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Goysdotter, Moa

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LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Extension desire and amputation fear. Post-phenomenologic theories on the relation between human beings and technology.

The double natured prosthesis

In *Parmenides lectures* held in 1942-43, Martin Heidegger expresses his dislike of the writing machine. The product coming from the machine can, according to Heidegger, not be said to be writing. To be writing for Heidegger there has to exist a certain relation between Being and man that is present in the hand-writing process: "Therefore when writing was withdrawn from the origin of its essence, i.e., from the hand, and was transferred to the machine, a transformation occurred in the relation of Being to man."¹ This "relation of Being to man", as something that can be manipulated, controlled or changed by technological equipment, has been lively discussed within different fields; often in terms of *the prosthesis*.

What does then the use of the word *prosthesis*, as a description of technological equipment, imply? It means an extension or an elongation of the human body, but this is not the whole truth. It also implies that is it something put instead of something else, maybe a substitute for a lost experience through an amputation or a castration (to speak with Freud). In Heidegger's view the typewriter is a substitute for a more "true" lived experience. As such it becomes a symbol of a loss of some kind of naturalness. Maybe it is in this double-natured sense we have to interpret the use of the concept of *prosthesis* as a description of the alteration of the relation between man and world caused by technological equipment?

To examine the concept of prosthesis as technological tool or equipment, I will here look at two theorists from different fields considered to be spokesmen of prosthesis theory: Canadian media theorist Marshal McLuhan who proposes that the media society is possible to view as an extension of man, and the post-phenomenological philosopher of science Don Ihde who discusses technical equipment that prolongs and extends our normally limited senses as prostheses. By doing this I hope to find and clarify something about the

intersection of extension and amputation within the concept of *prosthesis*. I will also relate these theoretical approaches to the invention of the camera and the early use of it as a tool for science, and see how it could be understood as a prosthesis in this context. The objectivity seeking context of early science is then contrasted to the development of postmodern photo theory, where the scientific ideal of camera as a symbol of objectivity has been largely abandoned.

The itching prosthesis

In the Aztec world of Gods the god Tezcatlipoca is handed a replacement for his foot which he loses in a battle with a monster. Tezcatlipoca's prosthesis is a "smoking mirror" through which clouds of smoke he can gain extended visual information of what is truly present in the heart of men. The mirror is also used to predict coming events.² This is one way to view the effects and impacts of the prosthesis - as something that grips into the world and lends more knowledge and information to the person, or culture, wearing it. The Czech philosopher Vilém Flusser, for example, describes the relation between mankind and technology as follows:

Machines are simulated organs of the human body. The lever for example, is an extended arm.³ [...] tools, machines and robots can be regarded as simulations of hands which extend one's hands rather like prostheses and therefore enlarge the pool of inherited information by means of acquired, cultural information.⁴

However, in the very use of the word prosthesis, as description of the relation between human being and world as mediated through technology, the Flusserian, quite simplistic, way might just not be sufficiently satisfying. The prosthesis is not only a harmonic elongation or extender. It is simultaneously a constant reminder of its own unnaturalness, or artificiality, creating a certain ambivalence in the act of sensing or experiencing through technology.

Sigmund Freud pinpoints this ambivalence in *Civilization and its discontents* as he writes:

Man has, as it were, become a kind of prosthetic God. When he puts on all his auxiliary organs he is truly magnificent, but these organs have not grown onto him and they still give him much trouble at times.⁵

This ambivalent characteristics of the prosthesis, as well as of the relation between man and world through technology, has since Freud generated a lot of studies where the view and use of the concept of *prosthesis* is analogue to Freud's not ever really attaching limb. Perhaps not surprisingly, theorists discussing the prosthesis as an ambivalent metaphor for technological equipment as a mediator between human and her surrounding world have traditionally been critical to a forthgrowing technologically dependent society. Instead of being tools for increased cultural and scientific information, the prosthetic function is most often concluded to be an amputation or reduction of what Heidegger would call Being.

Society as human extension and the collective neurosis

Marshal McLuhan's media theory is structured around a view where technologies are extensions of the human body. In his seminal book *Understanding Media: The Extensions of Man* from 1964 McLuhan describes how different circumstances that make up our society and culture can be seen as elongations of our selves. Technology is the elongation of our bodies and brains, clothes is an extension of the human skin⁶, and cities are "extensions of bodily organs to accommodate the needs of large groups"⁷, to mention a few examples. All these are kind of mechanical and safe elongations that humans are in control of. But more threatening to McLuhan is the electrified technology where power and speed has been increased in such a rate that it can only be compared to extensions of our very central nervous system.⁸ This new sense of "inclusive awareness"⁹ leads to disintegration, a loss of control and to a state of "implosion and contraction" among mankind.¹⁰ Our central nervous system has become extern, which largely resembles a diagnosis of a collective neurosis.

Though Marshal McLuhan never himself used the metaphor of the prosthesis, he is commonly considered one of the fathers of prosthesis theory. Instead of prosthesis McLuhan uses the binary pair extension/amputation. This indicates something important

about the concept of prosthesis; that it is a synthetic paradox of the two opposites, and that the intersection between the two poles can be found within the prosthetic concept.

The amputation as psychological auto-mechanism

McLuhan means that the modern (1964) status of mediation has caused our consciousness to auto-amputate itself, in order to maintain a sanity equilibrium. He grounds this theory on medical research that has shown that when equilibrium in the body is non-reachable, the body detaches or numbs the body part or organ which causes the overstimulation.¹¹ This auto-amputation is thus a psychological mechanism connected to the sense apparatus and is activated when our senses are too overly stimulated. This idea re-echoes Georg Simmel's modernist critique of the 1890's, where the modern urban life with its blinking lights and self-assertive steady flow of information is supposed to create a blasé attitude in the streetwalker, whose nerves become exhausted by the exposure.¹²

McLuhan proposes that we have to numb something in ourselves to make our extensions work. For example we have to stop lifting with our arm in order to steer the lever etc. We can't do anything but accept amputation as a part of our elongation when it comes to technology. McLuhan's theory is severely haunted by technological determinism. The bodily extensions that make up society have been created by mankind in order to maintain an existing equilibrium. In the pre-medial society the extension process seems to have been a part of mankind's natural development.

The really dystopia invoking problem to McLuhan is that the late extension of the central nervous system seems to have numbed our consciousness:

With the arrival of electric technology, man extended, or set outside himself, a live model of the central nervous system itself. To the degree that it is so, it is a development that suggests a desperate and suicidal autoamputation."¹³ "[...]we have to numb our central nervous system when it is extended and exposed, or we will die."¹⁴

In the case of the modern mediated culture, there seems to be no way back to a peaceful and “more originally human” Eden-like existence. The modern extensions of man is not only itching prostheses, but numbing prostheses.

The man-world relation as prosthesis

Contrary to any technological determinism the American philosopher of science, Don Ihde, views technology as something that both effects culture and something that culture effects. Ihde puts technology in the very centre of the phenomenologic philosophical problem; as something that pin-points the relational aspect of mankind’s being in and with the world. Ihde means that the embodiment of one’s praxis through technologies ultimately is an existential relation with the world.¹⁵ The embodiment of technology hereby becomes the very relation that is the central aspect of his phenomenologic investigation.

Ihde means that there is prosthetic technology that has been proven to be well suited for embodiment, such as glasses. This kind of technology can “withdraw” to a transparency when used.¹⁶ There are moments when the bearer of glasses doesn’t think of himself as a glass-bearer. But then, on the other hand, this wish for transparency and withdrawal does not work equally well on other types of technology:

There is also a deeper desire which can arise from the experience of embodiment relations. It is the doubled desire that, on one side, is a wish for total transparency, total embodiment, for the technology to truly “become me”. [...] The other side is the desire to have power, the transformation that the technology makes available. [...] The desire is, at best, contradictory. I want the transformation that the technology allows, but I want it in such a way that I am basically unaware of its presence.¹⁷

There is a certain frustrating tension between the aspiration for power and the aspiration for transparency in Ihde’s description of this relation¹⁸ which is similar to the one described by Freud above. According to Ihde this frustration caused by an ever attaching quasi-transparency, and a feeling of ambiguity since the experienced sensation that is evoked combines an unwanted feeling of reduction with a feeling of extension, is present in most human-technology-world relations.¹⁹ The process of technological embodiment necessarily contains a certain amount of resistance, which makes the technology into a *quasi-other* or to

an other to which I relate”.²⁰ This could perhaps be compared to Freud’s concept of *das Unheimlich* where the experience of something well known is suddenly altered, which provokes a feeling of creeping uncanniness or alienation. The experience of the world is partly mine, but it also belongs to *an other to which I relate*, and is as such not totally mine to control and recognise as my own.

The intersection and what to do with it

McLuhan saw the amputational or reducing aspect of technology as located in a psychological mechanism responding to a technical development not designed for mankind to rightly manouver. In Idhe’s view this transgression from extension to reduction is instead found in the very phenomenologic relation between man and world. Man wants to be one with his experience of the world through technology, but can never be because he is dependent on a mediator to get the experience. It is in his relation to his relation to the world we find the failure of harmonic extension.

Thus, it seems as if it is in man’s thoughts around the prosthesis where this amputation or feeling of reduction has its base. Mankind is able to reflect upon this relation, and when the pure phenomenologic experience of the world clashes with a more hermeneutic process – the amputation begins. Technology “[...] retains its unique role in the human-technology continuum of relations as the medium of transformation, but as a recognizable medium.”²¹ This could be compared to McLuhans well-known statement “the medium is the message” where no human reflection is considered as part of the experience process. Instead the autonomous medium totally dupes mankind and make them forget cognitive steps where reflection about mediation and information should normally occur. With McLuhan technology numbs people. With Idhe it instead gives a great opportunity to consider phenomenologic questions about the relation to the world. Ihde and McLuhan’s theoretical approaches to technology as prosthesis differs widely on this important point: the view of

mankind's potential to make use of new technological situations. The dystopic tune of Heidegger's concerning the transformation in the relation between mankind and his being, is fully developed with McLuhan – where the relation nearly ceases to exist in some paralysing numbness compared, in his words, with suicide. Ihde, on the contrary, makes the effects of the technical development to a triumph for phenomenology, who got itself a perfect case to study, and potentially a larger popular interest in the phenomenologic ideas around mediation of the human relation to the world.

Photography; the creation of a prosthesis

When the new invention of photography was publicly presented in 1839, one of the most important foreheld aspects of the new medium was its capacity to reproduce nature without man's direct involvement in the reproduction process. Chemistry, the sun and nature itself worked together to create a sort of ontological portrait of nature and things, that were believed to really reveal the truth of these objects.

As photography was thought to provide access to ontologic knowledge, the consensus was total over photography's future meaning for science. It did not take long before these prophecies became reality and photography had been made the central tool for science, and as such a "witness to truth". Photography became essential for the formation of, for example, astronomy and biology.²² Important in the scientific discourse around photography is the common antropomorphic analogies made between the eye and the camera. Both this antropomorphism and the status of photography as a witness to "truth" is seen in the president of the Royal Academic Society, W. De W. Abney's proclamations of 1895:

this year the eye has to hold a subordinate place, giving way to the photographic plate as a recorder. [...] for a study of the heavens its retina is capable of receiving more accurate impression than that sensitive surface that lines the eye, and which transmits impressions to the brain, more or less tainted with preconceived notions.²³

During the late 1870's the American photographer Eadweard Muybridge successfully captured instantaneous motion in a series of plates. The momentaneous motion of a galloping

horse, never seen before, was presented step by step. The camera could freeze time. A reviewer of Muybridge's first exhibition states how the prior erratic conception of movement was due to

"the impossibility of the unaided eye to convey correct impression to the brain [...]". The grand discovery of an eye which would catch, and a plate which would register the most evanescent of movements, has enabled us to comprehend what was concealed before".²⁴

The contrast between the "naked eye" and the eye equipped with photographic aid was frequently stressed, always to the detriment of the naked eye, which was degraded to an eye of the second range.

The discovery of x-rays in 1896 by means of photographic plates, and experiments showing that the photo plate could record ultraviolet and infrared light, totally invisible to the naked human eye, accelerated the degradation of the naked eye and further increased the dreams of visual expansion. New worlds and dimensions of research were opened. By aiding the human eye with "an eye that would catch the most evanescent of movements", the humanity would soon enjoy visual control. The human eye, with its new prosthesis, appeared unstoppable.

But, as always, there is a dark side to the moon. The opening up of new dimensions brought with it a sense of anxiety of facing the unknown. Walter Benjamin summoned photography's effect on mankind in "The Artwork in the Age of Mechanical Reproduction" from 1936 as follows: "the camera introduces us to unconscious optics as does psychoanalysis to unconscious impulses".²⁵ The door into the unknown was now open, and only the camera eye could see something in the dark that hovered behind it. Without the new prosthesis, man could not navigate in his newly revealed world.

In the article "The Aim and Future of Natural Science", published in *Science* in 1890, the glory and triumph of the progress of science through the photographic medium is haunted by a slightly anxious tone:

So, too, when we find upon the photographic plate the prints of stars so far away that we cannot see them even in our most powerful telescopes [...] we feel ourselves almost in the presence of infinity itself. Is there no end to the universe, no point beyond which there do not stretch worlds on worlds? Will the science of the future answer this? Who can tell?²⁶

Could the new dependence on technology be healthy? What to do with all the new information collected? And, most important, what kind of world did the new technology describe? Besides this fear of information overload, voices were also raised against photography's lifelessness and its static reproductions of reality.

When it came to reproducing reality, the photographic methods did not suit all scientists equally well. Geographers using photographic technique for mapping rated it as "the least perfect" since "it gives permanence to images in either an increased or diminished ratio; distance, foreshortening, and perspective".²⁷ The ideal image, the perfect reflection, was too little dynamic in its static reproduction.

Nor did the new true ontologic dimension that had been revealed appeal to people like John Ruskin who found photographs to be lifeless reproductions. Ruskin, who was to become a determined opponent of photography, dismissed them as: "[...] popularly supposed to be 'true', and, at the worst, they are so, in the sense in which an echo is true to a conversation of which it omits the most important syllables and reduplicates the rest."²⁸ Maybe Ruskin condemned photography for the same reason that Walt Whitman found it peculiar to be surrounded by portraits: "Phantom concourse – speechless and motionless, but yet realities. You are indeed in a new world – a peopled world, though mute as the grave."²⁹

Maybe new dimensions had been opened, but some dimensions had been subtracted. Where were the colours, the movement, the life, and the dynamic world known to the human eye? If the newly discovered and more "true" ontologic reality was invisible to the human eye, then what did the human eye see? The camera had created an epistemological crisis.

The desire to create an extended eye of the camera that could reach into an ontological sphere thus fell a bit short when applied to an everyday context. The

reproductions of reality were only semi-recognisable as known reality. The new eye made, despite all effort to make it embodied, the camera and its product eventually to represent *an other*. In fact, this seems to have happened because of these embodying attempts. The extender was never assimilated, and as it did not, it constituted a constant reminder of its existence as such. Man had become dependent of his elongation to make sense of the new world order they together had discovered. The hopes of creating an extender grew into a kind of amputation of the experience of the world: the camera had become *a prosthesis*.

The post-modern embrace of the amputation

If one takes a leap to postmodern photo theory, the prosthetical view of the camera is everywhere to be seen. In fact it could be said to be the very common ground for theorists like Roland Barthes and Jacques Derrida when writing on photography. The harmonic extension of senses, has been removed from the camera discussion. The photograph is instead something which entraps its viewer in an intermediate position between image and referent, or with Barthes' words: "neither image nor reality, a new being, really: a reality one can no longer touch."³⁰

Both Barthes and Derrida focus on the photograph's ability to transfer the viewer to this place in no-man's-land located somewhere between image and reality in Barthes's case, and a place which Derrida describes as a ghostly limbo between picture and referent. For Derrida, the experience is depicted as a physical transition:

[...]it is something else, a bit come from the other (from the referent) which is found in me, in front of me but also in me like a bit of me (since the referential implication is also intentional and noematic; it belongs neither to the sensible body nor to the medium of the photogramme).³¹

This quotation directly describes the effect of the feeling of Ihde's quasi-otherness, and also the concept of *Das Unheimlich*. It is the tension of photography's resistance to embodiment and its simultaneous resistance to intellectualisation that form the essence of Derrida's lived experience with the photograph.

The very amputation is here in the centre of the discussions about the camera medium. Present is an insight that it is not the world known to the human eye that is seen, a knowledge of a dependence on a tool to see it again, a sense of entrapment between the referent and the picture and a feeling of never truly reaching out to reality though one has left the subjective sphere and entered a partly objective one.

This amputational aspect of the photography act is overwhelming in many of the reflections of the photographers of the 1970's. The American photographer Duane Michals' feelings of reduction is clearly seen in his note "A failed attempt to photograph reality" from 1975:

How foolish of me to believe that it would be that easy. I had confused the appearance of trees and people with reality itself, and I believed that a photograph of these transient appearances to be a photograph of it. It is a melancholy truth that I can never photograph it and must always fail. I am a reflection photographing other reflections within a reflection. To photograph reality is to photograph nothing.³²

The world is, for Michals, an illusion. Every attempt to capture reality is vain, especially through visual documentation since it will not reach any further than to the illusive surface of things. Photographs of things in the world are not showing reality. Reality is avoidant of any documentation. To Michals reality is presence, a multitude of simultaneous sense experiences, something that could never be captured with the redundant technology of photography. Instead it is the very act of being in the world that makes up the only true reality:

I am writing this to you in my thirty-ninth year. It is the twelfth of June, 1971, and as I sit here I can feel the warmth of the sun through the window, and the only sound is the buzzing of a fly against the glass. I can feel my breathing. I am in the midst of consciousness, this life. Everything before has dissolved to this moment, and this too will become memory instantly.³³

The redundancy of photography as a representation of reality that haunts the medium, becomes thematic in many of Michals' works. By submitting a textual account of everything the photograph has left out in his lived experience of reality, Michals' photograph *There are things here not seen in this photograph* becomes a sort of photographic emblem of Whitman's and Ruskin's opinions about photography's static representations of the liveful reality, and its inability to transfer anything more than a visual surface to the viewer.

There are things here not seen in this photograph



*My shirt was wet with perspiration.
The beer tasted good but I was still thirsty.
Some drunk was talking to another drunk
about Nixon. I watched a roach walk
slowly along the edge of the bar stool.
On the juke box Glen Campbell was
singing "Southern Nights". I had to go
to the men's room. A derelict began
to walk towards me to ask for money.
It was time to leave.*

There are things here not seen in this photograph, 1977

My shirt was wet with perspiration. The beer tasted good but I was still thirsty. Some drunk was talking to another drunk about Nixon. I watched a roach walk slowly along the edge of the bar stool. On the juke box Glen Campbell was singing "Southern Nights". I had to go to the men's room. A derelict began to walk towards me to ask for money. It was time to leave.

Instead of being representations of some objective reality, photographs for Michals are things that remotes the photographer and the beholder from reality. He describes his own changing experience of reality due to his photographic practice as "[...] some kind of growth but I find it frightening because I'm losing things out of my life that my ego can't account for. [...] The familiar is becoming unfamiliar."³⁴

Photography's uncanny effects on Michals has put him in the ghostly limbo experienced by Derrida, and in the "new reality one can no longer touch" as expressed by Barthes. This uncanny alienation from the world is provoked by the camera medium that refuses to withdraw, to speak with Idhe, from the experience of the relation with the world, and instead constantly reminds of its prosthetical quasi-otherness in its role as mediator between, in this case, Michals and reality.



Selection from *The Spirit Leaves the Body*, 1968

Michals is perhaps best known for his photographic series of magical or mystical narratives, such as "The Spirit Leaves the Body" (1968) or "The Bogeyman" (1973). Through these series Michals makes use of his insights into camera's function as a quasi-other, and a

recorder of the illusive. Since no external reality is ever able to capture in Michals' view, he instead turns to his inner experiences, such as dreams, fears and imaginations. These are then told through series of staged photographs, sometimes with text scribbled underneath the pictures. Double-exposures are often used when ethereal bodies or fantasy creatures appear in the narratives.

The Spirit Leaves the Body is a narrative documentation of a spiritual transcendence and *The Bogey Man* shows a little girl becoming aware of a sudden fear of that the coat hanging next to her should become animated. After a control of the coat she securely falls asleep, only to be carried away by the now animated coat. In both these series the camera becomes a recorder of ethereal, uncanny or nightmarish dimensions not commonly referred to as visual reality. By using the photographic medium with its long history of being viewed as an extender of human vision and an objective truth sayer, Michals both plays with the conception of the borders of reality and with the conception of what the photographic medium really is. Michals shows how the camera records the images where the girl is awake and those where she has fallen asleep and dreams in the same objective way. But by doing this the medium either undermines its objective reliability or shows that the boundaries of reality are arbitrary.

The uncanny aspects of the photographic medium are in Michal's work highlighted through his play with seeing visual unrealities, or as he himself calls them; "real dreams". This practice can be seen as the ultimate overthrow of scientific objectivity seeking by photographic means. Instead of troubling with the elusive reality, Michals concentrates on taking pictures of the limbo-like dimension of the quasi-other intersection of redundancy and extension which the prosthetic photographic medium is carrying within itself. Michals has by this orientation towards his "real dreams" embraced the idea of camera as a prosthesis, a development that well fits into the theoretical postmodern photographic discourse about the ontology of the medium.



Concluding remarks

If seen with Ihde's eyes the historical example of the camera shows how it is a technology that could not withdraw from the experience of the relation between mankind-world. This created an ambivalent, slightly anxious, relation to the new medium: the powers from it was wanted, but wanted in such a way that one could be "basically unaware of its presence". As the technical development of the camera progressed, the further it removed itself from the capacities of the human eye. And at some point this experienced ambivalence was accepted as an essence of the camera medium itself.

Ihde's theory lies at the core of the postmodern reflections on the camera medium, which can be seen in Barthes', Derrida's and Michals' accounts. The camera is found to produce the ambivalence significant for prosthetics. Ihde's point that technological development, which alters the relation between mankind and its world, could encourage studies into the phenomenological problems is definitely shown in photo theory of the early post-modernism. It is the relation to technology (the camera) as a mediator between man and his world that is in focus in these discussions. This technology has not numbed its public, as in McLuhan's dystopic prophecies.

Maybe there is a certain time interval after the launching of a new medium which is comparable to shock with an after following numbness? As an introduced prosthesis which, through its extension into the world, paralyses for a while before it starts to itch. When it has grown on so much that it has created a desire to become one with it, one is ready to start annoy oneself about it, and reflect upon its reductive effects and the effect it has on one's relation to the world. At that stage it is accepted as a prosthesis and has become a well suited empirical study object for phenomenologic philosophy.

¹ Heidegger, Martin, *Parmenides*, Bloomington and Indianapolis: Indiana University Press, 1992 (1982), p.85

² Maillet, Arnaud, *The Claude Glass. Use and Meaning of the Black Mirror in Western Art.*, New York: Zone Books, 2009, (2004), p. 53

³ Flusser, Vilém, *The shape of things: a philosophy of design*, London: Reaktion Books, 1999 (1993) p. 51

⁴ Flusser, p.44

⁵ Freud, Sigmund, *Civilization and its Discontents*, New York: W.W. Norton Company, 1962 (1930), p. 38f

⁶ McLuhan, Marshal, *Understanding Media: The Extensions of Man*. New York/Toronto/London: McGraw-Hill Book Company, 1964, p. 119

⁷ Ibid., p. 123

⁸ Ibid., p. 90

⁹ Ibid., p. 103

¹⁰ Ibid., p. 103

¹¹ Ibid., p. 42

¹² See for example Simmel George, "Infelices Possidentes! (Unhappy Dwellers)", 1893, in Frisby David and Featherstone Mike (eds.), *Simmel on Culture*, London: Sage Publications, 2000 (1997), pp. 259-262

¹³ McLuhan, *Understanding Media: The Extensions of Man*, p. 43

¹⁴ Ibid., p. 47

¹⁵ Ihde, Don, *Technology and the Lifeworld. From Garden to Earth*. Bloomington and Indianapolis: Indiana University Press, 1990, p. 72

¹⁶ Ibid., p.73

¹⁷ Ibid. p.75

¹⁸ Ihde, Don, *Bodies in Technology*. Minneapolis: University of Minnesota Press, 2002, p.14

¹⁹ Ihde, Don, *Technology and the Lifeworld. From Garden to Earth.*, p. 75f.

²⁰ Ibid. p.107

²¹ Ibid. p.106

²² Tucker, Jennifer, *Nature Exposed. Photography as Eyewitness in Victorian Science*. Baltimore: The John Hopkins University Press, 2005, p. 159ff.

²³ Block, David L. and Freeman, Kenneth, *Shrouds of the Night: Masks of the Milky Way and the Awesome New View of Galaxies*. New York: Springer, 2008, p. 125

²⁴ Review from *San Francisco Call*, 5/5, 1880, reprinted in Weaver Mike and Wolf Daniel, *The Art of Photography: 1839-1989*, New Haven: Yale University Press, 1989, p. 142

²⁵ Benjamin Walter, "The Work of Art in the Age of Mechanical Reproduction" in *Illuminations. Essays and Reflections*, New York: Schocken Books, 1968, p.237

²⁶ "The Aim and Future of Natural Science", *Science*, Vol. 16:404, 1890, pp. 239-244

²⁷ Bellas Greenough, George, "On an Improved System of Mapping", *Journal of the Geographical Society of London*, vol.11, 1844, pp. xxxix-lxxvii

²⁸ Ruskin, John, "Cestus of Agalia" (1865), reprinted in Rabb, Jane M., *Literature and photography. Interactions 1840-1990*, University of New Mexico Press, 1995, p. 113

²⁹ Whitman, Walt, "'Visit to Plumbe's Gallery', July 2, 1846", reprinted in Rabb, Jane M., *Literature and photography. Interactions 1840-1990*, University of New Mexico Press, 1995, p.21

³⁰ Barthes, Roland, *Camera Lucida*. London: Vintage, 2000 (1980), p.87

³¹ Derrida, Jacques, "The deaths of Roland Barthes", in Silverman, Hugh J., *Philosophy and Non-Philosophy since Merleau-Ponty, Continental Philosophy I*, New York/London: Routledge, 1988, p.282

³² Note reprinted in Michals, Duane, *Photographs. Sequences. Texts 1958-1984*, Oxford: Museum of Modern Art, 1984, p. 105

³³ Michals, Duane, *The Journey of the Spirit after Death*, Winter House Ltd: New York, 1971, p.1

³⁴ Michals Duane, *The Photographic Illusion: Using the camera as the minds eye*, Thames and Hudson: London, 1975, p. 40