresponding shots from Rodriguez's film version.

The issue that becomes immediately apparent in this comparison is that of movement. Movement in the comics medium can be implied at both the intra-panel and inter-panel levels. In addition, individual panels and inter-panel structures can be analysed for their construction of rhythm and time through shape and number. The first panel of this sequence from *The Hard Goodbye*, which also functions as the establishing shot for the corresponding scene in *Sin City*, exemplifies this notion of intra-panel motion. As can be seen, panel 1, which depicts the peak of a Roman Catholic church spire, consumes the entire width of the page, and two ninths of the page's height. The panel contains two speech balloons with separate tails indicating two speakers. The first speaker, who is later revealed to be the priest, asks "and what have been your sins, my son?". Marv's riposte is "Well, padre, I don't want to keep you up all night – so I'll just fill you in on the latest batch…". In Rodriguez's film version, an establishing shot opens on the church spire and tilts towards the ground, the movement lasting long enough for the same offscreen dialogue to run its course (see Fig. 47). The tails of the speech balloons in the comic point down and out of the panel, the same direction that the camera moves in the film version. This echoes Paul Atkinson's argument that, while a static medium, the comic can imply movement at the inter-panel level through a variety of cues. Pivotally, unlike the film frame,

> the panel is not an instance in time but the contraction of a period of movement that is informed not only by the shape and size of the panel, but by the gestural arc of a character's body – there is implied movement in lieu of movement (2009, 268)

Speech balloon tails demonstrate this "implied movement in lieu of movement", just as the panel in which the priest is shown jerked back in his seat after having being shot by Marv (see Fig. 48) demonstrates implied movement within the story-space. In the comic, the 'gestural arc' of the priest implies that the bullet has pushed him away from the grille, while in the film, the priest (portrayed by Miller himself) is actually shown undergoing this motion, resting in the final position depicted in panel 15 of the comic. As such, Frank Miller the actor, in rocking backwards in his chair, enacts the trajectory that his own gestural illustrations imply to have just taken place.
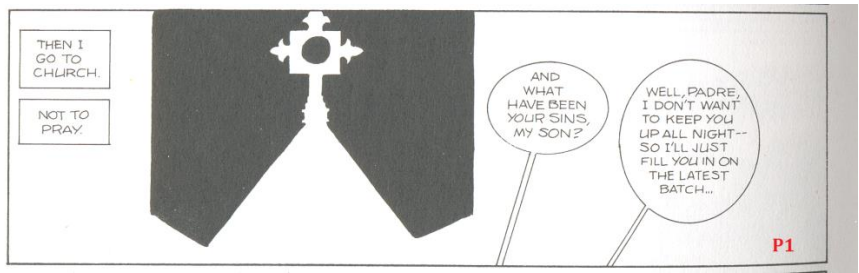
Figure 46: Speech bubble tails and implied movement in *The Hard Goodbye.*
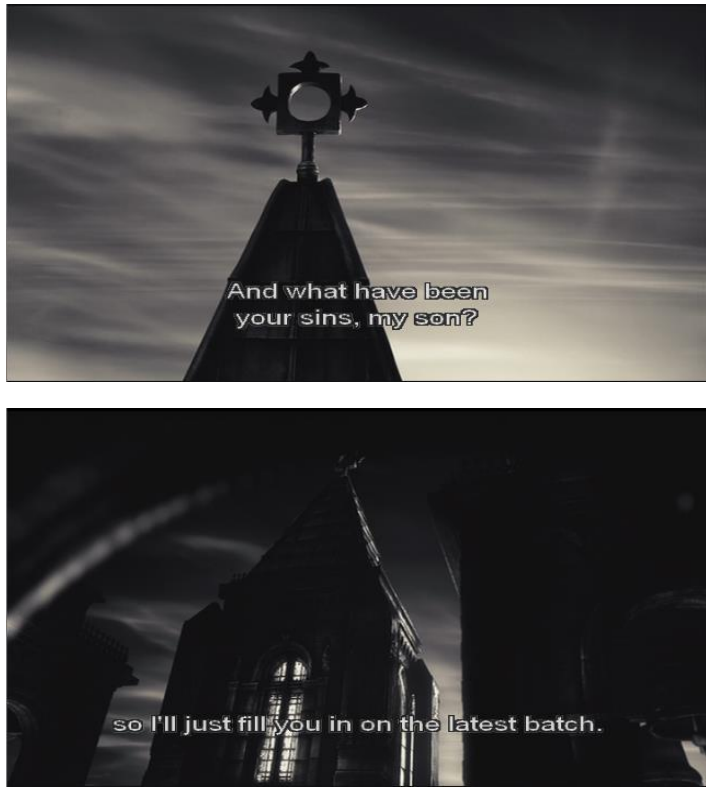
Figure 47: Corresponding camera tilt in *Sin City.*
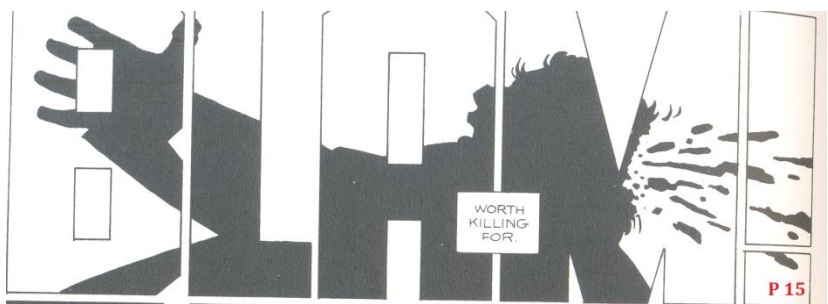
Figure 48: The gestural arc of the priest implies backwards motion in *The Hard Goodbye.*

Figure 49: In the same scene in *Sin City*, S17 depicts the priest physically moving backwards, resting in the position from panel 15.

A different kind of movement is constructed through sequential rhythm, at the intra-panel and intra-shot level. The ensuing exchange between Marv and the priest in the confessional box is divided into twelve panels, all of the same size (one ninth of both the page's height and its width). Describing the perspective of these panels in cinematic terms, the three main points of view used are Marv in close-up, left profile view; Marv in close up, three quarter degree view from the right; the priest in close-up, approximately front facing with variations. Rodriguez's adaption of the exchange cuts more frequently between these three main perspectives. Both shot 2 and panel 2 (Marv left profile), and shot 3 and panel 3 (the priest) cut together, and both comic and film return to shot 4/panel 4 of Marv. However, whereas the comic shows Marv in a three quarter view for the duration of his speech, the film version first shows him in left profile, before cutting to the right three quarter view perspective (shot 5) to emphasise the sinister conclusion to his dialogue:

> *[shot 4]* When I need to find something out, I just look for somebody who knows more than me and I go and ask them. *[shot 5]* But sometimes I ask pretty hard.

Rather than cutting to the priest's reaction as Miller's comic does (panel 5), the film then returns to a left profile image of Marv (shot 6), as he intones "by way of a for instance, I killed three men tonight". The same speech balloon in panel 6 also contains the sinister addition "I tortured them first", which is ironically preceded by Mickey Rourke, the actor that plays Marv, nonchalantly blowing dust from his finger nails. This dramatic device proves cumbersome in the context of a comic; to convey so many character emotions visually would require more panels, slowing down narrative execution and affecting the dramatic dynamics of the scene. Instead, pacing in the comic is constructed through a sucession of fewer equally sized pannels as a repetitive rhythm. By contrast, the film closes in on Marv himself, with Rourke's peformance (namely, his facial expressions) reinforcing and complicating the tone of his dialogue. The scene in the film has a duration of one minute and eighteen seconds, and the reading time for the corresponding sequence

108

for this author averages at one minute seventeen seconds.[20] Although reading time is highly variable, this small sample serves to illustrate that the considerable formal differences between the two media have little impact for questions of adaptation; the sequence is easily adapted into a scene without the need to remove narrative content. Rather than Rodriguez's assertion that this is because the cinematic medium is somehow being digitally transformed in the direction of the comic book, however, it is because Miller's use of the shot-reverse-shot principle means that the sequence lends itself well to storyboarding from which a close adaptation can be filmed.

The climax of the scene, in which Marv kills the priest, can be used to illustrate both inter-panel movement and important distinctions between the presence of sound in comics and in cinema. The final four panels of the sequence (14-17) roughly correspond to the final five shots (15-19) of the same scene in the film. The panels convey the following series of events: Marv draws his gun on the priest; he fires it three times at close range; the impact of one of these shots causes the priest to fall backwards in his chair. In addition, Marv may also offer a spoken riposte to the priest's question "whether that corpose of a slut is worth dying for", with each sentence punctuating a gunshot: "worth dying for/worth killing for/worth going to Hell for". However, these might also be read as an internal monologue, or perhaps part of Marv's recollection of the event to the reader (the entire yarn is read by Marv in the present tense in the style of the narrator of a hard-boiled detective fiction). This series of events is conveyed by three panels depicting: a close up of Marv's gun (14); the priest in profile having been knocked backwards by one of Marv's bullets (15); a low angle view of the church spire (16). Again, that the reader can infer not only the specific movements of the figures (Marv's arm rising to fully outstretched position, the priest falling backwards), but the wider event in which these movements are implicated, is indicative not only of the gestural cues considered above, but the importance of "the causal relationship between panels" for narration (Atkinson 267).

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[20] Mean average calculated from the reading times of 1:13, 1:23, 1:17. The reading approach followed was reading the panel from the top downwards, with pause duration dictated by the relative size of the panel.

Figure 50: Three successive images depicting Marv's execution of the priest, each linked to the sound of a gunshot

Figure 51: The corresponding sequence in Rodriguez's film version.

Benoît Peeters locates this imagined movement between panels within the "case fantôme", or phantom panel (1991, 27). In the phantom panel in between panels 13 and 14, Marv would be reacting to the priest's disparaging description of Goldie, raising his gun, and, as the "BLAM!"-shaped panel 14 along with the ejected spent casing would suggest, firing at the padre. Between panels 14 and 15, a second bullet, the firing of which panel 15 (again shaped into the word "BLAM!") represents, has made contact with the priest's forehead, and has pushed him backwards. Panel 16 depicts the weathervane of the church spire, and is again shaped into the word "BLAM!". In the phantom panel between 15 and 16, then, Marv fires his last shot, which is apparently loud enough to be heard from outside the church. In the film version, the second shot is shown as being fired twice: once through a close-up of Marv's gun (shot 16), and again via a medium-shot of the priest (shot 17), confirming the impact with the priest's skull. The decision to repeat a moment in time

from a different perspective, so as to explicitly show which bullet kills the priest, reveals the importance of the phantom panel in the original comic book. The phantom panel between 14 and 15 conveys the firing of a second bullet and its impact, inferred from the position of the dead priest. One assumes that *Sin City*'s creators found an exact moving depiction of this –Marv fires, fires again, the priest falls backwards– as too ambiguous, raising questions as to which bullet actually made the pivotal contact. The insertion of an alternate view of the same instance in time (shot 17) thus conveys an apparent difference in how temporality is conveyed in the two media: a repeated split-second can be easily parsed as such by the viewer as repetition, rather than a new event, which the comics medium would presumably struggle to communicate. Contrastingly, the phantom panel requires more work on the part of the reader to establish a sequence of cause and effect. Thus, it is the small differences – such as the insertion of an additional, slightly tighter shot (shot 16) – which convey the limits of Rodriguez's ruptural argument as much as the obvious formal differences like the illusion of motion and recorded sound. How to best read this relationship between the illusion of motion in the comics and cinema media, and its implications for digital presence, can be clarified even further by a similar analysis of *300.*

3.6   *300:* Recuperation

In describing the storyboarding process for *300*, director Zack Snyder discusses not only the role of Miller's comic, but also his own theory on the difference between the two media:

> Basically the challenge for me was to get the movie to go through Frank's frames [...] if you look at the book, it's a montage, right? It's not *a moment-to-moment experience, like a film is*. So the challenge for me is to go, "okay, here's the moment that Frank drew. The horse rears up, and it's frickin' awesome. So how [do I], like, get into that moment? […]" So basically my challenge was to [decide] "It's 10 shots to get to his shot, and another 10 shots to get out of it" (Anon. 2006. Emphasis added).

The particular shot to which Snyder refers takes place in an early scene in *300* in which a Persian messenger delivers the demand that Sparta submit to King Xerxes. Holding the skulls of defeated kings in one hand, the messenger pulls on the reins with the other, causing the horse to rear. In Miller's comic, this is represented by one panel of the horse stood upright on its hind legs (see Fig. 52). In Snyder's film version, one long shot of the horse moving into a fully upright position is shown in slow motion (Fig. 53). The use of slow motion in order to capture Miller's tableaux aesthetic has been noted by Michael Williams, who terms the technique "frieze-framing" (2009, 44). Such shots, Williams

112

argues, "are slowed down to the point at which motion pictures become still images" (47). While this is not quite the case, Williams is correct to observe the switch in viewing style initiated by these changes in speed, the slower speeds facilitating a scrutiny of a kind similar to that of the large comic book panel, and causing the shot to appear closer to a still image more generally. In discussing Zack Snyder's 2009 adaptation of Alan Moore and Dave Gibbons' *Watchmen* (1986-7), Bob Rehak makes a similar observation, arguing that "the effect of all the slow-mo[tion] is to suggest something of the fascinated readerly gaze we bring to comic books, lingering over splash pages, reconstituting in our internal perceptions the hieroglyphic symbolia of speed lines and large-fonted 'WHOOSHES'". However, Rehak also characterises Snyder's *Watchmen* as a 'transcription [...] a phenotypic readout of a genetic program, a "run" in cinematic hardware of an underlying instruction set". Unlike Rodriguez's evocation of transformation – of the digital backlot as a technology facilitating a hybrid of film and comic – Snyder and Rehak favour language of translation, imitation, and tribute: in other words, the language of recuperation.

Figure 52: Gestural arc of a rearing horse in *Chapter One: Honour* (Dark Horse, 1998).

Figure 53: The corresponding shot from *300*. While this screen cap represents only one frame, the use of slow motion nevertheless creates a sense of story action culminating and emphasising this particular pause.

Moreover, the use of slow[ing] motion, taken alongside Snyder's comments, reflects an analogous understanding of the digital composite comic adaptation. Though "montage"

is a misleading word choice, Snyder's understanding of motion in comics nevertheless appears to reflect the findings of scholarship of the medium. Suitably enough, the notion of "montage" reflects Atkinson's argument that motion and causal events in comics are depicted in a *discreet* process: that is, as abstractions of movement in time distinct from that of the panels that precede and succeed it (Atkinson 266). Cinema, on the other hand, is a fluid medium in the sense that individual frames are projected at such a rate as to be imperceptible to the human eye. While the slow motion footage in *300* does not quite constitute a pause, it nevertheless aspires towards and implies one, revealing its analogous relationship with the discreet panels of the comic in the process. Indeed, the preceding slow-motion shots of the Persian messengers arriving in Sparta (see Fig. 54) recall Eadweard Muybridge's 1878 zoopraxiscope sequence *The Horse in Motion*, whose individual frames demonstrate the nature of the gallop (Prodger 115). As Thomas K. Seligman notes, the aesthetic ideals of Muybridge and his contemporaries in the instantaneous photography movement rested upon the hypothesis that "as photography effectively freezes its subject […] if the medium could work fast enough, it could stop motion – that is to say, capture the animate reality of nature" (vii). *300*'s evocation of the instantaneous photography reminds us not only of the illusion of motion underpinning cinema, but its own aspiration towards the discreet panelling that characterises the comic strip; it cannot fully imitate the panel-by-panel illusion of movement and the aesthetic choices that it offers, but it can nevertheless approximate them.

Figure 54: Slow motion footage of galloping horses in *300* alludes both to its own aspiration towards the discreet panelling of the comic…
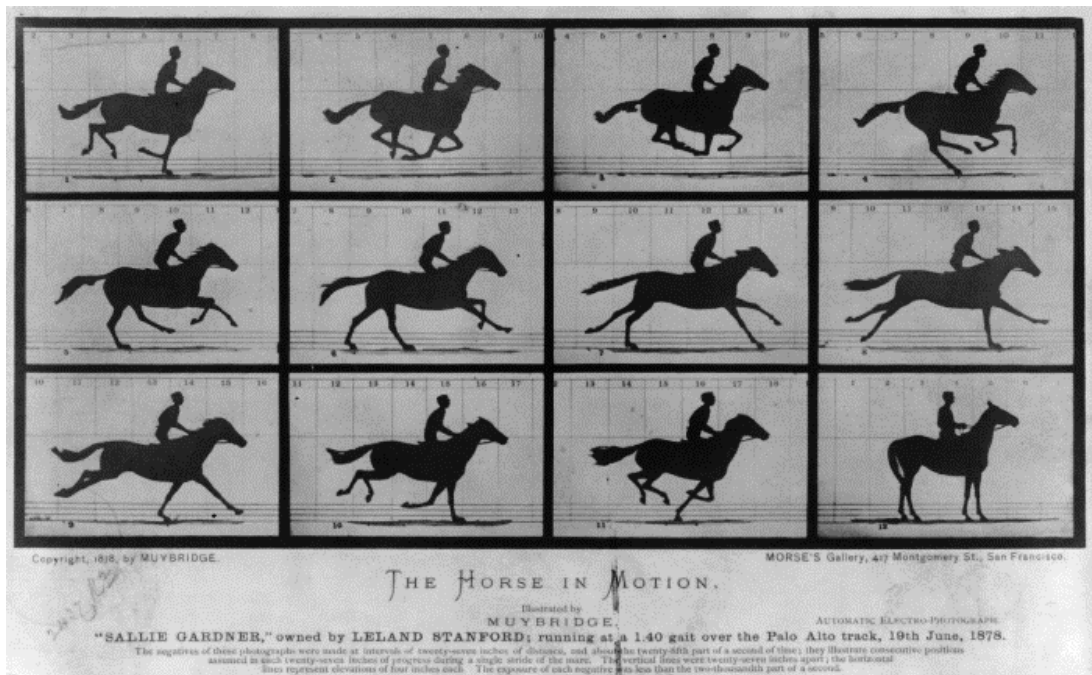
Figure 55: and to the rapidly acquired and very briefly exposed sequential photographs on which are based the cinematic illusion of motion, demonstrated by Eadweard Muybridge's *The Horse in Motion*. Gravure copies of "automatic electric photographs" of "Sallie Gardner" moving at a rate of a mile in 1:40 minutes (galloping), 19th June 1878. Library of Congress, Prints & Photographs Division.

Moreover, this use of slow motion in order to make a fluid medium imitate a discreet one can be related back to Snyder's comments about how to get from one 'moment' to another. Unlike *Sin City*, whose storyboarding closely follows the panelling of its source

material, *300* takes select panels as key images around which scenes are built. In the aforementioned scene in which a Persian messenger rides into Sparta, for example, only two shots out of sixteen (a shot of the messengers galloping, and the final shot of the rearing horse) directly imitate comic panels, and another thirty eight shots pass before another panel from the comic is referenced. Similarly, in a scene depicting a young Leonidas slaying a wolf, three panels from *Chapter One: Honour* (see P1-3 in Fig. 56) are explicitly referenced by shots in the complementary scene in *300*. Again, the use of slow motion in these three shots creates a sense in which references to Miller's panels function as punctuation around which the rest of the scene is structured. Snyder's analogical discourse thus proves to be a more accurate reflection of both the relationship between film and comic and the use of digital technologies than the transformative, ruptural logic of Rodriguez and others.

Figure 56: Three panels (marked P1,P2,P3) from the wolf-slaying sequence in *Chapter One: Honour…*

Figure 57: ...become punctuating slow motion shots in the complementary scene in *300*.

Moreover, rather than a discourse of hybridity or transformation, the formal specificities of Snyder's adaptation appear to compare and contrast the narrative strategies of the two media. While slow motion enables key shots to aspire towards the static, tableaux qualities of Miller's full page panels (Fig. 58-9), the film form can only approximate the use of nested panels. For example, the sequence in which Stelios severs the hand of a Persian messenger in Miller's comic is conveyed by a half-page panel of the Spartan leaping mid-air towards his enemy, sword outstretched. Two smaller panels nested within the larger one depict Stelios's face and the messenger's severed arm. Rather than adhere to this nested presentation, which is not impossible given the availability of split screen techniques, *300* approximates this (Fig. 61) with a slow motion shot of Stelios leaping. The sequence becomes several shots (a close up of the messenger's face, of his arm, and of Stelios) which make the phantom panels explicit, and concludes with a similar shot of the severed arm. A

similar linearization of nested panels occurs at the climax of a battle scene, in which three mini panels of bloody spear tips become three successive close ups in which the spear tips enter the shot diagonally, accompanied by the sound of steel piercing flesh. Rather than retreats from an attempt to 'become' a comic, as seen in *Sin City*, these examples find conventional film narrative cues to approximate the characteristics of the specific object of the comic book. Moreover, these are accompanied by scenes in which *300* asserts is own narrative qualities to expand upon the relative limitations of the comics medium. As such, rather than discourses of transformation, hybridity, or rupture, *300*'s formal relationship with the comic can be read as a dialectic on the respective features and limitations of the two media.

Figure 58: In *300*, slow motion used to evoke…

Figure 59: …the full page panel.
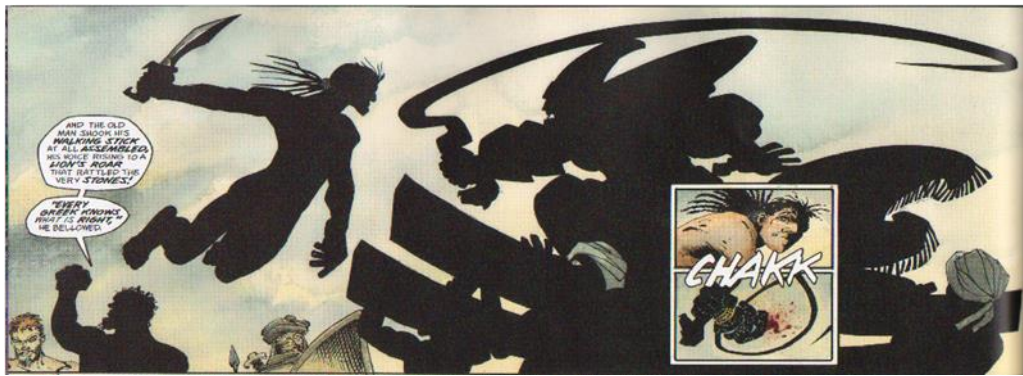
Figure 60: By contrast, nested panels in *Chapter 3: Glory*…

Figure 61: …are displayed in linear succession in *300.*

Figure 62: Finally, nested panels…

Figure 63: …become a quick succession of close-up shots in shallow focus.

The most salient example of this technological display in *300* is the so-called "Crazy Horse" scene, in which King Leonidas dispatches fourteen charging Persians (Fig. 65). The

scene appears to consist of one continuous profile shot of Leonidas, but is actually achieved through hidden splices between three cameras synchronised through a single view finder,[21] each with a different focal length lens: close, medium, and wide angle. The take was recorded at high speed and combined with interpolated frames in post-production to vary the motion speed in relation to the on-screen action. The resultant scene lasts 67 seconds and consists of 1700 frames and 24 composited shots (DiLullo Bennett). Digital zooms were then employed to move between the three camera positions. By contrast, the source material for the scene consists of a single rectangular panel that depicts Leonidas in the midst of battle (Fig. 64). With its profile perspective and orange colouring, this is perhaps the most reminiscent of Ancient Greek pottery painting, the aesthetic which Williams argues is also evoked through *300*'s slow motion "frieze-framing". However, contrary to this, the use of variable playback speeds and digital zooms could be seen as precisely the opposite of this kind of intermedilality. Rather, the use of these technologies in this scene emphasises the *difference* between cinema and comics as media, and moreover, the former's particular perspectival and temporal techniques. As with high-speed photography more generally, the slowing down of the footage invites a quasi-scientific gaze at the behaviour of photographed human bodies and objects in choreographed combat, such as the rippling of arm muscles upon impact with another body, and the wobble of a flying spear.[22] Moreover, via digital zooms added in post-production, multiple cuts can be composited into one "continuous take", facilitating both an illusion of seamless motion recording and a left-to-right dolly that evokes the reading patterns of the static comic. In keeping with Snyder's analogous rhetoric, *300* can be read as behaving "like" a comic while also performing its own intensified cinematic qualities.

Figure 64: A single panel from *Chapter Four: Combat...*

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[21] This was achieved by bolting three cameras to the same dolly, and using a beam splitter to synchronise camera angles.

[22] High-speed digital photography's narrative potential is more explicitly employed in *Sherlock Holmes* (Guy Ritchie, 2009). During a bare-knuckle boxing match, Holmes (Robert Downey, Jr.) is depicted defeating an opponent in slow motion, accompanied by a clinical commentary via Downey, Jr.'s voiceover ('In summary: jaw fractured, three ribs cracked, four broken, diaphragm haemorrhaging. Physical recovery: 6 weeks. Full psychological recovery: 6 months.'). Holmes' winning blows are then shown again at normal speed.

Figure 65: ...becomes a single shot comprised of 24 spliced pieces of footage, totalling 1700 frames, in *300*. Each screen-cap represents a separate piece of raw footage joined at either end by a splice masked by a digital zoom.

As such, Constandinides' claim that *300* and other adaptations "remediate" features from comics proves problematic. As has been argued thus far, it is the technologies of chroma key, digital animation, and digital capture that are the celebrated features of these films; heightening and expanding the stylistic qualities of cinema, doing so via executing aesthetically ambitious adaptations of comic books. Rather than reading the use of slow motion as a moment that is "in-between" (81) the film and the comic, it is possible to regard these moments as expansions of already-existing cinematic techniques. As such, Constandinides' claims that such scenes evince an "anti-cinematic" or "post-cinematic" tendency (88) can be countered with the argument that they *expand* what is understood as being cinematic. As has been argued throughout, and as the "Crazy Horse" scene demonstrates in particular, formal innovation and the development of new cinema

technologies subtly renegotiate what constitutes "cinema". While Costandinides is entirely correct to assert that "cinema's 'independence' as an art form lies in its unique ability to absorb/understand other forms and expressive experimentation as it technologically evolves", it does not necessarily follow that the "comic-art's vocabulary" is "remediated" (88). As a consequence, Constandinides' assertion that these films should be viewed as part of a wider hegemonic tendency "which expands across media by building the illusion of a perpetual *incompletedness*" is unconvincing (emphasis in original). Instead, in a somewhat strenuous analogy, one might say that, like Leonidas, visual traces of digital technologies lead the charge in this regard. Through their presence in the film image, traces of digital technologies denote – to paraphrase *300*'s much-parodied dialogue – "this is Cinema!". Rather than 'becoming' other media, or behaving 'like' them, these traces of new technologies can be read as demonstrating the 'cinematic-ness' of cinema, defined precisely in relation to the media that it is not.

3.7   Photorealism and recuperating the cartoon aesthetic

The limitations to these films' ruptural qualities can be further evinced by a comparison of their wider aesthetics, which are broadly indebted to photorealism, despite the rhetorical protestations of their creators and critics. In contrast to the fallacy of the film-comic argument, there is indeed a sense in which these films can be considered hybrids of live-action and animation, although such observations need to be qualified. Indeed, in the case of *Sin City*, Rodriguez's transformative ambitions to turn cinema "into a book" were partly thwarted by issues of practicality. As animator Everett Burrell notes, a factor in Rodriguez's retreat into photorealism was the potential discomfort of the audience:

> As we talked to Robert, he said, "[...] we can't go as graphic as the graphic novels, because it would wear and tear on the audience's eyes." *We then realised it was going to be a photorealistic show* and that we would selectively pick areas that are more stylized than others. So, we had to build the whole world, photoreal, and then in certain moments, it goes more stylized. That way, the audience isn't so strained looking at a big, white screen all the time. (Emphasis added).

The notion that there is a degree of colour contrast that is deemed unpleasant or undesirable for live-action (and perhaps animated) cinema exhibition is indicative of the limits to Rodriguez's ruptural argument. Drawing attention to the respective strains of viewing illuminated images in a darkened room and reading pages stresses the fundamental technological and formal differences between the two media, and thus the weaknesses of the broader hybrid argument. The "more stylised moments" to which Burrell alludes include the aforementioned example taken from "The Customer is Always Right". As has already

been argued, this particular instance functions as a statement of intent, and it is revealing that it also happens to be the least photorealistic image in the entire film. After this startling shot, *Sin City* does indeed settle into "a photorealistic show", albeit stylistically distinct from the examples considered in this chapter's introduction. The effect of this one shot is to briefly demonstrate the capability of rotoscoping technology in an impressive chiaroschuro flourish, rather than evenly sublimating the entire film to a comic book aesthetic.

Indeed, these comments lend further weight to the argument that *Sin City* remediates digital-backlot technology rather than the formal or stylistic features of the comic book. The notion that such films are "a photorealistic show" complicates the claims that this alleged media-hybrid cinema can be partly defined by its 'anti-realist' aesthetic. The Orphanage, who admitted that they were more familiar with 'invisible' CG, similarly stated that their "mission statement" for *Sin City* was that "stylisation [would] be photographic". Again, the photographic image becomes the desired visual reference point; Orphanage co-founder Stu Maschwitz noted that animators would "manically horde our reference for things like what a Ferrari headlight looks like when it's six inches away from a Panavision lens". He notes that

> we would emulate [Miller's panels] using computer graphics, but we would *rigidly adhere to a set of rules that would limit us to real world solutions.* We have a lot of night time exteriors where it's snowing outside, so we looked at a lot of films for reference that had snowy night time exteriors. One thing that became really obvious was that you could always tell where the light was coming from in a scene. It's really interesting because in vfx, we have to remember that *we aren't simulating reality, we are simulating moviemaking.* We would light our digital environments using essentially what they call *photometrically correct lighting — CG lights that follow all the real world rules of light*, in terms of how it falls off and how it spreads out over an area. It was interesting because a lot of the artists on my crew were resistant to that, because they felt like they were being robbed of some of their tools. I was trying to get them to think like a gaffer on the set, rather than some impossible CG manoeuvre. I wanted to give them a set of parameters, so it didn't look like it was being put together without any rules (Emphasis added).

What is revealing about Maschwitz's comments is the way in which adherence to the "real world" rules of physics is expressed in terms of the conventions of the photographic image. In *Side By Side*, James Cameron notes how a director of visual effects requires technical personnel with as much expertise in photorealism as computer animation: "you need people who are trained in photography [...] to write the code". This might be expected of Cameron, given that his work can be categorised as part of the aforementioned

"spectacular" CGI tendency, in which photorealism is an assumed aesthetic reference point for the creation of fantastical image, but to see echoes of this in discourses surrounding more stylistically experimental films reveals the extent of photorealism's aesthetic entrenchment in narrative cinema.

Despite this, *300*'s art director Grant Freckleton appears to argue the opposite. In detailing the difficulties in communicating his aesthetic to animators, he notes that

> a lot of visual effects artists are trained to strive for reality, so if you say to them 'we need to add in digital blood in this scene' then they start thinking in terms of squib footage, or fluid simulations…if you say 'we want to make the blood look like […] 3D blood that looks like 2D paint splatters,…but it needs to be shaded and integrated into the scene' quite rightfully a lot of artists end up wondering what on earth you're talking about (Di`Lullo Bennett)

Contrary to *Sin City*, Freckleton's concern in this instance rests with animators who appear reluctant to diverge from photorealistic norms; the solution was to scan paper splattered with balsamic vinegar and animate the resulting patterns in After Effects. However, concerns around the appropriate aesthetic for blood splatters do not represent a radical departure from the assumptions of photorealism more generally. Indeed, even though Snyder rejected his animators' early attempts at backgrounds because they looked "like something you'd see in a real movie" (Director's Commentary, Warner Home UK version), his use of the word "real" appears to convey an iconic or referential understanding, rather than a semiotic one. That is to say, while the Ancient Greece of *300*'s backgrounds is not comprised of real photographs, these images are photorealistic. Moreover, the most consistent stylistic choice made by *300*'s filmmakers to link it to its source material is the colour filtration process known as "The Crush", whereby specific colours are removed from the digital footage in post-production so as to imitate Lynn Varley's colouring in Miller's comic (Douglas 2007). Again, there is nothing distinctly 'non-cinematic' about this technique; as Stephen Prince notes (2004, 24), digital intermediate (DI) colour timing has been employed to similar reflexive effect in *O Brother, Where Art Thou?* (Joel and Ethan Coen, 2000), and has analogue precedents in the form of Hazeltine timing.[23] As such, these techniques can be placed along a continuum of cinematic effects independent of other media, again suggesting that post-production technologies are the true remediated features of such films.

The aesthetics of *Casshern* and *Immortel (ad vitam)* invite similar interpretations. *Casshern*'s alternate history premise of a despotic Imperial Japan reigning over the

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Eurasian continent is significantly influenced by the television anime *Shinzō Ningen Kyashān* [*Neo Human Casshern*] (Fuji, 1973-4). However, as with the examples of comic book adaptation, any claim of hybridity is complicated by anime's own complex relationship with narrative cinema as a medium. Indeed, as George Poitras argues, what sets anime apart from US animation is that "much of the action in anime is framed as if it had been filmed with actual cameras" (2001, 57-88). On the one hand, anime is indebted to manga, a panel-based narrative form whose visual style, as Cavalaro notes, differs "quite profoundly from those usually associated with mainstream American cartoons", and yet many other of its formal and stylistic qualities stem from cinema. Cavalaro continues:

> the shooting techniques used in the anime world are explicitly inspired by the pictorial style peculiar to manga. Indeed, anime assiduously embraces the comic-strip formula inviting viewers to use their imagination as a means of nudging or propelling the narrative along. At the same time, the films abound with tracking shots, long-view establishing shots, pans, uncommon point-of-view camera angles and extreme close-ups, where Western animation tends to capitalise on an action-driven middle distance (11).

The way in which anime complicates boundaries between manga and cinema again suggests how thinking of digital-backlot films as unprecedented hybrids is problematic. On the one hand, *Casshern*'s distinctive use of colour can again be traced back, perhaps less problematically, to its anime influences. As Cavalero notes, anime is "characterised by a keen sensitivity to the importance of combining specific types of action and movement with appropriate chromatic palettes" (33), and *Casshern* uses DI colour timing to much the same effect. When the Azumas, the family at the heart of *Casshern*'s narrative, pose for a family portrait (see Fig. 66), their verdant greenhouse and white clothes are intensified to convey a purity that is seen to be lost as events unfold. Similarly, when the aging upper echelons of the Japanese Empire are dispatched in a bloody coup led by the young heirs to the throne (Fig. 67), intensified colour saturation is used to induce a sense of nausea at the events: a bowl full of grapes takes on sickly lime green tone, the dragon fruit in the opposite side of the frame becomes almost fluorescent. Human blood and red wine both spilled as a result of the insurrection become indeterminably luminous, as well as unsubtly symbolic of the violent means by which the Empire affords its indulgences.

Figure 66: Reflexive colour timing in *Casshern*…

Figure 67: …is imbued with thematic symbolism.

More generally, *Casshern* associates contrasting colour schemes with specific environments within its ficitonal universe, with palates often moving between the vividly intense and the monochrome on a scene-to-scene basis. Scenes involving the Empire are cast in golds and crimsons suggestive of royalty, their warmth contrasted against the sulphur yellows of the dystopian world beyond their palace. The battlegrounds of the Eurasian continent, meanwhile, play out in monochrome, and the vengeful race of Neo-Sapiens are depicted in a minimalist palette of black, white and red reflecting their Nazi-inspired aesthetic. However, these techniques are indicative more of their own 'cinematic-ness' than of any intermedial aspiration. A brief scene depicting an army of robots is entirely animated, featuring a minimalistic red and black aesthetic (Fig. 68), but this scene echoes *Sin City*'s "Customer is Always Right" shot, or the blood splatters from *300* as an exception that only emphasise the photorealism of their live-action composites. As with the question of supposed remediated comic features, the wider aesthetics of these films in fact demonstrate the stylistic capabilities of digital extentions of existing cinematic technologies.

127

Figure 68: A brief animated sequence contrasts with the overwhelmingly live-action majority of *Casshern.*

Immortel (ad vitam) presents a different, albeit related, concern with regards to aesthetics. Negative reviews of *Immortel* focused on its combination of three live actors and synthespians. Revealingly, one critic levelled the charge that, in failing to be adequately photorealistic, the film evokes the aesthetic and realist ambitions of another medium: the computer game. One such review characterised the film as "a third rate *Playstation* game into which a few actual actors happened to wander by accident" (Cornelius 2005). Given that the review was published in 2005[24] one assumes that the writer is referring to the cut-scenes employed in sixth generation game titles like the *Metal Gear Solid* series, which had begun to strive towards a distinctly cinematic photorealist mode, to revealingly inverse critical acclaim. Moreover, the efforts of the creators of *Final Fantasy: the Spirits Within* (Hironobu Sakaguchi and Moto Sakakibara, 2001) to create an entirely CG and convincingly photorealistic world inspired by the eponymous game series provoked similar reactions to that of *Immortel (ad vitam)*. As Jessica Aldred notes, "cued by *Final Fantasy*'s promotional materials to wonder and worry about whether the real actor will be replaced by a digital simulation [...] most spectators expressed their unease" with the film's animated stars (2011). The specific criticisms levelled at the animation – that the characters were "mechanical", and conveyed a "limited range of expression"– appears to reflect the cool reaction to *Immortal (ad vitam)*'s similarly uncanny animated

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[24] That is, before the release of most of the seventh generation of video game consoles.

characters. On the one hand, the 'failures' attributed to the two films are slightly different; *Immortal (ad vitam)* makes a concession towards the 'less-sophisticated' photorealism of the video game cut-scene, whereas *Final Fantasy* fails to successfully 'transcend' this same aesthetic. Both are deemed to have not only failed to meet a satisfactory level of photorealism befitting of the feature film over the video game cut-scene, but also consequently reproduced the oft-cited cultural trope of the uncanny valley: "the more that digital human characters come to replicate human appearance, the more our perceptual apparatuses hone in on the tiny differences that render them "other" and strange". The uncanny is a technological performance that fails to suitably impress, a form of technological presence, in that digital processes prove salient and unnerving, despite their resemblance to the human.

Figure 69: Charlotte Rampling interacts with an insufficiently photorealistic synthespian in *Immortel (ad vitam).*

Inadequately rendered synthespians reveal that *Immortel (ad vitam)* is a 'failed hybrid' only inasmuch as its particular combination of live-action performance and other technologies do not sufficiently achieve either the "simple deception" or "mediated ostentation" of photorealism. Returning to the unfavourable comparison with computer game graphics, it is revealing that Quantic Dream have spent the ensuing decade developing their motion capture technologies so as to produce more photorealistic synthespians, as demonstated by the the 2013 game *Beyond: Two Souls* (see Fig. 70). Dan North argues that the uncanny reaction against recent instances of the synthespian stems not only from their inability to satisfactorily imitate the appearance of the human face, but also from the role of the computer as tool: "until computers are granted or attain for themselves a level of intelligence and unpredictability", North argues, "the synthespian will not transcend its role as digital stand-in or uncanny curiosity, and will remain disruptive, special effects" (North 165). In other words, it is the digital animating technologies themselves that exert an on-screen presence, not just the likeness that invites emotional identification; in this case, these technological traces are deemed undeserving

of such identification.[25] Regardless, in *Immortel (ad vitam)*, the various synthespians with which Linda Hardy et al. interact can be seen as an extension of the digital backlot: a demonstration of technological capability for expanding the animated environment in which live-actors perform.
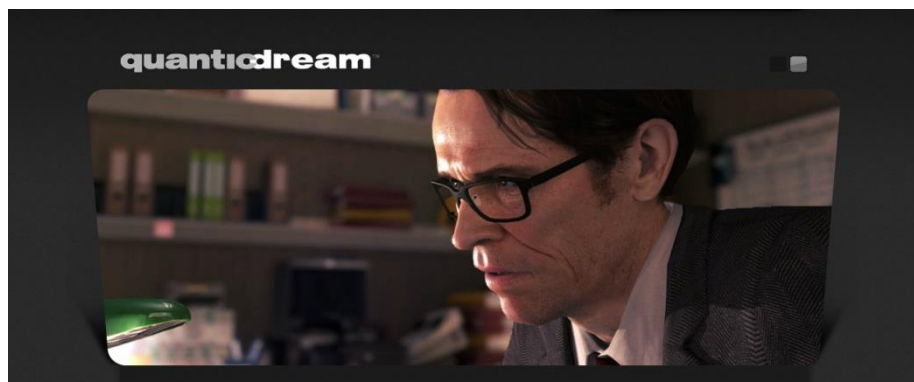
Figure 70: Still from *Quantic Dream's Beyond: Two Souls*, featuring an animated Willem Defoe much more photorealistic than the synthespians of *Immortel (ad vitam).*

Even if adaptations from other media can ultimately be read as opportunities to demonstrate technological performances of a formally and aesthetically expanded "hybrid" cinema, the digital backlot still proves intriguing for questions of space. Again, such spaces have indeed been characterised as a "hybrid". In discussing *300*, Drew Ayers (2011) argues that "digital special effects" facilitated a "hybridized" image in which "the physical bodies of *300* are folded into the virtual spaces of the film". Ayers argues that the tension between the hypermasculine bodies of its eponymous warriors and their animated environs visualises a cultural fantasy of a "transhuman utopia where flesh and information can be easily exchanged". The universal equivalent of such a project world, Ayers argues, is one in which disparate material outputs share an underlying, universal "currency" (binary code), and the implications for digitally captured images. The substantiation of *300* through binary code finds the analogue body of Gerard Butler copied into code that is easily subjected to manipulation and interaction with purely synthesised images. Part of the reason why the actors' physiques maintain a distinct presence, Ayers argues, is due to a refusal to accept that the physical can be subjected to digitisation. The resulting space is thus a hybrid, between digital environ and live-actor. *Sky Captain, Casshern, Immortel, Sin City* and *300* all display different kinds of hybrid space, and analyses of depth of field, actor movement and camera movement all prove useful ways of establishing a nuanced notion of these. Indeed, the digital backlot takes its name from the large external sets built by studios to accommodate principal photography, and this allusion suggests two competing

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[25] This cultural logic is satirised in *District 9*, where the Weta-animated aliens are second-class citizens within the diegesis of the film.

notions of space: it is simultaneously a physical set and one of the virtual environments made possible by post-production compositing.

While much of cinema's pro-filmic space is artificial and staged, digital backlot films can be differentiated because the environs in which the actors perform are visually and (in an illusionary sense) spatially distinct from those of the composite image. Despite this, digital backlot films display a series of techniques that aim to compensate for this. *Casshern* and *Sky Captain and the World of Tomorrow*, for example, display notably flat hybrid spaces. Shooting with an extremely shallow depth of field, Kiriya offers few visual indicators of where the foreground (sound stage space/basic sets) ends and the background (the digital backlot) begins. To heighten this sense of flatness, the environments that are digitally painted onto these backgrounds themselves display a notably 'levelled' sense of perspective. In one scene, the ghost of protagonist Tetsuya (the figure walking down the staircase in the centre of the frame) visits his grieving fiancé, Luna. The shallow depth of field not only flattens the potentially cavernous perspective of the diegetic space, it also works to flatten the "real" perspective of the two actors placed in varying positions along a trajectory between the camera lens and the greenscreen. Instead, the entire frame is one of an anime-like flatness. This is a technique also employed in *Immortel (ad vitam)*, with the apparent desired technique being the flattened perspective of the drawn image (in this case, the static image of graphic novel panel). The animated environments of *Sky Captain and the World of Tomorrow* also bear a distinct flatness, although Conran has not made any public pronouncements to suggest that this was a deliberate desired aesthetic. Indeed, it is possible that such instances of perspectival levelling, such as the scene in which Sullivan stands in front of a narrow walkway which extends into the background of the frame, may well be an unintended effect of the chroma key process itself (indeed, there are many instances in which digital backgrounds follow perspectival conventions much more closely). Despite the apparent intention to integrate the pro-filmic live-actor into their post-production environs, then, such perspectivally unconvincing images suggests a hybrid space only in an unintentional, faulty sense.

Figure 71: Shallow depth of field in *Casshern.*

Figure 72: Flatness in *Immortel (ad vitam)*…

Figure 73: …and *Sky Captain and the World of Tomorrow.*

The relationship between actor and environ is not limited to depth of field; movement within the green-screen set also contributes towards the notion of a hybrid space. On set, the CG figures in the animatics functioned as guides for the movements of the actors themselves, informing not just where they moved in the empty set, but also their gestures and mannerisms, and the head turns and posture of *Sky Captain*'s cast indeed often appear mechanical. Moreover, takes could instantly be subjected to rough compositing to compare the movement of actors against their animated counter parts. As Cellini notes, "by running footage from the HD [DV] camera through a switcher and then through a Mac running Final Cut Pro" the filmmakers "created a simple video keyer, letting them line up

the animatics with the live onstage photography and actually do run-throughs". As such, there is a clear sense in which movement within the sound stage was explicitly aligned with movement within a virtual space at the point of capturing the pro-filmic event. Such efforts again suggest an aspiration towards a hybrid space, with Conran's direction encouraging actors to think of themselves moving through animated space, rather than the physical sound stage. The Final Cut Pro playback encourages actors to think in what Ayers might call digital materialistic terms: that is to say, in seeing themselves as digitally captured data in relation to animated environs, actors are conditioned to understand their performances as sampling data with which to construct a hybrid space.

Figure 74: Animatics and live-actor movement in *Sky Captain and the World of Tomorrow.*

The live-actor is not the only figure which moves within the physical space of the film set, however. As Mike Jones argues, beyond its physical, indexical role in image capture and production, the camera in live-action cinema can be broadly thought of as a semiotic "vehicle and entity, as positioning construct for perception and engagement", an abstract conceptualisation which "links cinema inextricably with perspective, with point-of-view, and, more inclusively, with perspective embodiment" (2007, 225). By contrast, the virtual camera of the 3D digital animation constitutes a shift from "composition *in* the frame and staging *for* the camera, to a new mode entailing a composition of space and staging *of* the camera". The transition between the first scene in *Sin City* and its title sequence is also a transition between an environment staged for a camera, and a camera staged for an

environment. After The Salesman assassinates The Customer, the physical camera cranes outwards (see Fig 74). As the two characters become smaller within the frame, this crane is replaced by the perspective of a virtual camera, still "craning" to allow a much wider aerial view of the City. As the camera "cranes" further away, the frame is selectively darkened to transform the skyline into Miller's iconic *Sin City* lettering. Through this transition, the camera becomes "a simulation of viewer-derived presence in [virtual] space rather than an anthropomorphically based viewing apparatus" (228). On the one hand, the transition from an opening scene involving pro-filmic sets presented as diegetic space to a non-diegetic title sequence has considerable precedent: consider for example, the longstanding use of such a trope in the *James Bond* film franchise. On the other hand, the transition between staging for the camera and staging of the camera suggests a sense of hybrid space more nuanced than that of the journalistic discourses considered throughout. The extent to which these transitions feature in the digital backlot film is difficult to discern, although they are unequivocally less frequent than the cutting between purely animated shots and composites that constitute a far more prevalent, if not cruder, form of hybridity.

Figure 75: Staging for the camera becomes a staged camera in *Sin City.*

3.8   Conclusion

As with all of the other formal and stylistic features that have been explored in this chapter, the notion of the digital-backlot film as constituting or creating a hybrid space can be most satisfactorily characterised as being both distinct from, and indicative of, trends in wider narrative cinema. The explanation of this paradox lies in its digital substantiation: that is, in its technological 'novelty'. Although their producers do not explicitly state as such, the discourses that surround these films pay testament to the presence of digital technologies that allow filmmakers to place the image of the live-actor within highly stylised animated environments, rather than build verisimilar or fantastical environments around them. Whereas previous technological hybrids have become institutionalised within the medium of narrative cinema, the digital backlot is framed in these films as a salient break with tradition. While this chapter has established that this is not the case, these films certainly represent expansions in the stylistic, and some cases, formal capabilities of cinema. Though the dominance of photorealism as a perspectival mode limits this stylistic experimentation in one sense, these films can be read as innovative instances of digital experimentation, within aesthetic and economic confines.

Bearing these economic constraints in mind, it is worth noting that the digital backlot films considered in this chapter appear to mark a three-year cycle,[26] suggesting that the stylised digital backlot was a moment of experimentation ultimately constrained by generic and economic imperatives. Earlier in this chapter, I suggested that, unlike the found-footage film, the majority of films which utilise the digital-backlot can be considered fully rucuperated in the sense that chroma key is instiutionalised to the point of being almost imperceptible. Stephen Prince echoes this, arguing that the far more prevelant applications of these technologies in order to create naturalistic environments are the latest moment in an "ongoing process of stylistic continuity" (182). Thus the highly stylised digital-backlot movie can be read as a ruptural moment superceded by a complete recuperation, in which the unconventional application visual technologies were largely subdued and subordinated to more established aesthetic traditions.

Given these technical and realist continuities, it is unsurprising that the highly-stylised digital backlot film has had a limited existence. By contrast, *Scott Pilgrim vs. the World* (Edgar Wright 2010), an adaptation of Bryan Lee O'Malley's *Scott Pilgrim* comic series (2004-2010), constitutes a different aesthetic, combining much greater use of real location shooting and conventional film sets with 2D CG graphics, and a title sequence that

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[26] Although the Frank Miller-directed *The Spirit* (2008) and *Sin City: a Dame to Kill For* (Robert Rodriguez and Frank Miller, 2014) could be seen as a continutation of this style of filmmaking.

subjects scratched, dirtied acetate and 35mm film to digital manipulation. While it would be tenuous to extrapolate too much from this one film, *Scott Pilgrim*'s aesthetic nevertheless suggests a move away from the purely animated environments of *Sky Captain* in favour of a more technologically nostalgic approach. Moreover, while the supposed film-comic "hybrids" of *Sin City* do not actually incorporate panelling or speech bubbles, *Scott Pilgrim* does indeed draw upon formal features of the computer game, such as the display graphic (see Fig. 75).

Figure 76: Computer game graphics in *Scott Pilgrim vs. the World*.

Figure 77: Part-digital 'scratched' film in the Shynola-designed title sequence.

Finally, the digitally enhanced scratch title sequence hints at the concerns of the next chapter: the aesthetic of the digital glitch. *Scott Pilgrim* appeals not only to the analogue techniques of experimental filmmakers Stan Brakhage, Norman McLaren and Oskar Fischinger, but also to the graphics and sound effects from the now superceded digital cultures of fourth generation games consoles such as the Sega Genesis and the Super Nintendo Entertainment System. Thus far, I have noted the reverence displayed towards the digital consumer camera and the apparent transformative powers of particular stylistic applications of digital technologies. In the next chapter, I consider the fetishisation of digital processes themselves, with particular focus on the notion of flawed technologies, decaying recordings and their symptomatic relationship with analogue film.

The 'retro' computer game sounds that litter *Scott Pilgrim*'s soundtrack represent one such example, echoing a wider techno-nostalgia that electronic composer Steven Ellison defines as, and identifies with, "the Nintendo generation": that is, those "used to hearing bleeps [as] a comforting sound" (Ellison 2008). *Scott Pilgrim*, both forward looking in its stylistic innovation and nostalgic in its affection for a 'vintage' digital images and sounds, straddles the postmodern and digimodern cultural logics indentified in this chapter and the next.

Indeed, just as this chapter focused on a moment of rupture followed by complete recuperation, the example of the glitch considered in the following chapter begins in a similarly ruptural way, before becoming recuperated, albeit to a lesser extent. However, unlike the digital-backlot, which becomes nearly invisible –in this sense, it is no longer a "trace" of a digital technology– the glitch retains a unavoidable presence within the cinematic image. Rather than being disruptive, though, the recuperated glitch serves a range of narrative functions, from foregrounding themes to figuring as an animated character; the glitch remains highly visible yet is paraded in a variety of roles in which it is subordinated to narrative and stylistic demands.

Chapter 4. The Glitch

The Last Broadcast **(1998),** *Cloverfield* **(2008),** *REC 2* **(2009),** *Apollo 18* **(2011),** *Wreck-It Ralph* **(2012),**
Tim and Eric's Billion Dollar Movie **(2012).**

> "There is an obvious critique here: to design a glitch means to domesticate it [...] It is no longer a
> break from a flow within technology, but instead a form of craft."
>
> -Rosa Menkman, *The Glitch Momentum* (55)
>
> "You've gotta get that glitch under control, kid!"
>
> -Wreck-It Ralph to Venelope von Schweetz, *Wreck-It Ralph*

In this chapter I explore the presence of glitches in digital narrative cinema. Adapting theories of the glitch from scholars of experimental music and visual art, I argue that the film *The Last Broadcast* (Stefan Avalos and Lance Weiler, 1998) –the first feature length film shot, edited, and exhibited almost[1] entirely via digital technologies– uses the glitch as a disruptive device in a spirit similar to these other avant-garde art forms. In everyday life, glitches undermine the otherwise seamless informational flows of digital technologies, and in experimental art, are deliberately deployed to disrupt commonly held aesthetic and ideological expectations. In *The Last Broadcast*, I suggest, the glitch echoes these disruptive tendencies by interrupting narrative flows. In so doing, *The Last Broadcast* comments not just on its pioneering status as a digital film but also its very digitality, and in the process, contests the discourses which frame digital technologies as immaterial. Returning to the work of Kirby, I frame this reflexivity by thinking of *The Last Broadcast* as a postmodern text preoccupied with digimodern textual forms.

I then move on to trace the appropriation of glitch art by commercial designers in the mid to late 2000s, a period that coincides with what Flaxton would call the "meso-digital" establishment of digital cinematography as a reputable production choice within the Hollywood film industry. I demonstrate how this coincides appropriately with films such as *REC 2* (Jaume Balagueró and Paco Plaza, 2009) and *Apollo 18* (Gonzalo López-Gallego, 2011). Like the "conservative glitch" of commercial design, these films recuperate the glitch to aid narrative flow rather than to disrupt it, existing as features of the films' story space rather than meta-textual comments on it. In taking the example of comedy film *Tim and Eric's Billion Dollar Movie* (Tim Heidecker and Eric Wareheim, 2012), I mount the complementary point that the 'comic' glitch, though ostensibly disruptive or chaotic,

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[1] *The Last Broadcast*'s directors admit to the limited use of celluloid at the principal photography stage, though the film was edited using Adobe Premier and Syncspeed Razor and exhibited using digital projectors ("The Technology Behind the Movie").

serves a similarly recuperative role in realising the non-narrative appeals of narrative comedy that are a long-enshrined aspect of the genre. *Billion Dollar Movie*, I suggest, echoes what I term the 'digital kitsch' and 'digital disgust' aesthetics which underpin web-based humour memes and shorts.

In the final section of the chapter, I consider the example of *Wreck-It Ralph* (Rich Moore, 2012) in which glitches are personified as loveable Disney characters and glitching is a key feature of the film's narrative. As such, while I demonstrate a limited number of ways in which the cinematic glitch might echo the disruptive or subversive practices of experimental art, I argue that its similarity to these is largely superficial, and instead indicative of both commercial appropriation and formal incorporation – in other words, its recuperation. Much like the lo-fi digital imagery of the found-footage genre, the recuperation of the glitch is not a complete recuperation in the sense that it continues to exude a distracting presence within the frame, even if it is also incorporated into narrative structures in the form of dramatic devices or even characters. Whether the glitch has more in common with found-footage or the digital backlot in terms of the general function of the glitch –in other words, whether its role is realist or purely aesthetic– is less simple. While I argue that the glitch is not simply a marker of verisimilitude, that does not mean it performs quite the same aesthetic function as the highly stylised use of chroma key.

In mounting this argument I engage with and contribute to glitch theory as outlined by scholars of visual art, new media and music (Sangild 2004, Manon and Temkin 2011, Menkman 2013) and, in the case of Manon and Temkin, interrogate their claims about the role of the glitch in narrative cinema. I also draw links between the claims of glitch theory and the work of Nicholas Rombes, whose ruminations on the significance of errors constitutes the closest thing to an existing discussion of the cinematic glitch in film studies. I also return to Dan North's work on *Cloverfield* (2010), which partly echoes Man and Temkin's views on the cinematic glitch, while suggesting some alternative readings of the film. Finally, in considering the case of the comic glitch, I turn the debate surrounding the incorporation of gags in film comedy narratives (Gunning 1995, Crafton 1995) and again consider how this moment of digitisation might resonate and display continuities with earlier periods of technological change in cinema's history.

Initially at least, the prospect of devoting an entire chapter to the discussion of the glitch might appear strange. Glitches are, after all, a rare phenomenon in digital cinema; when they do occur, they constitute a small proportion of overall screen time, and indeed, a small proportion of the frame itself. In recalling how Chapter 2 discussed an entire genre and its perspectival strategies, and how Chapter 3 limited itself to a specific deployment of chroma key technology, it makes sense to view this final chapter as part of a gradual

narrowing of scope. Indeed, one could be forgiven for arguing that a discussion of ostensibly small surface details of the cinematic frame is perhaps one narrowing too far. However, I will demonstrate how this provides another opportunity to situate trends in contemporary cinema in relation to trends in both its wider history and in other digital visual media. Rather than thinking in terms of a narrowing of scope, then, I consider the discussion of glitches as a sharpening of focus, of 'zooming in' on the technological trace.

4.1   Beyond authenticity

Of all of the objects of study covered in this thesis, the glitch has attracted the least scholarly attention. With the exception of Rombes, who does not actually use the term 'glitch' in his own reflections upon digital errors in cinema, and whose ruminations are themselves confined to a few sentences in his opening chapter (1-3, 8), the discussion of the cinematic glitch is limited to a passing observation in Hugh S. Manon and Daniel Temkin's *Notes on Glitch*, a text primarily concerned with visual art and commercial design. According to Manon and Temkin, the typical example of the cinematic glitch is that seen in *The Dark Knight* (Christopher Nolan, 2008), in which Bruce Wayne is taunted by a glitchy digital image of his nemesis, The Joker. So as to lure Batman into action, The Joker uses a handheld DV camera to film himself executing a civilian hostage, and concludes by threatening to carry out more killings if the real Batman does not reveal his true identity to the public. The recording is sent to Gotham City News, and is first seen by Wayne when the station broadcasts the material. The Joker's leering face is distorted both by the motion of the camera and by the low resolution of the digital image; as he assaults his hostage, presumably damaging the camera in the process, the image is scrambled into an unintelligible mesh of pixels. As Manon and Temkin note, these glitches evoke the low image quality of the real-life hostage videos disseminated in the mainstream media, leading them to argue that, in narrative cinema more generally, the glitch is

> always deployed in the name of authenticity, and never in order to call into question the illusion of (digital) cinema itself. Rare is the feature film in which a glitch goes unexcused by the premise of a film-within-a-film.

"Authenticity" in this context echoes an observation that has been made throughout this thesis. In the example given by Manon and Temkin, digital glitches communicate that the hostage video recorded by The Joker within the diegesis of *The Dark Knight* resembles those recorded in real life. These signs of malfunction testify to a technological process that the audience is asked to believe has taken place within the story space of *The Dark Knight*, regardless of whether the glitches themselves were actually achieved by damaging

a camera during the principal photography stage, or were added to the captured image in post-production.[2]

Manon and Temkin are correct to observe that the glitch typically appears in narrative cinema through "the premise of a film-within-a-film", and while this chapter expands the corpus of glitch films beyond their two examples (*The Dark Knight* and *Cloverfield*), it does not necessarily contest their claim that such visible malfunctions are confined to media that are clearly framed as existing within the diegesis of a particular film. North, in discussing *Cloverfield¸* echoes this authenticity thesis, arguing that the "compression artifacts, pixelation and other technical flaws […] serve to authenticate the film as an accidental occurrence rather than a studio-produced, pre-visualised property" (North 2010, 88). However, as I demonstrate later in this chapter, North also suggests ways in which glitches perform other meta-textual and thematic roles. Indeed, though digital glitches are confined to the fictive content of narrative cinema, rather than its broader formal structure, that is not to say that such malfunctions do not communicate their contrivance. In other words, there are indeed a variety of instances in which the glitch, while it does not go "unexcused", is, nevertheless, foregrounded for aesthetic, satirical, or narrative effect other than authenticity or realism. Manon and Temkin's absolutist claim –that glitches "always" perform this function– thus proves reductive.

For example, while *The Dark Knight*, along with many of the found-footage films considered in Chapter 2, appears to support Manon and Temkin's "authenticity" thesis, this is not the only way in which the glitch can be read. In *The Dark Knight*, the degraded, unreadable image resonates with the wider themes surrounding the character of The Joker. Throughout the film, The Joker evades identification (a police officer observes that there are "no matches on his prints, DNA, dental"), and defies rationalisation (Wayne's butler Alfred muses that "some men just want to watch the world burn"). He is an antagonist in the purest sense, whose role within the narrative is to undermine Wayne/Batman's moral code and undo his efforts to bring stability to Gotham. Thus, the dissolution of his ransom video into glitches is entirely appropriate; in the place of further information – a motive for his desire to learn of Batman's identity, perhaps– there is only (electronic) noise. In the hands of The Joker, the digital image and its promises of infallible, efficient communication are subjected to the forces of entropy, resulting in an indecipherable haze of pixels. Digital order is thrown into digital chaos. Such alternative readings suggest that, in order to discuss the role of the glitch in narrative cinema, the scholarly work on the concept needs to be reconciled with the nature of its wider use in

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[2] Manon and Temkin's argument echoes what Bolter and Grusin call the "dual logic" of remediation. Visual markers of a particular medium are, paradoxically, emphasised so as to insist upon the transparent potential of that medium.

the medium. Moreover, as the broader industrial and cultural contexts in which the cinematic glitch emerges are as important as its counterparts in the artistic avant garde, I offer a brief history of both the principle and practice of the glitch as a necessary lead into a discussion of *The Last Broadcast* and its ruptures.

4.2   The origins of the glitch

A definition of the term itself is a useful place to start this discussion. According to Torben Sangild, the word "glitch" is derived from the Yiddish "glitshn", which means "to slip" or "glide" (258). Other etymological accounts have suggested a direct borrowing from the German "glitschen" and "gleiten" ("to slip" and "to slide", respectively), introduced via the jargon of hardware engineers and popularised by its use in the US space program when referring to technological malfunctions; this specific context is recognised in its first entry in the Oxford English Dictionary in 1972 ("Glitch"). As will be discussed later in the chapter, this particular strand of the glitch's history appears to be referenced in *Apollo 18*, whose narrative presents the technical glitch as part of a 1974 NASA conspiracy against its astronauts. This notion of a momentary disruption is carried over into its English borrowing, which Sangild defines as "a minor malfunction [...] often related to a system or an electronic device". Rosa Menkman echoes this sentiment, defining the glitch as "an unexpected occurrence, unintended result, or break or disruption in a system" (26). Specifically, Menkman draws upon the work of information theorist Claude Shannon to consider the glitch as an instance of noise overpowering the capacity of an electronic communications network to clearly carry a meaningful signal (12-13). With the word's etymological root in mind, then, the glitch can be read as a 'slip' away, or diversion, from an otherwise "protocolised data flow within a technological system" (26). Whether it is a software bug that undermines the physics logic of a computer game, a skipping compact disc, atmospheric interference with a television signal, or an undesired electrical pulse in a digital circuit, the glitch constitutes the disruption of technological flows, and signifies noise interrupting the exchange of information.

Moreover, the glitch implies, and thus reveals, the otherwise concealed electronic networks that underlie contemporary social interaction via digital communications technologies. As such, the glitch is salient not only in its disruptive potential, but also in its testament to the limitations of familiar technologies. For Mikhel Proulx, the glitch

> embodies the potentials of losing control. Glitches signal unknowns and
> ambiguities within information systems, and may give way to a radical reappraisal
> of their fundamental principles [...] their images reveal the limitations of
> technological progress. Here, degradation, compression and *lossy* images mark the

ambiguous aesthetic of digital errors [...] the perceptible result of an error, a glitch disrupts the pixel-perfect, efficient-signal, Photo-shopped, hi-res, disambiguous imperatives of digital culture. They are useless, textural bugs in the machine: a sputtering and bubbling-up of information onto the clean, rational surface of the digital image (22-3, emphasis in original)

Proulx's reflections are echoed more concisely by Manon and Temkin, when they argue that the glitch "undoes the communications platforms that we, as subjects of digital culture, both rely on and take for granted" (1). In a cultural context marked by the pervasion of digital media technologies routinely lauded for their clarity and efficiency, then, the glitch is a particularly loaded artefact. Indeed, over a decade before both Proulx and Manon and Temkin, Lev Manovich makes a similar claim in *The Language of New Media*. According to Manovich, a popular misconception held about the digital is that the artefacts of lossy data compression are "an aberration, a flaw in the otherwise pure and perfect world of the digital, where not even a single bit of information is ever lost" (55). Manovich counters this, pointing out how data compression is "is the very foundation of computer culture" and as such, until processes improve, "loss of data, degradation, and noise" are the realities of interfaces with new media.[3] With this in mind, the glitch is as much a place-holder for technologies as it is a technological trace in its own right.

Despite this symbolism, the discussion of its significance to digital cinema is limited to a few sentences in the introduction to Nicholas Rombes' 2009 *Cinema in the Digital Age*. Rombes claims that "at the heart of the perfect digital image – coded by its clean binaries – is a secret desire for mistakes, for randomness" (1). However, Rombes' explanation for this drive towards imperfection in cinema differs from that of Proulx and the other glitch theorists. For Rombes, to offer imperfection is to "reassert" a human aura, to leave traces of a "human signature within a technology that ostensibly offers perfect reproduction" (2-3). Whereas Proulx et al. figure the glitch in terms of technological failure, Rombes offers a humanist alternative, reading the mistake as an artistic "countermeasure to the numerical clarity and disembodiment of the digital code"(8). Instead of seeing these theories as diametrically opposed, however, it is more appropriate to see these approaches as complementary. Both theories offer an insight into the way in which the glitch lays bare the integration of digital media into social life, with Proulx et al. placing the emphasis on the limitations of communications technologies, and Rombes focusing on the human desire to assert their own influence over them.

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[3] Manovich was writing in 2000; improvements in storage and processing capabilities of hardware as well as refined compression processes have indeed made compression artefacts a less common feature of new visual media.

143

Moreover, the notion of the glitch as a human signature actually goes some way to capture the role of the practitioner in glitch art. Unlike purely "accidental" glitches –that is, malfunctions that occur without the deliberate intention of the artist– the glitches found in experimental music and visual art, and, as I demonstrate, in cinema, are at least partly the result of human agency.[4] The involvement of the agent in glitch art is relatively limited, as the human artist "*triggers* a glitch", rather than creates it (Menkman 9, emphasis added). Yet, while the artist initiates a process that leads to a glitch, the computational processes themselves also play a key role, to the extent that they limit the "amount of control the artist maintains", a partition of agency that is "evident in the resulting image" (9). Even in instances where the role of the artist is limited to that of catalyst or initiator, this form of glitch art involves enough automatic physicality to be read as analogue:

> Despite the fact that one most often uses a digital interface to glitch a file, this intervention nonetheless comes from the side of analogue. The ultimate glitching experiment: choose a media file at random and transcribe its lengthy hex code by hand from the computer screen (error is inevitable). Then delete the file and re-enter the code form the handwritten sheets (more error). Press save. Open the file with the appropriate software: a glitch. Such an experiment lays bare the analogue/digital nexus of glitch art (10).

Again, this sentiment stresses an interaction between analogue and digital, artist and tool, human and technology. While the uninitiated glitch is a malfunction that undermines the ideology of efficiency and agency associated with digital technologies, the artistic glitch is a willing surrender of control, constituting not a retreat from technological development, but a deeper engagement with it.

Applying these ideas to the case of the cinematic glitch, however, requires more work. Thus far discussion has focused on glitch art techniques that appear to favour the creative process and its conceptual implications over the end product of these activities. In these instances, the final work of glitch art, while still aesthetically important, is figured as a by-product that is ultimately subordinated to the act and concept of glitching itself (Menkman 10). This proves problematic for an exploration of the glitch in narrative cinema, because, while the uses of the glitch in film offer formal and ideological readings

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[4] Menkman argues that "although a glitch can take place strictly within the computational system, the majority of artefacts that are called or referred to as glitches within glitch art are not purely informational, but make sense only through a synthesis of agents and contexts involved". She adds that "it is necessary to recall that the word 'glitch' in 'glitch art' is often used as a metaphorical concept, even by glitch artists, and therefore varies from the stand-alone technical or informational term 'glitch'" (34).

that resonate with those of glitch art, the notion of a conceptual process taking precedent over a finished product is alien to conventional understandings of the medium.

An overview of visual glitch art and glitch music suggests useful similarities with digital cinema, and considerable limitations. While both 'glitch' as visual art aesthetic and musical genre emerged in the 1990s, the two trends have precursors. Circuit-bending,[5] an experimental music technique first pioneered by Reed Ghazala in the late 1960s, has been acknowledged as a key precursor to glitch music (Manon and Temkin, article 23). As Sangild reminds us, however, glitch music also has precursors in the electroacoustic compositions of Pierre Schaeffer in the 1940s, which exploited the spluttering effect of a worn vinyl record, and the compositions of John Cage arranged for 'prepared' instruments in the 1950s and 1960s.[6] Moreover, Yasunao Toné's 1985 *Music for 2 CDs*, which incorporated the sound of a CD player failing to read deliberately damaged discs, anticipated the digital glitch music of the 1990s. Indeed Toné returned to this technique for 1997's *Solo for Wounded CD*. From the mid-1990s, Markus Popp, better known as Oval, continued this tradition of arranging the sound of skipping CDs into loops, with the sounds often triggered by fast-forwarding the disc, rather than damaging its surface. Finally, in the same decade, composers Ryoji Ikeda and Alva Noto arranged and digitally manipulated "sine tones from stereo test records, fax connections screeches, radio static noise, humble technological clicks and ticks, bad speaker connection hums" (Sangild, 265). Over the course of its development from the experiments of academic composers to relatively popular musical form, glitch music has constructed a vernacular comprising of found sounds pertaining to mundane technological processes, abrasive noise, and loops that are either triggered by, or at least evoke, a skipping audio playback device. Aspects of this vernacular are echoed in the visual and sonic aesthetics of *The Last Broadcast* and *Tim and Eric's Billion Dollar Movie*, and as such, will be discussed in more detail later on in the chapter.

As Menkman notes, precursors of visual glitch art can be found in the work of experimental artists from the mid-twentieth century onwards. Len Lye's 1937 piece *A Colour Box* (Fig. 78), created by purposefully damaging cinefilm that had been subjected to the additive colour process known as Dufaycolor, is perhaps the earliest well-known example of mining the aesthetic potential of degraded cinema technologies. The forced-malfunction of screen-based technologies unites Nam June Paik's 1965 work *MagnetTV*,

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[5] Circuit-bending is the manipulation of circuits of low-voltage electronic devices, such as children's toys, for creative purposes. Ghazala developed the technique by accident, after a battery-powered amplifier with exposed circuitry made contact with the steel panelling of his work desk, and allegedly created "some of the most unusual sounds [he had] ever heard" (Ghazala, 8).
[6] The following account is drawn from Sangild 259-265.

which involved magnetically distorting television images, (Fig. 79) Cory Arcangel's screen-burned plasma television, created in 2007 by playing a DVD consisting a single frame of white text against a black background for several hours, (Fig. 80) and JODI's exploitation of cracked liquid crystal displays in 2009's *%SCR2* (Menkman 33). In this digital era, Ant Scott is the first to use the term "glitch art" to describe a series of his works posted on his blog between 2001 and 2006,[7] which involve "computer crashes, software errors, hacked games, and megabytes of raw data turned into coloured pixels", both accidental in nature and deliberately triggered by the artist (Menkman 36). Finally, and perhaps more technically removed from these practices is the work of Dan Hays, who paints imitations of glitchy digital nature photographs found on the website of an amateur photographer of the same name (Harper 2009).
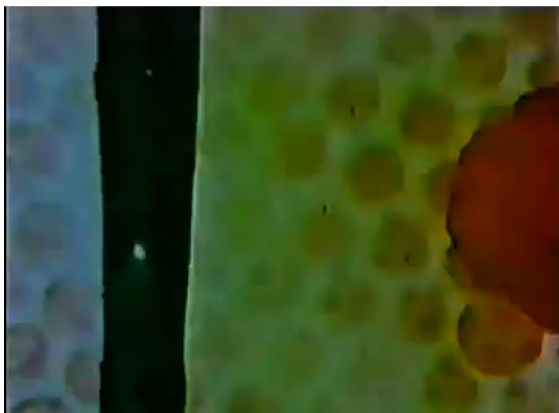
Figure 78: Len Lye, *A Colour Box* (1935). 35mm celluloid and Dufaycolor process.

Figure 79: Nam June Paik, *MagnetTV* (1965). Magnet and cathode ray tube television set.

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[7] Menkman also notes that an "actual historiography" of glitch art would include Karl Klomp, Lovid, Morgan Higby-Flowers, Max Capacity, Jon Satrom, jonCates, Melissa Baron, stAllio!, Pixelnoizz, and Hellocatfood. (33).

Figure 80: Cory Arcangel, *Samsung PS42Q7H Plasma Screen Burn* (2007). Plasma television set and DVD player.
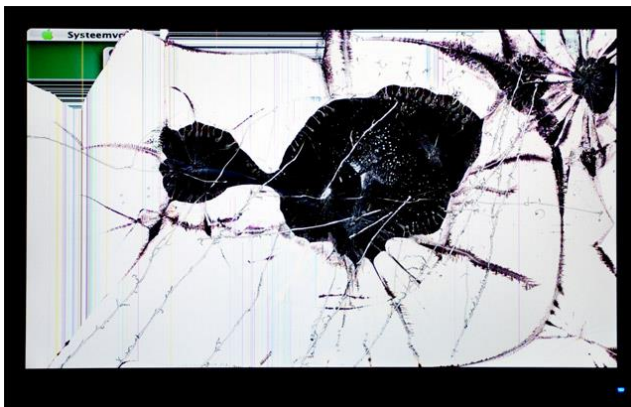
Figure 81: JODI, *%SCR* (2008). Cracked LCD display.

4.3   The cinematic glitch

These various strands of glitch art can be categorised as either being arranged primarily *from* sounds or images of malfunctioning technologies (Schaeffer, Cage, Ikeda, Noto, Scott, Hays) or the result of subjecting a sound or visual device to disruptive or damaging pressure (Tomé, Oval, Lye, Paik, Arcangel, JODI). *The Last Broadcast*, *REC 2*, *Apollo 18,* and *Tim and Eric's Billion Dollar Movie* all feature deliberately degraded digital images, which, as the following comparisons demonstrate, bear superficial aesthetic similarities with visual glitch art. In many cases, the exact processes involved in disrupting the digital image are unknown, but can be assumed to consist of either degrading the footage in a manner similar to glitch art, or digitally painting imitation glitches. Despite these surface similarities, however, there are fundamental differences between the glitch as it appears in digital narrative cinema and its instantiation in the art forms outlined above. These differences partly arise from the formal distinctions between the film medium and those of the static visual arts and music. The most striking difference, of course, is that whereas, in the former examples the glitch constitutes the majority of the

147

substantiation of the text, either through the arrangement of glitches, or via the dissolution of the text into glitches, the glitch in digital narrative cinema constitutes a small proportion of the total textual content. As such, while the glitch still disrupts the cinematic text, it does so in a comparatively restricted manner.

Figure 82: Michael Betancourt *The Kodak Moment* (2013).
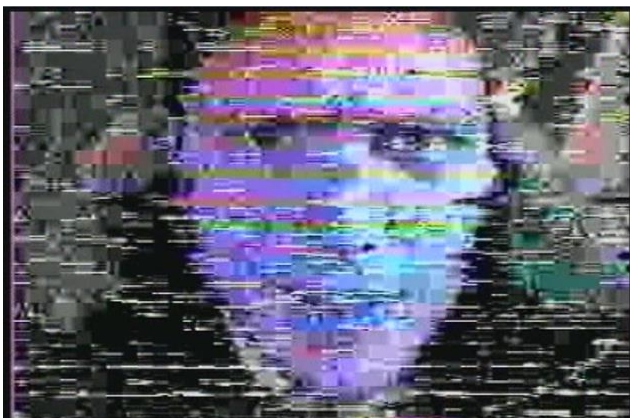
Figure 83: *The Last Broadcast.*

Figure 84: Dan Hays, *Overgrown Path* (2000).

Figure 85: Frozen, glitching footage in *The Last Broadcast*

Rather than proving problematic, however, it is this notion of a passing malfunction that hints at a satisfactory way of theorising the glitch in narrative cinema. The everyday glitch, be it the result of malfunctioning software or a disrupted television signal, is understood as a break in a technological flow. An analogous discussion of the films under analysis in this chapter should thus figure the glitch as a break in the *narrative flow* in the sense that these instances serve to momentarily direct attention away from the focal point of the frame, such as a moving figure, and toward another part of the frame. Moreover, given that these glitches direct attention away from the action of the narrative to invite scrutiny of the medium itself, the glitch can be seen as constituting a figurative 'pause' in narrative flow. Indeed, in some instances, these pauses are also literal as footage freezes and confronts the audience with static, broken images that closely resemble visual glitch art (see Figs. 83 and 85, for example). On the other hand, it is important to note that these paused moments do constitute part of the syuzhet itself. Existing as deliberate narrative cues to convey the malfunction of a fictive object within an imagined world, the glitch cannot be credibly located as outside of the diegesis, though this is not to subscribe to the "authenticity" argument offered by Manon and Temkin. Instead, it is to acknowledge that the glitch constitutes an interruption, both in the flow of frames, and in the flow of narrative.

Where this theory of the cinematic glitch departs from Rombes' own observations is the notion of human-presence versus machine-presence. For Rombes, the digital error is a "human signature", the mark of an infallible designer or user in an otherwise efficient and clinical environment. As this chapter goes on to argue, however, the cinematic glitch is as much about foregrounding the errors or limitations of the technological processes themselves as it is of their users, perhaps even more so. As the glitch foregrounds digital materiality, it is a form of technological presence, rather than human presence. This approach concurs with Rombes' assessment of the glitch in the sense that it signifies technological imperfection and thus the continued necessity of human oversight, but

maintains that the glitch does so by drawing attention to imperfect technological processes rather than to human error. Moreover, if a "human signature" is to be detected in the majority of case studies in this chapter, it is in the form of glitches contrived via sophisticated animating techniques. In these cases, then, the cinematic glitch's simulation of technological error implies the artist's hand.

4.4   Physical immateriality and *The Last Broadcast*

Part of the rationale behind the narrowing of focus in this chapter is to explore how these films resonate with broader discourses surrounding the materiality of the digital image. It should be apparent that the communiques of glitch art are explicitly concerned with the materiality of the image: how to draw attention to it, how to pay testament to it, and how to seize upon its specific characteristics. However, an appreciation for this materiality is often lacking in more popular discourses surrounding digital technological media, to the point where they are framed as uncanny, magical, and immaterial. For Michael Betancourt, a theorist and an artist whose work frequently involves glitches, this is a consequence of the way in which digital media, based upon additive, computational, and discrete processes, aspire "towards the state of information" (2006). This invites the erroneous conclusion that digital media are somehow 'not really there', that they constitute 'pure' information outside the limitations of physical production. This aura of the digital is frequently that which the glitch aims to undermine. The glitch, as a symbol of malfunctioning processes instigated by a fluctuation in electricity or other such physical occurrence, reminds the viewer that what they see does not lack "a substantial, material link to reality" at all. Indeed, the aforementioned examples gathered from glitch art often do just this, presenting themselves as artefacts of electrical activity.

The 1998 film *The Last Broadcast* not only emerges as an approximate contemporary of the glitch trends in visual art and experimental music, but also shares their emphasis on digital materiality. Visual traces of digital malfunction are foregrounded both for their own sake and to satirise the aura of the digital. Although it was released several years before digital cameras were established as a credible alternative to cinefilm, *The Last Broadcast* nevertheless uses glitches to satirise anxieties surrounding the technological transition away from film stock. *The Last Broadcast* is a mockumentary that interrogates a fictive murder trial in which DV footage forms part of the prosecuting evidence. While the characters 'interviewed' in the mockumentary attest to the unreliable and ethereal nature of digital media, glitches are used to interrupt this narrative flow and satirically contradict the claims made by characters in it. These ruptures draw attention to digital materiality by

demonstrating the electronic processes involved in generating such images as well as demonstrating how they can refer to a physical referent in ways distinct from that of analogue media.

The Last Broadcast purports to be a documentary made by filmmaker David Leigh about the so-called "Fact or Fiction murders", the legal case that followed, and the case's legacy for those close to the victims. Via voiceover narration, Leigh explains the events leading to the murder of cable-access television hosts Steven "Johnny" Avkast and Locus Weiler, as well as their sound engineer, during a live broadcast from the Pine Barrens of southern New Jersey. Avkast and Weiler present Fact or Fiction, a paranormal discussion show that is struggling to retain its cult audience, despite its kitsch value. As its ratings fall, Avkast and Weiler incorporate Internet Relay Chat (IRC) into the show in an effort to encourage audience participation and improve viewing figures. It is through IRC that the pair are contacted by a caller known only by the username "D", who suggests that they make a programme about The Jersey Devil, a malevolent mythical creature said to inhabit the Jersey Pine Barrens. To build upon their pioneering introduction of IRC to the show, Avkast and Weiler decide to make a live "simulcast" of Fact or Fiction live from the Pine Barrens that entails both a webcast, IRC chat, and conventional live cable broadcast. To realise their project, they enlist the help of paranormal sound engineer Rein Clackin and alleged psychic Jim Suerd. During the course of the filming, Weiler, Clackin, and Avkast are murdered, leaving Suerd as the sole survivor. Given the remote location and mysterious circumstances of the men's deaths, Suerd is identified as the only suspect, and successfully charged with the murders of his crew mates. Suerd later dies in prison, leaving the police to officially consider the case closed.

In interrogating the case against Suerd, Leigh's documentary demonstrates how various broadcast media are subject to the agenda of their users. For example, the prosecutors enlist a video editor (dubbed the "Killer Cutter") to reassemble raw Fact or Fiction DV footage recovered from the crime scene into a damning portrait of Suerd. Leigh, by contrast, implicitly endorses the notion that the documentary form can access truth when he states that the purpose of his project is to get to the bottom of the Fact or Fiction murder case. His own documentary is thus favourably contrasted with a slew of media forms – public access television, local news reportage, "Web 1.0" – that are presented as untrustworthy by comparison. The Last Broadcast climaxes with the revelation that it is in fact Leigh who is the murderer, having called into Fact or Fiction using the pseudonym "D" in order to lure its presenters into the woods. Rather than an objective report, then, Leigh's documentary is a rationalisation of his crimes, and as a consequence, the persuasive tropes of the documentary (the slowing down of footage of individuals and

zooming in on their eyes to make them appear sinister, the illustrative panning across newspaper headlines, the instructive musical underscore) are ironically framed as just as manipulative as the editing techniques that Leigh aims to debunk.

However, *The Last Broadcast*'s satirical targets extend beyond the privileging of certain media, to the notion that digital media are fundamentally immaterial, untrustworthy forms. On the one hand, the association between analogue media and sturdy materiality is questioned from the very beginning of *The Last Broadcast*. After Leigh's introduction, a recording of Jim Suerd's call to the emergency services made after losing contact with his crew mates is replayed on a tape machine. As Suerd's voice is heard, close-ups of the tape player's internal mechanisms, including its corroding metal chassis, pay testament to the record's materiality, and therefore its fallibility (see Fig. 86).On the other hand, this physicality – the sense of tape being seen to move around tape heads, of existing in the here and now – is taken to be a sign of credibility by the prosecution case against Suerd. The prosecution uses the phone recording to argue that Suerd is a manipulative actor capable of deceiving the authorities and convincing them of his innocence. It is the prosecution, however, who prove truly manipulative, as their damning portrait of Suerd leads to his wrongful imprisonment. Rather than a sturdy physical marker of truth, analogue recordings prove to be a tool in presenting untruths.
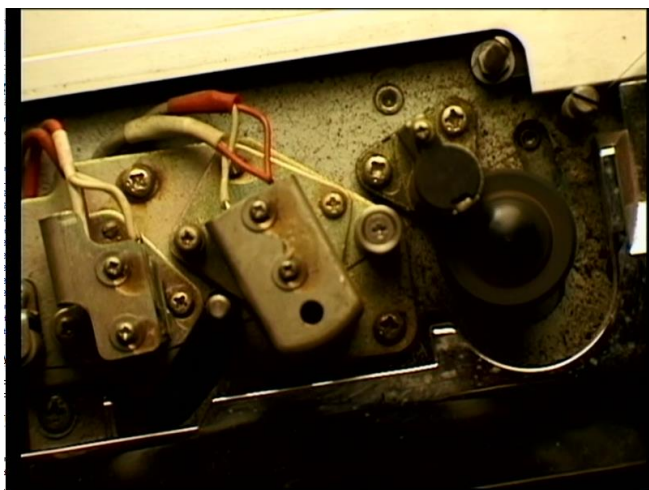
Figure 86: Rust and dust – at once sturdy and fallible anaologue media technologies.

The Last Broadcast's ironic turnaround finds the digital medium as the greater marker of truth. During the course of his own research, Leigh reveals that Suerd engaged in an IRC conversation while alone in his tent in the Pine Barrens, and that his chat logs provide him with an alibi for the time of murders of which he was accused. This digital indexicality[8] –a data log referring to the physical location of an interface user– proves his

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[8] This idea of digital indexicality –of archived digital activities corresponding to past movements– evokes my Introduction's discussion of the use of Facial Action Coding System technology in *The Curious Case of Benjamin*

innocence. However, this digital time stamp is not used in the court case, suggesting its less credible status in relation to analogue counterparts. This distrust of an emergent digital medium echoes the preoccupation of film theorists such as William J Mitchell in the 1990s with the question of digital cinema's ontology. Mitchell's conception of the "referent" of film having "come unstuck" understands technological transition as destabilising the medium, throwing its ontological underpinnings into uncertainty (131). As its replacement is derived wholly from computational processes, and thus misses this physical link, it is thus viewed with suspicion as a conjured, unreliable image. Taking this logic to its conclusion in *The Last Broadcast*, the emergent world of digital imagery triggers a psychotic break in Leigh. As the digital severs the link with the referent, Leigh severs his links with reality.

Moreover, this technological transition from analogue to digital is ironically expressed in terms of a move from familiar physical practices to ethereal, even occult, practices, echoing Jeffrey Sconce's observation (2000) that emerging media, be it telegraphy in the nineteenth century or television in the 1950s, were received as being somehow "haunted". Avkast and Weiler introduce their live show from the Pine Barrens as "the first ever web simulcast, cablecast", following this claim with the announcement that Clackin will be keeping his ears pricked for "otherworldly sounds". Here, as with the history of the reception of telecommunications,[9] innovation in communications becomes indelibly linked with paranormal communication, the development of technology tied to accounts of supernatural presence. Leigh, who himself appears obsessed with this transition towards digital technologies, imagines digitisation in similar terms. Early in his commentary, he argues that Avkast, Weiler and Suerd are "children of a digital age", as if the contention surrounding their demise is their curse for coming of age in a nascent mediascape and its apparent threat to truth. In a particularly florid moment, Leigh pontificates that "it is though the Jersey Devil is a monster reborn in the digital age, reborn on the Internet, a demon captured on IRC logs, mangled video, whispers in the dark". Later, he continues: "The Jersey Devil is the electronic image, the sound, the communication to the masses, somehow twisted into a surrealist electronic world". Of course, the Jersey Devil is in fact a "monster reborn" through Leigh's homicidal actions. The only links between the mythical beast and digital technologies are established by Leigh's rationalisation for his murders.

Leigh's treatise on "the digital age" is the moment at which *The Last Broadcast*'s orientation toward an emergent digimodernist culture reaches its most explicit. In Chapter

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Button, which as Prince notes, is precisely indexical in that digitally animations correspond with past movements of Brad Pitt's face. (2012, 150).

[9] See Sconce's *Haunted Media,* especially Introduction, and Chapters 1 and 2.

2, found-footage films (particularly *Paranormal Activity* and *REC*) were read as demonstrating digimodern aesthetic sensibilities, and are bookended by films which display more characteristically postmodern traits such as irony and intertextual references. *The Last Broadcast* falls into the latter category. While it engages critically in discourses surrounding the ontology of digital media, it does so as part of a wider artistic tradition that is itself indebted to modernist and postmodernist ideologies. While both glitch art and *The Last Broadcast* are fascinated by the emergent cultural forms facilitated by digital technologies, they appear at a loss to understand or borrow from their formal structures. Even though *The Last Broadcast* frames Leigh's distrust of digital culture as a paranoid folly, the film itself fails to forge a deeper engagement with its ostensible subject matter. While it bears a sophisticated understanding of digital technologies, then, its grasp of digital culture[s] is somewhat lacking. In 1999, Microsoft's own instant messaging (IM) service, MSN Messenger (later Windows Live Messenger), would familiarise such text-based communications technologies via their inclusion in consumer-friendly operating system packages. For *The Last Broadcast*, however, IRC in 1998 is apparently the reserve of vulnerable loners, documented by concerned social commentators for the edification of 'normal' audiences.[10]

Despite its limitations, *The Last Broadcast* explicitly locates itself in relation to a nascent digimodernism expressed through consumer technologies and the experimental art which aims to subvert them. It is in this location that *The Last Broadcast* contests conceptions of digital ontology, and does so via the glitch. The glitch, then, can be read as satirically debunking digital technology's supposed immateriality by revealing the physical processes at work in digital malfunction and its subsequent correction. In discussing this, it is important to note that the majority of the film was captured using the Sony DCR-VX1000 and JVC GR-DV1 digital video cameras ("The Technology Behind the Movie"), before being edited using Adobe Premier and In Sync Speed Razor software.[11] Promotion for *The Last Broadcast* touts the release as "the first time that a feature film of this magnitude has actually been created from start to finish with the technology available on the desktop" ("The Last Broadcast: Behind the Scenes), evoking Avkast and Weiler's own claims about the novelty of *Fact or Fiction* 'simulcast'. In keeping with the film's self-conscious commentary on its technological and cultural contexts, it is entirely appropriate

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[10] This recalls the technophobic overtones of *Paranormal Activity 4*, discussed in Chapter 2.There are also echoes here of "the uncanny powers of television" (Sconce 133) which invite distant images into the domestic space. *The Last Broadcast* is thus not merely a cinematic counterpart to radical glitch art, then, but also a somewhat conservative response to the popularisation of Internet-based communications technologies.
[11] The DCR-VX1000 was the first prosumer DV camera to offer MiniDV video cassette and direct digital file dumping to Windows and Mac as recording formats, and thus constitutes something of a bridge between digital video cameras with tangible recording facilities and the allegedly abstracted, "immaterial" notion of information storage.

that both the fictive simulcast and *The Last Broadcast* itself are presented as pioneering digital media works. Their formal innovations are linked back to their digital materiality, a materiality that is emphasised by glitches, such as moments in which electronic noise causes Clackin's camera image to burst into green and black geometric patterns (see Fig 87). Such flashes of electronic noise reveal the random fluctuations in electrical currents in circuits: that is, a materiality not easily available to the naked eye and intermittently beyond the reach of human agency. Such fluctuations remind the viewer that these formal innovations are due not to an esoteric immateriality, but to the ever-more sophisticated manipulation of this natural physical phenomenon.
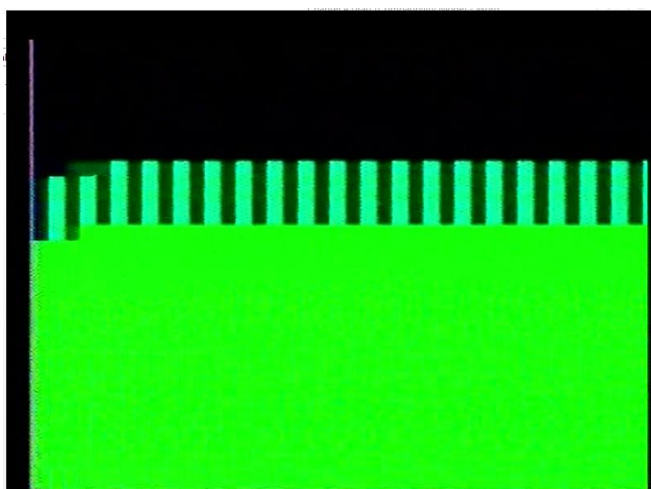
Figure 87: Digital materiality evinced by electronic noise in *The Last Broadcast.*

Indeed, it is important to remember that these glitches are intentional, regardless of the manner of their construction. While Weiler and Avalos have not confirmed precisely how these glitches were achieved, their comments on other aspects of the production and post-production processses suggest particular approaches. In some instances, it is likely that glitches were caused by using damaged cameras,[12] or at least subjecting these cameras to the kind of physical distress that would lead to a glitch. Figure 88, for example, appears to be the result of a damaged camera, as the image wavers vertically "through" the frame. In other examples, however, the glitch appears to have been achieved via post-production effects. The directors reveal that much of the digitally captured footage was "age[d] electronically" in Adobe, and that make-up effects like fake blood were avoided by using digital painting tools (Avalos and Weiler). It is likely that these tools were also used to produce glitches that suited certain aesthetic demands, in particular to contribute to the horror atmosphere. In particular, an instance in which digital footage of Weiler in the Pine Barrens freezes (see Fig. 89) appears to betray an

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[12] The directors note that they used "all kinds of low-end cameras for a bunch of different looks" ("The Technology Behind the Movie").

organising hand. Weiler's face, particularly his eyes and nostrils, are multiplied at the centre of the frame. The result is an alien-like face surrounded by white noise, an image whose composition suggests that it was deliberately organised to grotesque effect. Indeed, this notion of an underlying horror glitch aesthetic is reflected in *The Last Broadcast*'s underscore, which, like the glitch music of Ikeda and Noto, is partly constructed from the sound of an Internet dial-up modem digitally slowed down into a series of drones and rumbles. The directors themselves attribute particular aesthetics to the underlying digital processes. Specifically, Avalos notes how he aimed to undermine the 'smooth fluid motion' of the digital image – an undesirable quality that the director attributed to interlacing – by deinterlacing the image.[13] Beyond its aesthetic effect (see Figs. 90-2), these practices reveal how digital materiality proves as compelling to the directors themselves as it does to their characters. As Avalos notes, "post [production] now is [...] just another place to manipulate the image". This 'misuse"' of digital editing workstation software reflects the broader similarities between *The Last Broadcast* and the glitch art outlined thus far.

Figure 88: The glitch as a result of damaged hardware.

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[13] Interlacing is a video display method in which, rather than displaying complete frames at once ('progressive scan'), the frame is divided into two 'fields'. One field consists of odd horizontal lines, the other of even horizontal lines. These two fields are displayed one after the other, updated at a rate of 60 fields per second (the number of frames per second in broadcast video, therefore, is 30). Deinterlacing the image involves removing one of the fields at a given moment in time and blurring together the remaining lines.
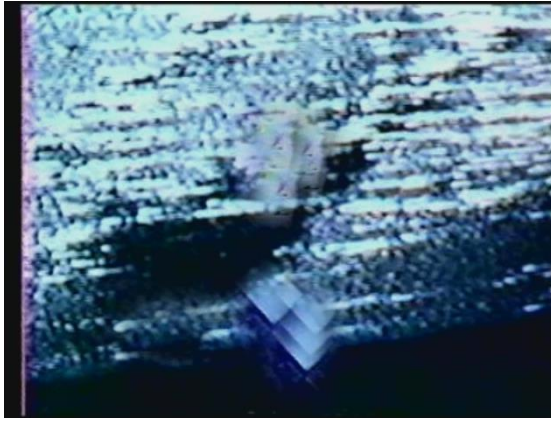
Figure 89: The glitch as a result of post-production effects.

Figure 90: Interlaced digital image.

Figure 91: Deinterlaced digital image, as it appears in *The Last Broadcast*. Note how, in the deinterlaced version, the branches of the tree in the background of the frame appear less defined. In addition, the dynamic range of the image is reduced, which is especially noticable in the shadows created by the crumples in the figure's coat sleeve.

The use of the digital glitch in *The Last Broadcast* is even more sophisticated in the satirical rupture of its narrative claims. Before he reveals that he is the real murderer, Leigh "deduces" in his documentary that Suerd could not have possibly murdered his crew mates, and posits the presence of another person in the Pine Barrens. This is apparently confirmed by a fragment of recovered, but heavily distorted, footage filmed by Clackin that appears to show the assailant (see Fig. 92). As such, Leigh argues that a single, "mangled"

image will reveal the *Fact or Fiction* murderer: "the truth comes down to this one frame". He subsequently assigns Shelly Monarch, a "magnetic media data recovery" specialist, with the task of removing the digital glitch, and her efforts to digitally clean the image punctuate the final act of the narrative. As Monarch's work progresses and a human face begins to emerge from the glitch, the dramatic tension heightens as Leigh moves towards revealing the identity of the real *Fact or Fiction* murderer. Captions illustrate the rendering time required to restore the image, paying testament both to the digital processing power, and labour time, necessitated by the recovery. The transition from distorted image to a fully-restored scan demonstrates the capabilities of digital or, in this case, digitised, images. Comprised of discrete information, the image can be reconstituted and subject to a manner of computational processes. Ironically, this digital process is expressed with a physical metaphor of "cleaning up" – of wiping away dirt from an image, implying two physical layers that require gentle seperation, rather than a recomposition of discrete information.

Actual render time: 1775 hours
(two months, 14 days)

Figure 92: "The truth comes down to this one frame".

The glitch is figured as a subversive presence within the narrative because, to Leigh, it symbolises a digital materiality that "undermines" the certainties of analogue, and comes to condemn him. The photochemical image, once formed, marks the end of a unidirectional process, as a chemical reaction forms an image that, while subject to limited manipulation, is ultimately defined by a fixed, unique arrangement of silver halide grains. By contrast, the digital data triggered by an eletronic image sensor exists in a perennially unfixed state; as such, the momentary glitch need not be a permanent fixture of the digital image. The implication of this, given Leigh's characterisation as a man pathologically obsessed with the transition to digital technologies, is that the glitch proves threatening precisely *because* it outperforms his assumptions about the materiality of [cine]film. Indeed, when Monarch reveals the digitally restored image, thus incriminating Leigh, the filmmaker responds to this by murdering Monarch and continuing his documentary; he

responds to the digital eradication of a glitch by successfully eradicating Monarch. It is this digital materiality – misconstrued as immateriality – that proves threatening to Leigh, both as evidence of his guilt, and as a confirmation of the threat of digital media.

Though there are numerous differences in form, style, and commercial contexts, the presence of the glitch in *The Last Broadcast* appears to echo the aesthetic and ideological role of its counterparts in other artforms in the mid to late 1990s. Both examples share the unconventional or 'incorrect' use of software so as to degrade the digital image, with the resultant glitches figured as disruptive forces. Like the digital-backlot film, *The Last Broadcast* finds inherent value in the technological trace, rather than using it is a realist tool, as in the found-footage genre with which it bears superficial similarities. The cinematic glitch does not reappear, however, until the release of a series of found-footage films – *Cloverfield* (2008), *REC 2* (2009)*, Apollo 18* (2011) – which foreground the signs of digital malfuction. In the intervening period, several cultural and technological changes take place, to the extent these later cinematic glitches belong in a markedly different context. In particular, the appropriation of the glitch by the design strategies of commercial advertising finds as its correlate the use of the glitch as a less subversive device in narrative cinema.

4.5 A glitch in the mainstream

While the digital glitch first emerged in the experimental art of the mid-1990s, its aesthetic strategies, and the techniques required to achieve them, gradually became appropriated for all manner of commercial ends. Such was the extent of this appropriation that Manon and Temkin argue that "by the mid-2000s, the signifier "glitch" [...] had arrived squarely within mainstream American culture". This transition was epitomised by a coincidence which took place in March 2009, as the glitch artist Paul B Davis prepared to launch an exhibition of his work at the Seventeen Gallery in London. Exploring what he terms "compression aesthetics", via the technique of datamoshing,[14] Davis's work incorporates music video footage, such as that for Rihanna's 2007 single "Umbrella" (see Fig. 93), subjecting ubiquitous and high-resolution pop imagery to lo-fi digital

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[14] Ben Baker Smith defines datamoshing as "the technique of exploiting video compression to create intentional artefacting and diction". More specifically, datamoshing exploits the sequencing of different frame types involved in digital video. Digital video files consist of two types of frame: I-frames and P-frames. I-frames, Baker Smith notes, "are full representations of a single frame of the video [...] still images containing all the colour and luminance information of that frame". By contrast, P-frames "are reference files that inform the video player of changes in the image since the previous frame," especially that of motion and changing luminance. Borrowing the language of film editing, we can say that each shot constitutes a single I-frame followed by as many P-frames is necessary to communicate the changes in the I-frame wrought by movement or luminance. Datamoshing exploits this structure by inserting P-frames from one video clip so that they appear immediately after an I-frame of another video clip. The result is that the P-frame's instructions with regards to motion and luminance act upon the pixels in the I-frame, causing pixels to be configured in a jumble akin to the mosh pit of a rock concert.

manipulation. As Davis made preparations for the show, he discovered to his dismay that Kanye West's latest single "Welcome to Heartbreak" was accompanied by a promotional video which made extensive use of datamoshing. Davis's radical ambitions were frustrated by the move; as he put it, "the very language I was using to critique pop content from the outside was now itself a mainstream cultural reference" (Davis). Nabil Elderkin, director of the "Welcome to Heartbreak" video, appeared to confirm this critical defanging, declaring that he intended to use the glitch in a "strategic way, using calculated moshes, colours and textures to compliment the [song]" (Rodriguez 2009). Despite the glitch in the 'Welcome to Heartbreak' video being subservient to wider narrative and aesthetic considerations, comparisons with individual frames from Davis's work suggest considerable surface similarities.

Figure 93: Paul B. Davies Compression Study #1 (Untitled Data Mashup), 2007.

Figure 94: Nabil Elderkin, *Welcome to Heartbreak* video, 2009.

For glitch theorists like Menkman, however, these examples are ideologically and aesthetically distinct enough from glitch art to warrant their own description as "conservative glitch". Such examples place emphasis on

design and end products, rather than on the post-procedural and political breaking of flows. There is an obvious critique here: to design a glitch means to domesticate it. When the glitch becomes domesticated into a design process, controlled by a tool, or technology – essentially cultivated – it has lost the radical basis of its enchantment and becomes predictable. It is no longer a break from a flow within technology, but instead a form of craft (55)

An immediate concern here is whether any use of glitch in cinema can be saved from Menkman's critique. This chapter has stressed parallels between *The Last Broadcast*'s use of the glitch and the "political breaking of flows" as a form of rupture, though Menkman's riposte may well be that the infrequency of these glitches within a largely conventional mockumentary narrative text is merely another means of "domesticating" – or recuperating – the glitch. Menkman makes a clear distinction between the "break from a flow within technology" and "a form of craft". While the examples of *Apollo 18*, *REC 2,* and *Cloverfield* considered shortly appear to confirm this analysis, the examples of *The Last Broadcast* and *Tim and Eric's Billion Dollar Movie* complicate Menkman's political disruption/commercial design dichotomy; glitches are at once crafted and ideologically disruptive. The conclusion of this chapter returns to this divide and offers a reading which reconciles these contesting understanding of ruptures and recuperations.

As Davis's Kanye West dilemma demonstrates, the technological, economic and cultural changes that took place between the release of *The Last Broadcast* in 1998 and *Welcome to Heartbreak* eleven years later rendered the already reductive distinction between a digital 'underground' and analogue 'mainstream' all the more untenable. Returning to Terry Flaxton, on the one hand this can be seen in terms of the capabilities of digital cameras and subsequent use in the film industry itself: of a movement into the "meso-digital" era of cinematic image production. At the time that *The Last Broadcast* was made, the resolution of Hi8 DV cameras was 530 x 480 pixels, and the resolution of standard definition television that would mark digital broadcasting (SD) was 720 x 480. As I outlined in Chapter 2, by the late 2000s, professional digital cameras had reached and surpassed '4K' resolution of 4096 x 2160 pixels (so-called '16K' has a resolution of 15360 x 8640), offering image quality that at least rivalled that of 35mm film stock. As such, the glitch, as with the consumer-grade DV camera, functions as a reminder of the technological processes underpinning the development of a digital medium that is becoming increasingly indistinguishable from film-stock-based cinema. On the other hand, this change is much broader: namely, the proliferation and popularisation of digimodernist textual practices and their contestation of their postmodernist counterparts. An example that epitomises this historical, technological and cultural moment in a manner that is

particularly relevant both with regards to Menkman's point about the commercial appropriation of the glitch is the financial success of services such as the photo-sharing website Instagram and the smart phone application Hipstamatic, both of which allow their customers to manipulate digital photographs so that they appear to have been made using inexpensive and obsolete analogue cameras.[15] Just as the digital camera's quest to imitate and surpass the practicalities and image resolution of cinefilm, and thus threaten its institutional status within the industry, its amateur cousin demonstrates its 'superiority' through a digital parody and fetishisation of analogue photography.

Figure 95: Hipstamatic's digital simulation of analogue photography ("Libatique 73").
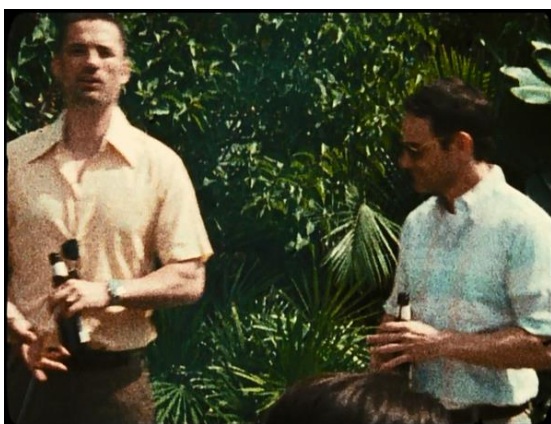
Figure 96: Faux analogue footage in *Apollo 18*.

Part of the paradoxical appeal of such retrospection lies in its confirmation of the 'analogue-as-stable/digital-as-untrustworthy' discourse considered in relation to *The Last Broadcast.* In the case of Hipstamatic (tagline: "digital never looked this analogue"), this aesthetic of ironic, contrived malfunction is categorised into a consumer-friendly database, with the "Hipstamatic Field Guide" offering users advice as to which settings might offer "light leakage", "overexposed warm highlights", and forms of chromic aberration ("Alfred Infrared Film"). Giovanna Tiso argues that the fake-analogue glitches

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[15] The name *Instagram* references the Kodak Instamatic series produced from the early 1960s to the mid-1980s, while the square image shape favoured by *Hipstamatic* evokes the instant photographs of Polaroid.

of Hipstamatic and its ilk convey the "folding of the past into the present that defines late postmodernity through the mediation of digital technology" (2011).[16] On the one hand, the digital artefact proves difficult to date given its lack of immediate physical manifestation, and yet can also convincingly imitate the physical imperfections and malfunctions used to date analogue artefacts.[17]

4.6   Glitch as narrative device

Indeed, it is appropriate that Tiso's article about Hipstamatic, whose faux-analogue digital aesthetic is echoed by *Apollo 18*'s fake-cinefilm (see Figs. 95-6), is entitled, "How to be a Retronaut". Recalling the clichéd observation that the processing power of the handheld digital consumer device exceeds that involved in the moon landings, *Apollo 18* can be read as extending this cliché, by framing then-cutting-edge NASA technology as risibly crude in relation to the digital post-production tools afforded to a horror movie with the relatively low budget of $5 million. Tasking digital technologies with the simulation of a more familiar, and distinctly analogue, materiality finds its correlate in *Apollo 18*, in which analogue imperfections like celluloid scratches and burns are imitated by digital visual effects.[18] *Apollo 18* is a found-footage film that purports to consist of material recovered from a clandestine and ill-fated 1974 NASA moon landing, uploaded to the website *Lunartruth.com* in 2011. The three astronauts depicted in the footage believe that their mission is to install 'high frequency transmitters' to provide the US defence department with early warning against Soviet Intercontinental Ballistic Missiles. So as to document the mission, the crew take several cameras, including hand-held cameras equipped with Kodachrome film, two cameras installed within the lunar module, and one attached to its exterior. In addition, a tripod-mounted, motion detection camera is erected on the Moon's surface. Footage from the motion detection camera reads "Westinghouse", referring to manufacturers of the slow scan television (SSTV)[19] cameras used on Apollo missions 9 to 16 between 1969 and 1972 (Steven Boniecki, 54). These cameras sent live relay images of the Apollo 11 landing to several observatories, including Parkes

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[16] Simon Reynolds (2011) makes a similar point about the lucrative potential of applying digital processing power so as to imitate analogue imagery appears to exemplify a pop culture trends. For Reynolds, popular music and youth culture more generally in the 2000s and early 2010s can be characterised by a tendency towards the appropriation and valorisation of past trends, often an explicitly ironic manner. Reynold's "retromania" and Tiso's "retronauts", then, are largely complementary ideas.

[17] Indeed, Tiso might have added that even Hipstamatic's backstory–that the app is named after the failed Hipstamatic 100, an entirely plastic point-and-shoot camera produced in the early 1980s by the idealistic and ill-fated Dorbowski brothers– is itself a marketing hoax (Smart 2011), replete with fake period photographs of the siblings. Yet, that some of the webpages used as part of this hoax are now inaccessible due to link rot, again reminds us that digital technologies do indeed possess a materiality, one that renders them vulnerable to perishing.

[18] A combination of digital Sony CineAlta and an analogue Arriflex SR 16 cameras were used in principal photography.

[19] A method of transmitting images over a narrower bandwidth than broadcast television.

Observatory in Australia, where the image was then converted for broadcast television. The scan process led to a considerable decrease in image quality, with glitches inherent to the degraded images fuelling much of the conspiracy theories about the landing. That the pre-conversion tapes of the SSTV relay were subsequently lost or taped over by NASA has also attracted attention from conspiracy theorists.[20]

This preoccupation with format conversion, and its association with a loss of information, is evoked in *Apollo 18* itself in its opening intertitle, which claims that the footage was uploaded to the Internet, thus implying digitisation. Like the obsessive David Leigh in *The Last Broadcast*, the transfer to digital is foregrounded as a cause for concern. No other information is given as to how this material might have been manipulated, other than its being "edited" into a coherent, chronological narrative. This suspicion of conversion, coupled with the reference to moon landing conspiracy theories, lends *Apollo 18* a particularly self-conscious quality as digital simulation of analogue technologies. What is more revealing, however, is the narrative role that these self-conscious faux-analogue glitches play. Comparing *Apollo 18* and *The Last Broadcast*, the key way in which the two films differ is how the glitch is fully absorbed as a plot device and diegetic phenomenon, rather than a disruptive, non-diegetic and meta-textual satirical device. After a series of disturbances, the crew discover that the true function of the transmitters is to monitor the behaviour of small, spider-like aliens that disguise themselves as moon rocks. Given that the cameras' purpose is to, as one crew member puts it, "pick up and track anything we can't", it is unsurprising that the recording equipment detects the presence of the aliens before the crew themselves do. The movement of the aliens causes the transmitters to register their presence, which in turn leads to interference with the camera recordings. As such, glitches play a central role in *Apollo 18*'s mystery narrative. Not only does the ultimate provenance of the malfunctions preoccupy the astronauts, it also allows *Apollo 18*'s audience to access knowledge that is denied to its protagonists. While the crew only experience glitches in terms of strange noises and electronic surges, the audience are privy to additional information. The motion detection camera zooms in on an apparently innocuous moon rock, as signal disturbance manifests itself onscreen in the form of electronic noise. Why a static rock would attract the attention of the camera, given that the audience has learnt through the Apollo crew that it reacts to motion, is a source of some confusion. Moreover, the audience is led to believe that the camera is of interest to NASA in relation to the activities of the crew, raising further questions as to why cameras are running in their absence. When the rock moves, it not only reveals that it is a living organism, but that, unbeknownst to the Apollo crew, it is the real object of study

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[20] See the film *Did We Go?* Dir. Aron Ranon. Third Wave Media 2005.

of the mission. In other words, the glitch functions as a narrative device which facilitates the use of dramatic irony, raising awareness to the audience of a physical presence undetected by the agents within the diegesis.

Figure 97: Glitch as sign of alien intererence in *Apollo 18.*

The glitch functions as a similar narrative device in the all-digital *REC 2.* In Chapter 2, several examples of digital found-footage films were offered as examples of the absorption of diegetic camera perspective into more conventional narrative structures, and this trend was contextualised in relation to the process by which the digital camera became institutionalised as a reputable filmmaking tool. The phenomenon of linking narrative perspective to a physical object that is both diegetic prop and the really-existing recording tool thus loses its disruptive novelty. Both a disruptive technological presence and the unconventional narrative potentialities that it represented ossified into a stylistic choice, to be deployed alongside more well-established narrative tricks. While *REC* was offered as an example of diegetic camera perspective, particularly with regards to how this disruptive phenomenon might lend itself to the demands of the horror genre, its sequels were seen to exemplify the rapid appropriation of this once novel trope.

REC 2 also proves revealing in relation to the use of the cinematic glitch, and does so for similar reasons. Just as diegetic camera perspective becomes a stylistic choice alongside various other perspectives, so too does the glitch feature as a narrative device, rather than a way of interrupting the flow of narrative. Indeed, it is through the glitch that *REC 2* establishes that supernatural phenomena comprise a permissible feature of its fictional world. In the first film of the series, the two-person crew of Barcelona-based reality television series *While You're Sleeping* shadow fire brigade personnel as they tend to a disturbance in an apartment building. The building is quarantined by local authorities after it transpires that a deadly, rabies-like virus has infected the occupants of the apartment, and both members of the film crew are eventually killed. The syuzhet of *REC 2*

begins immediately after that of the first film. The opening perspective is that of a helmet-mounted camera worn by a Special Group of Operations officer (Grupo Especial de Operaciones/GEO), and the perspective subsequently switches between the helmet-cameras of other GEO officers and the handheld DV camera of a group of youths who also attempt to enter the quarantined apartment block. In addition to this stylistic departure, then, *REC 2* also introduces a supernatural conceit that was absent from the original film. In *REC*, the homicidal behaviour of the apartment's residents is attributed to a highly contagious virus. It is revealed that the virus was introduced into the building by the Catholic priest who occupies its penthouse suite. Within the confines of his room, the priest is tasked by the Vatican to carry out experiments on Tristana Medeiros, a Portuguese girl believed to have been demonically possessed. However, no narrative details confirm that supernatural activity such as possession is deemed possible in the diegetic world of *REC,* suggesting instead that the girl is the carrier of an as-yet-undiagnosed virus that, as the result of the Vatican's clandestine activities, has been unwittingly unleashed on the general public. By contrast, *REC 2*'s diegetic world permits supernatural occurrences: blood spontaneously combusts in reaction to Catholic rites, and, as is discussed in Chapter 2, it is established that Tristana is trapped in a parallel dimension by darkness, and only freed into the visible realm by the presence of light. The representation of supernatural events represents a departure from the particular realist aesthetic of *REC*, which combined cinematographic techniques that connote 'immediacy' with a largely verisimilar narrative of a virus outbreak. That *REC 2* uses the glitch to mark this move away from a particular cinematographic and narrative conception of realism is significant.

The glitch functions as a narrative cue, anticipating the occurrence of supernatural activity. Of course, the glitch also functions as a realist cue, in the manner observed by Manon and Temkin: when the GEO's camera helmets are disturbed, this is reflected by having the digital image itself flicker and distort. However, glitches appear in scenarios in which this realist conceit cannot be plausibly entertained (such as when the camera is not knocked or damaged) and as such, call for an interpretation which moves beyond that offered by Manon and Temkin. The supernatural glitch first occurs when Dr Owen, a priest sent by the Vatican to investigate the outbreak in the apartment building, delivers a Catholic rite. As Owen reads the first few lines of the rite, dark horizontal lines appear on the screen, before the image begins to become pixelated (Fig. 98). A high-pitched ringing and electrical hum sound as the rite progresses, before the dialogue becomes entirely muffled. Returning to the discussion from Chapter 2, we recall that this perspective is solely the privilege of the audience, given that the diegetic camera operator is deceased. If this camera no longer corresponds to the vision of a diegetic character, and is established

as one of several windows into the diegesis, it can thus be used for the purposes of dramatic irony, allowing the audience to access knowledge that is denied to the characters themselves. Indeed, the glitch functions in precisely this way, confirming for the audience that Dr Owen's rite has had a supernatural effect before other events demonstrate this to the characters themselves. In this instance, the on-screen presence of the glitch corresponds to an invisible supernatural presence; once the image has become pixelated and the sound of Owen muffled, the extra-diegetic sound of a child's voice further conveys this sense of digital technology being able to perceive and record the paranormal.

Figure 98: The supernatural glitch in *REC 2*.

This narrative device is repeated twice more in *REC 2.* When a teenage boy is bitten by one of the infected, his deteriorating health is mirrored by his DV camera's draining battery life; when the boy finally succumbs to the infection, the camera runs out of power. Moreover, when it is revealed that Ángela, the television reporter from the previous film, has not been killed by Tristana but is apparently alive and well, dark horizontal lines appear on the screen, foregrounding the later revelation that she has been possessed by the demon into doing its bidding. Finally, at the film's climax, before Ángela murders Owen, thus scuppering the Vatican's plans to contain the virus/possession, she bursts into demonic laughter, which again coincides with the camera image jittering. Screen tearing[21] performs a similar role*.* Indeed, the very first image in the film, the logo of producers/distributors Filmax International, is subjected to tearing and other glitches (see Fig. 100). From this inaugural image, *REC 2* announces itself as having absorbed the glitch

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[21] *Virtualdub.com* ("How to Fight Screen-Tearing") offers the following definition of screen tearing: "*Tearing* is a display artifact that occurs when images are presented to the screen without regard for the current status of the output circuitry. It occurs because pixels are sent to the screen gradually in book order rather than instantaneously. What happens is that the output DAC reads across the same area of the screen that is bring written to, so the monitor ends up showing a half-updated image. The result is a momentary frame that has half of an old frame and half of a new one, with a clean horizontal split across (the tear)". The found-footage web-series *Marble Hornets* ("Entry #5") uses screen tears predict the appearance of its antagonist, with on-screen captions explicitly stating this trope, noting that "there have been numerous instances of visual tearing".

into its stylistic repertoire, and as such, is willing to deploy it in a controlled manner that is ultimately subservient to narrative demands.

Figure 99: Visual tearing in *[REC] 2* anticipates a supernatural or horrific event.

Figure 100: Screen tearing during the title sequence of *[REC] 2.*

This association between glitches and ominous supernatural events has significance beyond its function as a narrative device. As Adam Harper notes, the late 1990s and early 2000s saw several films in which ghosts emerged from videotape (Hideo Nakata's *Ringu*, 1998), television white noise (Geoffrey Sax's *White Noise*, 2005), and Polaroid cameras (Banjong Pisanthanakum and Parkpoom Wongpoom's *Shutter*, 2004) among other analogue technologies (Harper 2011). For Harper, it is the sense of obsolescence that invites ghosts, as discarded technologies are haunted by the remnants of information that they once carried. Harper speculates as to the next wave of technological ghosts, predicting that "we'll probably be haunted by ghosts made of jpeg compression artefacts, once they too become a thing of memory and nostalgia". The glitches of *The Last Broadcast* and *REC 2* suggest that this has already taken place. But rather than focusing on the past, these glitches suggest a preoccupation with the new digital medium. Such films are 'haunted' in the sense that their peculiar materiality is markedly different from that of their cinefilm predecessors. Misconceptions about the indexicality of digital capture leaves digital cinema susceptible to charges of

'otherworldliness'. Contrary to *The Last Broadcast*, these films echo the fallacy of immateriality, piling superstition onto the debate around digital ontology. In *The Last Broadcast*, the glitch satirically undermines this response, confronting the viewer with the physical electronic activity that lies beneath the illusion of immaterial digital media. By contrast, *REC 2* paradoxically uses glitches to draw together digital technologies and the supernatural, as if the 'immateriality' of digital media is the result of it emerging from another dimension.

These observations are echoed in Sconce's work on the history of telecommunications media, and his approach is perhaps more enlightening to the concerns of this chapter than Harper's. Sconce notes that "the electronically mediated worlds of telecommunications often evoke the supernatural by creating virtual beings that appear to have no physical form" (4). This is especially true for digital media, as the link between the sounds and images that appear on the digital screen is confined to obfuscated electronic circuitry. The digital, by definition, exists in a constant state of incompleteness, subject to processes of recombination and lacking a permanent physical location. Figuring the digital camera in fiction as an object of uncanny, supernatural ability thus draws parallels between familiar ontologies of digital technologies and that of the ghost. Indeed, though electricity is no longer commonly understood as a meta-physical or supernatural phenomenon, as it was during the emergence of the electromagnetic telegraph, it remains, as Sconce notes, "a somewhat uncanny agent in popular thought" (7). The latest and perhaps least understood of these electronic communications technologies are digital devices, and as such, it is unsurprising to see their fictional representation expressed in terms of the supernatural. *REC 2* imbues the digital camera with the ability to capture phenomena invisible to the naked eye, and the particular manifestation of this through glitches suggests that this 'supernatural ability' is somehow linked to digital technologies. Demonic presence leads to malfunction, suggesting that the supernatural and the electronic somehow exist on a similar plane.

In *Cloverfield,* the glitches again attest to the digital camera's apparent supernatural ability, in this instance, to convey the emotional preoccupations of its users. The hand-held camera in *Cloverfield* is predominantly operated by Hud, as his friend Rob's leaving party is disrupted by the destruction of Manhattan by a gigantic monster. Before Hud uses the camera to document these catastrophic events, however, Rob uses it to record a romantic liaison with his formerly-platonic friend Beth. As such, footage of Rob and Beth's secret day together is wiped over by footage of destruction and chaos. While most flee Manhattan, Rob decides to remain and rescue Beth from the other side of the island. As North points out, when the camera is struck or Hud rewinds or fast-forwards

footage, it glitches, and "near-subliminal" frames from *King Kong* (Merian C. Cooper and Ernest B. Shoedsack,1933), *Them* (Gordon Douglas, 1954) and *The Beast from 20,000 Fathoms* (Eugène Lourié, 1953) flash on screen (85). North argues that "these inserts act as subcutaneous imprints of the film's generic heritage", alluding to earlier strategies of horror movie illusion.
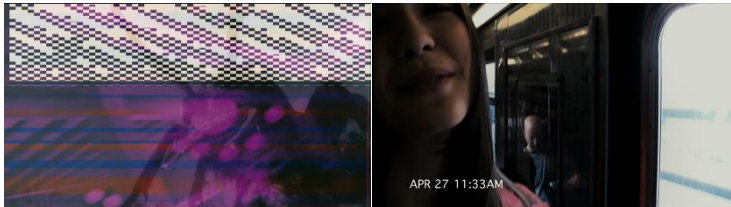
Figure 101: Glitch/Them/Beth.
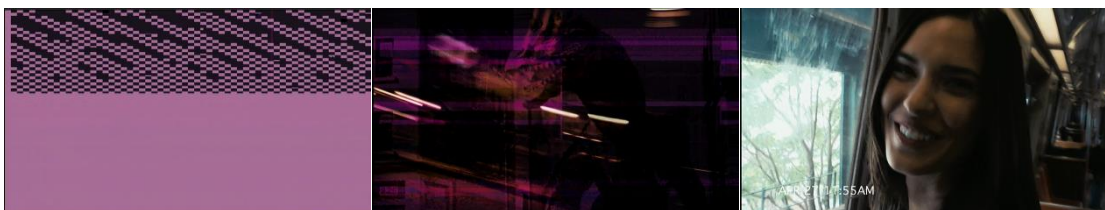
Figure 102: Glitch/The Beast/Beth.
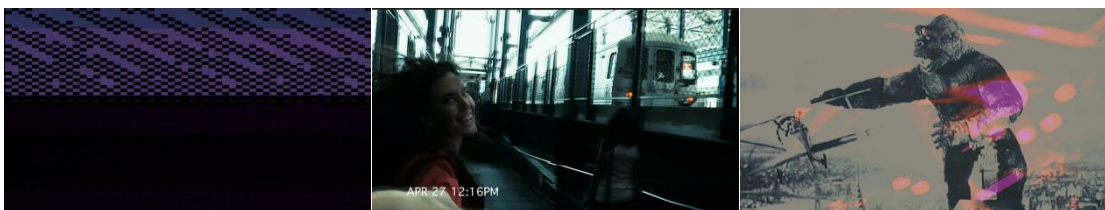
Figure 103: Glitch/Beth/King Kong.

The rapid, sub-liminal succession of images, however, can also be read as contributing to the characterisation Rob, figuring the camera as a site of memory. The glitches and subliminal horror movie frames are followed by fragments of the overwritten footage of Rob's day with Beth (see Figs 101-103), evoking the montage sequences used to convey life flashing before the eyes of a character as they experience a near-death moment. As the debris flies and Rob finds himself in a grave situation, his camera returns to a comforting memory of consumated love, displaying the face of the woman for whose company he is willing to risk his life in these final moments. In so doing, *Cloverfield* associates digital cameras and lo-fi imagery with personal intimacy, though not in the way one might expect. In discussing the DIY digital cinema of so-called "mumblecore" director Joe Swanberg, Aymar Jean Christian (2011) argues that the evocation of the "webcam's formal and technical qualities –primarily the focus on facial close-ups, but also low-grade image quality" as "a way to dramatize the search for intimacy and reality in a world of voyeurism and virtuality" (126). In the case of mumblecore cinema, this appeal to webcam

attempts to "dramatize the promise of connection in a [digitally] networked world" (131); in other words, it is an attempt to convey the affective state of digimodernism by embodying some of its forms. *Cloverfield*, by contrast, bears a more guarded, postmodern orientation towards digimodernism; though the film cannot help but evoke amateur footage made by the panicked victims of terrorist attacks, the DV camera – or at least its editors – bears the omnsicience of the storyteller, trasncending the chaos of the monster invasion in order to access Rob's thoughts, or at least convey them for the audience. As with *Apollo 18* and *REC 2*, the glitch functions as a tool to convey dramatic irony, in this case allowing the audience to access Rob's momentary retreat from reality (a break in the flow of thought, perhaps) into the comfort of memories.

In all of these examples, the glitch contributes some kind of narrative purpose, be it dramatic irony, conveying the emotional state of a particular character or establishing that supernatural events are permissible within its story space. In *Apollo 18*, the glitches themselves are acknowledged by characters, albeit without using the word "glitch". In *REC 2* and *Cloverfield*, however, the glitch remains unacknowledged within the story-space, and, in the latter case, consists only of momentary flashes. Adhering to Manon and Temkin's assessment of the glitch, one would have to conclude that examples like *REC 2* and *Apollo 18* constitute the limit to which the glitch might be used for narrative purposes, bound as they are by the 'film-within-a-film' conceit. If, as they suggest, glitches function solely as a stamp of authenticty, then their explicit discussion by characters within the diegesis is likely to break the fourth-wall and erode this sense of verisimilitude.

4.7   *Billion Dollar Movie* and the comic glitch

The comedy film *Tim and Eric's Billion Dollar Movie* features gags based on malfunctioning or otherwise uninspiring digital technologies, and, on the one hand, thus constitutes an appropriation in the same manner as *Apollo 18* and *REC 2*. On the other hand, this use of glitches, especially when pushed to absurd[ist] lengths, shares some of the disruptive and subversive characteristics with *The Last Broadcast*, presenting something of a challenge to the neat binaries of "rupture" and "recuperation" entertained thus far. Engagment with the critical debate surrounding the alleged disruptiveness of gags in film comedies more generally is made to reconcile this ostensibly troubling example of the comic glitch. This strategy also presents the opportunity to once again explore the historical parallels between this period in cinema's technological development and its predecessors. *Billion Dollar Movie* uses the glitch to both satirise and celebrate 'cheap' corporate digital imagery – indicative of a wider trend of mostly web-based humour (what I call "digital kitsch") – and to link together personal digital technology use

and abject bodily functions, echoing another popular discourse of web humour that I term 'digital disgust'.

It is perhaps unsurprising to find the comic glitch to be a disruptive force, given the moot relationship between the gag and comic narrative in film studies. For Tom Gunning, the comic gag is a key feature of the pre-1907 cinema characterised not by narrative but, rather, by "[the direct solicitation of] spectator attention, inciting visual curiosity, and supplying pleasure through an exciting spectacle – a unique event, whether fictional or documentary, that is of interest in itself" (381-88). In this so-called "cinema of attractions", the gag proves a key form of this solicitation:

> From comedians smirking at the camera, to the constant bowing and gesturing of the conjurors in magic films, this is a cinema that displays its visibility, willing to *rupture* a self-enclosed fictional world for a chance to solicit the attention of the spectator (382, emphasis added).

Kristine Brunouska Karnick and Henry Jenkins follow on from Gunning in arguing that the comedy narrative film was one forum in which the cinema of attractions continued to survive past 1907, with gags constituting "an expected disruption" or "momentary break" within "a highly structured and formulaic narrative" (80). Donald Crafton echoes this sentiment, arguing that, if a film narrative is understood "as a system for providing the spectator with sufficient knowledge to make causal links between represented events", then gags undermine this process, "misdirect[ing] the viewer's attention, and obfuscate[ing] the linearity of cause-effect relations" (Crafton 119). For Crafton, there is a fundamental distinction between the narrative elements of film comedy, exemplified by the comic chase, and non-narrative elements, evinced by the pie-throw.

Rather than following the dichotomous logic of "pie and chase", there is a way of reconciling the comic glitch with the theory of rupture and recuperation outlined *passim*. Indeed, Gunning himself offers a more complex reading of its integration into the narrative structures of film comedy, arguing that, if, rather than a linear structure, narrative is imagined as a "process of integration in which smaller units are absorbed into a larger overarching pattern and process of containment", then an alternative notion of its relationship with non-narrative elements such as the gag arises (Gunning 121). Instead of thinking of the disruption of narrative logic as oppositional, Gunning characterises it as a "dialectical interrelation", by which the gag adopts and subverts the "narrative's form of logical anticipation" (122). Gags are thus "the potholes, detours, and flat tires of narrative" (121), disruptive forces that are as vital to narrative as "the forces that contain" (120). If the gag is a disruptive but permissible and essential aspect of the narrative structures of film

comedy, then the comic glitch can be read as the recuperation of an otherwise disruptive visual phenomenon as a permissible comic tool.

For Tim and Eric, the writers, directors and stars of *Billion Dollar Movie,* visual markers of malfunction are a long-established element of their comic aesthetic. The duo's comedy combines dark humour, scatology and absurdism, along with amateurish production aesthetics, to create an overall style which Heidecker characterises as "something that makes you feel uncomfortable or awkward and doesn't belong on television" (Brown 2008). This comic style exemplified by their television series, *Tim and Eric's Awesome Show, Great Job!* (2007-2010), whose comic sketches are presented as the programming and commercial breaks of a fictive public-access cable television station "Channel 5". Wareheim explains that

> What I really liked, maybe even more than cable TV, were these old videotapes of high-school performances from the '70s and '80s. I was president of the A.V. club in high school, and I came to fall in love with that amateur style — *in both the production and entertainment sense* (Sacks and Spitznagel 2008, emphasis added)*.

These comments about "amateur style" suggest that the technical failure is closely connected with the pair's attempts to revel in the humour of social failure. Indeed, Heidecker argues that glitches are often essential to the humour of a sketch, observing that "a lot of ideas need to look bad [in order] to work". In *Awesome Show, Great Job!* this illusion of ineptitude[22] is achieved by running high-definition digital video through a VCR machine, resulting in a washed-out, degraded image. For example, in the sketch "Getting the Most out of Your Child Clown Rental", which takes the form of an infomercial for customers of Steve Mahanahan's "Child Clown Outlet" (which sells enslaved children bred to perform as clowns), analogue video technologies are used to complement and deepen the sense of disgust. Mahanahan's cheery admissions of child abuse ("my child clowns are blind; they'll eat anything!") are reflected by the tell-tale signs of a decaying medium, as if the video tape has been sullied by the signal it carries. The infomercial bears the signs of degraded video tape: yellowed discolouration and flashes of monochrome and red-blue-green that reveal the Nima additive colour process that underpins video recording and transferral (see Fig. 104). Meanwhile, the muzak soundtrack of the infomercial falls in and out of tune, suggesting the physical distress of video tape reels and inducing an appropriately nauseating effect. Glitches in this instance are thus complementary comic cues, with footage deliberately degraded so as to heighten a sense of disgust and revulsion.

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[22] Heidecker notes "we're not nearly as incompetent as we appear to be". (Spitznagel 2009).

Figure 102: Analogue glitches in *Tim and Eric's Awesome Show, Great Job!* Noisy video tape contributes to the disturbing effect of "Getting the Most Out of Your Child Clown Rental".

The second of Heidecker and Wareheim's interests is absurdist comedy; in this field, the glitch functions as a source of amusement in its own right. In the Child Clown Outlet commercials, for example, footage is frequently subject to digital skipping, recalling the music of glitch artists like Yasunao Toné and Oval. A fragment of dialogue is looped, altered in pitch and layered into dissonant chords while the on-screen image quivers and freezes. Such glitches extend far beyond the realm of diegetic authenticity, however, as it is impossible to entertain the notion that one's television reception could undergo interference or malfunction of a kind that would lead to these carefully arranged errors. Instead, these glitches are best read as absurdist non-sequiturs, whereby the rhythmic characteristics of audio-visual footage become comic cues that overshadow the content of the sketch. One such commercial, for example, aims to communicate a closing-down sale after Mahanahan is convicted of sexually abusing his child clowns. The sketch conveys this basic message, but the precise dialogue by which it is articulated becomes increasingly difficult to scan as the footage is subjected to excessive glitching; explanatory lines such as "I'm having a going-out-of-business clown sale!" and "I touched a clown, now I'm going to jail!" are repeated, sped up and slowed down, and pitch shifted to abstraction, their literal meaning becomes less important than the comic qualities of the sound itself.

4.8   Billion Dollar [Digital] Movie

What these two uses of glitches share, however, is their largely analogue aesthetic; while *Awesome Show, Great Job!* may be captured and edited digitally, it imitates the appearance of magnetic video tape used by public-access television studios. By contrast, the feature film *Tim and Eric's Billion Dollar Movie* bears an entirely digital glitch aesthetic. An increased budget[23] and the demands of feature-length narrative led Heidecker and Wareheim to abandon the public-access television conceit in favour of a conventional

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[23] The film's budget was "under $3 million" (Stein 2012).

Hollywood narrative and its attendant production values. The film follows fictionalised versions of Tim and Eric as they attempt to raise a billion dollars in order to repay their employers Tommy Schlaaang and the Schlaaang Corporation, whose money they have squandered on the production of a three-minute film entitled *Bonjour, Diamond Jim*. To raise the money, the pair form a PR company called DoBis and embark upon renovating a dilapidated shopping mall, of whose lucrative potential they have been assured by its previous owner Damien Weebs. While the majority of *Billion Dollar Movie* follows the conventional production aesthetic of Hollywood narrative cinema, Heidecker and Wareheim supplement this narrative with the glitchy parodies of *Awesome Show, Great Job!*, via infomercials for DoBis (an abbreviation of 'Doing Business'), the Schlaaang Corporation and other bizarre organisations. The particular digital quality of these glitching images proves central to their comic appeal. Whereas the tonal palate of *Awesome Show, Great Job!* is that of washed-out magnetic tape, *Billion Dollar Movie*'s shorts feature a palette of lurid and synthetic blues and reds, with the colour schemes of Dobis P.R.'s infomercials drawing from commercial presentation software and blogs. As such, the analogue kitsch of the low-budget public broadcaster is exchanged for a digital kitsch of the cost-cutting private enterprise. The corporate digital aesthetic is mined for similar grotesque and absurdist comic ends, mapping the specific unpleasant qualities of the cheaply-rendered digital image in the process.

Billion Dollar Movie begins with one such instance, as Tim and Eric's film-within-a-film, *Bonjour, Diamond Jim* is preceded by a series of advertisements on behalf of the Schlaang Corporation. The first of these is a guide to the Schlaang Super Seat, a seating device which claims to enhance cinematic experience through the administration of intravenous drugs and other devices. The Super Seat, itself a grotesque extrapolation of 'immersive' cinematic technologies such as stereoscopy,[24] is introduced and explained by "Chef Goldblum", whose entrance is marred by a lack of professionalism and glitches. Walking awkwardly onto the set, Goldblum is taken by surprise by the camera and his opening address ("Oh, good morning…hi!") is repeated three times from three different camera angles, as if the editor of the sequence has failed to decide which shot will make the final cut. Goldblum finishes his first introductory segment, and the advertisement cuts to a demonstration of the Super Seat, but not before pausing on a close-up of Goldblum's face as he pulls an unflattering expression (Fig. 105), suggesting that even the multi-billion dollar Schlaang corporation are prone to glaring digital errors.

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[24] See Prince's chapter entitled "Immersive Aesthetics" in *Digital Visual Effects in Cinema.*

F**igure 103:** After Chef Goldblum introduces the Schlaang Super Seat, *Billion Dollar Movie* pauses on an unflattering facial expression.

The same can be said for a promotional short for Tim and Eric's PR company, "DoBis". Entitled, "DoBis: What we do, who we are", the short purports to inform patrons of the S'Wallow Valley Mall about Tim and Eric's business values, but singularly fails to explain either what DoBis do or who they are. Instead, the short depicts Tim and Eric in front of a series of bland, digitally painted corporate logos, while singing a glib and repetitive anthem ("We like what we do/And we love who we are/We're DoBis P.R/We're DoBis P.R.!"). This vapidity is complemented by superfluous visual effects, such as the letters "PR" flying out of Tim's mouth (Fig. 106), and a chorus of Erics (Fig. 107). When the anthem reaches its most vapid ("*Dobis-P, Dobis-P, Dobis-P, Dobis-P, DO DO DO!*"), a glitching loop depicting Tim mouthing the word "DO" appears on, and magically flies out of, a personal computer screen. As the loop repeats, the words 'DO_DO_DO_DO_DO' appear in the background, evoking an MS DOS error message or perhaps one of the most well-known computer glitches: The Blue Screen of Death (Fig. 108-109) These absurdist glitches serve to undermine the professional pretensions of their backers, revealing a kind of 'cheapness' particular to the profit-oriented PR company that rivals that of the poorly funded public service provider.
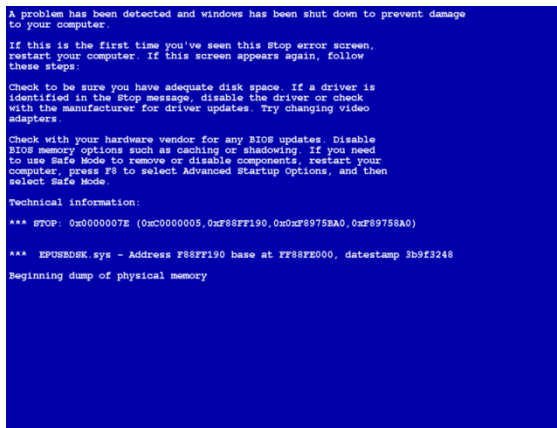
Figure 104: Digital corporate logos and absurd illustrative gimmickery.

Figure 105: A chorus of Erics.

Figure 106: 'DO_DO_DO_DO_DO_DO_DO_DO_DO_DO'.

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A problem has been detected and windows has been shut down to prevent damage
to your computer.

If this is the first time you've seen this Stop error screen,
restart your computer. If this screen appears again, follow
these steps:

Check to be sure you have adequate disk space. If a driver is
identified in the Stop message, disable the driver or check
with the manufacturer for driver updates. Try changing video
adapters.

Check with your hardware vendor for any BIOS updates. Disable
BIOS memory options such as caching or shadowing. If you need
to use Safe Mode to remove or disable components, restart your
computer, press F8 to select Advanced Startup Options, and then
select Safe Mode.

Technical information:

*** STOP: 0x0000007E (0xC0000005,0xF88FF190,0x0xF8975BA0,0xF89758A0)

***  EPUSBDSK.sys - Address F88FF190 base at FF88FE000, datestamp 3b9f3248

Beginning dump of physical memory
```

Figure 107: The Blue Screen of Death (Public domain < http://s.coop/1tqon >).

As with the digital backlot, the technological trace is foregrounded for its own inherent aesthetic value, even if this aesthetic runs counter to conventional notions of taste. Indeed, these particular glitch scenes resonate with a digimodernist, online-based trend of comic digital glitches that might be termed 'digital kitsch'.[25] Examples of deliberate comic glitches include the *YouTube* videos of *PilotRedSun* (see Fig. 110), which incorporate crude Microsoft Paint drawings, Flash animations, and error-strewn dialogue enabled by text-to-speech software, as well as the surreal machinima shorts posted by *YouTube* users such as *seinfeldspitstain* and *an0nymooose* (Fig. 111).[26] Other examples exploit unintentional glitches, such as the Twitter account *@Horse_books*. Initially designed to promote e-books by using technology to generate tweets that appeared to have been composed by a real person and thus avoid identification as spam, its algorithm unintentionally produced humorously surreal sentences, and subsequently garnered a cult following (see Fig. 112).[27] Regardless of whether they induce glitches or re-present pre-existing errors, what these various practices share is a sense of celebration of digital malfunctions, crudities, or qualities as comic. Given this, it could be said that such an aesthetic sensibility amounts to a sense of digital kitsch. As with the notion of kitsch more generally, the appeal of digital kitsch implies a series of codes regarding what is 'proper' use of digital media technologies. In the case of *PilotRedSun*, this pertains to the static, digitally scribbled images, which look as if they were drawn by an "amateur" artist. Of course, this implies the existence of aesthetic norms of professional digital animation, which more successfully aspires towards photorealism; in the case of *Horse_ebooks*, it is malfunction that is the source of humour, implying affection for its departure from the

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[25] The conception of digital kitsch owes much to the camp tradition of celebrating non-normativity. Appropriately, Ruth Holliday and Stacey Potts suggest that the materiality of the kitsch object proves central in this reception, particularly, "if the iconic material of the era of mass production is plastic (the development of organic polymers allows for the acceleration of mass production and consumption), then plastic is, simultaneously, the iconic kitsch material" (10). According to Holliday and Potts, the materiality of kitsch is cause for "enduring anxieties". They note that in Roland Barthes' discussion of plastic consumer goods, he describes plastic as '"a miraculous substance", inspiring pleasurable and "perpetual amazement" due to its capacity to enact "a sudden transformation of nature"' (104). I would suggest that "plastic" could be easily replaced with 'digital' and retain a similar meaning.

[26] Henry Lowood defines machinima, or "machine-cinema", as "the making of animated movies in real time through the use of computer game technology" (10).

[27] The account was later acquired by another party and incorporated into a performance-art piece, increasing the number of absurd tweets and reducing the number of those that actually promote e-books (Orlean 2013). Thus, an unintentional glitch was identified as possessing comic appeal, and was duly appropriated and reframed so as to maximise this potential.

expected level of professionalism of digital commerce, or perhaps an ironic affection for the tenacity of spammers. The emergence of a digital kitsch sensibility can be partly understood as complementing and, in some cases, reacting against the establishment of a digital cinematographic standard.

Figure 108: *PilotRedSun*'s digital kitsch.

Figure 109: seinfeldspitstain's machinima short 'Jimmy Neutron Happy Family Hour'.

Figure 110: The tweets of *Horse_ebooks.*

In *Billion Dollar Movie*, the flipside to digital kitsch is an aesthetic of digital disgust, whereby cheap and glitching digital imagery is associated with scatological humour. In one example, Tim and Eric watch an infomercial for Dr. Doone Strutts' "Shrim Alternative Healing Centre". Dr. Strutts' outline of the health benefits of his treatment is intercut with

two beneficiaries of shrim, one male, one female, performing unintelligable and bizzare monologue to camera against an unconvincing chroma key mountain backdrop. As they do so, they are digitally manipulated so that their faces overlap, with the male convert's moustache appearing on the female convert's face, and the neck of the male beneficiary stretched to grotesque proportions. This digital digust is a sign of things to come. Eric later tries shrim therapy, which transpires to his horror to consist of being placed in a bath tub and defecated on by several children suffering from diarrhoea. As the scene cuts between Eric struggling to keep his head above the bath's runny contents and a sex scene involving Tim and an elderly woman replete with exaggerated sounds of various bodily functions, the digital is framed as the harbinger of revulsion.

As with digital kitsch, this digital disgust resonates with another digimodernist web-based discourse that associates malfunction and physical abjection. For example, the music video for "Still Life (Betamale)" by the electronic musician Oneohtrix Point Never, distributed solely online, expresses this logic. As Adam Harper, observes, the video features

> flashes of disgustingly dirty computers and keyboards, screenshots of anime pornography, live-action shots of furries and other online fetishists, and a variety of other NSFW, internet-enabled manifestations of human sexuality, violence, and general carnality - all presented through a hallucinatory digital aesthetic (2013).

The video evokes various kinds of digital materiality; soiled computers undermine futurist narratives of a utopian marriage between body and cyberspace by calling attention to the necessity of physical devices needed to engage with digital information systems, as well as the organic residue that collects in the gaps between plastic keys. Rombes argues that the glitch is a marker of human error, and thus humanity, in otherwise efficient digital processes. Such texts, by contrast, figure this logic in a misanthropic manner, replacing the human "signature" with its greasy fingerprint. This is a potentially technophobic response, figuring the proliferation of digital communications technologies solely in terms of detrimental social or physiological effects, instead of the more complicated reality of their potential application. Harper is right to point out that the way that "Still Life (Betamale)" presents fetish imagery decontextualized from the online communities in which it is produced is problematic, framing the products of cultures with their own consensual rules as grotesque or symptomatic of uncomplicated social malaise (Harper). While this criticism is valid, such texts can be read as significant in other ways. That is to say, the "Still Life (Betamale)" video need not be the only way that digital disgust can be construed. Rather, a closer reading of how the glitch is framed as a repulsive, laughter-inducing

device reveals the normative assumptions made about the use of digital visual effects in cinema more generally.

In the case of *Billion Dollar Movie,* the corporeal and the digital are not only combined to disgust, but also to poke fun at, digital cinema's alleged immateriality and intermediality. *Billion Dollar Movie* contrasts corporeality with the 'unreality' of unconvincing chroma key environments, placing actors in two-dimensional, bright coloured environments that could never be mistaken for photographs (see Fig. 113). This contrast between corporeality on the one hand and unconvincing chroma key on the other also evokes the work of Drew Ayers, as discussed in relation to *300* in Chapter 3. Ayers postulates a "hybridized" image that consists of photographed bodies moving through animated environments, and argues that there is a tension between the two which results from the refusal of the body to be subjected to digitisation. Unlike *300*, Tim and Eric's digital kitsch nudges this tension into absurdity. In the previous chapter, *300* and *Sin City* were read as demonstrating the expanded 'cinematic-ness' of cinema, in a self-conscious process by which the capabilities of novel technologies, or indeed the technologies themselves, are foregrounded. If the lack of photorealistic 3D perspective in *300* was taken as an example of digital cinema's alleged "hybridity", here it celebrates the failure to achieve this. In this respect, Tim and Eric successfully update the "amateur style" of the 1980s high school AV Club –the celebration of social failure through signs of technical failure– for the meso-digital era.

Indeed, Tim and Eric have experience in finding the comic potential of bad chroma key, as evinced by a sketch starring comedians John C Riley and Will Ferrell. The faces of Riley and Ferrell are first shown on the bodies of animals as part of a digital composite of a jungle scene. The sketch then cuts to the principal photography stage, which is being directed by Tim and Eric. Riley and Ferrell are shown sitting in front of a green screen with their heads held in place by a vice and inexplicably holding uncomfortably heavy bags of sand (see Fig. 114). Riley and Ferrell ask the directors as to the need for their discomfort, only for Tim to insist that it is all part of the chroma key process, as he patronisingly informs the actors that "it's called '*keying out*'". Rather than a way of denying the materiality of either the human body or the digital process itself, then, chroma key is thus imagined as an absurdly physical, torturous affair. As with digital disgust, chroma key technology is imagined as a cruel and unusual practice, its inability to convince prove more appealing to comic ends.

Figure 111: Unconvincing hybridized images in *Billion Dollar Movie.*

Figure 112: "It's called 'keying out'". Imagining chroma key as a cruel and unusual process in "John C. Reilly and Will Ferrell's 'Animal Choices'".

4.9   Glitch as character

The film *Wreck-It Ralph*, however, demonstrates the limitations of thinking about the glitch purely in terms of conveying authenticity. In this instance, the glitch functions as an even more central narrative device; rather than a fault of an inanimate object within the story-space, the glitch is personified as a character within the story-space. In *Wreck-It Ralph*'s electronic universe, the glitch is embodied by the malfunctioning computer game character Venelope von Schweetz. Glitches are explicitly and routinely referenced in the narrative (a first amongst the films under consideration in this chapter), and forms the lynchpin of *Wreck-It Ralph*'s key sub-plot. Moreover, not only is the glitch explicitly represented in its familiar form (that is, a disruptive malfunction to be remedied), it is also imagined as a sentient being in an electronic world and an identity attracting social stigma within this world. More revealingly, given Menkman's disdainful account of the "conservative glitch", the narrative resolution of both of these versions of the glitch are expressed in terms of achieving commercial approval. Following Menkman's lead, we can surmise that a film about self-acceptance that figures the glitch as a personal imperfection to be celebrated is a particularly revealing expression of the recuperation of a disruptive digital marker.

182

Wreck-It Ralph centres on a computer game character's quest to defy the expectations thrust upon him by his role as principal antagonist, as well as his relationship with his glitching companion, whose experience of banishment mirrors his own. Wreck-It Ralph is the villain in the 8-bit arcade game *Fix-It Felix, Jr*, in which gamers use the avatar of Fix-It Felix to remedy the damage done by the hulking Ralph to an apartment building in "Niceland". When the arcade closes for the evening, Ralph and his fellow computer game characters enjoy free time, and may travel between games via electrical cables. For Ralph and other bad guys, however, life in this electronic universe is characterised by prejudice and rejection, a fate to which Ralph is unprepared to resign himself. Ralph embarks on a mission to prove himself as a hero, one which inadvertently leads him to *Sugar Rush*, a kart-racing game that takes place in the saccharine realm of King Candy, where he meets the glitchy Venelope. This glitching is conveyed by having Venelope routinely beset by fits of blue binary code (see Fig. 115), with the glitch imagined via the physiological analogy of a seizure. The spread of data corruption is similarly imagined, with other *Sugar Rush* characters responding to Venelope's glitches as if it were a contagious disease.

Figure 113: Venelope von Schweetz experiencing a moment of glitching.

Stemming from this physiological expression of the glitch is the imagination of the glitch as social stigma within an electronic world. Ostracised from *Sugar Rush* society, Venelope is labelled a "freak" and "a mistake […] that wasn't even supposed to exist" by its glitch-free subjects. Venelope herself, on the other hand, denies that she is glitch, insisting instead that she merely suffers from "Pixlexia". Venelope is partially vindicated in this respect when it is revealed that she was originally programmed as the ruling Princess of *Sugar Rush*, but was usurped by Turbo, the eponymous hero of the condemned 8-bit racing game *Turbo Time*. Seeking refuge from the deleted game, Turbo has hacked the code of *Sugar Rush,* wiped the memories of its characters and crowned himself King Candy (Fig. 116). Turbo removed Venelope from the roster of playable avatars, which caused her to develop her characteristic glitch. Ralph helps Venelope defeat Candy and reset *Sugar Rush*, returning her to her rightful role as monarch.

Figure 114: Visualising the creation of a glitch as cyberspace sabotage.

Despite being returned to the throne that she was programmed to occupy, Venelope is unable to shake off the glitch. She remains unperturbed by this, however, redefining the glitch as an attractive quirk and staple of her reformed rule. Moreover, as the feature of a now playable avatar in the *Sugar Rush* game, the glitch proves popular with arcade customers; as Ralph notes in his closing voiceover, "players love her, glitch and all". Venelope's imperfections make her a popular choice among gamers as her glitching allows them to overtake other racers. In other words, commercial viability validates self-acceptance. King Candy/Turbo threatens that Venelope "just being herself" will lead to the deactivation of *Sugar Rush*; instead it makes it a more popular game. As such, Venelope embodies the appropriation of the glitch by commercial design, both in the diegesis itself, and at the industrial level. Menkman's argument that "to design a glitch means to domesticate it" finds an ironic echo in Ralph's advice to Venelope on securing victory: "you gotta get that glitch under control".

Indeed, *Wreck-It Ralph* is itself an exercise in both design and control of the glitch; glitches are not only designed by a team of animators, but become part of a larger body of ambitious and technically innovative effects work.[28] In particular, both the glitch and the other effects work are ironically framed in relation to the development of computer graphics since the early 1980s. In the opening scene of *Wreck-It Ralph*, circa-1982 gamers are shown poring over the *Fix-It Felix Jr*. game, and as the camera pulls back, one is heard to exclaim "this animation's so real!". Thirty years later, Ralph hints at developments in gaming graphics by remarking of the demise of other 8-bit, sprite-based games ("*Centipede*? Who knows where that guy is…"), and points out that gamers find *Fix-It Felix Jr.* "retro", which he understands to mean "old…but cool".[29] *Wreck-It Ralph*'s realisation of

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[28] *Wreck-It Ralph* is notable for featuring multiple computer game "worlds", each with its own distinct aesthetic. This is partly achievable due to the application of bidirectional reflectance distribution functions (BRDF), whose algorithms allow more realistic and less CPU-intensive simulation of the physical behaviour of light and surfaces (Sarto 2012).

[29] Again, this evokes the logic of *Hipstamatic*.

several distinct digital aesthetics is foregrounded even more explicitly when Fix-It Felix strays into the first-person rail shooter *Hero's Duty*. Astonished by the advancement in computer graphics that *Hero's Duty* character Sergeant Calhoiun embodies, Felix marvels "Jiminy-jaminy…look at that high definition. Your face; it's amazing!" Far from undermining the ideologies of digital visual media, the glitch enters into the pantheon of Disney corporation characters, and is presented as evidence of its ability to continue to enjoy a leading role in the animated feature-film industry.

Figure 115: "Look at that high definition…"

Once again, this returns the discussion to the relationship between film as a postmodern form and computer games as the "formal exemplum" of digimodernism (167). The importance of player subjectivity means that to privilege the visual qualities of computer games as *Wreck-It Ralph* does is not unlike remarking upon the aesthetic appeal of chess figures (169): a perfectly valid pastime, but one which is unable to describe the process by which the text creates meaning. With this in mind, it is appropriate that *Wreck-It Ralph*'s depiction of video games as universes in which rational agents exert their own free will emphasise the narratological aspects of the video game (its characters, settings) over its ludic features (its players, rules, goals, controls, generated scenarios). Besides *Wreck-It Ralph*'s explicit claims to depict an imaginary world 'inside' computer games, and the indexical similarities between on-screen characters and those from actually-existing

185

games, there is nothing to distinguish a screen shot from *Wreck-It Ralph* and one from a seventh generation game as both are simply instances of digital animation. This reveals how little *Wreck-It Ralph* engages with the formal structures of video games; that is, with the features that make it a distinctly digimodernist kind of textuality. In focusing only on the computer game's digital aesthetic, *Wreck-It Ralph*'s postmodern appropriation of well-known game characters is a pyrrhic victory.

4.10   Conclusion

In drawing this chapter to a close, it is worth reflecting upon the most basic sense in which the glitch is recuperated. Glitches are contrived rather than occurring accidentally during the production or exhibition of the digital image, either by triggering them, or simply animating images that simulate the typical manifestations of day-to-day malfunctions. However, recalling the arguments of glitch art practitioners and theorists, it follows that contrivance of the glitch does not necessarily constitute a recuperation of it, given that much subversive or anti-commercial experimental glitch art follows such a strategy. More specifically, then, cinematic glitches are recuperated as far as they are incorporated into narrative films, predominantly, but not exclusively, in a manner that advances narrative. As the "disruption" caused by these technological traces exists mainly as part of a film-within-a-film, or in the form of a character within a narrative, it is easy to see how the disruptive glitch is appropriated and absorbed by the conventional meaning-making structures of narrative film. In this instance, the "conservative glitch" as imagined by Menkman, and recuperation, articulate the same process.

However, in the case of *The Last Broadcast*, I have also identified instances of the glitch that are disruptive in a way that echoes the strategies and effects of experimental glitch art. In these instances the glitch appears to distract and challenge the viewer, and subvert the narrative rather than advance it. In this example, technological traces are recuperated in that glitches are still contrived, but retain something of a disruptive presence within the frame. That *The Last Broadcast* is the only example of digital cinema that bears this disruptive, subversive quality is revealing, as is, perhaps most importantly, the fact that it is itself an early, pioneering work of digital filmmaking. Produced in a period in which such digital production and editing tools were relatively novel, especially to filmmakers with small budgets such as Avalos and Weiler, there is a sense in which the novelty of these technologies is carried over into the frame itself. The desire to experiment with these technologies, especially in ways that sidestep or subvert their intended application, manifests itself in the form of on-screen, disruptive glitches. Following from this analysis,

one could conclude that, as these technologies become more commonplace, and thus less novel, the appeal of exploring and incorporating visual markers of their malfunctioning into the final image of the film wanes.

The case of the comic glitch requires a slightly different conclusion. Initially, the use of glitches in *Billion Dollar Movie* appears so gratuitous and bizarre that it threatens to undermine the comedy narrative altogether, throwing it into absurdity. On further inspection, however, these glitches can be seen as contributing to the permissible, non-narrative comic appeals of the film comedy, joining a canon of gags that can be traced back to before the institutionalisation of narrative cinema. Again, it is easy to see how such an incorporation can be read as a form of recuperation. In addition, *Billion Dollar Movie*'s digital kitsch aesthetic includes the glitch as part of a gleeful, comic exploration of "bad" applications of digital technologies, implying a set of normative assumptions about "good" digital animation in the process. Moreover, drawing links between the changing uses of glitches in *The Last Broadcast* and *Billion Dollar Movie* respectively, one might speculate over the character and speed by which certain digital filmmaking practices become norms. Indeed, the emergence of a non-comic digital film that uses glitches but not as part of a film-within-a-film conceit might be the best way of assessing the ongoing cultural status of such markers of malfunction. Unfortunately, at the time of writing, no such example appears to have emerged. Returning to Rombes, we can conclude that the notion of recuperation offered in this chapter validates his suspicion that digital errors are a way of maintaining the presence of a 'human signature' in the supposed era of digital perfection. Glitches recuperated as productive narrative and non-narrative units suggest the organising hand of the filmmaker, and indeed, so too does the more subversive use of glitches to confront the viewer with a satire of discourses surrounding digitisation.

Conclusion

The technological trace has proven a useful tool for exploring the forces which facilitate and constrain the ongoing development of digital narrative cinema, and focusing on the salient presence of digital technologies within the cinematic frame has allowed me to discuss how cinema and its practitioners respond to, and engage with, these wider technological and industrial changes. As a conceit, 'rupture and recuperation' has provided the parameters for this discussion, tracing recurring trajectories from disruptive novelty to structural absorption. This has enabled the study of previously understudied genres and trends, and structured an expressive account of digital cinema which stresses continuities with its predecessors as much as exploring its digressions. Moreover, the conceit of rupture and recuperation has gone some way to showing why the radical potential of digitisation that fascinated many commentators in the 1990s has not necessarily been realised, by demonstrating the narrative conventions and economic imperatives which restrain the creative applications and implications of new technologies. In so doing, however, I have not denied the existence of fully recuperated technological traces, such as 'invisible' chroma key, or indeed ruled out the possibility of more profound ruptures, such as the "soft cinema" touted by Manovich.

Rather, my case studies have frequently shown how these constraints act upon the creative trajectories of digital cinema, and the notions of 'partial' recuperation and ruptures have proven pivotal in understanding the complexities of these processes. In the case of the digital found-footage film, for example, the survival of the basic narrative conceit of the genre can be attributed not just to the waning of the novelty of lo-fi digital imagery as a realist marker, but also to the incentives not to stray too far from a lucrative combination of cheap cameras and traditional formal conventions. Again, that the number of highly stylised, supposedly "hybrid" digital backlot film pales into insignificance when compared to more subtle or nearly imperceptible uses of chroma key technology is suggestive of such imperatives, while the transformation of the digital glitch from subversive interruption to lovable child's character is perhaps the most extreme example of this logic entertained here. As such, each of these case studies speaks to a different aspect of the institutionalisation of a filmmaking technology, or, to borrow D.N. Rodowick's terminology, the absorption of a technical constituent into the wider cinema medium.

By contrast, this thesis has demonstrated the ways in which the ontology of digital cinema remains a contested subject. In siding with Rodowick, I argued that the cinema medium, like any other, should be studied less with a concern for its essential 'identity'

than with an eye for how its constituent parts can be retained or replaced. Following from this, I argued in my intervention that scholarly claims of digital cinema's immateriality were mistaken, and instead called for an approach informed by the insights of theorist-practitioners who have been engaged with the development and application of digital filmmaking technologies. My case studies have not only reflected this differing approach, but have also sought to reconcile the often conflicting claims of films and filmmakers themselves with this critical work. While remaining aligned with Rodowick's thought, I have nevertheless demonstrated how discourses of the novelty and materiality of digital cinema are informed not just by commentaries within and around the academy, but by directors, DPs, and film narratives.

On the whole, I have identified a contrast between the way in which these films and their creators conceive of digitisation, and the reality of their work's practical implications. In the case of the digital backlot, for example, directors such as Robert Rodriguez and Kerry Conran characterised their experiments in chroma key as media hybrids which perhaps even nudged toward the creation of a new, distinct medium. The reality, as I have demonstrated, however, is that the digital backlot shares considerable continuities with its analogue predecessors, and the majority of applications of this technology in recent years, which do not declare their artificiality in the manner of *Sin City* or *Sky Captain and the World of Tomorrow*, would attest to this fact. This is not to suggest that filmmakers or films do not qualify or contest ideas of digital materiality or the alleged novelty of digital cinema. *The Last Broadcast* is an example of a film which is not only a technological experiment with consumer level cameras and editing software, but also a subversive text which confronts its audience with the materiality of digital processes and satirises commentaries which characterise the digital image as an immaterial spectre. Similarly, *300* is a self-conscious performance of digital 'cinematic-ness', in which technological traces are not framed as disruptive markers, but instead are paraded as new means for achieving old creative ends. In mapping the particulars of 'actually-existing' digital cinema, I have not only shed new light on films that have garnered a modicum of critical attention, such as *The Blair Witch Project* and *Cloverfield*, but subjected to scrutiny films that have previously evaded the attention of academics. More importantly, this focus on some of the less salient ways in which digital cinema has developed has allowed for new approaches to assessing the nature of stylistic and formal changes and continuities.

Following from this, it is worth summarising how my thesis has answered some of the other questions posed in my Introduction. The question of the uniqueness of this particular juncture in the history of cinema's technological development, as the case studies have illustrated, is a complicated one. The by now familiar discourse of digital immateriality is constitutive of a broader logic which frames digital technologies as not simply unprecedented but ethereal and revelatory. While in a technical sense, the digital technologies pioneered and institutionalised from the second half of the twentieth century onwards are indeed unprecedented, to observe as such is to risk sounding merely tautological. Widespread application of systems of data representation based on principles of discreteness may well be novel in the wider history of human technology, but they do not fundamentally alter the wider social meaning of technology itself. Digitisation has altered principal photography workflows, post-production capabilities, distribution and consumption patterns with still untold repercussions for vocational employment and amateur opportunities, yet does so in ways that are at once radical and in keeping with earlier moments in the medium's history. With this in mind, the question of uniqueness becomes moot. Digitisation's implications for how cinema 'works' or what it 'means', though similarly evocative of this wider technological history, are more subtle in their implications.

Paradoxically, then, the novelty of digitisation for cinema lies in the way that the process is misconstrued. Digital technologies, as this thesis has argued, are manifestly *not* immaterial or unearthly. Yet, discussions surrounding both digitisation in general and digital cinema in particular seize upon this notion that the digital is not merely different but abnormally different. As such, my case studies have served both to validate Andrew Utterson's notion that visual traces of technologies can function as units of "cultural refraction" by capturing the way in which being signified as 'digital' influences their representation and reception. So doing answers that other question presented in my Introduction about what these films might reveal about the cultural status of digital technologies. Digital images, cinematic and otherwise, have been framed and received as simultaneously immediate and otherworldly, trash and state of the art, resistant to human agency and infinitely malleable. These contradictory descriptions attest not just to the prevalence of digital imagery of radically varying forms, resolutions and contexts, but also the competing narratives which champion, qualify, and police them. The found-footage films of Chapter 2 imbue the hand-held DV camera with an uncanny transparency, an attribution which speaks of a conflicted preoccupation with the popularity of personal digital recording equipment such as camera phones and webcams. As image technologies proliferate over time, however, establishing themselves more firmly as fixtures of social life, it is higher-resolution digital images which take over this novel role; indeed, as

Chapter 2 demonstrated, the recuperation of the low-fidelity digital image into conventional narrative cinema depends on its emergent pedestrian status. By contrast, Chapter 4 illustrated how glitches owe their subversive power to the lack of popular understanding of the technical processes which underpin the operation of commonplace digital technologies. Experiences of seamlessness and efficiency are threatened by images which make manifest the poorly understood technologies, revealing in the process a broader lack of engagement with everyday technology beyond basic utilitarian demands. Moreover, my appeal to the work of Alan Kirby, a scholar concerned with the implications of the digital text's materiality, goes some way to explain these shifting cultural positions. Kirby characterises the period beginning in the late 1990s as witnessing a shift in cultural dominants, away from postmodernism and toward digimodernism. Given their role in both enabling and symbolising this shift, it is perhaps unsurprising that digital technologies are thus framed as remarkable and ordinary, revolutionary and trivial. Compared to quintessential digimodernist forms like the blog, cinema is a less relevant cultural artefact, anxiously taking aesthetic inspiration from digimodernist media but remaining nevertheless a marginal institution by comparison.
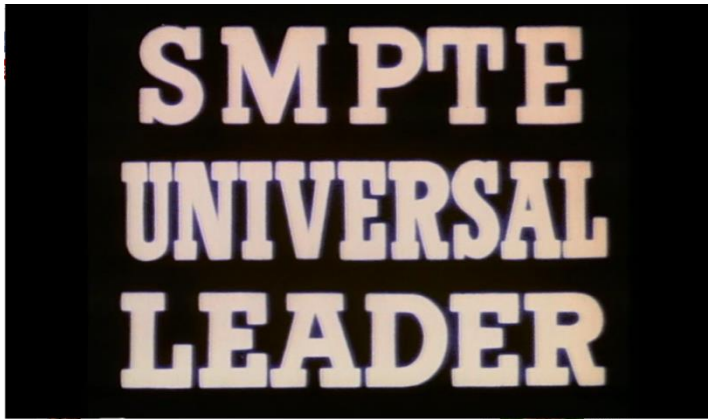
If cinema is a marginal institution, then the extent to which digimodernist theory can inform its study is perhaps limited. Kirby's key insights into the aesthetics and qualities of the digimodernist text rarely apply to digital cinema, as the medium is not a "pure" digimodernist form of textuality, if indeed it can be conceived as one at all. Despite this, consulting Kirby's work has allowed for an understanding of the aesthetic and functional aspirations that digital cinema in this period has occasionally demonstrated. Rather than read this, as many scholars continue to do, as evidence of cinema's transmogrification into something new, an awareness of digimodernism both as a form of textuality and as a cultural dominant allows for an appreciation of the emerging media that cinema aspires to imitate, reference, appropriate from, and, ultimately define itself in relation to. Applying Kirby's work has, therefore, not presented drawbacks, but rather the opportunity to expand upon the idea of marginal cultural series in a digimodern cultural dominant. This thesis has thus not only used Kirby's theories to orient its discussion of digital cinema; it has also used digital cinema to flesh out a relatively understudied aspect of digimodernism in the form of the marginal medium.

Using the conceit of 'rupture and recuperation' to set the parameters for this discussion could also be read as limiting. Positing a 'recuperation' necessarily repudiates the idea that cinema has been fundamentally transformed by digitisation. However, as mentioned previously, this approach does not rule out the possibility that the technological and formal constituents which comprise the cultural series known as cinema

could change to the point at which a new medium could be said to emerge. Rather, 'rupture and recuperation' has offered a way of characterising and historicising media behaviour not through the discussion of hypothetical scenarios, but with reference to pedestrian actualities. Whether strikingly stylised or barely perceptible, the technological traces found in the digital cinematic image are artefacts which at once speak to routine technical replacement and symbolise broader technological and cultural shifts. It is this insight that has explained how and why digital cinema at once demonstrates so many continuities with its broader history *and* remains a site in which media ontologies and the cultural status of digital technologies more broadly are contested.

Appendices

A: Leaders/intertitles

i.   *84C MoPic*

The following people
are not actors

ii.   *The Last Broadcast*

In October of 1994, three student filmmakers
disappeared in the woods near Burkittsville,
Maryland while shooting a documentary.

A year later their footage was found.

Paramount Pictures would like to thank the
families of Micah Sloat & Katie Featherston
and the San Diego Police Department.

Last Fall, Thomas Finley was arrested for
the rape and murder of his 19 year old
sister, Samantha Finley. He was also
charged with the murder of Edgar Lauren,
a paranormal investigator. Thomas claimed
that the victims were attacked by a demonic
entity of unknown origin. Shortly after,
he committed suicide while imprisoned.

R.B.
CAT#8465 B

CAMERA RETRIEVED AT INCIDENT SITE "US-447"
AREA FORMERLY KNOWN AS "CENTRAL PARK"

DoD (7) 32-16-12
NGIA 901-836

00:04:16:11

Paramount Pictures would like to
thank the families of the deceased
and the Carlsbad police department.

vii.   *Paranormal Activity 2*

The Vatican does not authorize the recording
of Roman Catholic exorcisms.

viii.   *The Devil Inside*

What you are about to see is real.

ix.   *The Amityville Haunting (Geoff Meed, 2011)*

This recording is the property of the East Anglia Police. It has been prepared pursuant to the Criminal Justice Act 1988 and 2003 and must not be copied or shown to unauthorised persons. Unauthorised use or retention may lead to a fine, a period of imprisonment or both.

EAST ANGLIA POLICE   Keeping our communities safe

x.   Hollow

13. oktober 2008 mottok Filmkameratene AS en anonym sending bestående av 2 harddisker som inneholdt 283 minutter filmet materiale.

On October 13, 2008, Filmkameratene AS received an anonymous package

xi.   Troll Hunter

IN 2011, EIGHTY FOUR HOURS OF CLASSIFIED FOOTAGE IS UPLOADED TO WWW.LUNARTRUTH.COM.

xii.   Apollo 18

On October 9, 2006,
Hunter Rey was abducted.
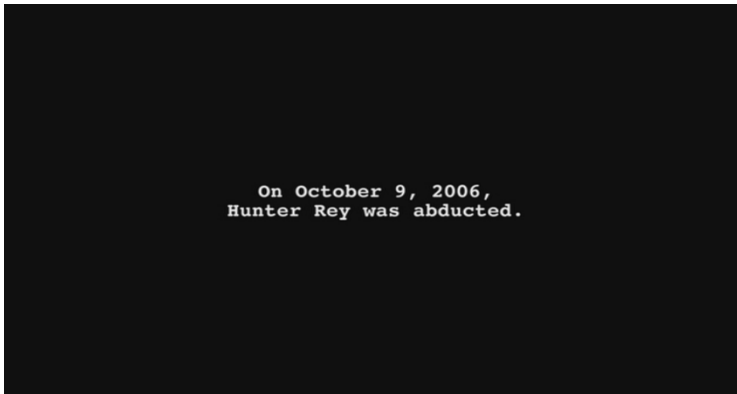
xiii.   *Paranormal Activity 4*

B: Static ground shot: death of camera operator, end of syuzhet

i.   *Cannibal Holocaust*

ii.   *84C MoPic*
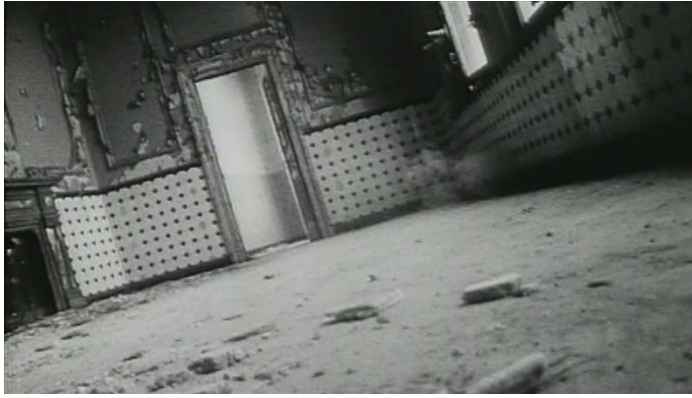
iii.   *Man Bites Dog [C'est arrivé près de chez vous]*

iv.   *The Last Broadcast*

      v.   *The Blair Witch Project* (RCA Hi8 colour video and monochrome 16 mm film)

     vi.   *[REC]*

vii.   Quarantine

viii.   Cloverfield

ix.   *[REC] 2*

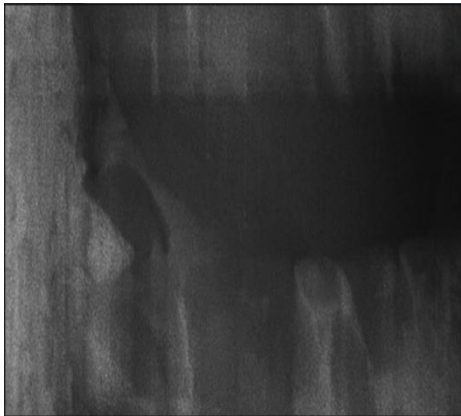*x.*   *Troll Hunter*

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