Photography: The Go-between of the Record

From now on, matter would at last be mastered without any illusion of ruling or inherent powers, of hidden qualities.¹

What I have described so far is a history of a concept of image as record. But an image is not the same thing as a record. We can talk about photographs or film-recordings as records. Pictures drawn in a camera obscura can also be called records. And even paintings and drawings can meaningfully be called records. My starting-point for this chapter is that the status of the image as record cannot be dependent on the medium of depiction. Rather they become records through their use. It is in relation to what we do with images that they get their status. In the examples I have discussed, in natural science and specifically in astronomy, it was the requirement to establish an unbiased form of observation that gave us visual records. This is what I have tried to articulate so far by pointing out that the idea of species and the idea of the retinal image in one sense already had established an idea of an image that is a neutral recording of the visual field, even before the advent of photography. Furthermore these ideas where connected to actual depiction in the perspectivist painting. This said, photography and the discourse around this medium, holds a special place in this discussion.

Photography has often been conceived as an indexical picture, it has been said to be a trace of the object due to the fact that it is brought about through a process in which light that is reflected from the actual object in nature, inscribes the image on the photographic paper.² What this view entails is that only the photograph can be a proper record, since it essentially is a recording of/by light, whereas other forms of depiction: engravings, paintings, etc., are man made reproductions of the colors and forms in the visual field. As Roland Barthes puts it: "Photography was "in itself," by what essentially feature it was to be distinguished from the community of images"³. My issue with this idea is that it actually entails that the photograph constitutes the standard for visual records, and that all other forms of depiction are essentially something else. In Barthes’ meaning other forms of depiction give us merely images, whereas photographs are something beyond the status of image. What I want to make clear in this chapter is that photographs, and photography, held a similar position in the discourse about the epistemology of the image, as did the idea of species and

¹ Theodor Adorno and Max Horkheimer, Dialectic of Enlightenment (Verso 1979), p. 6.
² For an elaborate example of this idea, see Roland Barthes, Camera Lucida (Hill and Wang 1981), p. 80-82.
the idea of the retinal image that I have dealt with in the former chapters. When photography came about it gave rise to similar sensibilities that Barthes expresses when he conceives the photograph as something beyond image. My point is that this idea will be inhabited by similar misconceptions as the idea of the species and the idea of the retinal image.

In this following chapter I will be concerned with the history of the invention of photography and the scientific milieu around it. The questions concerning the status of the image will continue to provoke discussions during this time. The invention of photography introduces a new kind of image that is conceived to be better suited for use as record compared to earlier forms of depiction. It cannot be refuted that in a sense photographs are products of an automatic process. However, the problematic assumption that sometimes follows this definition of photography is that they, because of their automatic origin, somehow sidestep human involvement. This assumption is common both for the inventors of photography and many of the most influential 20th century theorists on photography. For example, André Bazin writes: "For the first time an image of the world is formed automatically, without the creative intervention of man [...] . All the arts are based on the presence of man, only photography derives an advantage from his absence." But, what could it possibly mean to sidestep human involvement? Does this sidestepping leave us with a pure visual record, that which is left when all human judgments and conceptions are left aside? As I have shown earlier this cannot be the case, since if photography was all this, when it is seen, it is again brought back into the world of human understanding. As Donald Evans puts it: "If the camera is to be said to see anything at all it can only be said to see what the viewer of the photograph can see". In this sense the idea of a pure visual record is misguided. The whole idea of an image that exists somehow beyond, or despite human perception is absurd. However, as I have shown earlier, and as I will continue to point out in this chapter on photography, there is a persistent desire within western science and philosophy, to construct an outer view, a view from beyond the human.

This desire is linked to a bundle of other pivotal philosophical questions that I have addressed earlier. Problems within the classical and early modern theory of vision stemmed from the fact that in order to rationalize the visual field scientists like Euclid, Al-Hazen and Kepler, to some extent disregarded what can be called subjective vision. As long as this reduction was deliberate it did not necessarily entail problems. Kepler did not claim

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that subjective vision does not exist, rather he suggested that in order to understand vision and observation better, it might be fruitful to see what can be said about the visual faculty without taking subjective experiences of vision into account. That is, that which can be said about vision from a third person perspective, that which we still can agree upon if we stick strictly to this perspective on vision conceived as a phenomenon in nature, not as an experience. The same line of thought was applied to science in general. The method of choice for the natural sciences was to figure out what science can say about objects when we disregard the different roles they play in our everyday life. The task of science was to construct an understanding of reality that was not relative to different personal experiences, opinions and earlier theories. It is in this ideology that the idea of an image as record becomes paramount, but at the same time this idea carries with it a temptation to forget about the inevitable involvement of the self in seeing. What happens when we get carried away by this temptation is that our concepts start to get jolted and unsolvable paradoxes start to announce themselves; expressions beyond language, images beyond human perception, a world picture as seen from the view of nowhere, etc. These are conceptual failures, failures in meaningfully thinking and talking about the concepts of the image, record, judgement and the self. It is important for me to continue pointing out how these failures occur, from where they appear and what they consist of.

It is in our thinking, in a theory of perception, not in actual perception that we establish this rift between the objective and the subjective. So the rift is a theoretical tool not an actual state. (See also L.W, P.I. II, xi, p.212) This line of thought is articulated by Merleau-Ponty who points out how this discrepancy between a certain theory or philosophical system and our understanding of vision in our subjective experience, is a consequence of the presupposed rift between mind and body. Merleau-Ponty writes: "Here, for the first time, we come across the idea that rather than a mind and a body, man is a mind with a body, a being who can only get to the truth of things because its body is, as it were, embedded in those things."6 The world of perception is then: "a world in which being is not given but rather emerges over time."7 The theory of a rift between mind and body cannot account for how we as perceiving and experiencing beings are involved in the world, how this involvement is a process. The view of Merleau-Ponty entails that objects are not merely bundles of given qualities, forms, colors, odors, sounds etc. They have a meaning for us that develops over

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7 Merleau-Ponty 2005, p. 54.
time, through our relationship to them and our interaction with them. The relationship between
the perceiver and object is a dynamic one. This relation cannot be exemplified by an
instantaneous snap-shot of the visual field as Locke or Kepler would have it. Bill Nichols
points out this discrepancy: “Seeing” involves our experience, conception, memory and
judgement. How I see something reveals something about who I am. But a picture cannot
carry with it a theory of how it is to be viewed, a concept cannot be illustrated.\(^8\) When we try
to understand what it means ‘to see’, it becomes evident that the philosophical branch of
empiricism, at least the generic form of it that uses the concept of image as a model for
understanding, has completely missed the mark while trying to explain perception. The idea
of record does not make any sense if it is taken to serve as a model for how we see.

Still, this construction of an ideal of objectivity as well as the practice of
constructing new visual aids and recording technologies will continue to strive during the
beginning of modernity. Photography and several other technological inventions are both
constructed and used by the scientists of 19\(^{th}\) century. During
this time the likes of Etienne-Jules Marey, Ernst Mach and Francis Galton, among many
others, study a vide range of phenomena, from locomotion, cardiology, aeronautics to
sociology, anthropology and psychology, by the means of automatic apparatus. These
scientists do not only use the technology of photography. They also perfect, modify and adapt
the invention that was first set forth by Nicéphore Niépce, Fox Talbot and L. J. M. Daguerre.
In many senses Marey, Mach and Galton pick up, not only the technique, but also the
expectations and predictions of the pioneers of photography. The photographic technique that
can be used for a variety of different forms of depiction has a scientific aura about it that has
to do with its convergence with an ideology that strives to find truth, ”beyond the limits of the
human”\(^9\). This ideology is brought forth by the new doctrine of positivism during the 1830’s.
Positivism constructed a ‘view from nowhere’ that was alien in comparison to the subjective
world of perception; that of phenomenal space and time. It is exactly this alien aspect that
appeals and reawakens hopes and expectations of a new science and a new worldview. But
again the underlying assumption of a view from beyond the limits of the human continued to
muddle 19\(^{th}\) century understandings of vision, image, record and the subject.

\(^8\) Nichols, Bill, ““Getting to know you…”: Knowledge, Power and the Body”. In Renov, Michael (ed.)
\(^9\) I have borrowed the expression from Germaine Dulac as quoted in Hannah Landecker, “Microcinematography
The View from Nowhere

For Bacon and his contemporaries, and even for George Berkeley in the 18th century, God was a superior observer, because this omnipresent being was a guarantor of the existence of the perceivable world. This idea is reproduced in positivism, that is, the positivists understand the human senses as far too weak, too tied up with subjective conceptions or too inattentive to grasp the workings of nature. But instead of God the positivists turned to the automatic machine as a superior observer. In the absence of God, the record was required in positivist theory to grant an external view on nature: physics, chemistry and the new discipline of sociology. What these machines did was that they introduced a kind of "automatic seeing" that could promote a scientific view on phenomena. In this sense positivism was purely ideological. By means of visual recording, the observational gaze of science was brought into a public domain by the reproductive capacity of photography and later film. Tom Gunning brings up this relation between the invention of cinema and other inventions that were used, not only to record, but also to transform our understanding of human life. He writes: "Cinema emerged within a welter of new inventions for the recording or conveying of aspects of human life previously felt to be ephemeral, inaudible, or invisible: the telephone, the phonograph, or the X-ray are only a few examples." The scientific method of detached observation was brought into a larger social context and the recording and reproductive capacity of the camera enabled this development. In this sense positivism was not strictly a disciplinal movement within science. It was an attitude that privileged the scientific way of seeing. It also had an impact on how we as perceiving subjects understand the world. Jonathan Crary describes this as a part of a "massive reorganization of knowledge and social practices that modified in myriad ways the productive, cognitive, and desiring capacities of the human subject." The new machines and the doctrine of positivism taught us a new way of looking at things. Or, maybe more precisely, they gave us means to popularize a scientific view, in a way that was not possible earlier. What is interesting for my purposes in

10 In Berkeley’s dialogue between Hylas and Philonous, Philonous claims: "To me it is evident, for reasons you allow of, that sensible things cannot exist otherwise than in mind and spirit. Whence I conclude, not that they have no real existence, but that seeing they depend not on my thought, and have an existence distinct from being perceived by me, there must be some other mind wherein they exist. As sure therefore as the sensible world really exists, so sure is there an infinite omnipresent spirit who contains and supports it." George Berkeley, The Works of George Berkeley Bishop of Cloyne, Volume Two, edited by A. A. Luce and T. E. Jessop (Thomas Nelson and Sons Ltd. 1949), p. 212.
the transition to modernity is a shift toward an even more rigorous skepticism toward subjective vision. When photography and later film, along with the new doctrine of positivism establishes an idea of an external view upon, not only natural phenomena, but also human life, it is a shift towards an understanding in which the self becomes a source for puzzlement. As if we would not have known our selves properly before.

A change in epistemology, a shift in the theory of knowledge was the essential impact of this development. I will articulate how this change also had an impact on the conception of the image, but in order to get there, I will first articulate how the epistemological development first got on its way. There is a certain familiar misconception in positivism that will on the one hand cause similar confusions concerning the status of the image that I have described earlier. On the other hand positivism’s disbelief in a God-given natural order will take these confusions to another level. In his *Positive Philosophy* Auguste Comte describes the evolution of science as a progression that is linked to the development of human intelligence. He proposes that there are three stages in this development of the mind: the theological, the metaphysical and the positive. These three concepts signify three methods of philosophizing. He sees as his task to outline the last stage, the positive. In a peculiar way, questions concerning vision, observation and the record, are at the core of this new doctrine. Although positivism is understood as a novel way of philosophizing in comparison to the older metaphysical doctrines, as a discipline, it still requires the concept of the go-between. However it is a different kind of go-between. Comte writes:

The Positive Philosophy, which has been rising since the time of Bacon, has now secured such a preponderance, that the metaphysicians themselves profess to ground their pretended science on an observation of facts. They talk of external and internal facts, and say that their business is with the latter. This is much like saying that vision is explained by luminous objects painting their images upon the retina. To this the physiologists reply that another eye would be needed to see the image. In the same manner, the mind may observe all phenomena but its own. It may be said that a man’s intellect may observe his passions, the seat of the reason being somewhat apart from that of the emotions in the brain; but there can be nothing like scientific observation of the passions, except from without, as the stir of the emotions disturb the observing faculties more or less. It is yet more out of question to make an intellectual observation of intellectual processes. The observing and observed organ are here the same, and its action cannot be pure and natural. In order to observe, your intellect must pause from activity; yet it is this very activity that you
want to observe. If you cannot effect the pause, you cannot observe; if you do effect it, there is nothing to observe.  

In this passage Comte introduces several important notions that are dominant in 19th century philosophy and science. He quite rightly criticizes the theory of the retinal picture as a source of our knowledge. The fact that a picture requires a set of eyes in order to be seen proves the incomprehensibility in the idea of the retinal picture as a model for our knowledge. On this point he distances himself from all the Keplerian and Lockist optical metaphors for knowledge and understanding. But in general he shares the empiricist understanding in which the subjective only confuses pure observation. That is, he understands the fallacy in the camera obscura metaphor for our understanding, but at the same time he is drawn to the core idea that it entails. Comte does not deny that there is an internal reality of affects or feelings, but he claims that, due to the misconceptions of earlier metaphysical philosophy, the subject has not yet had proper, scientific access to it(self). Here the emphasis concerning knowledge is another than in Descartes epistemology in which: "this me – that is, the soul by which I am what I am – is completely distinct from the body: and is even easier to know than is the body; even if the body were not, the soul would not cease to be all that it is". Again here occurs a generic philosophical pattern of a split in the concept of knowledge. Descartes claims that we know our soul, his dilemma is how to explain how we know the material extended world. Comte’s problem is the opposite, how to extract observational and objective knowledge of the subject. The challenge for this positivist approach is anthropology, the science of the nature of man. How can we gain knowledge of human phenomena, when our point of observation is from within that which is human? This will become the problem that positivism and the era of the new empiricism will see as its’ task to solve. Comte’s requirement of a point of view beyond the human perspective is however problematic in exactly the same way as the Cartesian rift between mind and body. They are both built on the same structure.

Descartes, when he states that he can know the self completely, that the self is accessible for the I in a transparent way, invites the so called homunculus problem. That is, if the I can perceive the self, and by perceive we mean literally visual perception as the camera obscura model would have it, then there are already two perceiving instances, the I and the self. This would then again require a third and a forth, etc., set of eyes, thus ending in an endless

regression. This error is not primarily due to Descartes philosophy, it stems from the visual metaphor. When Comte talks of the impossibility to observe the self, because in this case the perceiver and the perceived would be the same faculty, he could go the way of not accepting this model of the self. But when he goes on to take this, the problem of accessing the self objectively, to be a real problem and furthermore build up his epistemology and the whole science of anthropology on this dilemma, he reveals that he accepts the model. He really thinks that science has to find a way to access the subject from an objective viewpoint. However, what Comte gets wrong is that these two perspectives do not stand in contrast to one another, on the contrary they consolidate the same solipsistic conception of the self. All discourse that understand knowledge and understanding as primarily in some way or another consisting of a relationship between object and subject, look past how we essentially know the world or what knowledge essentially is for. That is, it is something that exists because we share this world with other subjects, i.e. it stems from relations between subjects. There is then nothing problematic about an intellect that observes passions. The only situation in which such a perspective would be impossible would be if we could count out all other living beings from our experiential world.

My point here is not to explain the relation between the epistemology of Descartes and Comte, but to point out a discrepancy that, despite Comte’s attempt to rid positivism of metaphysics, inhabits both his and his predecessors understanding of the subject. When Comte writes "as the stir of the emotions disturb the observing faculties more or less", he tangles himself up in a problem that he thinks he can solve by emphasizing the importance of scientific observation. He sets out from a paradox in which emotions constitute something that will soil the pure observation and that this is inevitable since the visual faculty is inhabited by these passions by necessity. This opens up for a requirement of a form of scientific observation that is beyond the subject. Like Kepler, who talked about pictures as opposed to images, since he understood images as distorted because they where a compound of the visual input and of that which reason adds on to this input, or like Bacon who professed that "the great error of the senses" stems from the fact "that they set the outlines of things by the pattern of man"17, Comte also conceives the effect of the subject as something that distorts observation.

But he also makes another point when he states that the intellect cannot observe itself since then the observer and the observed are the same. Without a distance between the

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observer and the observed, observation is impossible. There can then be no observation without there being two different entities because sight requires distance. On one hand Comte sees the subjective as something that distorts pure observation, on the other hand he acknowledges that the subjective is an integral part in perception. Comte’s assumptions are paradoxical since if the subject by necessity influences the observation it is misleading to conceive it as either pure or distorted. If purity means a perception unconditioned by the subject and we agree that this is impossible, then there is no purity or any corresponding distortion. This would be a reasonable conclusion for Comte. But he fails to see the paradox in both holding that passions thwart observation and then confessing that the subject with her passions is inevitably entwined in observation of phenomena. He makes an attempt to address this by referring to a classical distinction between the passions and the intellect, as if they were two different entities, but this does not solve the confusion. Due to this line of thinking he constructs an intriguing paradox by pointing out that the intellect cannot observe itself, since in observation the observer and the observed cannot constitute the same entity. In this specific context it rings true that "In order to observe, your intellect must pause from activity” since "If you cannot effect the pause, you cannot observe; if you do effect it, there is nothing to observe". But of course this point only makes sense in the very specific circumstance. Only if the thing under observation is the very same intellect, like a camera that would try to photograph the automatic process of itself, does the point hold any ground. But even if we take this case at face value and admit that 'I cannot observe my self externally", this is not a problem, it is just stating what is not possible, in order to see the seer and the seen cannot constitute the same entity. Note how the visual metaphor is the source for confusion. Again an intriguing metaphor accumulates conceptual problems.

If we move away from the strictly optical discourse it is evident that Comte’s reasoning can be understood in a different, but maybe even more problematic way. His assumption that the intellect cannot “know” itself also carries existential undertones. From an example that builds on the problems that we might have understanding ourselves, due to the impossibility of the intellectual faculty to observe its own functions externally, he makes an analogy of how science should conquer the problem of the involvement of the self in observation. In this sense Comte establishes an ideal in which scientific, observational

18 St. Augustine makes this point brilliantly, he writes: “How could a picture of a horse be truly a picture if the horse were not fable? How could there be a man’s face in a glass, true as such, though not truly a man? So if a certain kind of falsity is necessary in order that there should be truth, why do we dread falsity and seek truth as a great boon?”. St. Augustine, The Soliloquies, in Alexander Sesonske (ed.), What is Art?, Aesthetic Theory from Plato to Tolstoy (Oxford University Press 1965), p. 96.
knowledge, even when we are concerned with our selves, has priority over the subjective. However confused this outset is the ethos of positivism points out the self as the problem for scientific observation and this will have vast consequences. For Comte sciences’ task is to erect an order and maintain that order, in an otherwise fragmented and chaotic natural world that includes a fragmented and chaotic psychology of the subject. He writes:

[…] the growth of humanity is primarily spontaneous; and the basis upon which all wise attempts to modify it should proceed, can only be furnished by an exact acquaintance with the natural process. We are, however, able to modify this process systematically; and the importance of this is extreme, since we can thereby greatly diminish the partial deviations, the disastrous delays, and the grave inconsistencies to which so complex growth would be liable were it entirely left to itself.\(^{19}\)

By “growth of humanity” he refers to its thought, feelings and actions. The task of science becomes then not only to discover or analyze these phenomena, but to control and unify them. He continues: “With this object in view the philosopher endeavors to co-ordinate the various elements of man’s existence, so that it may be conceived theoretically as an integral whole. His synthesis can only be valid in so far as it is an exact and complete representation of the relations naturally existing.”\(^ {20}\) Again here is an apparent contradiction at play. It is one thing to describe or re-present an order, another thing to establish one. Essentially Comte advocates the establishing of a totalitarian model that mimics an order given by nature.

Francis Galton, who was the father of psychometrics and eugenics, expressed a similar unease about the discrepancy between the actual physiological states in our consciousness and our knowledge of them. He writes: “We must be content to admit that our consciousness has a very inexact cognizance of the physiological battles in our brain”\(^ {21}\). By this Galton expresses a view according to which the subject is too inattentive and weak to understand the objective conditions of its’ self. The misconception that he claims to be common for us is that we think of our consciousness as a free will. Galton’s main argument in this particular essay is that a thorough systematic observation of the mind would leave us with the conviction that “man is little more than a conscious machine”\(^ {22}\), and that a mature perspective on ones self should reveal that humans are automatons.\(^ {23}\) The obvious problem in

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\(^{19}\) Auguste Comte 1973, p. 6.


\(^{22}\) Francis Galton 1884, p. 412.

\(^{23}\) Francis Galton 1884, p. 408.
both Comte’s and Galton’s constructed scientific view is that things do not add up. If we are but automatons, why would there then be a need to unify, rationalize or control the chaotic subject? If the will is \textit{not} free, why does it then need to be controlled? Comte fails to see the inconsequence here, instead he goes on to establish a view on science as a regulatory institution that should be able to construct such a point of observation that is external to the subjective. This idea is followed by an aim to establish a system. He writes: “We have now to proceed to the exposition of a system; that is, to the determination of the universal, or encyclopedic order which must regulate the different classes of natural phenomena”\textsuperscript{24}. In this case “natural phenomena” also includes human actions and human psychology. Positivism is then not only a new empiricist method for science. Comte also inaugurates a system of control for the self. In order to perceive the natural order as fixed, the ways of observation must be fixed. In order to achieve this, the positivist must understand the workings of his consciousness objectively. This view is connected to a major change in the understanding of vision that can be said to determine the step into modernity. Jonathan Crary writes:

The virtual instantaneity of optical transmission (whether intromission or extromission) was an unquestioned foundation of classical optics and theories of perception from Aristotle to Locke. And the simultaneity of the camera obscura image with its exterior object was not questioned. But as observation is increasingly tied to the body in the early nineteenth century, temporality and vision become inseparable. The shifting processes of one’s own subjectivity experienced in time became synonymous with the act of seeing, dissolving the cartesian ideal of an observer completely focused on an object.\textsuperscript{25}

It is also this understanding of the subject as shifting or unstable as opposed to the fixed container-like subject of Locke, that evoked new concerns about the accountability of the subject that I mentioned earlier. Crary describes how, from the perspective of 19\textsuperscript{th} century science the former philosophy with its camera obscura metaphor for understanding, naively conceived the relation between the observer and the observed as a stable state, in which vision signified the eyes capability of presenting the soul with a copy of the outer object. From Kant onward, this view was no longer viable. In the time of Comte the mind could no longer be conceived as a container of readymade sensations, but an active force that ordered the

\textsuperscript{24} Auguste Comte 1893, p. 14.
different fragmented experiences into a comprehensible order. Comte seems to understand the inevitable involvement of human judgement in observation that Kant articulated. Comte writes: “In a word, every phenomenon supposes a spectator: since the word phenomenon implies a definitive relation between an object and a subject”\textsuperscript{27}. In this sense we have no access to natural phenomena beyond the human ways of understanding them. Comte does not seem to be able to grasp how this assumption stands in contrast to his requirement of a form of scientific observation that grants an external view on human phenomena.

Despite its internal confusions, or maybe even due to them, positivism will have a vast impact on its time because of its redefinition of the overall epistemological framework. The shift in focus from an epistemology constituted on an idea of a fixed natural order to positivism that is based on an idea of nature as temporal and dynamic phenomena is expressed in Comte’s declaration: “the mind has given over the vain search after Absolute notions, the origin and destination of the universe, and the causes of phenomena, and applies itself to the study of their laws,—that is, their invariable relations of succession and resemblance”\textsuperscript{28}. Only through unification of the practices of observation will this ordering be possible. In this shift mathematics becomes: “the most powerful instrument that the human mind can employ in the investigation of the laws of natural phenomena.”\textsuperscript{29} In this sense mathematics is not part of the fabric of nature. It is not the order of nature, but an instrument that the intellect uses to establish an order in nature and society. The go-between for positivism is then not a readymade representation or a copy of outer objects, but a logical and classificatory mathematical method that unifies observation. It is not then an image or even representable by images, since axioms and rules are not visible. In this sense there is nothing new at all in Comte’s positivism. He continues, although reluctantly or even unknowingly the metaphysical path that Descartes, Leibniz and even Plato, have set out before him. The result of this is a science that seeks to standardize by looking for common denominators.\textsuperscript{30} The requirement of an external view is then not actually tied to the visual \textit{per se}, not to the actual eye of the observer, but to the minds eye that can supposedly categorize and rationalize the visual data. But, in a peculiar way, the visual record still has an important role in this venture. Visual data will become the raw material for this categorization.

\textsuperscript{26} Jonathan Crary 1992, p. 100.
\textsuperscript{27} Auguste Comte 1973, p. 356.
\textsuperscript{28} Auguste Comte 1893, p. 2.
\textsuperscript{29} Auguste Comte 1893, p. 26.
\textsuperscript{30} Let’s bear in mind that at this stage perspectival depiction and the rationalization of the visual field are already finished projects. Comte and his contemporaries already have a standardized model of the visual field to work with.
The reason for why I give so much space to scrutinizing the unclarities in Comte’s views above is that I think that they serve as an outline for the problematic mentality within science and philosophy, during the time of the invention of photography. During the first half of the 19th century, photography lands in the tension of this dialectic between the fixed objective and dynamic subjective view on vision. This tension creates a new kind of uncertainty concerning the status of the image. Beyond the more commonly acknowledged uses of photography; portraiture, journalism, art-photography etc., the aspect of it as record is what initiates this technology to its age. It is not photography per se that evokes an ideal of an objective encyclopedic compartmentalization of the world. Rather it is its’ adaptability for a certain use, a standardization of the means of representation, that suits the positivistic spirit that requires an externalized view.

**Fixing the Image – The Indexical Relation**

I shall go further. I shall fix permanently these fugitive images!\(^{31}\)

L. J. M. Daguerre

How charming it would be if it were possible to cause these natural images to imprint themselves durably and remain fixed upon the paper.\(^{32}\)

Fox Talbot

This is not one of my recent results but dates from last spring; since then I have been diverted from my researches by other matters. I shall resume them today, now that the country is in full splendour, and shall devote myself exclusively to copying views from nature.\(^{33}\)

Nicéphore Niépce

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\(^{31}\) Helmut and Alison Gernsheim, *L.J.M Daguerre – The history of the Diorama and the Daguerrotype* (Dover Publications Inc. 1968), p. 48. Daguerre, who is commonly conceived to be the inventor of photography (although this is a quite inaccurate statement), was claimed to have uttered these words after attending a public lecture by Professor Jacques Charles. Charles is said to have been able to make profile portraits on silver chloride paper. This was an early attempt on making photographs, however, Charles portraits where unfixed. Daguerre seemed to have understood that there was an immense importance in completing this technique by figuring out how these images, made by natural light, could be permanently fixed.

\(^{32}\) Quote from Fox Talbot’s *The Pencil of Nature* as quoted in Helmut and Alison Gernsheim 1968, p. 49. Fox Talbot, Daguerre’s main contender for the title of primary inventor of photography, expressed his ambition to capture the image inside the camera obscura in the year 1833.

\(^{33}\) Niépce as quoted in Helmut and Alison Gernsheim 1968, p. 56. If anyone can rightfully be titled the true inventor of photography, it should have to be Nicéphore Niépce. The quote above is taken from a letter addressed to Daguerre in 1827. The correspondence between Niépce and Daguerre is maybe one of the most important factors that led to the invention of photography.
The idea of species constituted an understanding of knowledge as a fixed index. Through species we receive impressions that are natural signs, signs that communicate how nature is constituted. In this sense the signs are essentially natural because they are created by the processes and the powers of nature. The same kind of idea is present during the invention of photography. Photography is conceived to carry a trace of the natural object, to be, due to its emergence from natural light, an image authored by nature. This understanding is still at the core of many prominent theories on photography. André Bazin, Susan Sontag and Roland Barthes have all pointed toward the indexical nature of photography as the aspect that defines it and makes it unique compared to other forms of depiction. I think this is correct if we take this point as a description or an articulation of the idea that gave photography its significance during its early ears. However, I want to show that this idea was riddled with problems from the start. It is one thing to talk about the photographic process as a natural optical process. Of course this is undisputable in the sense that the workings of light, permit photography to exist. Without the natural camera obscura effect, there would be no photography. But when this process is used in order to produce pictures that show the perceiver something or other, it is already part of a conditioning or a cultivation of a certain natural process. Consider the quote above by Fox Talbot: “How charming it would be if it were possible to cause these natural images to imprint themselves durably and remain fixed upon the paper”. Here Talbot talks of natural images that exist prior to the photographic process. The process becomes then simply a task of capturing the already existing image. As if there would exist an image world that stands as an index to nature. The error in this statement is interesting, since it wrongly alludes to the process as simply capturing the image. But the images do not exist there in order to be captured, they come about through the process, i.e. there is no picture, before it is brought about through a series of optical and chemical processes. To call this process natural is pure rhetoric. If we look at the efforts involved in producing what would be called the first photographs, they surely did not occur naturally. If nature does not constitute of a fixed given order, then the index of nature will always be a construction, not a copy of something fixed and already existing, but an attempt to construct a framework for the understanding of the dynamic and temporal natural occurrences. It is this shift in epistemology that is evident in Comte’s writings on positivism and it will have recoil on the way that photography was used.

There were two challenges involved in the venture of making images in the camera obscura. Firstly one had to figure out how to get light to inscribe or imprint, not only project, an image on a surface. This was achieved as early as 1802 by Tom Wedgewood who
accomplished an early form of the photographic process by using silver nitrate on white paper or white leather. The quality of silver nitrate, that its monochromatic color-tone is altered by light, was known throughout the 18th century. Wedgewood used this knowledge to make copies of paintings on glass. He exposed the photosensitive paper infused with silver nitrate to light, and obstructed the light by placing the painted glass-plane between the photo-paper and the light-source. The shadow of the obscuring painted glass left a trace on the paper. The other significant obstacle was to get the image to stay fixed permanently on the surface. The impact of Wedgewood’s early primitive photographic experiments where very modest because of the ephemeral nature of the images. As soon as they were exposed to light they decayed and quite soon the trace of light was resolved. This was the problem that Niépce, Daguerre and Talbot tackled three decades later.

Among the above quoted inventors of photography, Fox Talbot’s first attempts on fixating an image projected by light on prepared light sensitive paper, where simply a process of placing objects on the paper so that they would leave an imprint on the surface, so called photograms. In this sense photography was first achieved through actual contact between the photosensitive surface and object. Not unlike Wedgewood’s early attempts, Talbot’s first experiments consisted of placing a piece of lace on the photographic paper and exposing both lace and paper to light. (see image 3.1) The only significant difference between Talbot’s and Wedgewood’s processes was that Talbot was able to fix the image on the paper. Geoffrey Batchen describes this process: “The image is physically caused by, is even directly touched by, the thing to which it will subsequently refer. This indexical type of relationship gives photography much of its distinction as a compelling mode of representation”. As I have mentioned earlier, this idea of an indexical relation between image and nature had a far-reaching history within philosophy. Another factor that relates to the previous chapters is that the tactile, causal process of photography corresponds to the classical paradigmatic theory of sense-perception as primarily tactile. The tactile theory of perception was based on the assumption that touch or contact lacks the element of interpretation, it is not a “reading”. This idea is articulated by Susan Sontag, she writes of photography that it is: “not only an image (as a painting is an image), an interpretation of the real; it is also a trace, something directly stenciled off the real, like a footprint or a death mask” (On Photography, p. 154).

35 Lorraine Daston and Peter Galison, Objectivity (Zone Books 2010), p. 128.
Talbot understood the photogram as a form of depiction that sidestepped the artist, it was a “picture which makes itself”. In this context I think it is highly interesting that the first attempts on photography where based on an actual contact between the light sensitive surface and object. Later on this actual contact was overcome by Niépce and Daguerre and it became possible to make pictures of distant objects, but the idea of the tactile connection of object and picture lived on as an analogy in the discourse on photography. It corresponds to what can be called an indexical relationship in which the sign is naturally caused by the object, an actual trace of the object. In this sense new metaphors appear that refer to the classical idea of species. But the same discrepancy that was inherent for the classical theories of sense perception is apparent in the discourse on photography as trace. Vision is not a tactile, but an optical sense, that requires distance. Neither vision nor photography can then rightfully be described by the metaphors of footprint, fingerprint or death mask since neither the eye, nor the photograph are actually touched by the object in nature. The photogram, an image that actually is created by a tactile contact, could perhaps more rightfully be described as an indexical trace of the object, but we do not give photograms any specific epistemic value. Then the reason for why photography received its specific epistemic status cannot be dependent on this issue. I will return to this point later, and show how the idea of photograph as a tool for science actually depended on its’ capability to capture views that the eye could not see. It did not gain its epistemic value, because of its ability to copy what we see, but because of its ability to establish a picture of something unseen. In this sense the idea of trace or index prevailed. Photography seemed to bring us views that where alien, and at the same time supposedly natural. Here a breach between what we can see and how nature supposedly looks starts to occur.

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37 Ibid.
In between the experiments of Wedgewood and Talbot, on the other side of the English Channel, two French scientists tried to complete the same technique of photographic depiction. In June 1827 Nicéphore Niépce was moderately successful in capturing the view from his studio window on a pewter plate coated with a light-sensitive bitumen solution, in a camera obscura. The result was a barely recognizable view of houses, rooftops and a tree against a horizon. (see image 3.2) Niépce called his technique heliography, a concept that again refers to an inscription, a trace of light. This was a result of a long period of experimentation. Already in 1816, Niépce had made his first experiments with paper soaked in silver chloride.39 During the same time another inventor and stage designer Louis Daguerre had made similar experiments. Daguerre and Niépce started a correspondence and eventually a partnership, but due to Niépce’s death in 1833, Daguerre continued his work on his own. One important change that Daguerre made was to use iodized silver plates instead of the bitumen-coated plates that Niépce had used. This reduced the time, from the eight hours that it took for Niépce’s pewter plate to be exposed in 1827, to six minutes in 1839 (see image 3.3).40

Up to the point when Daguerre started to get close to completing the invention of photography, he had dedicated his work to perfecting different techniques of *trompe l’oeil* depiction. For him photography contained a greater goal. It was a way of bringing the techniques of realistic representation from the realm of art into the realm of science. The diorama, the camera obscura pictures and the perspectivist painting had served successfully as
techniques of deceiving the human eye into perceiving the two dimensional surface as an opening toward an outer view. What the pioneers of photography actually wanted to achieve was something else. A very simple, but at the same time revolutionary feat: to fixate the images caused by natural light inside the camera obscura. Instead of making drawings or paintings that would *appear* to be views of nature, the pioneers wanted to make visual records of nature by the means of the workings of light. These kinds of expressions point at a way of transcending the images faith of being *merely* an image, a manmade representation of nature. Even primitive recordings of natural light on metal plates or prepared light-sensitive papers, where considered to perform something completely different than realistic painting, engraving, linotype etc. This idea is also at the core of Andre Bazin’s ontology of photography, he writes:

> The photographic image is the object itself, the object freed from the conditions of time and space that govern it. No matter how fuzzy, distorted, or discoloured, now matter how lacking in documentary value the image may be, it shares, by virtue of the very process of its becoming, the being of the model of which it is the reproduction; It *is* the model.⁴¹

Bazin takes this idea of an image that transcends it’s imageness to its extreme. As I said earlier it is not all that far off if we take it as a description of the attitudes of the inventor’s of photography. Right from the start, photography starts to gain a reputation as the realistic medium, before others. After perfecting the photographic process, Daguerre describes his (and Niépce’s) invention not only as an image, but as a process that grants nature a way of reproducing herself. He writes: “the DAGUERROTYPE is not merely an instrument which serves to draw nature; on the contrary it is a chemical and physical process which gives her power to reproduce herself.”⁴² When uttering words like these, Daguerre must have had some understanding of their recoil on certain scientific ideals. But perhaps not an understanding of the inherent problem with this kind of metaphors.

As in the case of perspectivist painting and the new direction within natural philosophy, the photographic apparatus shared its place in history with the new direction of positivist philosophy. As a consequence of the dissociation from metaphysics, the scientific attitude of the 1830’s consisted of attention on describing what was seen instead of on

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⁴¹ André Bazin, *What is Cinema?* (University of California Press 1997), p. 14. There is an ongoing discussion about how this passage should be interpreted. One thing that complicates this issue is variations in different translations. For a discussion on this see Tom Gunning 2007, p. 32 and n. 4.

interpretations. The scientists influenced by positivism believed that they needed pure records of the visual to sidestep, human judgment, earlier theories and subjective interpretations. In this view the automatic and mechanic way of depicting was seen as the preferred method for scientific ordering and classification. This practice was not solely connected to photography. It came about in connection to earlier methods of depiction like tracing and wood-engraving. As Lorraine Daston and Peter Galison point out, photography did not give rise to the new classificatory epistemology of science, but it did fit the needs of this doctrine. In this way photography and positivism should be seen as two separate developments with strong ties. Daston and Galison go on to define three reasons for why photography fit the preconditions of objectivist science. Firstly, the reproducibility of the photograph, the possibility of making identical copies of pictures, fit a standardization of the ways of observing. Secondly, the machine was considered to be more attentive, more honest than the human agent. The camera was conceived to be a superior observer in comparison to the easily distracted human eye. And thirdly, the machine seemed, for reasons I have explained throughout this thesis, to offer an image uncontaminated by interpretation, a picture with an indexical relation to the natural world.

However, the inventors of the many inventions that were required to complete the technique of photography were not single-mindedly influenced by positivism. The photograph and its way of capturing nature by the means of the workings of natural light also corresponded with romantic sensibilities. As early as 1840, Finnish landscape painter Magnus von Wright noted in his diary his amazement, after he for the first time saw a daguerreotype of a view in Paris, exhibited in a gallery in Helsinki. He writes: “this was thus a copy made by nature of itself”. What this example reveals is the rapid speed with which the photograph was spread, even to the peripheral town of Helsinki, then the Western fringe of the Russian empire. It was only in the summer of 1839 that Daguerre had made his invention public and during this time the first exhibitions of daguerrotypes where held in Paris. Furthermore it also exemplifies how the rhetoric that was connected to photography followed with the invention. The utterance “a copy made by nature itself”, when it is picked apart, seems to refer to two quite different ideas. In one sense it means an image, the actual photograph,

44 Lorraine Daston and Peter Galison 2010, p. 139.
45 My translation, Magnus von Wright, Konstnärsbröderna von Wrights dagböcker 2, Magnus von Wright, Dagbok 1835-1840. (Svenska litteratursällskapet i Finland 1997), p. 428.
46 Helmut and Alison Gernsheim 1968, p. 95-96.
conceived as a natural sign, an indexical picture of nature. But it also refers to the actual process, natures’ ability to reproduce images of her self.

My worry with both these understandings is that they, in a problematic way, point towards nature as a force that constitutes the visible world, beyond or without the attention, judgement and experience of the perceiving subject. In this sense they share the problems of the camera obscura model for perception. Jonathan Crary notes how the analogy between the camera obscura and the eye is finally and devastatingly confronted by Kant’s Copernican revolution within epistemology. He quotes Kant: “our representations of things, as they are given, does not conform to these things as they are in themselves, but that these objects as appearances conform to our mode of representation.”

The image is in this Kantian sense not a device that copies the qualities of the outer object. Rather they bring the natural into an anthropomorphic order. It is hard to articulate this point, because it is not unproblematic in the way that Kant expresses it, but at least it disqualifies rigorously all attempts to make sense of representations as “copies made by nature” or processes that give nature the power “to reproduce herself”.

What I want to articulate with the help of Crary’s analysis is not primarily a historical point, but more accurately a point about the paradox at hand. The idea of photography as index stands in contrast to the idea of photography as a representation that translates the dynamic temporal phenomena of nature into an anthropomorphic order, into a system of signs. In the first case the photograph is a copy of the visual field, an index, or even a tactile trace. In the second case it is reorganization of the visual world into, not a copy, but a cultivation of the visual field. The latter case recognizes the inevitable status of the image. In the image, nature is brought into culture, attention and judgment is focused on certain aspects of reality. The idea that photography, as opposed to other images, would have a special indexical power to reproduce the visual world is at the core of the problem. Because images and along with them photographs, do not copy ready-made views of nature, they construct these views, these views do not exist before they become photographs or paintings, engravings, films etc. It is not nature, but the human consciousness, the human eye and the human hand that gives images this power. Despite the early rhetoric around photography, it will become evident that it stands no closer to nature than any other form of depiction. That it evokes these kinds of thoughts of a natural sign has to do with the way in which it feeds on our desire to see with uncontaminated, innocent eyes. One expression of this desire can be

found in Bazin’s thoughts on photography. Bazin writes: “Only the impassive lens, stripping its object of all those ways of seeing it, those piled-up preconceptions, that spiritual dust and grime with which my eyes have covered it, is able to present it in all its virginal purity to my attention and consequently to my love. By the power of photography, the natural image of a world that we neither know nor can see, nature at least does more than imitate art: she imitates the artist.” Here Bazin, if we read him correctly, makes a very important statement. Photography evokes in him an experience of seeing something for the first time, without all his knowledge, preconceptions and psychological baggage. Now we cannot deprive Bazin, or anybody else of having this kind of relationship with photography. This is a role that photography sometimes has within a culture. But the simple reason for this is that we have given photography this role, it does not carry this role by itself, it is not inhabited by nature. The actual appeal of the scientific view is then perhaps not scientific at all, but rather existential. A need to transcend dogmatism, opinions, judgement, in order to reawaken an interest in the world of perception. When the actual world starts to appear as thoroughly conditioned and designed by human mind and human hand, perhaps a need to reestablish a kind of wonder towards the objects in the world is awakened. I think this is a sensible understanding of the context in which the concept of record can find its home. In this sense the record, be it a painting, an engraving or a photograph, has a distinct place within the world of images, since it signifies an external view. This externality should not be confused with something beyond the human. On the contrary it is at the core of an existential, very human desire to understand the world beyond what we have made of it. To have an understanding of it beyond an fixed and indexical order. I think it is something like this that Bazin and the early inventors of photography find attractive in the new medium. But this should be understood exactly as a countercurrent to the rationalization and standardization, the encyclopedic ordering of the world, that gave momentum to the invention of photography.

From Index to Approximation

Beside the obstacles of successfully fixating the projection of light upon the photographic paper there was one more issue that could be described as fixing the image in time. The qualities of the film and the shutter-speed determined what could be photographed. Photography of moving objects required faster exposure-times and faster shutters. Therefore

speed and temporality entailed another obstacle for the technology of the camera and film. The early photographs required a very long exposure time. From the 1860’s onward there occurred a rapid progress in perfecting faster more light sensitive film and faster shutters for cameras. This made possible photography of moving objects. Donald Evans points out how this technology of high speed photography also brought something new into our visual realm. He writes: “Figures where now frozen by the camera in apparently inconceivable positions quite alien to our customary manner of seeing with the naked eye.”

High speed photography was able to present us views that could not be seen by the human eye. It indicated that the instantaneous snapshot of the world, the ideal of Locke, when finally realized in high-speed photography, actually looked nothing like our subjective psychological visual realm. It also meant that the “machinic speeds” that high speed shutters together with high speed film could achieve showed how temporality, the freezing of a moment by limiting the recording of light during different intervals, played a part in how things look. This was a factor that the Lockean visual theory had completely ignored. Time and temporality cannot without friction be represented in an image. A snapshot, how it looks and what it reveals, is dependent on the exposure time in relation to the quality of film etc. etc. In other words there is no given standard for how things look, even photography is a result of a complex standardization that is dependant on the different particular needs that different forms of depiction require.

This gap between the visual representations of high-speed photography and subjective vision corresponds differently with the earlier and latter doctrines of theories of vision. If the emphasis is put on how our psychological subjective vision actually works it seems apparent that the Lockean static camera obscura model of perception had played out its role. The snapshot captures the kind of views the camera obscura model should offer, and when what it offers is revealed to look nothing like continuous, dynamic, temporal subjective vision, the model evidently reveals its shortcomings. But, another aspect that still kept an inkling of the original empiricist notions alive was that the mechanical process of the camera granted in some cases views that revealed facts about natural phenomena, that where not perceivable by the naked human eye. On this level, the alien images given by high-speed photography seemed to correlate with the earlier epistemological doctrine of objective vision that claimed that the subjects’ involvement in vision thwarted pure perception. This view was supported by the epistemological status that photography had achieved through its supposed indexical

relation to the objective world. This mismatch between photography as a visual index of the outer objective world and our psychological way of seeing the world complicated things further. Or, more correctly, the misguided interpretation of this as a mismatch, kept the troublesome theory of a non-anthropomorphic view afloat. In this context high-speed photography seemed fit to serve as a model the neutral unbiased and objective view upon nature, or even the view of nature. But again, what is forgotten is the fact that in order for the photograph to tell us anything it had to be viewed by a subject. Only through somebody seeing it, can it reveal anything about nature.

One example that became paramount for this kind of mismatch between subjective vision and scientific objective observation derived from Eadweard Muybridge and Etienne-Jules Marey’s experiments with photographic recording of the movement of the legs of horses, during the 1870’s. In a letter to the editor of La Nature, Gaston Tissandier, Marey expresses his hopes for what the photographic image can bring to the natural sciences, he writes:

And then what beautiful zoetropes he will be able to give us: in them we will see all imaginable animals in their true paces, it will be animated zoology. As for artists, it is a revolution, since they will be provided with the true attitudes of movement, those positions of the body in unstable balance for which no model can pose. You see, my dear friend, my enthusiasm is boundless.51

In this letter Marey refers to the artist and inventor Eadweard Muybridge who, like Marey, was a pioneer of experiments of photographing moving objects. They had similar goals but slightly different techniques. They both attempted to record movement, which also required that they figured out how to represent temporality in photographic pictures. Muybridge solved this by making series of photographs that captured different sequences of the movement of a horse. The result was then a series of different pictures where each picture was a frozen moment in the sequel of a horse in gallop (see image 3.5).52 Marey established another technique in which the moments where captured on one photographic negative, so the same negative had several exposures with the different sequences of the movement of the galloping

51 Marey as Quoted in Marta Braun 1992, p. 47.
52 Marta Braun 1992, p. 52. This procedure is described in 1881 in the Paris based newspaper Le Globe (quoted in Braun 1992), as follows: “[..] Before this arrangement of apparatus ranged along like canons, 24 in number, the animal passes along on a track, beyond which is a white wall which furnishes an appropriate background for the photography. At each step, the animal breaks a thread, which brings an instrument into play, so that at each stage of its passage no matter how rapid, there remains to us an image.
horse (see image 3.6). The extraordinary thing that Muybridge’s horse images revealed was that they discredited earlier conventions within painting. In naturalistic paintings a horse in gallop was usually depicted differently compared to Muybridge’s photographs. The differences where quite minute details concerned with the postures of the legs in gallop. However this became a big issue due to the supposed epistemic superiority of photography that these kinds of examples seemed to reveal. Muybridge writes: “So it is with the galloping horse; we have become so accustomed to see it in art that it has imperceptibly dominated our understanding, and we think the representation to be unimpeachable, until we throw all our preconceived impressions on one side, and seek the truth by independent observation from nature herself.” In this case the horse image seems to indicate that there actually exists a visual realm that is alien to our anthropomorphic understanding of it. Another, more refined, example of such a case is Ernst Mach’s 1880’s photograph of a bullet in flight (see image 3.8). The image of the bullet does not only show the bullet frozen in time, it also reveals that at such speeds (supersonic speed of 520 meters per second) the bullet will cause visible shockwaves in front of it. Mach’s picture seems to show that the physical world is unfamiliar to us, and that the go-between of photography will introduce us to this alien world of natural phenomena. The shockwaves are not in the picture because of the conventions of representation, pre-conceptions or earlier knowledge would require them to be there. On the contrary what we see is something that is there, despite our ways of seeing and depicting.

53 Mary Ann Doane, The Emergence of Cinematic Time, Modernity, Contingency, the Archive (Harvard University Press 2002), p.49.
54 Muybridge as quoted in Donald Evans 1978, p. 230.
55 Jonathan Crary 2001, p. 144
Image 3.5, Muybridge chronophotography (www)\textsuperscript{57}

Image 3.6, Marey chronophotography (www)

Image 3.7, degas Horse??

\textsuperscript{57} http://commons.wikimedia.org/wiki/File:The_Horse_in_Motion.jpg
Now, one could say that perhaps photography eradicates all ways of looking at things, that it shows how something looks despite our ways of seeing. It is something like this that Mach’s, Muybridge’s and Marey’s photographs seem to tell us. But if we turn around the question and ask why does Mach’s bullet image reveals the shockwave? It is not enough to say that it does so because it is a photograph, because any photograph would not reveal this. It is dependant on it being a high-speed photograph, this and exactly this photograph is able to capture the shockwave due to the specific technological process behind it, just any photograph or camera would not do. In this way we cannot say that this photograph would eradicate all ways of seeing, since it is conditioned in a certain way and this conditioning enabled the capturing of the shockwaves on film. It does not eradicate all ways of seeing, but prioritizes or lets us focus on a way of seeing. The important point here is to articulate what the photograph actually does in this context. My claim is that it simply does what images usually do, it cultivates a way seeing. It makes a certain aspect more significant than others. It is true that in this example the visual information on record corresponds with a fact. The image does not create the shockwave, it is there regardless of the representation. The shockwave is then a part of nature, not something added on to nature in the process of producing the photograph.

On the epistemological level we have to agree that shockwaves exist and horse-legs are jackknifed in the way that a high-speed photograph indicates, whether we see this or not with our bare eyes. But this does not prove the ambiguity of the epistemological status of subjective vision, since these photographs do not contradict what I or anybody else actually can see. The fact that we cannot discern bullets in flight or shockwaves with our eyes, if it is considered to be a shortcoming, is not an epistemic shortcoming. What makes it an epistemic shortcoming, a deficiency in our knowledge, is if these photographs contradict our previous
understanding of things. In this case the contradiction does not stand between my subjective vision and objective visual data, but between my preconceptions and what the visual data reveals.

(L.W. On Certainty, check §14-22). Only when there is a tension between, as in this case, what the photograph reveals and what I earlier held to be true, the question concerning truth and falsity, reality and appearance will arise. The truths or the need to assess what is true and false arises from a tension. If we interpret the examples of Mach’s bullet photograph and Muybridge’s horse photograph in the generic empiricist way, the examples indicate that the tension resides between the subject and the object, but the tension can only constitute a tension within a subject. As long as the fact that horse-legs are jackknifed in a certain way under the horse in gallop or that projectiles with a supersonic velocity produce shockwaves are not brought into our knowledge they cannot constitute any knowledge. It is only when these facts are brought into a system of knowledge by our attention, into the world as we know it, that they become truths. They are related to the questions we pose to the world, not copies of a world as it exists by itself.

Recording Life

One of the key figures in this development was French physiologist, engineer and inventor Etienne-Jules Marey, who is also known as one of the inventors of cinematography. His interest in high speed photography and chronophotography, the assembly of photographs into one single representation of the different sequences in movement, derived from his interest in medicine, physiology and the natural sciences as a whole. In the spirit of Comte, Marey saw the history of science as deterministic. In 1866 Marey wrote: “Science has two obstacles that block its advance […] first the defective capacity of our senses for discovering truths, and then the insufficiency of language for expressing and transmitting those we have acquired. The aim of scientific methods is to remove these obstacles”\(^58\). E. J. Marey was occupied with what Marta Braun describes as the ephemeral: “the law like relations between observable magnitudes that cannot be experienced through the senses but are established by observation and experimentation”\(^59\). If these statements are to be taken at face value they disqualify both sense perception and human

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language as bases for our knowledge. Instead Marey, like Comte, believes in scientific methods, observation and experimentation as the paths to true knowledge. But the very obvious conceptual problem here is that there cannot be observation without sense-perception. This paradox is again a result of a confused epistemological theory, but to show at least how Marey could come to such a conclusion I want to bring forth some examples of his work.

Marey believed in a special kind of universality. When the basic natural laws where established by science, Marey believed that the same patterns can be detected in widely different phenomena. This meant a thoroughly mechanistic world view in which physiology is based on the same principles as physics and chemistry. Earlier views in which the human body was conceived as a static machine driven by a metaphysical vital force was now overtaken by a doctrine that held that bodies, animate as well as inanimate, where inhabited by energy governed by the laws of electricity, light and heat. The old philosophical debate concerning the categorical difference between animate and inanimate bodies was in this way sidestepped. For this scientific doctrine, the movement of a body, organic or inorganic, dead or alive, was governed by the same principles of energy. That is, the reduction of the psychological into the physiological that the likes of Comte and particularly Francis Galton advocated, was highly influential for Marey’s experiments.

One of Marey’s key interests was locomotion, the study of movement. Movement, because he believed it to be an expression of energy, and energy was linked to the pivotal principle of 19th century science – the first law of thermodynamics – that states that energy never vanishes, it simply changes form. This was a natural law that seemed to determine the whole of nature. The appeal that Marey found in the study of movement was based on movements’ dependence on energy. Whereas we can see movement we cannot see the energy which makes things move. By visual observation, recording and mathematical translation, Marey thought he could extract facts about energy. Something invisible was believed to become graspable by this translation. In this sense, visual recordings of movement where translated into mathematical and quantifiable data. In the spirit of Bacon and Kepler, Marey searched for visual aids to interpret nature. In this case the visual aids where not there to aid sense perception, like the telescope or the microscope, they made possible the translation of phenomena into mathematical axioms. In other words, this was not a case of “seeing better”. It was a case of using machines, graphs and measuring equipment as aids for translating the visual into a formal language of mathematics, i.e. to translate

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something visual to something non-visual (see, Evans, p. 227, for note). Then it was not static images or pictures, that where the result of these scientific observations. Rather it was the assemblage of data that was derived from different mechanic recording machines, the recording process and the scientific method, that became the go-between between mind and matter.

Marey’s first inventions where quite simple devices, like his first graphic instrument the sphygmograph. It was a pulse writer that was applied to the wrist, like a wristwatch. It consisted of a lever that was resting on the pulse point on the wrist and connected to a stylus. In addition there was a clockwork mechanism that moved a paper blackened by smoke, under the stylus. The apparatus produced a drawn graph that correlated with the rate and regularity of the heart’s pulse (see image 3.4). What made this tool extremely important and successful for cardiology, was its recording capacity. The process of measuring the heart beat had earlier been dependant on the touch of the physicist. The physicist felt the pulse of his patient by touching the pulse point on the wrist with his fingers and then calculating the rate by looking at a watch. The sphygmograf sidestepped all dependence on direct sense perception. It made possible a translation of the information to permanent, graphic representations that could be viewed by one or several scientists at the same time. These records could be compared to other records of the same standard. In this way the, at first glance, quite modest invention had a wide applicability and furthermore, it fit the ideals of a doctrine that saw objectifying of an earlier subjective sensuous form of observation as its task.62

Image 3.4, Marey’s sphygmograph63

63 http://commons.wikimedia.org/wiki/File:Marey_Sphygmograph.jpg
Another, perhaps more eccentric, interest of Mareys’ was the study of the movement of the wings of different birds and insects. His motivation for these kinds of studies was his belief that if one could understand the muscles, motions, aerodynamics of the wings of a flying animal, perhaps this information would amount to an understanding of how to reproduce this mechanically. The study of flight was aimed at “making visible the mysteries of nature” so that perhaps “humans could imitate and reproduce them”\(^64\). With this in mind, Marey began experimenting with different processes of recording the movements of the wings of a buzzard. As this movement was so fast that a human eye could not detect any patterns, the graphic method offered promising results. He constructed a harness that carried pistons that where attached to the tips of the buzzards wings in order to trace the rate with which the wings where raised and lowered, as well as a myograf, a device that signaled the resistance each muscle encountered. These where attached to tambours that communicated the information by air-pressure to a writing device. By these methods Marey acquired quite detailed graphical data on the movement of the wings. Based on this information, he went on to construct mechanical birds, in extension these kinds of experiments set the technology of aviation on the right path.\(^65\)

A detail worth mentioning is that Marey, although he probably caused some amount of stress to the animals in his experiments, was opposed to vivisection. This was not only a moral concern, it also constituted a difference in the methodological approaches. Marey held that the dissection and the study of dead matter fundamentally altered the observed phenomena. For him vivisection only revealed the static perceivable facts that where already available for human perception.\(^66\) In the same way, but for different reasons than the earlier natural scientists, Marey understood the subjective human vision as presenting science with mere appearances, whereas the objective recording method gave us facts.\(^67\) The facts, in the sense that Marey talks about them, are not “given” in perception. They stem from the systematic form of representation that the automatic recording machines are conditioned to establish.

Based on these kinds of experiments Marey moved on to using the camera to record data. He continued his work of recording the movement of birds and other animals by photographing the different sequences in the movement of bodies with high-speed cameras. Initially it was not the prospect of getting access to the visual \textit{per se} that attracted Marey towards

\(^{64}\) Marta Braun 1992, p. 35.
\(^{65}\) Marta Braun 1992, p. 32-35.
\(^{66}\) Marta Braun 1992, p. 38.
\(^{67}\) Marta Braun 1992, p. 30.
photography. On the contrary, he had worked under the assumption that sense perception somehow had to be sidestepped in order for the scientist to get in touch with the true fabric of nature. In this sense the epistemic status of the visual world was ambiguous for Marey. But when the high-speed camera seemed to offer another, alien, but yet visual world, it seemed to correspond with his scientific doctrine that was skeptical towards the senses. From being conceived to be an image of nature, photography, the way in which Marey used it, became a recording device that helped translate natural phenomena into quantifiable, standardized data. Here the photograph is not indexical in the sense that it was before. It is not a trace of nature, a natural sign. It is part of a man made index, a standardized way of presenting data. Here the meaning of index has shifted. From signifying a natural trace, it has become an archive of systematized data, an encyclopedic, man made world order.