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Aporetic Apparatus

Epistemological Transformations of the Camera

Janne Seppänen & Juha Herkman

Abstract

In this article, we examine the epistemology of the camera today. In order to answer this question, we concentrate on three social and technological forms: the camera obscura, the photographic camera, and the digital camera.

On the one hand, the camera extends our human sensibilities and helps us to obtain knowledge of the world. On the other hand, it works as a device for delusion, bodily vision and spectacle. Historically, these two functions are meshed together in complicated ways and this establishes the paradoxical epistemology of the camera.

We argue that, even if contemporary debates about the truthfulness of the photographic image have persistently been tied to the digitisation of the photographic process, the very origin of these debates actually lies in the camera itself and its contradictory epistemology. The camera has worked, and still works, as an apparatus that relentlessly produces irresolvable ambiguity, aporia, between true knowledge and illusory vision.

Keywords: camera, camera obscura, epistemology, photography, digital photography, visual culture

Introduction

With the proliferation of digital cameras, and particularly camera phones, almost every situation and event can now be photographed and quickly placed on public display. Camera images are thus an essential part of communication and surveillance, in both public and private spheres, as well as, in fact, the whole visual constitution of society. The camera also seems to be an idea or a representation, which has gained a significant presence in the narratives of popular cinema and television. The central medium of spectacle, the camera, has itself turned into a spectacle, especially in the genres of action, crime and horror. For example, camera-based surveillance scenes, often via mobile technology, inhabit numerous films and television series. We have entered into the 'Cam Era' (Koskela 2003; Lehmuskallio 2012), where the presence of the camera is larger than ever.

In spite of the camera's strong technological and symbolic proliferation, it seems to be almost invisible and 'black-boxed' in two ways. First, people mostly use cameras without concerning themselves with the technical details of the functioning of the device itself. It is enough that it works. Second, and more importantly, the social function and meaning of the camera as part of the visual constitution of the society is even more obscure. The camera appears simply as a mechanical tool for taking pictures, moving

or still. In addition, contemporary visual culture scholars have been more interested in the different kinds of camera *images* (photographs, videos, film, and so forth) than in the apparatus itself as social and technological device (see, e.g., Cobley & Haeffner 2009; Gye 2007; Son 2009).

In this article, we focus on the epistemology of the camera, which refers to the ways in which questions of knowledge have been connected to the uses and articulations of the camera. In particular, over the last 20 years, the digitisation of the photographic process has raised notable discussions about the truthfulness of the photographic image in different branches of visual culture (see, e.g., Lister 1996), but especially in the field of news journalism. The debate has most often revolved around the question of the proper limits of the editing of the digital image file, which has given impetus to the establishment of different kinds of codes of conduct (Mäenpää & Seppänen, 2010). We argue that the debates on digital editing of the photographic image have their origins in the different uses and contexts of the photographic representation, and also in the controversial epistemologies of the camera itself.

The camera has been, and still is, an extension of human sensibility and a device for obtaining knowledge of the world. In the course of its history, the camera has also been used as a device for magical spectacle, amusement and perceptual delusions. In order to understand the current epistemology of digital photography, we need to turn the focus away from the photographic image and towards the camera and its history, which has been full of indeterminacies and paradoxes. The camera itself seems to be a kind of *aporetic apparatus*, which has fuelled and still fuels the epistemological debates concerning, for example, the truthfulness of the photographic image. The term 'aporia' is loaded with historical and philosophical connotations (Anker 2009; Derrida 1993; Kofman 1988), but here we simply use it to refer to a state of uncertainty and ambiguity, in which different, even contradictory, epistemological stances exist. Our main question is as follows:

- What is the epistemology of the camera today?

In order to get to an answer, we need to journey through a different history of the camera, asking the following:

- How the camera has been conceptualised in different historical contexts?

Below, we focus on three main historical iterations of the camera: camera obscura, the photographic camera, and the digital camera. In this short introduction, we are forced to be very selective, but we are fully aware of the historical richness, as well as the complexity, of each iteration.

Camera Obscura

Several scholars from different disciplines have been interested in the history of the camera obscura (e.g., Gernsheim 1986; Kittler 2012; Kofman 1999; Steadman 2005). A seminal work is Crary's *Techniques of the Observer* (1992), which offers a far-reaching exposition of the change in the concepts of vision, the camera obscura, and the observer during the nineteenth century. It is not possible to offer a detailed overview of Crary's work here, but we can summarise the main narrative.

Since the Renaissance, the camera obscura served as a dominant metaphor for human vision, as well as the relationship between the observing subject and the world; its epistemology manifested the new scientific worldview as a device for searching for truthful knowledge. "For two centuries it stood as a model, in both rationalistic and empiricist thought, of how observation leads to truthful inferences about the world" (Crary 1992, p. 29). This connotation appeared in various forms in the writings of René Descartes, David Hume and John Locke, for example. However, at the beginning of the nineteenth century, the position began to change. A Cartesian dualism between the observing subject and the observed world gave way to a much more corporeal concept of the subject, in which inner sensations and the physiology of perception played a crucial role. The shift was particularly visible in Goethe's *Zur Farbenlehre* (1810, *Theory of Colours*), where the camera obscura served as a model for subjective vision, bodily experience and visible sensations arising from the optic nerve system. In addition, during the nineteenth century, the role of the camera obscura started to signify an instrument that conceals, inverts or confuses the truth. Karl Marx, Henri Bergson and Sigmund Freud turned their gaze on the hidden dimensions of the psyche and society and employed the camera obscura as a metaphor for literally obscuring the truth, reminding us that "things are not usually just as they appear" (Crary 1992, pp. 27-29).

In a famous passage from *The German Ideology* (1845), Marx and Engels (1969) write that, "If in all ideology men and their circumstances appear upside down in a camera obscura, this phenomenon arises just as much from their historical life-process as the inversion of objects on the retina does from their physical life-process" (p. 14) . For Marx, the camera obscura worked as a metaphor for ideology precisely because it turns the world upside down: ideology sees things upside down and in a distorted manner. As Kofman (1999) summarises, "The camera obscura functions, not as a specific technical object whose effect is to present, in inverted form, real relationships, but, rather as an apparatus for occultation, which plunges consciousness into darkness, evil and error, which makes it become dizzy and lose its balance" (p. 14).

Crary's analysis of the camera obscura helps his attempt to construct a general theory of the observing subject, from the Renaissance to the beginning of the modern period. His argument draws heavily on the writings of prominent philosophers, such as Locke, Descartes and Hume. However, Crary's scholarly orientation leads to certain limits to his interpretations. One may well ask, for example, how much the visual experience of the so-called common people followed the shift that Crary delineates (see Prasch 1992).

Bodily and magical sensations inhabited the use of the camera obscura in the seventeenth century and earlier. For instance, the Italian scholar, Giambattista della Porta, described the camera obscura in the extended edition of his *Magia Naturalis* (1558) and praised how the viewers could see human beings, animals and plants in such lifelike detail that they were not able to distinguish whether the sights were real or an illusion, as early as the sixteenth century (Huhtamo 1997, pp. 25-26). In this way, the camera obscura created the spectacle *inside* the camera itself. Hence, while the camera obscura served the epistemological passion for truth, it represented magic and entertainment for the common people.

The device was also used to make a profit. In the seventeenth century, French mathematician, Jean-François Niceron, described its exploitation:

> And charlatans have deluded some naive and ignorant people by persuading them that what they saw was a manifestation of the occult science of astrology or of magic, and they had no difficulty in astonishing them and this afforded the opportunity to abuse the simpletons and draw whatever profit they could from this (as cited in Slater 1995, p. 229).

Undoubtedly, most of those who watched the performances were aware that the pictures produced by the camera obscura were illusions. They admired the adroitness of the science of the time to piece together these magnificent performances. However, for part of the audience, the whole thing was a frightening machine from the underworld that turned the familiar world upside down, literally as well as metaphorically.

Crary also describes in detail the multiple uses of the camera obscura. However, he does not let them challenge his general line of argument about the epistemological shift at the beginning of the nineteenth century. If we consider the camera as a hybrid object, comprising technology, cultural practices, visuals, and discourses connected to these practices, Crary's reading begins to lose its strength because, already *before* the seventeenth century, the camera was *at the same time* inhabited by the illusionistic sensations and scientific efforts to produce truthful knowledge about nature. This epistemological paradox was a central attribute of the camera from the very beginning, and it was to become an important attribute of the camera *after* the discovery of the photographic process. Moreover, the invention of photography causes problems in Crary's model, because it continued and even confirmed, at least partly, the Cartesian epistemology by maintaining a gap between the photographer and the photographed object/scene (see Batchen 1991, p. 6). Photography worked, and still works, as an extension of perception in order to know and obtain accurate information.

The Photographic Camera

The invention of photography was not a straightforward process of historical evolution from the camera obscura to the photographic camera. On the contrary, the invention, so often credited to Joseph Nicéphore Niépce, Louis Daguerre or William Henry Fox Talbot, was an outcome of a long historical process of different kinds of experiments and *the desire* to fix the image of the camera obscura. In the study *Burning with Desire*, Batchen (1999) traces the development of this desire to before 1839, the year the invention was officially launched to the public. This desire played an important role in the cultural shift of the camera at the turn of nineteenth century. Here, however, we do not have the space to go into the historical details of this transition. We focus, instead, on the relationship between the camera and the newborn photographic image.

It is commonly asserted that the photographic image is an indexical trace that, to quote Peirce's (1998) famous definition, is "physically forced to correspond point by point to nature" (p. 6). This was, and still is, a central part of the epistemology of the camera: it is a device that produces indexical pictures that have a causal and material relationship to the photographed objects, bringing history to the present, as Barthes (1983) famously noted (also Flusser 2000, p. 8). However, their relationship is much more complex. At the moment of the exposure, the film and the body of the camera form a single unit, in which the trace (a latent image) is born, according to the laws of the optic and photochemical properties of the film. After the exposure, the camera and the film

become separate, and the developed trace begins its cultural circulation in the form of a film or a reproduced photograph. This image also has, of course, an indexical relation to the photographed objects. However, the indexicality is a necessary but not sufficient condition for a picture to be a photograph. We do have many other genres of 'light-made' indexical pictures: photograms, x-ray images, or tanning traces, for example. What is essential and what, first of all, makes a picture a photograph, is its *metonymic relation* to the very apparatus itself, the camera. The exposed film not only (indexically) represents the photographed objects or the scene but also represents (indexically *and* metonymically) a camera because it has been a part of the apparatus. The important thing is that the photograph's metonymical bond with the camera has not changed in the course of the recent digitisation of the photographic process. Digital photographs are still camera pictures with their indexical logic (Gunning 2004).

Hence, the invention of photography was also a splitting process, through which the camera split into two artefacts, namely, the photographic image and the camera (obscura), which are technologically and discursively tied together but can also inhabit different social practices and spaces. As a consequence of their metonymical relationship, every photographic image carries the social meanings of the camera. The doubling also had some consequences for the camera itself. The fast-growing popular spectacle of photographic images turned the gaze away from the device and towards the photographs, which first began their small-scale circulation in culture and, finally, were reprinted in mass media. The photograph as a separate object eclipsed the camera and fostered its 'black-boxing' by emphasising the representation at the expense of the camera. This means that it is difficult to see the complex agency of the camera behind the photographic image. In addition, the metaphor of the camera obscura was fated to give way to a new construct, that of negative/positive. This construct is the paradoxical logic of the photographic camera: its cultural weight notably increased in the form of photographic images, but the device itself descended into the obscurity of the 'black-box' (Flusser 2000, p. 27).

Simultaneously, the binary division between the true representation of reality and the ephemeral, misleading bodily sensation, so familiar to the camera obscura, transformed into the binary division between the subject's unpredictable agency and objective reality. Photographer Lewis Hine's famous slogan captures the main point: "Photographs don't lie, but liars may photograph". Hence, in the epistemology of the camera, the new 'subjective vision' also meant the possibility of producing false visual representations by relying on the camera's (alleged) objective vision. The epistemological tension that has existed since the Renaissance *between different uses of the camera obscura* was now found in the relationship *between the camera and the agency of the subject*. This position is still current in discussions concerning the ethics of photojournalism where, in the age of easy digital photo editing, the burden of the responsibility of an individual photojournalist to produce truthful images has increased (see Mäenpää & Seppänen 2010).

These changes in the epistemology of the camera were closely tied to the plethora of new practices, in which the camera underpinned many different disciplines. The proliferation of photographs, and their well-documented uses in anthropology, criminology, psychiatry, and other disciplines, opened up a whole new epistemological space, where the camera was supposed to produce knowledge about the subject (see, e.g., Tagg 1988; Sekula 1986). These uses of the camera were accompanied by its being used to create

public spectacles of historical events. The camera witnessed, for example, the Civil and Indian Wars in the United States in the nineteenth century, the First and Second World Wars in the twentieth century, as well as representations of the blossoming, and then collapse, of socialist regimes.

It can be argued that, without the camera, such a degree of 'spectacularisation' of culture, which was fundamental in the formation of ideologies at those historical conjunctures, would not have been possible. Spectacles, of course, appeared long before the camera existed. We only have to think of the Olympic Games in Ancient Greece, or the triumphal processions of monarchs and the Church to imagine the spectacular experiences of our ancestors. However, the camera turned the spectacle into a mediated era, where a larger number of people could be 'governed' by the spectacle (see Debord 1987). It is no coincidence that European totalitarian movements gained such a profound advantage from the camera, screens and printed visuals in their spectacular propaganda of the early twentieth century, and neither does it surprise anyone that their liberal and market-driven counterparts have exploited camera-based spectacles even more efficiently since then (see, e.g., Kellner 2003). The indexical dimension of the camera has inherently linked the spectacle with the authenticity of the image and therefore increased the affectivity of the spectacle: the power of the emotions could otherwise have been lost in the mediated forms of spectacle. In this, the photographic image turned the spectacle out from the camera obscura. The camera was now just a technical device for the production of spectacular representations, this time, *outside* it.

A key element in the spectacularisation of camera culture was the invention of the moving photographic image in the late nineteenth century. It was cinema that finally linked the former modes of spectacle (mass performances, theatre, music halls and vaudeville, magic lantern shows, as well as phantasmagory) with indexical image construction (Huhtamo 1997). For these reasons, the psychoanalytical film theorists of the 1970s (for example, Peter Wollen, Christian Metz and Laura Mulvey) started to see the film camera as a substitute for the eye and as a key factor in a process they called 'cinematic apparatus'. It was a camera-based narration which, according to them, identified the film spectator as a subject in a complex process of interpellation: the spectator momentarily becomes a part of the cinematic apparatus by camera-based narration, which appealed to scopophilic and voyeuristic desires and fantasies relying on the unconscious constitution of the subjectivity. The power of cinematic spectacle was seen as so intrinsic that the whole subjectivity of the spectator was thought to be dominated by the film camera (Lapsley & Westlake 1988). This so-called 'psycho-semiotic' or 'screen theory' has been significantly challenged since the 1980s, for example, by phenomenology, narratology and cognitive analysis of film, but the role of the (film) camera as a starting point of cinematic narration and experience has not, nevertheless, been denied (e.g., Bordwell & Carroll 1995).

The Digitised Camera

Just as the shift from the camera obscura to the film-based photographic camera was not a straightforward process of historical evolution, so too did the transition from analogue to digital camera have different phases. Computer-based image-editing technologies were already in use at the beginning of the 1980s and became more common in profes-

sional practice by the end of the decade. However, digital cameras only conquered the market in the early years of the twenty-first century. Therefore, the widespread digitisation of the photographic image took place earlier than the digitisation of the camera.

With digitisation, the photographic process diversified the use of the camera and enmeshed it with other technologies, paving the way for radical technosocial changes, both in the equipment itself and its functions in society. First, the camera has become a small computer, with built-in image-processing technologies that, for example, enable the user to instantly see an image or video clip. This function has changed the photographer's relationship to the equipment, as well as to the very act of taking photographs. Second, the camera is often connected to data transfer networks (most often the internet), which makes instant online publishing possible, as well as remote visual surveillance (see Lehmuskallio 2012). Third, digitisation has enabled the seamless joining of the camera to other technologies, most notably, to mobile phones and laptops. Fourth, the camera's role as a device for producing popular imagery has also been transformed via vernacular publishing on the internet. In this respect, the most dramatic change has perhaps been the 'invasion' of the camera phone; practically every smartphone is also a camera.

According to some scholars, digitisation ruins the indexical capacity of the camera: they argue that digitisation represents the artificiality of culture and that the naturalness of traditional analogue photography thus disappears with an 'algorithmic image' (e.g., Lister 1996; Mitchell 1992, p. 31; Rubinstein & Sluis 2013). Although there have been some scandals in recent years, for example, where press photographs have been digitally manipulated, there is no evidence that the authenticity value based on the indexical nature of the camera pictures would have been diminished. As a matter of fact, there is some empirical proof that the digitisation of the photographic process is not an essential factor in determining an audience's trust in news photographs (see Puustinen & Seppänen 2011). The popularity of amateur footage in the press, on television, and on internet photo galleries, as well as the huge popularity of reality and 24/7 television programming, indicate that trust in the documentary value of the camera flourishes at least as much as it did before digitisation (Herkman 2010; Andén-Papadopoulos & Pantti 2011). The digitisation of the camera, therefore, has not changed the camera into a more 'artificial' or 'untrue' visual technique, as some early critics of digital photography argued (see also Seppänen 2006, p. 101).

The huge number of personal cameras is accompanied by the rapidly increasing number of public and private camera surveillance systems (closed-circuit television or CCTV), which can be found in nearly all public places in large cities. Cameras were used for surveillance well before digital imaging, but data networks and digital content storage and management have made surveillance remarkably effective and much faster. The digitisation of camera surveillance systems has also made it possible to integrate them seamlessly into various databases, as well as to take advantage of computerised content analysis and identification technologies. Today, for example, 'deviant' behaviour can be recognised automatically from the visual data. CCTV and other surveillance systems gather information about a subject's life, in order to discipline public behaviour. Hence, there is a strong connection between governance, power, and the visual data gathered by these technologies. This connection ensures the camera's indexical role as a disciplinary apparatus, which had already started in the late nineteenth century with the emergence of crime photography.

However, simultaneously, the spread of camera phones has helped to question the top-down, panopticon-type surveillance between the surveyors and surveyed. For example, an amateur videographer happened to film the assault of black trucker Rodney King by some Los Angeles policemen and the video then catalysed a chain of events, including riots and demonstrations that finally led to the resignation of the Los Angeles police commissioner. This was thought to be exceptional in the early 1990s; it was unusual that someone had witnessed the assault but the most extraordinary thing was that this person had a video camera so the event could be recorded (i.e., documented) as it happened. Today, the recording of these kinds of events would not surprise anyone: if there are people, there are also cameras. We could even see almost real-time footage from the Asian tsunami in 2004, because those who witnessed the catastrophe wanted to record it with their digital and phone cameras and deliver their videos via mobile networks.

Nevertheless, the extensive spread of camera technology as a part of everyday communication, surveillance and entertainment has obscured the camera's status as a *specific* visual technique and assimilated it into common communication practices but, at the same time, has made the camera itself a spectacle in popular representations. It is the 'camera everywhere' that has enabled the popularity of so-called 'reality' television formats such as *Big Brother*. The Orwellian dystopia of the surveillance society has been realised, not only through the spread of real life surveillance cameras but also through several popular narratives representing the spectacle of the camera itself. One has to think only of the significance of the camera in some contemporary popular narratives of action and crime genres, such as *24* or the *C.S.I.* television serials and *Mission Impossible* films, to become convinced of the spectacular role of the camera in today's popular imagination.

With digitisation and computerisation, the camera has been turned from a special social and cultural metaphor into the everyday visual technique of documenting and witnessing the 'real'. Even though the camera's indexical nature has remained, its aura as a specific visual technique, however, has diminished.

Today, the camera is perceived merely as a pure instrument for visual documentary and memory rather than as the master visual technology of the era. This kind of instrumental vision is connected also to the range of other communication practices and technologies which, in turn, can be situated to the overall context of late-modern capitalism and neo-liberal market economics (cf. Jameson 1992). The so-called convergence culture does not triumph over single master technologies as the central cultural determinant, but it prizes digital networks, social media, 'collective intelligence', and participation as its buzzwords (see Jenkins 2008). Today, the camera exemplifies the liminality typical to late modern societies and cultures (Latour 1991). The camera is and produces the borderline between history and the present, between on and offline, between everyday life and the spectacle, as well as between reality and simulation.

Aporetic Apparatus

In his *Towards a Philosophy of Photography,* Flusser (2000, pp. 21-32) considers the camera as an apparatus, referring to systems that enable something to function and simulate thought. Even if Flusser gives the camera some agency, he sees it rather as a tool or an extension of human organs, resembling McLuhan's (1964) medium theory.

Photographs still play the main role accompanied by photographers with their cameras.

We claim, instead, that the camera itself inhabits incommensurable cultural practices, which obtain different meanings. For example, on the one hand, the camera can serve as a means of achieving visuals from the Martian landscape to be used to build our astronomical knowledge. On the other hand, we can play with cameras and use their elaborate technologies to create pictorial effects and illusions. In addition, we can enjoy the spectacle of the camera by consuming it in a television series or film, for example. All these different cultural practices also seem to provide different epistemological contexts of the camera. Problems may emerge if there is a transgression between different practices: if the news image, for example, is edited too much, the principle of the camera as a device for creating indexical representations is undermined. Even worse is if the reputation of the camera as an objective device is used to deceive spectators, by claiming that the image is the camera image, although its indexicality has been destroyed. In some other practices, for example, art photography, the rules of editing are not so strict, and the indexicality may have been heavily edited. The explanation sounds logical, because cultural practices attach to material objects as well as technologies to certain meanings. However, the picture is slightly more complicated.

Niépce and Daguerre were already at pains to define photography: they could not decide whether the true author of the photographic image was the photographer or nature itself. This ambiguous concept of the photograph was also common among other inventors of photography. Batchen (1999) describes the discourse in which the photograph was:

> …a mode of representation that is simultaneously active and passive, that draws nature while allowing her to draw herself, that both reflects and constitutes its object, that undoes the distinction between copy and the original, that partakes equally of the realms of nature and culture (p. 69).

The quotation reflects not only the epistemology of the newborn photographic image, but also the *whole history* of the camera, in which it is an amalgam of nature and culture. The camera is an apparatus that produces representations, whether fixed or not, whose epistemological status is unclear and has vacillated from the very beginning. As a metonymic part of the camera, the photographic image also carries this obscurity.

From this point of view, the camera itself can be seen as an aporetic apparatus that produces images with the strong potential to become the objects of different kinds of controversies, because the photographic act "both reflects and constitutes its object", as Batchen brilliantly observes. This double logic of the camera makes its epistemology hard to understand, because the distinction between what is represented and the representation itself disappears. The photographic image, thanks to the camera, is and is not what it represents. As a matter of fact, in the camera picture, the whole logic of representation is paradoxically undermined. The documentary, recording and reflective attributes of the camera image serve as a disguise to hide its non-representational epistemology. Hence, every effort to discuss the truthfulness of the photographic image ends in aporia as far as the basic postulation of the discussion is the idea that the photographic image is a representation *of* something.

The double logic of the camera as a reflective and constitutive device establishes a good example of the split that Latour calls the 'Modern Constitution', which also dates back to natural science and political philosophy from the seventeenth century.

According to Latour (1991), our world is saturated with hybrids (or quasi-objects), which are both 'nature' and 'culture', and hard to grasp for just that reason: they are "invisible, unthinkable, unrepresentable" (p. 34). It seems to us that the camera and photographic images are hybrid objects *par excellence*. In the Latourian framework, we can say that, under the Modern Constitution, we have never managed to handle photographs as hybrids, seamless combinations of nature and culture. Theories of photography have managed to designate their object either in terms of nature (as a material base of the image and technology) or in terms of cultural signification (a constructivist approach). This antagonism is something that becomes visible in Lewis Hine's famous catchphrase, but it is also present in different kinds of current codes of conduct established by media houses in order to prevent the 'unethical' digital editing of news photographs (Mäenpää & Seppänen 2010). In both cases, the sheer materiality of the camera image is something that is on the side of nature and constantly in danger of being manipulated by human agency.

The Latourian solution to the split is to provide material objects with a sort of agency that gives them the power to influence human cultures. Through this operation, material objects become part of complicated networks within other material objects and also human agents. This point of departure allows us to comprehend photography and technological systems as products of human agency, but it also presupposes that human agency and cultural production are scrutinised from the object's point of view. Thus, to connect technology or nature with such agency does not mean that technical devices act and think like humans, or that they have free will or the capability of ethical considerations (see Wolf 2012); instead, it means that the objects re-affect humans. We can interpret the meanings of a photograph, but the fact that it is a *camera* image has some effect on our thoughts and actions. We are not actors who use the camera and outline it with different kinds of cultural 'meanings'. Quite the opposite, the camera itself is an agent that relentlessly forces us to oscillate between unarticulated physical nature and cultural meanings. Through this aporetic apparatus, nature penetrates, with its sheer transcendence, into the realm of the social.

Conclusion

The epistemology of the camera dates back to the Renaissance era and the different meanings and uses of the camera obscura. The development of the photographic camera, however, started to radically reshape this epistemology between the 1830s and 1840s. The emergence of the photographic image, its different uses and its circulation in both private and public spheres expanded the meanings of the camera. However, simultaneously, the vast proliferation of photographs rendered the camera to a state of pure technology. Thus, the visibility and attractiveness of the photographic image left the camera in a state of invisibility. Even so, the photographic image started to carry the meanings of the camera as an amalgam of objective, true knowledge and subjective vision.

Later transformations were anchored to the technological developments of the photographic camera, which turned into a common device in many professional organisations and ordinary households. These developments contain such changes as the decrease in the size of cameras, which made them easier to move from one place to another, the birth of the press photograph after the invention of photographic printing techniques,

and the development of fast film materials, which enabled reaching beyond the early limitations of time in photographing.

In addition to these developments, two radical changes appeared during the late nineteenth century: the invention of the moving photographic image and the spread of Kodak cameras (West 2000) as every day appliances, the so-called 'Kodakisation' of culture. The former fundamentally transformed visual representations, which could now document and spectacularise the world more prominently than ever before. The latter made the photographic image a key technology of memory on a large scale. However, perhaps an even more profound change was the historical transformation of the camera seen in the late twentieth century, when digitisation changed the material and physical processes of photography. Digitisation also expanded the camera to global visual networks.

All these historical changes have also re-articulated the conceptualisation of the camera as a technical device of spectacle. At first, the camera obscura constructed the spectacle inside the camera itself. During the nineteenth century, the photographic camera transferred the spectacle to its end products: photographic representations. Since the twentieth century, the most influential form of creating these spectacles has been the moving image of cinema and television. More recently, especially in the early twenty-first century, digitisation has, on the one hand, integrated cameras as parts of other utility techniques, especially mobile phones and, in doing so, has eroded the aura of the camera as a spectacular technology as such. On the other hand, these 'domesticated cameras' have invaded the popular imageries of films and television serials, turning the representation of the camera into a spectacle.

However, if the camera constituted an important metaphor for the recognised social and cultural scholars of the seventeenth and early nineteenth century, in the twenty-first century, its metaphors are represented by popular narrators. The camera has maintained its value as a device for documentary, but its aura as *the* technology has diminished at the same time as cameras have been merged with other communication devices and information networks. Instead, scholars use the vocabulary which developed along with the new digital communication technology. Such terms as 'information' and 'network' are used to describe, not only the contemporary condition of global communities (e.g., Castells 1996), but also the whole history of human societies and life-forms (e.g., McNeill & McNeill 2003). Computer-based networks have also taken the camera's place as the main hybrid object of visual culture.

The overestimated effects of the digitisation of the camera led to not very well-grounded assumptions about the end of photography. The protagonists of the digital revolution forgot that the basic optical device, the camera, is still behind both the analogue and digital photograph. The camera itself is a carrier of a historical continuity of a plethora of meanings connected to the photographic image and the camera obscura. The combination of the camera's documentary value and routinisation has actually increased the popularity of photographic practices to an extent never before seen in the history of the camera.

The epistemology of the camera has been inhabited by the paradox of true knowledge and unreliable illusion. The camera obscura was simultaneously a place for scientific observation and illusions and spectacles. The photographic camera is a tool for creating objective visuals of the world, but it is also a device that can be used to deceive spectators in many ways, as brilliantly described by Lewis Hine's famous slogan. The

controversies surrounding the digitisation of the photographic process continue this binary split between true representation and misleading illusion.

The pictorial dimension of the camera has weakened due to the digitisation of film. The latent image was, after all, an image. The saved file contains binary code. However, this fact is only one part of the assemblage of the camera, but it paves the way for the vast expansion of the camera and also its convergence with other technologies. Our claim is that, eventually, this unstable binary division, not the shift from analogue to digital image, still fuels the discussion about photographic veracity. Moreover, this paradox will be with us as long as we take pictures with a camera.

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