The self of the observer and the deception of vision

In our study of Anatomy there is a mass of mysterious Philosophy, and such as reduced the very Heathens to Divinity: yet amongst all those rare discourses, and curious pieces I find in the Fabrick of man, I do not so much content my self, as in that I find not, there is no Organ or Instrument for the rational soul: for in the brain, which we term the seat of reason, there is not any thing of moment more than I can discover in the crany of a beast: and this is a sensible and no inconsiderable argument of the inorganity of the Soul, at least in that sense we usually conceive it.

Thomas Browne

I pretend not to teach, but to inquire; and therefore cannot but confess here again,—that external and internal sensations are the only passages I can find of knowledge to the understanding. These alone, as far as I can discover, are the windows by which light is let into this dark room. For, methinks, the understanding is not much unlike a closet wholly shut from light, with only some little openings left, to let in external visible resemblances, or ideas of things without: would the pictures coming into such a dark room but stay there, and lie so orderly as to be found upon occasion, it would very much resemble the understanding of a man, in reference to all objects of sight, and the ideas of them.

John Locke

What is particularly interesting for my purposes in this often quoted passage by Locke, is not only the analogy between the camera obscura and human understanding. Furthermore Locke indicates that the only major difference between these two is that our understanding, that is the empty sheet of paper that our experiences are inscribed upon, can fixate these images whereas the camera obscura has no such proficiency. The obvious connection between this passage and the photographic apparatus has been highlighted in several theoretical contexts. In the later chapters of this book I will discuss this connection between empiricist and positivist epistemology and the invention of photography in detail. But for now I want to articulate the actual context in which Locke elevates the camera obscura to a model for our understanding.

This metaphor serves as an answer to the puzzle that is expressed in the quote by Thomas Browne. If we cannot find an organ or an instrument in our body for that what we call reason, what shall we then make of this “reason”? Browne simply discards his own question and postulates that reason is a metaphysical entity that does not reside in the make-up of the human body. Locke, on the other hand, takes another path and claims that our understanding basically is a container for our sense perceptions. In this sense, our bodies contain an organ like the camera obscura. The eye is the only sensory organ that corresponds to this analogy and in this way vision is the primary sense in epistemology. It is this epistemological theory that will have consequences for the concept of image. According to this Lockean line of thought, the state of things manifest themselves in a self portrait of nature, an imagined a priori, authorless, objective image that is produced by the workings of natural light. As if there existed a latent, universal image-world against which all other images could be compared and verified. Or simply: that our knowledge consists of images.

What I want to make clear in this chapter is how this supposed objectivity of the visual realm was a construction that emerged with the help of several misleading visual theories and metaphors. To understand the central role of vision in early modern philosophy one has to start with the actual problems, the discomfort that different concepts of vision introduced to philosophy. As I showed in the last chapter, one of the paradigmatic problems in this philosophical discourse was concerned with the status of species. Although the philosophers of the 17th century for the most part had got rid of the idea of species, they where still stuck with the same epistemological model as their predecessors. Whether we talk about likenesses floating about in the illuminated atmosphere or of images imprinted on the retina, the same discrepancy between the world and its appearance is present. The difference between the theory of species and that of the retinal image, is simply a question of where the intermediary is situated. In both cases, that what I really see is produced in me by the influence of an object. They are foremost causal and empiricist theories of vision, they only differ in

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1 Thomas Browne, The Works of Thomas Browne (John Grant 1927), p. 54.

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3 Which contexts?
that there is one and only one structure of reality that can be described in a purely logical language. What is forgot in this line of thought is that descriptions depend on the actual questions that one poses to the universe, that the answers that you get are conditioned by your questions.\footnote{Ibid., p. 4.} This critique will be developed within philosophy from Giambattista Vico onward as a countercurrent against the ideals of enlightenment.\footnote{Ibid., p. xiv.} One of the most devastating arguments against the idea of the given is found in Nietzsche. He points out the paradox in this idea, as follows: “The greatest of all fables is the one relating to knowledge. People would like to know how things-in-themselves are constituted; but behold, there are no things-in-themselves! But even supposing there were an ‘in-itself’, an unconditional thing, it could on the very account not be known!”.\footnote{Hyman, The Imitation of Nature, p. xiv.} It is this kind of blindside in the empirical attitude that led to a history of accumulation of errors within the theory of vision.\footnote{Johannes Kepler, Optics: Paralipomena to Witelo and Optical Part of Astronomy, (Green Lion Press 2000), p. 210.} What this theory leaves aside is that the likeness of images to a certain object can not be reduced to a question of what is seen, it is always also a question of how we see, of how we conceive or understand a certain thing and in the end it is a question of who the observer is, what kind of questions, goals or actions that inhabit him or her. Literally, things are not like images, therefore the way in which we use images to resemble or remind us of a certain thing is preconditioned by our concepts. Our concepts cannot, without friction, be understood as visual or visible. As in Nietzsche’s account of the idea of the thing-in-itself, an image cannot be unconditioned, the concept of image does not yield to such an understanding. But as I will show, this is exactly what Kepler and his followers constructed: an idea of an image that is unconditioned by human consciousness.

Kepler writes: “Since hitherto an Image has been a Beeing of the reason, now let the figures of objects that really exist on paper or upon another surface be called pictures.”\footnote{Friedrich Nietzsche, “The Thing-in-Itself and Appearance, and The Metaphysical Need.” In Ruth F. Chadwick (ed.), Immanuel Kant Critical Assessments (Routledge, 1992), p. 81.} As I have indicated above there is something highly suspicious about this way of categorizing. How this plays out is dependent on what role we give to this reason. Against the backdrop of the general development of perspectival painting, we

\footnote{4 That is, its first appearance in western literature. In Islamic philosophy the camera obscura had already been used and analyzed by Alhazen (c. 965-1039). See Wartofsky, Models – Representation and the Scientific Understanding, p. 228.}

Isaiah Berlin describes this as a core problem for the philosophers of the enlightenment. He mentions Leibniz and Condillac, who were obsessed with the idea of the given.\footnote{Isaiah Berlin, Against the Current – Essays in the History of Ideas, (Oxford University Press 1981), p. 6.} Furthermore, this device will for different reasons serve as a metaphor for an empiricist understanding of knowledge.

The epistemology of the 16th century entailed a constant quest for finding a form of representation that goes beyond human subjectivity and opinion. When the camera obscura seems to indicate that the workings of light produce images by themselves, that images occur as a natural phenomenon, optics become the core of visual theory. The task for Galileo, Bacon and Kepler, among others, was to get access to the correct descriptions of nature. In a sense, this was a very successful attitude that advanced the sciences and our common knowledge of cosmology. However, the problem with this venture was that they acted as if there were given correct descriptions of the world waiting to be discovered. The telescope, the microscope and, to some extent, the camera obscura became aids for accessing these descriptions. These instruments were needed in order to help natural vision along when certain objects and phenomena where too elusive to be grasped through observation solely by the human eye. On top of the amplification of the visual faculty, there was another aspect that became important. When one looks into a microscope or a telescope, it is as if one were looking at an image (when one is not). These devices fix a certain view. This is an aspect of their function. This is why the camera obscura had such an important role in the imagination of the natural philosophers, since even though it does not help one see further like the telescope or closer like the microscope, it shares the function of fixating with the other devices. And it is this aspect that will prove to be deceptive. The role of the visual aids helped the natural philosophers to forget that what they actually accessed in their observation was conditioned by their devices and that the devices where conditioned by their inquiries.
can find a context in which this categorization makes sense. Leonardo was in no way apologetic about the dependence of the visual arts on human rationality. The Italian perspectival image required a thorough knowledge of geometry, an understanding of the correct placement of the vanishing point, of the picture plane as the intersection of the Euclidian visual pyramid etc., etc. It was constructed in accordance with a whole set of intricate rules and preconditions. When looking at View from Delft by Vermeer one could say that all of these perspectival inventions are at play in the painting. But there is something that has shifted in its emphasize compared to the Italian masters. It is evident that it is more a result of looking, observing and fixating a viewpoint, than of constructing, imagining and reasoning. Alpers quotes Eugéne Fromentin’s analysis of the work of another Dutch painter: “It is the surfaces, the materials of the world that have caught the eye in Ter Borch. Fromentin catalogues for our eyes ‘the apparel, the satins, furs, stuffs, velvets, silks, felt hats, feathers, swords, the gold, the embroidery, the carpets, the beds with tapestry hangings, the floors so perfectly smooth, so perfectly solid’. It is as if visual phenomena are captured and made present without the intervention of a human maker.”

That which earlier had to be constructed was later conceived as something ready made. This distinction is helpful to keep in mind when one tries to understand the evolution, not only in the pictorial arts, but an progress of: “a specific cultural ambiance – the empirical interest of what is commonly referred to as the age of observation.” It is against such a backdrop that the new Keplerian understanding of the concept of image should be understood. What Kepler calls picture, a readymade optical image that is not of reason, plays an interesting mediating role in this kind of cultural transformation. On one hand it is a way of not letting go of the idea of the natural sign, on the other hand it introduces the muddled concept of an image that is a sign without an intentional significance. It is in this development that the camera obscura starts to have a slightly different meaning and use.

The error of the senses

Henry Wotton, Francis Bacon’s biographer, who visited Kepler in Linz in 1620 to present him with a copy of Bacon’s The New Organon noted Kepler’s use of the camera obscura. He recollects this visit in a letter to Bacon, as follows:

He hath a little black tent, exactly close and dark, save at one hole, about an inch and a half in the Diameter, to which he applies a long perspective-tube, with the convex glasses fitted to the said hole, and the concave taken out at the other end, through which the visible radiations of all the objects without are intromitted falling upon a paper, which is accommodated to receive them. And so he traceth them with his Pen in the natural appearance, turning his Tent round by degrees till he hath designed the whole aspect of the field.  

These panoramic drawings by Kepler usually depicted landscapes. They where a kind of collage of views that gave a continuous 360 degree representation of the visual field. Wotton saw the potential in this technique. He thought that it would be an ideal way of drawing maps and harbor plans. These kinds of maps became common in the Netherlands during the 17th century. They portrayed cities viewed as a panorama, not from a birds-eye-view that later on became the standard (Sekula, also scan image). Kepler also used the camera obscura to create public spectacles during his stay in Prague. In these events Kepler constructed a kind of camera obscura classroom. He sealed all windows in a certain room and made a small aperture that let in the natural light. The wall opposite of this light source was painted white. The public entered the room while the aperture was covered and the show consisted of Kepler removing the cover and in this way activating the camera obscura. Thus the outside view was projected on the white wall inside the room, not unlike a cinema experience. He referred to these events as magic ceremonies.

The interest that Kepler had in such ceremonies was a philosophical one. They seemed to indicate that vision is mysterious. It is a mystery how the play of light and shadow can produce images that in comparison to other manmade images seem very much alike our visual impression of the world. If we do not consider the hidden or non-visual causes for this phenomenon it will seem occult. For Kepler this served as an analogy for his scientific project of rectifying the theory of earth’s motion. Although we, if we consult our vision, might believe that the sun circles around the earth, astronomical observations together with mathematical calculations will prove

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11 Ibid., p. 32.
12 Henry Wotton in Francis Bacon’s, The New Organon, p. ix.
otherwise. Kepler’s point here is that our visual impression might deceive us into drawing untruthful conclusions. This is the analogy that Kepler puts forth in his *Sомнium*, a written account of a dream in which Kepler imagines how the inhabitants of the moon would perceive the motion of earth. For the inhabitants of the moon their home planet seems to be stationary and the stars seem to circle around it, just like we perceive earth as stationary and the rest of the celestial bodies as if they would circle around earth. The conclusion that Kepler draws from this is that there is something deceptive in the visual faculty, that the direct visual experience leads us to an occult understanding of the world. *(Note Galileo)* The Keplerian criticism of the visual impression as a source of knowledge has its origins in Plato’s metaphysics. But it is also a pivotal point for the philosophical discussions of his contemporaries, since the evolution of astronomy and the optical aids of the times is dependant on issues concerning the reliability of visual observation. For Bacon, vision is a special sense since it is the only sense for which we can find aids that magnify, enlarge and correct the visual input. Instruments like microscopes, magnifying glasses and telescopes help us interpret nature since they give us more accurate “presentations or exhibits”. In this understanding, these presentations are what is prior to our interpretations of nature. The visual aids help our interpretation of natural phenomena on its way, but the presentations themselves are not inferred information, but magnified or clarified sense perceptions. This is what Bacon calls “instances of first information”. If we recall the quote by Bacon in the last chapter (1.2) the visual aids were helpful because of their ability to correct errors that where due to the weakness of the senses, he wrote: “For errors of the senses should be assigned to the actual investigations of senses and the sensible; with the exception of the *great* error of the senses, that they set the outlines of things by the pattern of man, not of the universe [...].” Kepler makes a similar distinction between: “deception of the sense of vision, arising partly from the technique of observation [...] and partly from the simple sense of vision itself [...]”. In the first case questions are concerned with not being able to discern certain things, the way in which optical aids distort the shapes of things, etc., etc, i.e weaknesses and distortions in the purely visual observation of the world, the latter more fundamental error is based on a misguided belief in knowledge obtained through the senses *per se*.

**Kepler’s Image and Kepler’s Picture**

What Kepler brings to the theoretical discussion is a new distinction between the concepts of *image* and *picture*. What Kepler calls picture (*pictura*) entails a new kind of understanding of the images on the retina. These retinal pictures are not visual species that are received by the eye, as in Leonardo’s theory. Kepler understands that the image inside the retina cannot have been transmitted from the outside through the lens of the eye. Kepler writes: “The remaining possibility, therefore, is that what inheres in the eye is an image of the action and effect, not of light, but of illumination”. In this sense the eye becomes an “image-making-machine” as opposed to an “organ for receiving images”. However, this is again a marginal shift in the general theory of vision. As in the intromissionist theory of Alhazen, Kepler’s understanding still relies on the image as a connecting mediator between the observer and the object. The problem for him and for the philosophers to come consists of the question: how are we to articulate the connection between the image on the retina and our experience of sight? He writes:

> I say that vision occurs when an image [lat. *Idolium*] of the whole hemisphere of the world that is before the eye, and a little more, is set up at the white wall, tinged with red, of the concave surface of the retina. How this *image or picture* [my emphasize] is joined together with visual spirits that reside in the retina and in the nerve, and whether it is arraigned within by the spirits into the caverns of the cerebrum to the tribunal of the soul or of the visual faculty; whether the visual faculty, like a magistrate given by the soul, descending from the headquarters of the cerebrum outside to the visual nerve itself and the retina, as to the lower courts, might go forth to meet

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15 Ibid. p. 114.
17 Ibid.
18 Ibid., § XL, p. 178.
19 Kepler, *Optics*, p. 171.
21 Leonardo was a follower of the very same Witelo that Kepler addresses in the title to his optical treatise “Paralipomena to Witelo”. As I mentioned in the last chapter Leonardo was at some points reluctant towards the theory of species. As I will show, Kepler was not beyond the influence of this theory. See, Sarah Koobman, *Camera Obscura of Ideology*, p. 57.
24 Ibid., p. 7.
the image – this, I say, I leave to the natural philosophers to argue about.25

Although Kepler, in his physiological treatise of the eye, states that he leaves some questions to the natural philosophers, he cannot help but to be puzzled about why, at some point, vision escapes optical explanations. He continues: “For what can be pronounced by optical laws about this hidden confluence, which, since it goes through opaque, and therefore dark, parts, and is administered by spirits, which differ entirely in kind from the humors and other transparent objects, has already completely removed itself from optical laws.”26 The actual eye can be understood as a camera obscura that works according to the laws of optics, whereas vision, the way in which we have visual impressions of the world, cannot be explained by optics. Here occurs a division between the visual and the optical. The former can not be reduced to the latter.

In this development the meaning of the camera obscura analogy changes. For Leonardo the camera obscura received images (visual species), whereas for Kepler the camera obscura was a device that made pictures appear. In the first case the already existing image enters the camera obscura, in the second case there is no image before it is brought about in the camera obscura. This opens up the possibility of the interpretation that the visual impression, the way we perceive the world through vision, is a purely human way of knowing the world. The world by itself is then not visual. Descartes will later on put forth this idea, but as I have noted earlier this theory has its roots in atomism. In this sense the actual eye does not perform anything that differs from what a mechanical machine performs. One might say that Kepler pushes the organ of vision further back into the cavities of the skull, beyond the mechanical apparatus of the eye. The actual “seer” is not the eye, it is as if someone would regard the pictures on the retina.

This does not solve the mystery of how vision comes about, but it puts the mystery on hold and liberates the investigation of the eye from all non-optical factors. In his Optics Kepler is able to explain the physiology of the eye and the phenomena of light and color, better than anyone before him. In order to do so he is dependant upon a clear distinction between pictures painted or projected upon a surface (on the back wall of the camera obscura, on sheets of paper or cloth or on the concave retina) and images that are the human visual impressions of things. Here image signifies the world as it presents itself to reason.

In this sense the image, for Kepler, is not necessarily purely optical. In his examination of the anatomy of the eye and the optic nerve he understands that vision cannot be purely optical since the optic nerve is not an optical device but an organ, it consists of a dark and opaque passage. He goes on to distinguish between the optical means of vision of the eye and the visual impression. The latter can not consist of a picture, but of some kind of direct contact or pressure performed on the spirits. He writes:

This image, which has an existence separable from the presence of the object seen, is not in the humors or the tunic, as we proved above. Therefore, it is in the spirits, and vision occurs through this impression of images upon the spirits. However, the impression itself is not optical, but physical and mysterious. But this is a digression. I return to explaining the means of vision.27

Kepler understands that vision is not explainable simply by optics. But, although he in this context talks of spirits and illumination instead of lenses and rays of light, he is still held down by his insistence on giving a causal explanation of how visual impressions come about. On this point he reveals that he is still under the influence of the atomist theory, in which sense perception is dependant on some kind of contact and consequently within the classical discourse of the theory of vision. He refers to the after-image that has been a key concept throughout the history of visual theory and makes a comparison between the visual impression and pain, the sensation of a physical blow to the body.28 I.e., for Kepler there is some kind of disposition in the human body for sensing the world that is beyond the apparatus of the eye. In a footnote Kepler recalls an anecdote of a man who lost one of his eyes. When this man covered his other seeing eye and placed a shining object under his nostrils, he claimed that he still, although practically blind, could discriminate this shiny object. Kepler understands this as evidence of the activity of spirits in perception. He concludes that

26 Ibid.
27 Ibid., p. 181.
28 Ibid., p. 42.
either the cavity of the blind eye still transmits some sort of information to the spirits that interpret the input, or, alternatively, the information is transmitted through the nostrils. 29

Although the example might seem quite occult and medieval, Kepler is very sensible in distinguishing between optics and our psychological visual impressions. He quite rightly points out that optics cannot explain how we see. Optics play an important role in how our vision comes about, but it does not function as a theory of perception. This far, everything is comprehensible. From this standpoint Kepler goes on to explain what kind of role optics do play in perception.

Errors in the techniques of observation

The fact that different lenses and different apertures in the instruments that where used for astronomical observations gave different visual images, entailed a problem for the practice of observation of the heavenly bodies. One particular event that puzzled Kepler was an observation that his mentor Tycho Brahe performed in Prague in the year 1600. When observing an solar eclipse inside a camera obscura, because this indirect way of viewing was a safe way to look at the sun, he noticed that the diameter of the moon seemed smaller than normally. Kepler concluded that, since it is not possible that the moon is further away during the eclipse, neither is it possible that the size of the moon has changed, the device has to distort the appearance of the moon. 30 In 1604, after consulting the contemporary anatomical literature on the eye, Kepler went even further in his skepticism towards the apparatus. If the device of the camera distorts and if it works in a similar way as the human eye, then, he concluded, even the eye to some extent alters the dimensions of the objective world. 31

Keplers’s interest in the visual devices stemmed from a turning inward from the actual world toward the aids that we use to observe the world. In order to do proper observations in astronomy he had to rely on the telescope and the camera obscura and in the end on the human eye. In order to do correct observations, he had to understand the instruments of observation. In the cases of the eye, the camera obscura and the telescope he investigated the distortions that these devices produce in observation. He was simply occupied with finding and perfecting the correct apparatus in order to do correct observations. When he wrote his Optics Kepler was more concerned with astronomy and cosmology than with the theory of vision per se. This resulted in a divided theory of vision, that on the one hand indicated that optics does not explain vision, but on the other hand showed that vision required optics. This is not necessarily a paradox, since although vision cannot be reduced to optics, there is something about optics that makes it fundamental for vision. As Kepler points out, this is proven by the fact that certain people whose vision is impaired in one way or another, can correct this ailment with the help of optical devices such as spectacles with concave or convex lenses. A convex lens that corrects vision for one man can distort it for another. In this sense, the eye is relative to the visual input of light. Different eyes give different visual impressions. 32 Another fact that proves the optical nature of vision is that vision requires light. We do not see in complete darkness. 33 Also, a very strong light source will disrupt vision because it overwhelms the visual impression. 34 Therefore vision seems to be fundamentally dependent on optics. In this straightforward way Kepler paves the ground for a causal theory of vision in which the eye is a chamber causally affected by the phenomena of light.

According to Kepler, the size and shape of the refracted bundles of light rays are relative to the size and shape of the apparatus of observation. The optical apparatus intersects the rays and depending on its size and form, it captures and leaves out different pieces of optical information. 35 Based on this theory he concluded that, depending on the differences in construction of the optical devices, the information also differs. For example, the eye differs from a camera obscura since the camera lets in light through a pinhole whereas the eye has a lens that refracts the light. 36 The image that occurs inside the camera is then different from an image inside the eye in two senses. Firstly it is different because of the structural differences between the eye and the camera obscura. Secondly the images differ since the eye is connected to the visual organ and the visual faculty in a direct way. He writes: “Briefly, an image is the vision of some object conjoined with an error of the faculties contributing to the

29 Ibid., p. 181.
31 Kepler, Optics, p. 69-70.
32 Ibid. p. 217.
33 Ibid., p. 51.
34 Ibid., p. 193.
36 Catherine Wilson, Discourses of Vision in Seventeenth-Century Metaphysics, p. 121.
sense of vision. Thus the image is practically nothing in itself, and should rather be called imagination.”

It is this kinds of error that the camera obscura cannot contain. If the retina could be disconnected from the visual faculty, what would be left would be a purely optical retinal picture. This idea and this line of thinking is what makes Kepler’s contribution unique for the period. The role that he gives to the retinal picture, as a purely optical image, marks the beginning of a new cultural construction. We can maybe call this a side product of Kepler’s theory, but irrespective of whatever emphasis he himself put on this issue, this conception of image will start to live its own life in both the philosophy of perception and the conventions of pictorial art. He even goes as far as to imagine what would happen if the pictures on the retina were accessible for observation; he writes:

The result of this is that if it were possible for this picture on the retina to remain while the retina was taken out into the light, while those things out in front that were giving it form were removed, and if some person were to possess sufficient keenness of vision, that person would recognize the exact configuration of the hemisphere in the compass of the retina, small as it is. [...] the fineness of this picture within the eye of any person you please is as great as the acuteness of vision in that person.  

If the retinal image could be reproduced as an external picture, it would depict a perfect panoramic view of the hemisphere. It is exactly something like this that the inventors of photography think they have achieved 200 years later. Prior to the actual technology of photography, this idea has already established itself firmly within the scientific discourse. According to this line of thought the state of things manifest themselves in a selfportrait of nature, the imagined a priori, authorless, objective image that is produced by the workings of natural light. As if there existed a latent, universal image-world against which all other images could be compared and verified.

It might seem unfair to draw such dramatic conclusions from Kepler’s theory of optics, but there is something about how Kepler talks of distortion of the visual impressions that indicates that he has something like an objective and fixed image world in mind. One might ask: Kepler talks about distortion, but a distortion of what?

If there is no standard to compare these distortions with, then how can they be distortions; and if there is a standard, then what can it be, if not the vision of the human eye? Thus, if the image of the camera obscura and the image on the retina are distorted impressions, then what is the standard image, where does it reside? These questions point out an element of incomprehensibility in Kepler’s theory. The theory of species was essentially a hypostasization of an objective fundament for perception. When this significant building block of the theory of vision was tampered with by Kepler, the whole theory started to crumble. He quite rightly understood that the species was an unnecessary link in the theory of vision, but he did not completely rid his theory of this concept and he did not thoroughly analyze the consequences of what it would mean to erase this concept. As John Hyman points out: "The theory of the retinal image answered the crucial question of medieval optics: the scaffolding had served its purpose and should have been dismantled. Instead, Kepler mistook it for a part of the building: what he constructed as a scientific problem was nothing more than the extension of a metaphor." The image that was imagined to reside on the retina played from the start an important role in a theory that sought to explain the causal connection between man and the natural world. But it was one thing to postulate this as a needed component of a scientific theory, and another thing to regard the retinal image as an actual part of this natural world.

My main ambition here is not to prove that Kepler actually held a belief in a metaphysical image-world that stands as an indexical facsimile for every other image, although I believe that there are strong inclinations in his writings towards such an understanding. It is enough for me to show that there are certain inconsistencies in his line of thought that open up for such a metaphysical epistemology. In order to understand how the union of objective knowledge and vision came about, it is important to understand the highly problematic evolution of this concept. The theory of vision was still, or maybe even more so, a muddle after Kepler’s new discoveries in optics. He left a problematic question to the philosophers after him. If our eyes are “image-making-machines”, then who or what perceives these images? The question that Kepler puts forward to the natural philosophers is confused. What occurs is an endless regression. The problem here is that Kepler compares two things that are not comparable: on the hand the optical laws of refraction and reflection of light rays

37 Kepler, Optics, p. 77.
38 Ibid., p. 181-182.

that pass from the object to the camera obscura and to the retina, on the other hand, the visual impression, our psychological way of perceiving the visual. The optical can successfully be explained through causality, but the second instance, that of explaining how we perceive the world in vision, does not require any causal explanation.

**Literature**


