False Images Do Not Lie (draft)

Gideon Manning

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Je voudrais commencer par vous remercier d'avoir lu cet essai (qui est un brouillon que je modifierai et développerai avant le séminaire) et m'excuser de ne pas l'avoir écrit en français. Je regrette aussi que mon français parlé soit de nombreuses années hors de pratique et je devrai parler anglais pendant le séminaire. Le essai lui-même fait partie d'un projet de livre sur la provenance médicale du projet philosophique et scientifique de Descartes. Essentiellement, j'essaie d'utiliser l'histoire de la médecine pour nous aider à interpréter Descartes. J'ai hâte de vous rencontrer et de discuter de ce essai.

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Descartes exercised considerable control over the placement and form of the images in his published work, seeking advice from his correspondents and actively collaborating with draftsman and the printing houses he chose. As an example of what he achieved, consider this famous image from the *Dioptrics* [slide]. Not only is there a realistic depiction of a person with a racket, Descartes is using a geometric image to represent the movement of light in reflection and refraction. There is considerable abstraction and idealization taking place here, in both the image and in the accompanying text, which work together modeling the techniques of mathematical construction, something that fits nicely with Descartes's repeated insistence that he was guided by the methods of the mathematicians.
But not all of the images associated with Descartes are like this one from the *Dioptics*. Today I am interested in a subset of Cartesian images that have been used to cast aspersions against his attention to observation and description of particulars, i.e., his empiricism, as well as his interest in anatomy.¹ Descartes’s references to anatomy or anatomical study begin in 1629 and extend to the end of his life. Yet the images introduced into the *Treatise on Man* (*De Homine* / *L’homme*) by the Latin edition’s editor and translator Schuyl in 1662 and the French edition’s editor Clerselier in 1664 have not always been recognized as anatomical images.²

The complex publication history of the *Treatise* is well known. Descartes set aside the text in 1633 for two apparent reasons: first, it was part of a larger work, *Le Monde* (*The Universe*), which was unambiguously Copernican in its cosmology. Although the content of the *Treatise* is not itself Copernican in an obvious way, when Descartes chose to suppress *The Universe* as a result of the 1633 condemnation of Galileo, the *Treatise* was suppressed along with it. A second possible explanation for the suppression of the *Treatise* relates to what Descartes perceived as internal inadequacies in the work and the lack of experimental confirmation for the views expressed. Again, as is well known, the *Treatise* failed to present a genetic account of the formation of the animal embryo, as Descartes acknowledged in the *Discours* when referring to his earlier research, and it never seems to have included an account of animals or the human soul, as had been planned. [Hal offers a third in his talk here today].

Regardless of the reasons for its being withheld, by the late 1640s Descartes’s personal manuscript was nearly twenty years old and difficult to read.³ Several copies had been made, however, and these found their way into the hands of his editors, including, supposedly, the French “original.” Anyone familiar with the published texts of the *Treatise*
knows that they include many images. However, Descartes left very few usable images with
the manuscript. Thus, the editors had to make or commission their own. And that is what
they did. Schuyl made his own using copper plates and Clerselier, after considerable effort,
secured wood block images from Van Gutschoven and La Forge [slide].

In the remainder of my time I will be making just two claims. The first is
uncontroversial but the second may be controversial, or at least new. Were there more time,
I would discuss each claim in great detail but, as it is, stating my conclusions and then
offering some evidence in support of each will be my strategy. My first, and I hope
uncontroversial claim, is that the vast majority of the images in both versions of the Treatise
are not intended to represent the structure (fabrica) of the body. That is, combined with the
text, the images do not describe the actual details of the human body as it is literally seen or
felt in dissection. Put in other words, the uncontroversial claim is that there is a gap between
the images and the text, on the one hand, and what can be learned directly through gross
anatomy, on the other. But how to characterize this gap, what it says about Descartes’s
empiricism, his reliance on anatomical study and anatomical authorities, and how we should
think about the role of his images, is a far more complicated issue.

This brings me to my second claim. While I think many would agree that the images
and the text of the Treatise primarily concern the operations of the body and that the text
describes these processes and movements in mechanical (machine-like) terms, I see
Descartes as repeatedly using the language of anatomical texts and the editor’s images
reflecting what we might call the grammar of anatomical illustration. My controversial claim
is that we can enrich our understanding of Descartes’s Treatise by taking into account the so-
called grammar of anatomical images and the manner in which anatomy studies the body.
Specifically, noting the threefold division of anatomical study, which divides among historia
(fabrica), actio (functio, operatio), and usus (utilitatas), or their vernacular translations and equivalents (histoire, history, fonction, function, action, usage, use, etc.), I want to convince you that Descartes's text and the editor's images are primarily directed at actio, as opposed to historia and usus (though the latter do make an appearance in the Treatise). By historia anatomists meant dissection and the resulting description of the parts of the body. Actio was the way in which the part moved or operated through the powers of the sensitive or vegetative soul or the various faculties or virtues. Usus was the end result of its operation—e.g., speaking, hearing, or seeing—effectively the benefit the part offered to the living thing and the reason the part exists. Typically the anatomist would begin with historia in dissection, move to study actio in light of historia, and then proceed to give an argument about usus, often turning back from the reason a part exists to deduce its structure.

If I am correct that the anatomist's actio is Descartes's focus, there are several noteworthy consequences, not the least of which is that something many readers take as obvious (my first claim) is actually embedded in a tradition—medicine—that they hardly ever notice. There are other consequences that we may discuss if there is time related to teleology, mechanism, and further areas of research.

Taking advantage of the fact that my first claim is uncontroversial, I will move directly to my second. As a preliminary, however, I want to say something about the general question of an image’s accuracy and what it might mean for an image to be false yet not lie (as per my title). For a naive observer of these images on the screen [referring back to the slide of the brain in the two editions], the one on the left (Schuyl's) surely looks more like how such an observer might imagine the brain to look and, traditionally, the naturalistic representation of images in anatomical texts deriving from Vesalius's De Fabrica (1543) has been taken to imply the images derive from real world specimens. Schuyl did consult
cabinets of curiosities and as a medical student he would have seen the insides of bodies during dissections. Nevertheless, how we learn to see, and what to see in anatomy requires training and, more to the point, the belief that anatomical images necessarily derive from real world specimens is no longer widely held among historians (pathological imagery of bones may be a different story). Self-consciously adopted techniques in the production of anatomical imagery included enlarging one part of the body more than another to highlight a claim in the text, abstracting away extraneous or anomalous details, or simply an attempt to persuade that an object actually existed in nature even though it cannot be seen (e.g., Kusukawa, 2006: 74-75; each of these strategies is used in the *Treatise*). In other words, even a naturalistic representation should not necessarily call to mind an actual observation of a specific and real object.

Thus, when the distinguished anatomist Nicholas Steno objects to Schuyül’s illustrations of the brain in 1633—“…one sees elegant images, which have certainly originated from an ingenious mind; however, I doubt very much whether these can be seen in any brain / …figuræ conspiciuntur non inelegantes, quas ex ingenioso cerebro prodiisse certum est; an vero inullo cerebro conspiciendae valde dubitarem.” (letter to Thomas Bartholin, 1663; cited in van Otegem)—Steno shows a certain bias about illustrations. There is an anachronism in Steno’s remark that takes Descartes’s text and the images provided by Schuyül out of context, though perhaps it would be fairer to judge that the role of anatomical illustrations was not yet agreed upon even in the seventeenth century.13 Descartes’s illustrations generally, and those in the *Treatise* in particular, work in ways both subtle and conspicuous with the written text that scholars have only now just begun to consider.14 They represent a specific kind of idealized and universal object and they create meaning with the text. This opens the possibility that the two editions of the *Treatise*, with their different images, create very
different meaning with the text (Wilkin, Van Otegem and Zittel argue for this possibility). But what Steno misses, most of all, is that the images and the text are not meant to be instances of *historia*, yet this does not mean they are not anatomical images.

Now let’s talk about anatomy. Francis Glisson, in a work deriving from his public anatomies in 1641, but only published in 1654, writes: “the full definition of Anatomy will be: that it is an art which by artificial dissection… observes and discovers the structures, proportions, perfections, imperfections, elements, communities, differences, sympathies, antipathies, faculties, actions and uses of the body of man and all its parts, as far as human understanding can reach them.” (Glisson 1993: 15-21; cited in Cunningham 2010: 20-21. The English is Glisson’s original.). Though “history” is not used by Glisson here, the long list prior to his mentioning “actions” and “uses” constitutes *historia*. In anatomy, in the usage of Vesalius, for example, *historia* occurred frequently as a term for the textual description—the written record of observation—of a part of the body. Vesalius prefaced his account of the uterus by referring to “the location, shape, size, construction, substance, insertion of vessels, origins and implantations, ligaments, and other things of that kind to which it is necessary to observe closely in the historia of the uterus.” In something very like this sense the images in Vesalius’s *De Fabrica* seem to constitute exceptionally vivid visual historiae of the parts represented and described in the text (though whether they depict a real specimen is in doubt). Thinking back to the images from Descartes’s *Treatise*, some of Schuyl’s more closely approximate a visual historiae than do those in Clerselier’s edition. We might then recast the uncontroversial claim I made earlier about these images by saying that by any large they fail as visual historiae.

But if this is correct do the images succeed in some other way, as examples of visual actio or usus perhaps? Now that we have some of the anatomical background before us, we
can better appreciate the opening paragraph of Descartes’s *Treatise*: “I must first separately describe for you the body… [an] earthen machine formed intentionally by God to be as much as possible like us. Thus He not only gives it externally the shapes and colors of all the parts of our bodies but also places inside it all the pieces required to make it walk, eat, breathe, and imitate whichever of our own actions [*nos fonctions / nostras actiones*] can be imagined to proceed from mere matter and to depend entirely on the arrangement of our organs” (Hall trans. modified with the Latin from Schuyl also represented]. Actio in Schuyl’s Latin is the equivalent to the French fonction and this should be a signal to us. The text is calling our attention to the second aspect of the threefold division of anatomical study.

Jumping again to my controversial conclusion, I think we should understand Descartes here as setting aside the issue of historia in order to maximize his ability to investigate actio. 20 If we are interested, as Descartes surely was, in providing a framework for understanding all animal movement, and one that specifically proceeds without making reference to the powers of the sensitive or vegetative soul or the various faculties or virtues typically involved in orthodox discussions of actio, then the best way to confirm his “supposition” would be to see how many movements it could account for; i.e., to see how many actions or operations his supposition of the earthen machine could explain. Drawing on the tradition of mechanics, Descartes presses the mechanic’s strategy as far as he can into anatomy, and such a strategy, as Descartes understands it, means leaving historia behind to consider how the visible effects might be explained by appeal to the hidden and ultimately sub-visible parts. 21

What does this conclusion entail for the images needed in the *Treatise*? For Clerselier, who reflects at some length on the images he commissioned and why he did not copy those in Schuyl’s edition, which tried too hard to serve as visual historiae for his liking,
it means that he wanted to find images that make Descartes’s text “intelligible.” Not only does Clerselier claim his edition is not built on “experience and autopsy,” he goes even further in describing the volume he produced: “One should not be astonished if these figures [of the French edition] bear no resemblance to nature, because the purpose was not to make a book of anatomy... but only to explain through these figures what Descartes advanced in his book, where he speaks more often of things that are not to be sensed, but that had to be rendered sensible in order to be more intelligible. But there is nothing easier than to put them back in nature and to conceive them as they are, after having considered them other than as they are.”

I’m not so sure about the last sentence, especially given that the images of Van Gutschoven and La Forge do not always seem to agree, but at least La Forge agrees with Clerselier’s sentiment when he comments that he (La Forge) was “committed less to representing things according to Nature than to rendering [them] intelligible” (Treatise, commentary, 321). Surely something similar should be said about Van Gutschoven’s images. As for Schuyl, in spite of Clerselier’s resistance to Schuyl’s images, many, through by no means all of the anatomical illustrations from the Latin edition, seem to leave the pretense of historia behind. Of those images in both volumes that seem more focused on the “intelligibility” of Descartes’s text and what cannot be seen by representing nature, we might count these two [slides regarding memory formation] or even these [slides related to automatic response].

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Nothing I have said today should lead you to doubt the significance of images as a means of shaping and transmitting scientific knowledge in the early modern period. But does this
entail that false images never lie? Of course they lie. When taken out of context images lie all the time. In my brief remarks I have tried to put the Treatise’s images back into their medical context, to show that they could be both false and truthful. Here are two examples of the illustrations from Descartes’ Treatise being used after they were published [slide]. Both these images derive from the Latin edition of 1662, though one has to imagine that the 1664 edition would have had a similar appeal in France, though I have not been able to find them (student notebooks are ephemeral after all). What purpose copying these images served I cannot claim to know, but I am confident that by paying attention to the afterlife of these false images, as scholars have now begun to do, we position ourselves to learn more about Descartes and his reception.

1 We should not be too impressed by critics who claim Descartes gets the details wrong. This is not to say Descartes thought he was so wrong about the details. Rather, it is that the gross anatomical details are, in an important respect I hope to specify, not enough to answer the questions Descartes set for himself and he, like so many others, turned to authority and speculation when the senses reach their limits.

2 Descartes also differentiates his interests from those of the anatomists on several occasions, though this should be read, I believe, as a resistance to only one part of anatomy, namely the mass accumulation of descriptive knowledge characteristic of the encyclopedists.

3 The reviewer of the 1664 edition for the Le Journal des Scavans: “Descartes had left this treatise in such confusion that it would be unintelligible if Mr. Clercelier did organize it, and had Mr. La Forge and Guscoven not elucidated it with their figures” (L’Homme de René Descartes,” Le Journal des Scavans, 5 January 1665, 9–11).

4 It is difficult to imagine Descartes did not have images or sketches at hand while writing the text—the published text makes frequent reference to mechanisms producing effects in a
step by step way, even including designations, e.g., “f”, “H,” etc., referring to the parts involved. Making sense of the text without some visual guide is near impossible.

5 Luthy (2006) notes several features we might assign to Descartes’s images. For one, illustrations are repeated in Descartes’s work, sometimes page after page. This applies to the posthumous works as well, marking one instance in which the editors follow Descartes’s own practice. In addition, again as Luthy points out, Descartes combined elements from very different traditions of illustration, including “geometrical constructions, machine drawings, and conventional representations of human bodies or parts” (Luthy 2006: 99). This is also true of the posthumous works, serving as a second instance in which the editors follow Descartes’s practice. A third feature much remarked upon, especially in connection to the Optics, is a reliance on analogies and manifestly inconsistent imagery, as when Descartes compares light to a ball and then to a rigid body such as a stick. This feature of the published images appearing during Descartes’s lifetime is also apparent in the posthumous works and so represents a third strategy used by Descartes’s editors. Finally, though Descartes’s editors had no choice given the penchant for reduction to the sub-visible in Descartes’s text, they also avert to representing invisible parts and mechanisms. There are further continuities one might cite—such as the effort to explain a phenomenon by appeal to the sub-visible with the aid of an illustration that is subsequently relied upon to demonstrate other phenomena—but you get the idea that the editors of Descartes’s posthumous works could look to Descartes for guidance when it came to providing illustrations for the text he left them.

6 This view is held by Peter Galison, Brian Baigrie, Dennis Des Chene, Rebecca Wilkins, Matthijs van Otegem, Christoph Luthy, Steven Nadler, Susana Berger, and Melissa Lo, among others (cf. Zittel). To quote van Otegem, with many of Descartes’s illustrations “he wanted to demonstrate how things work.” (2005: 611).

7 I harbor no illusions about the complexity of labels such as “mechanics” and “mechanism,” let alone “mechanical philosophy.” To just consider “mechanics,” we are well advised to remember the advice of the Cartesian Nicolas Joseph Poisson, who edited the Traite La Mechanique. “One must be careful not to let oneself be deceived regarding the word “mechanics,” which refers not only to the science of machine construction or a knowledge of its components. This term also includes the different ways in which the body moves
according to various irrefutably fixed natural laws” (Descartes, 1668: 18; cited and trans. Lazardzig, 2008: 164). Bertoloni Meli (2019) is a new work on the issue of mechanism and I have not yet fully digested it, although I do know I disagree with his assessment of Descartes and his characterization of my disagreement with him (Nico Meli).  

8 Not every anatomist or anatomical book contained images. Vesalius’s teacher Sylvius did not utilize images and neither did Colombo (though he wanted to), nor Riolan the Younger in his Anthropographia or Plempius in his Optomographia. Abridgments of Vesalius’s De Fabrica were also published without images. Harvey similarly expressed skepticism about using images because they might prevent readers for attempting to see things for themselves (1651: preface). Harvey’s suggestion that he avoided the use of images in order to encourage his readers to see for themselves is predicated on an assumption about his readers: that they could access the range of subjects that Harvey had used. Certainly they could not easily access human cadavers. A trip to the butcher, perhaps, but vivisections, which required vast amounts of technical skill to perform would be well beyond the capacities of all but a very small number of Harvey’s readers. In fact, the illustrations used by anatomists might be seen as instances of displaying the truth for all to see in a way more accessible than Harvey’s pedagogical strategy of advising his readers to see for themselves; i.e., illustrations are a different but no less powerful way of inducing readers to see for themselves. In the case of the Treatise, there was no other way to “see” the things described in the text than to visualize them in images if seeing them was the goal. The same might be said about the pores in the interventricular septum.  

9 Compare Harvey’s definition of anatomy from his notes to the Lumleian Lectures: “Anatomy is a discipline that reveals the uses and actions of the parts by ocular inspection and dissection / Anatomia est facultas quae occulari inspectione et sectione partium usus et actiones.” Anatomy’s means are ocular inspection and dissection while its ends or goal is to expose the actions and uses of the parts (organs). Certainly the latter is an example of science as it relates to final causes.  

10 In Linacre’s sixteenth-century translation of Galen’s Method of Medicine and the four treatises on the classification and causation of diseases and symptoms, he translates the Greek energeia with the Latin actio and functio interchangeably (Johnston and Horsley, 2011: lxxxiv-lxxxv). The anatomist’s Latin reflects a sophisticated view of change deriving from
Galen, who inherited it from Aristotle along with distinctions among *dunamis*, *energeia*, and *ergon*. As Brock explains in his introduction to Galen’s *On the Natural Faculties*: “Any of the operations of the living part may be looked on in three ways, either (a) as a *dunamis*, faculty, potentiality; (b) as an *energeia*, which is the *dunamis* in operation; or (c) as an *ergon*, the product or effect of the *energeia*” (1916: xxx-xxxi; cited in Johnston and Horsley, 2011: lxxxv). Note, however, that Plempius titles a section of the *Fundamentals of medicine*, “De Functionibus,” the first chapter of which begins with a definition: “Functio, actio, seu operatio est *motus sive mutatio à facultiate anima procedens*” (1644: 168). *Functio*, *actio* and *operatio* are equivalents for Plempius and, at least in the case of *functio* and *action*, the two are also treated interchangeably by Harvey in *De Motu* (see Wear 1983). “Fonction” was uncommon when Descartes wrote, having yet to appear in any of the general dictionaries I have examined, e.g., Cosgrove (1632). In Goclenius (1613) “funtio” does not have its own entry and while Estinne (1570) does include “funtio,” “fonction” is not listed as its French equivalent; instead, one finds “charge ou office” (583). Usus is the Latin translation of the Greek *chreia*. Latin-French Dictionaries, like Estinne (1570), translate “usus” as “usage” and make the connection between utor and servir, the latter of which Descartes also uses (e.g., AT 6, 46). Nicot (1606) notes of “usage” that “this is what in Latin is called Usus.”

11 For Galen’s views on threefold division of anatomical study, see Schiefsky, 2007. The anatomical textbook tradition amply attests to the division. For discussion and references, see Mikkeli, 1992: 155-59, De Angelis, 2008: 218, and Cunningham, 2010: 20ff. For translations of Fabricius’s comments on the subject matter of anatomy that are very similar to Harvey’s definition from note 9, see Martin (forthcoming).

12 Given that medicine’s subject matter and the humanist endeavors of physicians were so expansive in the early modern period, touching on many fields of learning and practice, we as historians immediately confront a rich tradition that holds great promise for understanding Descartes, but we also confront a complex tradition that requires great care to be understood on its own terms. This partially explains why no attempt has been made to put Descartes’s illustrations into the medical context in which many of them most naturally belong. This is not to say that the medical context explains everything—the tradition of representation in mathematics, mechanics/machines, and optics are all worth consulting and are combined in creative ways by Descartes—but my goal today is to offer some initial
reflections on the medical context specifically and then to gesture toward more traditional questions in Descartes scholarship about teleology and mechanism that I believe the medical context helps to illuminate.

One historical strike against the Treatise was that it was published after the advent of microscopy and the microscope’s success in visualizing what otherwise could not be seen. Consider Leibniz’s remark that he preferred “a Leeuwenhoek” who shares what he sees over “a Cartesian” who shares what he thinks (Smith, 2011). The microscope changed the principles of evidence used to discuss the sub-visible world, which ended up being far more complex than Descartes had anticipated. In the hindsight of the 1660s and after, Descartes’s efforts from the 1630s-40s do not look so well conceived and are subject to the charge of unconstrained invention without any regard to the perceivable or known anatomical details. While there were standards at the time of Descartes’s writing that could be used against his claims—and he engaged with others using those standards—anachronistic readings of his goals, strategies and proposals do appear in the 1660s and this should be borne in mind.

We might imagine that the proof is being constructed simultaneous with the figure, a practice that can be found in Renaissance geometry manuals. In describing Descartes’s practice in this regard, Claude Clerselier notes that with Descartes’s strategy of drawing “he was trying to imagine a figure that satisfactorily answered to what he had in mind [il tentoit les moyens de s’imaginer une figure qui pust répondre & satisfaire à ce qu’il avoit dans l’esprit]” (Clerselier, 1664: preface; reproduced in AT: XI.xix; cited in Luthy, 2006: 99 and Wilkin, 2003: 60). [So does the idea exist separate from the text and image? Not really. That would be to over-read this, I think. Wilkin does. But it need not be that the image is an “afterthought,” and it certainly is not one to the reader of Descartes’s text.]

To my knowledge no one has noticed that the first instance in which two sets of images are used for the same published text of Descartes’s occurs in 1644, when his correspondence with Plemplius is published with an illustration in the latter’s Fundamenta medicinae and simultaneously with a different illustration in Jan van Beverwijck’s Epistolicae quaestiones (1644).

Descartes could not have read Glisson but the French anatomist André Du Laurens who, along with Casper Bauhin, wrote one of the two most important anatomy textbooks of the early seventeenth century, contrasts historical with scientific anatomy. According to Du
Laurens, anatomy “has a double acceptation… either it signifieth the action which is done with the Hand, or the habit of the Mind, that is, the most perfect action of the Intelect. The first is called Practical Anatomy, the later Theoretical or Contemplative: The first is gained by experience, the second by the living voice of a Teacher, or by their learned writings: The first we call Historical Anatomy, the second Scientifical: The first is altogether necessary for the practice of Anatomy, the second is only profitable; but yet this profit is oftentimes more beneficial than the use itself of Anatomy: The first looketh into the structure of the parts, the second into the causes of the structure, and the actions and uses therefrom proceeding.

According to the first signification we may define Anatomy thus: *An Artificial Section of the outward and inward parts …* If anatomy be taken in the latter signification, it is defined *A Science or Art, which searcheth out the Nature of every part, and the causes of the same Nature,* I call it a *Science*, because it hath universal or general Theorems of Maxims, and common Notions, out of which, being the first, true, immediate and best-known, all demonstrations are framed.” (Du Laurens, 1599: 15; English trans. in Crooke, 1631: I. 26-7; cited in Kusukawa, 2006: 93). On this definition, the first two parts of anatomy—the investigation of historia and actio—appear as manual and sense based activities whereas the investigation of usus was an intellectual and scientific activity. But what do we do when the parts cannot be seen because of their small size? This was the question Descartes confronted.

17 “… historia is meant in the sense of observation, that is, knowledge proceeding from first-hand experience or collected from the trustworthy reports of what [has been] experienced by others.” (Goclenius’ *Lexicon* of 1613; cited in Pomata). Examples where “historia” is used to mark a work as within the genre of anatomy include the two most widely read general textbooks of anatomy of the early seventeenth century: Andrea du Laurens, *Historia anatomica humani corporis* (1602) and Caspar Bauhin, *Anatomica corporis virilis et muliebris historia* (1609).


19 Perhaps this is all Steno meant in his criticism of Schuyl, which would be consistent with some of his remarks later in life about the value of Descartes’s *Treatise*. One cannot hide the fact that anatomy places special emphasis on sense experience and historia (see the titles in note 16), but I think this is not so simple of a claim as one might expect given the need for
argument and inference when making physiological claims related to actio and usus. Still, Gabriele Falloppio (1523-1562), *Expositio in librum Galeni de ossibus* (1570/1684) writes: “Anatomy is the art, indeed a habit of the mind, where by means of the most noble theory, that is, by contemplation, we can divide all the parts, internal and external, even the smallest... I add to the definition one last little part, in order that the parts are well and rightly known, they must be learned by sensation because in anatomy nothing comes to be secured except by what is clear by means of sensation / *Anatome est ars, vel habitus animi, quo optima cum θεωρία*, id est speculatione, omnes vel minutissimas corporis internas, ac externas particas dividere possimus... Addidi in definitione ultimam particulam, ut quae sensu sunt cognoscenda recte pateant quia in anatome nihil nisi quod sensu patent, percipiendum venit*” (cited in Harvey, *Prelectiones*, ed. G. Whitteridge)

Usus/usage is more complicated and teleologically fraught, but it is interestingly discussed in the Fourth Objections and Replies and then in Gassendi’s own reply, where Gassendi believes that any notion of usus implies fine and God’s design. This last connection is precisely what I think Descartes tries to reject, suggesting a nice parallel to the way in which Descartes investigates actio without reference to the soul or faculties.

The abstracted character of the images in the *Treatise*, something owing to their representing what is not directly observable—what cannot be literally seen in dissection—along with the text’s use of analogies with processes that we can observe, relate to Descartes’s notion of mechanical demonstration and the suppositions that form a part of many of his scientific proofs. In this way, the *Treatise* is just a further instance of Descartes’s oft repeated claim, found perhaps most clearly in the *Principles* IV 201 and 203, that we must explain the phenomena that we see by making reference to what we do not see, bridging the gap between the too with what we know about visible causes and their visible effects (see Manning, 2012). [Hutchins (2015) claim that Descartes’s mechanical explanations, especially those contained in the posthumous work accounting for the movement of the heart in the *Description*, are “non-reductive” strikes me as misleading. Is it true that Descartes does not consistently explain things in terms of the size, shape, and motion of particles? Of course, and the list of failures in this regard is quite long, as one would expect. But to the extent that Descartes’s deductions from the sub-visible back to the visible fail, he recognizes as much when he acknowledges that he resorts to hypothetical reasoning. And reductionism is
a complex notion in itself, not simply about the smallest parts, it also includes a reduction of explanatory principles which is something Descartes most certainly reduces. The specific instance of cardiac motion that Hutchins cites is significant evidence in his favor that the higher levels of organized matter intervene on the lower levels, but whether it supports the full case he attempts to make is the point on which I would disagree.

22 Clerselier refers to the images in Schuyl’s edition as inadequate and reason enough to publish the *Treatise* with new images. He does, however, concede that Schuyl’s copperplate engravings “are superior to the figures that I had put in this book, if one considers only the engraving and the printing.” (Clerselier, Preface, unpaginated; cited in Wilkin, 2003: 46). It is also possible Clerselier turned away from historia for the simple reason of cost. Wood blocks were less expensive and as a medium were limited in the details that they could include.

23 Clerselier included both sets of images even when they appeared very different, his rationale being that “what is incomprehensible in one might become clear in another” (this issue is discussed at length in Nadler, 2015).