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**SEAN CUBITT, DANIEL PALMER, AND
NATHANIEL TKACZ (EDS) (2015) *DIGITAL
LIGHT*. LONDON: OPEN HUMANITIES PRESS.
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Digital Light opens by taking aim at Photoshop's 'lens flare' filter. As the volume's editors note, the originally negatively connoted lens-flare effect – since it seemingly disturbs the image – was initially appropriated in order to produce 'simulated evidence of a fictional camera' (7), subsequently becoming 'a tool for producing spatial effects' (8). The example is deployed in order to hint at the 'transitions between analogue and digital in visual media' (8), one of the central concerns of this edited collection. Its editors, Sean Cubitt, Daniel Palmer, and Nathaniel Tkacz, follow this by providing a short introduction to the importance of light throughout the history of humankind. From the biblical term 'fiat lux' (8) to today's 'backlit screen' (207) of smart devices, the research agenda of Cubitt et. al.'s *Digital Light* engages a plurality of different research areas. By claiming the importance of light itself, its connotations reach from 'yearning for something more' (8), which is linked to 'ancient and theological traditions' (8), to aesthetics in cinema. In short, the editors seek to by and large approach the notions of light and the digital in ambitiously broad and expansive terms.

Echoing the title of the volume, the introduction highlights Stephen Jones' take on the supposedly digital quality of light: 'Digital Light is [...] an oxymoron: light is photons, particulate and discrete, and therefore always digital' (9). And since 'photons are also waveforms' and therefore 'subject to manipulation in myriad ways' (9), one main vocabulary with which the topic in general is engaged is already implied: control and regulation between history, technology and practice. Hence, the editors' bringing together of eleven contributors from such different fields as art history, philosophy, and photography, signals an interdisciplinary approach whose foundations were laid in a 2011 symposium in Melbourne, named

‘Digital Light: Technique, Technology, Creation’ (9). The result is, on the one hand, an invitation to both practitioners and theorists to further participate in a discussion on digital light, and, on the other hand, an effort to zero in on the ‘relationships between technologies [...] and techniques’ (9) that it generates and presupposes.

Therefore, what makes this edited volume unique are the ways in which the contributions engage the phenomenon of digital light, which is the *relation* of light and the digital itself. Sharing this common ground is largely what connects the texts with each other. Moreover, in order to enrich this background the volume aims to describe the historical conditioning of light in relation to ‘contemporary culture’ (9), as well as ‘challeng[ing] the constraints of increasingly normalised digital visual media’ (10). Yet, as there is no definite answer to the question ‘What is Digital Light?’, the contributions engage with it individually and in various ways. The editors address several of the possibilities and limits provided by engaging with digital light in terms of the relationship between the light itself and ‘the transition from analogue to digital media’ (10). Going far beyond questioning the difference between analogue and digital media technologies, the contributors point at how each of their respective fields is influenced, rearranged and challenged by a notion of light that is ultimately conditioned by the digital.

In order to give an impression of the edited volume, in what follows I will examine three of the texts in greater detail. Each of them stands in for a specific mode of engaging with digital light—in other words, they paradigmatically illustrate the spectrum of topics the edited volume tries to encompass.

1

In his contribution, Sean Cubitt engages digital light through a brief ‘history of lighting’ (43), from the ‘light of flames’, ‘oil lamps’ and the ‘light bulb’ (43), to ‘modern visual technologies’ (43) in terms of ‘visual technology systems’ (43). The author’s thesis is divided into two sections: first, focusing on glass and mirrors as a technology, Cubitt claims that these ‘have been and remain key to both analogue and digital management of artificial light’ (44). Second, the advancement of glass and mirrors as technologies is strongly conditioned by ‘visual media’ (44).

The author's central concern is the control of light. Examining relationships of control and technology across historical perspectives, Cubitt concentrates on the 'major new systems' which have come into existence: cinema, TV, and eventually laser and fibre optics (44). Cubitt sets the initial point of analysis with the Lumière Brothers' early cinematic projections, because 'cinema emerges as the first real employer of light as a projection medium' (45). The cinematic projection already entails an important part of Cubitt's reasoning. Directing light onto the projection wall is an effect of manifold 'translations in terms of steps of control' (45). Specifically, these are '[h]eat- and light-absorbent mirrors' (45) and lenses, channelling and directing the lamp's released light. From here on, Cubitt illustrates a process of reciprocal conditioning of visual media and technological components. His train of thought gathers at first a very specific focus on lenses in terms of their material, as well as their technological development. With 'Digital Light Programming', he takes the process of projection to the next step by moving it into the realm of the digital. In a technical sense, this means going from a comparatively easy technical setting that basically includes a light bulb, mirrors and lenses, to e.g. chips 'containing up to 1.3 million digitally controlled mirrors' (48). Cubitt points out that, on one hand, we have to speak of 'optically programmed light' (49). Yet also, he notes, on the other hand analogous 'lens technologies [...] are still vitally important to digital projection, and still control and shape the grammar of the projected image' (49).

Throughout the history of developments of techniques to control light, standardisation would become a necessity. A negative side effect of this is the production of 'a standard cinematic grammar' (50). Put in other terms: 'The democratisation of projection, as is so often the case with visual technologies, has come at the cost of a loss of control over the operations of the characteristic devices we use' (51). This thought also traverses the last step in Cubitt's history of the control of light which focuses on searchlights – as the 'cine-projector's sibling' (51) – and lasers. Here, the text culminates in the argument that '[i]t is not control itself [...] that requires our analysis' (54). Since control with regards to light is here connoted in a positive sense, Cubitt also addresses the handling of fire through humankind, as well as the possibility e.g. in arts 'to release a democratic and liberatory potential' (54). Hence, it is much more the 'normative power of universal standardisation around a meticulously arithmetic technology that requires our analysis' (54); with this call to analysis presumably including the standards, organisations and corporations that this technical shift would

require and enable. However, as the author signifies light in terms of the 'medium of twenty-first century telecommunications and network media' (58), Cubbitt pursues a more general urge to search for 'new modes of working with light that involve not simply freeing it, as an entropic gesture, but finding new ways to create in partnership with light, rather than through its enslavement' (58).

Consequently, this approach still has to be thought through in relation to the standards and forms of normalisation it implies; that is, in terms of corporations and organisations that regulate such light-based technologies and techniques. Although Cubbitt presents the history of light in terms of its control and standardisation, he neither situates this dualism on a dystopian or utopian side. By contrast, his demand to think of new possibilities of how to control light outside of standards and normalization does express the edited volume's broader framework of articulating theory through forms of practice. Most importantly, Cubitt displays that this task cannot be accomplished without taking this history of light and its control into account.

2

In 'Lilian Schwartz and Digital Art at Bell Laboratories, 1965-1984', Carolyn L. Kane focuses on the decades between the mid-1960s and the mid-1980s. She is interested in the digital art created in the labs in general, and the 'interdisciplinary collaborations' (102) specifically. As such, the chapter mainly addresses the work between 'visionary artists' and 'computer scientists' (102). The case study highlights experimental art in order to integrate it into 'the history of new media art' (102).

Taking a closer look at the famous telephone company's research facility, we learn that the era was defined by two settled antitrust suits that regulated Bell Labs' legal competences and responsibilities over these roughly two decades. While Kane describes the research lab as an innovative technical environment, she also carves out the conditions of possibility they held for the creation of media art. On the one hand, the lab reached a high degree of freedom during its two decades of existence, since it could step out of market competition. Here, the author addresses the 'non-official, on-the-side experimental and artistic pursuits with colour and visual computing' (105). On the other hand, research was 'officially' constrained to the technical domain of the telephone. Nevertheless,

‘[d]uring this time a prolific amount of innovative experimentation was conducted in a relatively open environment, laying the foundation for ‘computer art’ (104).

Inside of this context comes Kane’s central narrative figure, Lillian Schwartz, ‘working on computer art and colour experiments in digital computing’ (109). Schwartz undertook notable early projects with Kenneth Knowlton, whose art experiments with computers are also examined by Kane. By introducing the computer generated artworks ‘UFOs’¹ and ‘Enigma’², Kane identifies a production of important knowledge regarding the question of ‘colour in early computing’ (112). In general, the art works are structured by rapidly changing different shapes, forms, lines and colours. Hereby, the computer-animated cuts abruptly connect and separate opposing colours as well as coloured and brief monochromatic sequences with one another. The locations of these forms and shapes are in constant change as well. On first sight, ‘UFOs’ makes the impression of a multi-layered psychedelic interplay of colours, circles, and stripes. Incomprehensible to the spectator’s eyes, the rapidity of the oscillating screen-contents in combination with the psychedelic sound leave the viewer behind, monotonously staring at the screen. Additionally, the constant figural modifications have different speeds. While the pace of the continuously altering background is best described as an almost indifferent flickering, the transformations of the organic forms are comparatively slower. However, constantly interrupted image compositions evoke a provocative dance of computer images, which is simultaneously confusing and soothing. Incapable of comprehending the on-screen action, human perception cannot possibly follow the rhythm of the art work.

Concerning the specific translation of colour between the analogue and the digital, Kane shows two particular aspects ‘UFOs’ deals with. Firstly, on a practical level, it includes particular techniques taken from ‘painting and graphic design’ (112). Secondly, taking a more theoretical point of view, Kane demonstrates how the piece implemented a form of knowledge taken from ‘optical science’, as well as from the the field of ‘perception’ (112). Eventually, she concludes that this computer artwork implicitly investigates the relation of both humans as well as machines in terms of ‘analogous yet distinct drawing and perceiving systems’ (112).

Asking after the effects of these techniques, Kane assembles a dense network of linked thoughts on ‘expanded cinema and human

neurology', McLuhan's 'auto-amputation' and 'narcissistic trance' (113). In connection with this, Kane works out how (the limits of) perception could possibly be deferred in order to grasp what's 'already' entangled in computational processes, which at the same time is not 'known or visible' (113). The art work she discusses did not just mark a small revolution in the field of 'editing and effects' (113), rather, as Kane emphasizes, it presented the ongoing negotiation of new techniques of colour and 'style' (114). For Kane, what lies at the heart of the analysis of the computer art piece 'UFOs' is 'the adaptation of optical research into computer art' (114).

Discussing the second artwork 'Enigma', the author identifies specific qualities of colour which it negotiates. At first, the installation 'Enigma' seems more viewer-friendly, since UFOs evolving organic forms are initially replaced by a manageable account of lines. However, after accelerating the interplay of the lines and their contrastive arrangements, incomprehensible variations of nets and dots penetrate the viewer's eyes. A few seconds later, slowing down the speed of the alteration has the effect of disturbing the spectator's perception. There is also a strange feeling of pleasure, when the originally black and white configuration turns colourful, as the pupils can't focus and the field of vision becomes fuzzy. One is completely immersed in the oscillating colours, the stretching and compressing of shapes, as well as the seemingly dissolving and superimposing of fore- and backgrounds.

Kane shifts her attention to a paradox between comparisons of colour concerning its 'material and technical', as over and against its 'subjective attributes' (116). She claims to divide off the differentiation into 'synthetic colour' and 'sacred colour' (116). The latter, for Kane, is likely to carry 'anthropocentric' connotations, while the former signifies colour's 'machine-made' character and its artificiality (116). Both qualities and – more importantly – their computationally fabricated interplay which then can only be experienced in direct confrontation with the art piece itself, build the momentum of the artwork 'to *work*' (116). Being the nub of Kane's story, the 'co-existing' qualities of colour are the paradox of colour itself: 'both sacred and synthetic colours co-exist, in this particular historical and cultural moment of technological intrigue, along with a fascination with the future, and progressive social and political attitudes towards the human-machine consciousness' (116).

Kane offers a refreshing discussion of light within the volume as a whole. By engaging light in relation to colour, her narrative crosses the ‘open-minded and innovative’ (103) atmosphere at Bell Labs, the ‘visionaries’ (103) who worked there, the ‘new technologies’ (104) they discovered, and the ‘labs’ engineers’ (104), without losing sight of the ‘decade’s magic’ (105), the artists, as well as the ‘tensions between management and computer art’ (111) that defined it. Besides Kane’s clear argumentation, another accomplishment is that these *structural* events and actors are all connected through the figure of Lillian Schwartz as both a media artist and a central narrative actor. Schwartz’s story, unfolding during the ‘golden era of liberal experimentation’ (116) at Bell Labs, sheds light on the early steps which art and computing took concurrently. As Kane clearly points out, this history has to be grasped in cultural and aesthetic terms, while also stressing the precise computing technologies that were involved. Furthermore, by familiarising the reader with Schwartz’s central role, this chapter paradigmatically shows the need to further engage women’s roles within the history of early computer art. Thus, more of these stories need to be written in order to acknowledge the impact of early media art and its protagonists on the ‘newly emerging subfield of colour studies [...] and the major aesthetic histories and new media practices today’ (117).

3

Jon Ippolito’s contribution, ‘The Panopticon is Leaking’, closes the edited volume and asks for more examination around ‘the historical roots of light as both a metaphor for knowledge and a means of control’ (204). According to the author’s thesis, analogising light and information constrains our ‘understanding of politics in the Internet age’ (205). Therefore, Ippolito contrasts light as a metaphor with its physical realities: ‘light is simply a particular swath of wavelengths on the electromagnetic spectrum’ (205). Regarding the problematics of ‘digital’ light, it is nothing but ‘an even more arbitrary category’ (205). Eventually, the author grounds the metaphor by claiming that ‘the light that shines from our laptops and smartphones starts out as voltage differentials on a hard drive’ (205). Moreover, in stark contrast to ‘Enlightenment metaphysics [and] a deep-seated sense that light is the emblem of truth’ (204), Ippolito strengthens the non-metaphorical understanding of light. Against the metaphorical understanding of light as ‘truth’, he refers to the questions of control and regulation of digital light: ‘The closer

we look at our dependence on the metaphor of light as truth, the more we will see a political expediency hidden beneath it' (205). In order to underline this relationship between the visible and the non-visible, Ippolito claims that '[t]here is something seeing, but it is not being seen' (205). Illustrating this, he tells a short anecdote about a fortune cookie – but he rather imagines the working conditions of an employee who is monitored by invisible cameras while writing the small notes. Here, the twist is not only the relationship of 'metaphors of light' and invisibility, rather it is this 'asymmetry [...] [that] helps the powerful to instil fears in the powerless' (205). Thus, the author connects light with knowledge and power. Within this triangular setting, he introduces Bentham's well-known design of a prison from 1791, which provides the ideal possibilities of surveillance given by a clever interplay of architecture and natural light. Ippolito introduces the Panopticon in order to refer to its dependence 'on light as a means of gathering information' (207). Bridging the historical example to our contemporary 'networked' (206) conditions of communication, he claims that 'metaphors of vision and its attendant radial model of information gathering and dissemination are increasingly irrelevant'. This applies to 'a world lit not by a single light source in the heavens, but by a billion strands of interlinked fibre optics and Wifi networks' (206).

Consequently, Ippolito emphasises the difference between light that 'illuminates a perspectival space' and 'the way that electromagnetic signals [...] spread knowledge through networks' (207). Underscoring the argument, the author takes up the neologism 'Netopticon', coined by the architect Malkit Shoshan to translate Bentham's prison into present techniques of *monitoring*. The point is to critically reflect this term with 'the metaphor of light as information' (207). Here, Ippolito specifically identifies the problematic, that this particular metaphor is attached to an 'optical etymology' (208): 'The most information on the planet sits where light cannot reach it' (209). Consequently, Ippolito searches for a proper metaphor in order 'to describe network information' (209). Once more drawing on the Panopticon, he notes how Bentham originally planned to install an 'acoustic surveillance system' (209), which ultimately proved to be a failure, as not only could the guards hear the prisoners talking, but also vice versa. Ippolito concludes that this 'leaky network could offer a prototype for a more liberatory Internet' (209). In doing so, the author presents a whole set of exemplary strategies categorised by uses of 'updated metaphors' (209), such as 'Go Underground' (209), 'Dangle Something Shiny' (213), or 'Point out Cracks in the Light Bulb' (214). These

encompass the strategies of computer activists, artist groups, or just the guerrilla-like behaviour of single internet users.

Ippolito illustrates the problematics of the metaphors as well as possible strategies and modes of resistance in the context of surveillance. He demonstrates the urgency to reformulate our vocabulary concerning light which seems to be a static one. But one also has to take a step further regarding the suggestion of a new set of vocabulary. As he claims a reformulation in terms of non-visual metaphors, the problematics of this inventory process becomes evident. All of these 'reformulated' metaphors are exclusively situated within the context of (non-)visibility. Here, in my opinion, the potential to formulate a new set of metaphors which could be settled in the realm of acoustics instead of visibility remains to be articulated.

Conclusion

Digital Light is an interdisciplinary volume that strives to inscribe itself into an emerging research field by illustrating manifold facets of the relation between light and the digital. This particular relationship is not solely of interest for media scholars. Situated at the juncture of the contemporary technology and media landscapes, art historians, media archaeologists, as well as practicing artists also find themselves confronted with the undertaking to newly render concepts of perception, visual arts, colour, the status of the image, and the conditions of (non)visibility.

The contributions as a whole make digital light itself into an important object of study and offer an initial conceptual and empirical vocabulary to grasp its substantial heterogeneity and manifoldness. Besides showing the impact of digital light on a plurality of artistic, cultural, and scientific realms, the authors suggest a broad spectrum of theoretical sketches and strategies through which to approach it.

This book demonstrates the possibilities, the problematics, as well as the necessities in general of engaging with digital light as an essential and emergent material and conceptual reality—a reality to be read through this promising volume that shows how:

Light itself may well be eternal, and its handling historical, but we should not seek radical change where there is none. [...] At

the same time we should not understate the significance of even small adaptations, as the case of lens-flare should remind us.
(15)

Endnotes

¹ For the art work 'UFOs', see: <http://lillian.com/1971-ufos-3-min/> (accessed February 7, 2016).

² For the art work 'Enigma', see: <http://lillian.com/1972-enigma-4-min-20-sec/> (accessed February 7, 2016).