1. Aesthesis in anatomy: a framework

In the Leiden University Medical Center's anatomical museum, in Museum Boerhaave, the Leiden-based Dutch museum for the history of science and medicine, and in various storages around Leiden, a few hundred human, zoological, and botanical anatomical preparations from the long eighteenth century are housed.[1] It is not the aim of this book to give a linear or chronological, institutional account of eighteenth-century Leiden anatomy and its leading luminaries. Although there is not a single concise overview of the kind, these topics have been sufficiently described in Leiden University histories such as those by Molhuysen and Otterspeer, in Barge's early twentieth-century histories of the early Leiden medical teaching and collections, in Huisman's work on the anatomical theatre in the seventeenth century, and in several biographical accounts of Leiden anatomists, such as Punt's work on B.S. Albinus, Zwaag on Van Doeveren, Van Heiningen on Gerard Sandifort and the correspondence of S.J. Brugmans, and of course Luyendijk-Elshout's (nee Elshout) work on the eighteenth-century Leiden anatomical cabinet and Eduard Sandifort.[2]

The existing literature tells us many things about lives, discoveries and careers, and also sometimes about university politics and personal relations. The aforementioned works have great value, and form a sturdy basis for my present purposes. However, they tend to tell us very little about what we now call the eighteenth-century Leiden anatomical collections, and even less about the specifics of individual preparations. As the actual merging of eighteenth-century anatomical preparations into a collection in Leiden was a process that took place roughly between 1770 and 1820 it makes sense for them not to be seen normally as a whole. Moreover, the object-driven approach is a fairly recent one in the history of science.

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[1] The LUMC anatomical museum is currently closed to the general public. For more information see http://www.lumc.nl/home/0003/71210065101221/90331050631221/ (access date 16 April 2012).
[2] Molhuysen 1913-1924, Otterspeer 2002, 2005, Barge 1923, 1934a, 1937, 1954b, Punt 1983, Van der Zwaag 1970, Van Heiningen 1995, 2009, Elshout 1952, Luyendijk-Elshout 1989, 1974, Huisman 1991, 2009.

Therefore the biographies and institutional histories currently available shed little light on the eighteenth-century collections as a whole or on particular eighteenth-century Leiden anatomical preparations and the specific circumstances in which they were made and used, or on how they were looked at, both directly after their making and upon acquisition by the university.

As most of the existing works do not have the anatomical preparations or collections as a starting point, the story they tell about them is fragmented and diffused. The few works that do take the Leiden anatomical collections as a starting point are dated and rather brief, such as Geyskens' and Van der Klaauw's 1934 report.[3] Elshout's description of the collections from 1952 was primarily a conservation report with added biographies of the anatomists who made the preparations, but she was the first to actually devote some attention to the eighteenth-century anatomical preparations as cultural-historical objects.[4] That approach is important, as what we are left with today are the preparations themselves: delicate, highly evocative, though foreign, objects, which hint at a material and academic culture entirely different from the one we know. In this light, maybe the most remarkable thing is that almost none of the existing literature raises *why* questions about the eighteenth-century Leiden anatomical collections: why do they look the way they do and why is there so much variation in their subjects, in the techniques used to make them and in their finishing? Why do they evoke both appreciation and disgust? Why were some used in teaching for decades and heralded as tokens of the greatness of Leiden University, while others, although equally skilfully made, barely saw the light of day and were persistently ignored after their formation? Why did these preparations end up in this collection while other, apparently equally suitable, candidates did not? Answering these questions is important, as the answers clarify their significance for the history of science, for cultural history and for the history of collections and collecting. In addition, they may help to inform decisions about preservation and display.

As most of the why-questions are evoked by the materiality of the preparations, I want to take the actual, physical, material objects as the starting point for this book. This means that I will borrow freely from methods and approaches

[3] Geyskens and Van der Klaauw 1934.
[4] Elshout 1952.

originating in the fields of material culture studies and art history.[5] In short, this book is object-centred; it uses precise descriptions, focussing on the internal evidence of the object, followed by deduction and speculation, exploring possible connections between objects, people, and their intellectual and emotional responses to the objects, drawing from a variety of sources.[6] This will eventually lead to a better understanding of why the object is the way it is, what its historical value is, and why it provoked certain responses from its makers and contemporary users.[7]

As Alberti has pointed out, museum objects gather meanings through association with the people that make and use them, thus linking their history and that of the collections of which they are a part to broader scientific and civic cultures.[8] The objects themselves, their materiality, possess some kind of agency in this process, although I do think that the agency of objects is of a different nature than that of human actors.[9] In this book, the main focus will therefore be on the materiality of the anatomical preparations, their manufacture and collecting, and to a lesser extent their use within the collections, as it is through their materiality that the eighteenth-century Leiden anatomical preparations have played and will play a part in creating and shaping experiences, identities, and relationships.[10] That materiality was most obvious to the people who created and collected them, as they experienced it first-hand, whereas for later users of the collections this was largely (but not entirely)

[5] Obviously I am not the first historian of science doing this. Notable examples are Lucia Dacome, Lorraine Daston, Ursula Klein and Pamela Smith.
[6] Prown 1982, p. 9, 2001, p.235-242. By internal evidence, Prown means any facts about an object that can be derived from our sensory perceptions of its materiality, preceded or accompanied by intellectual apprehension.
[7] For more on object-centred material culture studies see i.e. Harvey 2009, Herman 1992, Prown 2001.
[8] Alberti 2005, p. 599.
[9] My idea of the agency of objects is similar to what Hacking (2002, p.17) describes as the agency of nature: he does not, like Latour (1993, p.142-145, 2005, p. 63-87), advocate a parliament of things or quest to minimize the difference between the human and the non-human. Hacking states that nature has some part in the development of beliefs about it, but that it has limited agency.
[10] Alberti 2005, p. 561 distinguishes three phases in the life of a museum object, of which the manufacture and collecting is the first and the use of the object within a collection is the second. The third phase, the role of the object in the experience of the museum visitor, will only be taken into account here in as far as it is accessible and relevant for the understanding of the contemporary, eighteenth-century biography of the object.

reduced to the visual realm. The materiality of the preparations is, in short, our primary point of access to their meaning.[11]

Moreover, this book argues that the answer to many of the why-questions evoked by the materiality of the eighteenth-century Leiden anatomical preparations lies in *aesthesis*. Aesthesis is a term that occurs in eighteenth-century texts and dictionaries, albeit rather sparingly. It is not usually found in general and art dictionaries before the nineteenth century, but two examples appear in medical and philosophical dictionaries. In Barrow's 1749 *Dictionarium Medicum Universale: Or, a New Medicinal Dictionary*, 'aesthesis' is explained as "to be sensible of, sensation, or the faculty or power of sensation". The same definition is given in James's 1740s medical dictionary. These appearances indicate that aesthesis was deemed specifically relevant in a medical context in the eighteenth century. I therefore use aesthesis as an analytic category, in search for a concept that can define a particular epistemic culture. It is very useful as it is a contemporary, eighteenth-century term denoting a reliance on the senses.

Aesthesis, therefore, referred to a certain sensibility, the sensory perceptions of materiality. But the word is also closely related to the terms 'aesthetica' and 'aesthetics', a connection I will discuss in more detail in the next section. This suggests it also had something to do with a sensibility to beauty and elegance in the sensory perceptions and materiality of anatomy, as well as possibly dealing with the disgust these may evoke too. Another aspect of aesthesis is commodification, the stabilizing and stressing of certain qualities of human tissue to make it into a tradable object. Yet it is the sensibility to beauty and perfection in materiality that is defining for aesthesis; it is what distinguishes it from other sensuous epistemic cultures and commodification practices. The challenge is that most of its intrinsic qualities are often tacit rather than explicit. However, the interrelated elements of aesthesis transcend historiographies such as biographies, institutional histories and colonial history, and can therefore provide us with a new understanding of the anatomical preparations in eighteenth-century Leiden. This book is therefore an exploration of the characteristics of aesthesis in Leiden anatomy of that period.

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[11] Pickstone 2001, p. 216 reminds us of the obvious but frequently ignored fact that our primary relationship to nature, as to each other, is one of meaning. I would like to add our primary relationship to objects to that.

The most problematic aspect of studying an epistemic culture is that its characteristics are hardly ever explicit – they can be known only through an analysis, both visual and material, of an anatomical preparation. Like any epistemic culture, the culture understood through aesthesis is tacit, and does not so much reside in an individual attitude as being a constitutive property of an epistemic culture. It could be said to be weak and relational, as described by Collins: it is not tacit because of deliberate secrecy, it is just so embedded, so obvious to its members, that there is no need for them to make it explicit. It does not stand out until seen through foreign eyes, and to those eyes, once they are used to this exotic country that is the past, it is clearly visible and all-encompassing.[12] Explicit references to the importance of sensory perception and the search for beauty therein are rather rare in the work of eighteenth-century Leiden anatomists. Particularly rarely mentioned is the quest to find and bring out beauty, perfection, and elegance in anatomy, and the use in any constructive way of the disgust it regularly evokes. Aesthesis is primarily expressed in relation to material objects rather than being explicitly explained in texts. However, as will be shown in this book, the attentive observer will find it easily discernible, and certain texts do testify to a degree of aesthesis, albeit mainly between the lines.

This chapter will discuss more extensively what is meant by the aesthesis of anatomy, and in so doing will help to avoid any possible confusion as to why I use *aesthesis* and not the related word aesthetics. We will also look at why aesthesis is essential for an understanding of eighteenth-century Leiden anatomy, and in what consists its added value for the history of science.

What is aesthesis?

What exactly is meant by aesthesis in this book? Aesthesis has five important, interlinked characteristics. Firstly, it is a concept that describes an epistemic culture, a manner of gaining knowledge rooted in sensory perception and materiality: it refers to a science of things that can only be known through sensory perception. Secondly, it scrutinizes and tries to manipulate the beauty, perfection and elegance, encountered in these sensory perceptions of the material world. Thirdly, it can also be a way of dealing with the disgust evoked by practicing anatomy. Fourthly, aesthesis in anatomy is inevitably characterized by commodification, domestication and

[12] Collins 2010 ch. 4-6.

objectification: it involves the creation of lasting, transferable anatomical preparations that both represent and are made of parts of the human body, as well as the domestication of the (exotic) other.[13] Finally, aesthesis is largely tacit. I will now discuss these characteristics in more detail.

Sensory perception and materiality

The first important characteristic of aesthesis is that it concerns the knowledge of things that can only be known through sensory perception. It is not surprising that it is in specifically eighteenth-century anatomy that this is so important. Ever since Vesalius took the scalpel in his own hand in the sixteenth century, anatomy had increasingly become a hands-on academic discipline, closely linked with the more philosophical discipline of physiology, which theorized anatomical findings.[14] Nonetheless, anatomy itself, laying bare and learning about the inner structures of the human body, was best done through the use of one's own hands and eyes. For example, in 1772, the newly appointed Leiden professor of anatomy, Eduard Sandifort (1742-1814), held his inaugural address in Leiden. In it, he stated that practical medical knowledge of both healthy and diseased anatomy, obtained through dissection, is essential for becoming a better physician and surgeon, as is also making a proper diagnosis in those cases where cutting does not occur.[15] To Leiden-trained anatomist Petrus Camper (1722-1789), who would later become professor of anatomy at Groningen University, sensory perceptions were also of fundamental importance to all his work. Early in his career, Camper already stressed the importance of sensory perception in his dissertation on sight:

"God has wanted sensory perceptions, the testimonies of others, and reason by analogy, applied with the appropriate cautiousness, to lead us to the truth and to be the foundation of our beliefs."[16]

However, in an age without artificial refrigeration and before the advent of bacteriology, the visceral experience of practicing anatomy was not for the

[13] Latour 1987, p. 223.
[14] See Cunningham 2002/2003.
[15] Sandifort 1772, p. 6: *"Haec practicae medicinae Gubernatrix. Hac ad intimosabditosque organorum recessus paratur via, funestae mroborum exponuntur clades, tutior patet curandi methodus, & accuratior instituitur prognosis, ubi fatorum mandata rescindere non licet."*
[16] Camper 1746, Dissertatio optica de visu. Original: *"Sensus, Testimonia, & Analogiam, adhibitis legitimis cautelis, nos ad veritatem conducere, & persuasionis fundamenta esse Deus voluit."*

squeamish. Anatomical demonstrations were often spread over several days, and although being limited to the winter months, using an unheated room facing north, burning incense and starting with the most perishable parts - the intestines - went some way in covering up the worst in terms of smell, by the last day of dissecting the atmosphere in the anatomy theatre cannot have been pleasant.[17] This is not to mention the private dissections and the making of preparations many professors and, later, also students of anatomy were frequently involved in. It may seem that touch and sight would provide the only sensory perceptions needed to rely on for the anatomist. However, although the hand and the eye were indeed considered to be the anatomists' most important instruments, all senses, including smell, taste, and hearing were involved in the practice of anatomy. Wendy Moore has vividly described the sensory practices of the English eighteenth-century anatomist John Hunter, who actively encouraged his students to smell and even taste bodily fluids such as urine and semen in order to come to a post-mortem diagnosis.[18]

As appears from these above examples, aesthesis was characteristic of a sensory manner of gaining knowledge about the world, and they confirm what Pickstone has pointed out, namely, that all ways of knowing involve not merely mental operations but *work* as well: hands on, manual, practical work, such as experimenting and making preparations.[19] This I have myself experienced first-hand when trying to make a preparation. For example, based on the preparations I had seen and the preparation handbooks I had read, I expected the process of injecting internal organs with fluid coloured wax to be difficult because of the size of the veins, but I had not anticipated how difficult it would be to keep the wax hot enough during the process to remain fluid and injectable without burning my hands, nor had I expected the smell of turpentine to be so overwhelming. It is this kind of practical

[17] See i.e. Cunningham 2010, p.26, 29-30, Huisman 2009, p.31-32. These were only general guide lines for anatomical theatres, and it was not possible to follow them everywhere. In Leiden for example, the anatomical theatre was housed in an old church building, which meant there was a lot of natural light, but the room was facing east instead of north.
[18] Moore 2005, p.79-80.
[19] Pickstone 2001, p. 17-20. This is not to say that aesthesis is a way of knowing itself. Aesthesis can be found in several different ways of knowing as distinguished by Pickstone, such as hermeneutics (world-readings), natural history, analysis and experimentalism. Although Pickstone's ways of knowing form a valuable epistemological framework, they are not sufficient to understand the epistemic culture of which the eighteenth-century Leiden anatomical collections are the material remains. The concept of aesthesis, with its duality of sensory experience and seeking beauty and perfection, is the key to understanding that culture.

work that provides knowledge that would remain inaccessible when one only uses written sources.[20]

In eighteenth-century aesthesis, collecting, mapping, and verifying sensory perceptions in anatomical preparations is precisely that work. When Leiden anatomy professor Wouter van Doeveren (1730-1783) obtained a preparation of a gravid uterus made by his deceased colleague Noortwijk for his own collections, he wrote an excited letter to a friend: finally he would be able to see and take apart the preparation, on which Noortwijk had based his thesis, that the blood circulation of mother and foetus are one, something Van Doeveren believed to be untrue based on his own experiments with gravid uteri. However, he apparently still felt it was important to verify and compare his own sensory perceptions and experiments with those of a colleague.

The importance of sensory perceptions and materiality was obviously not limited to the field of anatomy in the eighteenth century. The characteristics of the epistemic culture understood through aesthesis could only develop in a wider network, and the anatomical practitioners influenced by it were often equally involved in other fields of knowledge, such as natural history, medicine, chemistry, and fine arts. It is therefore very possible that other collections and areas of knowledge from the same period can also be understood through aesthesis, a surmisal supported by Lissa Robert's 2005 chapter on 'The Death of the Sensuous Chemist'. Here she describes how the use of chemists' senses in the laboratory in the latter half of the eighteenth century was altered and constrained to various extents by the increased use of precision instruments and mathematical calculation.[21] As we will see in this book, chemistry and anatomy were closely connected fields in the eighteenth century, and the use of the anatomist's senses also changed in this period, albeit for slightly different reasons.

The creation of lasting anatomical preparations, as well as the re-examination preparations made by others, was of course a way to map and disseminate knowledge, but the initial stages of dissecting a body and making preparations already had an independent epistemic value. It can seem that the resulting

[20] Appendix I.
[21] Roberts 2005, p. 117, 123.

anatomical preparations have only visual aspects. The materiality of the preparations may indeed have been primarily a multi-sensorial affair for their makers, yet we will see that in many cases the eighteenth-century meanings of that materiality far exceeded the purely iconographic and visual. Moreover, although the importance of sensory experience in gaining knowledge in early modern and modern times has been stressed by other scholars in the past decades, what seems to distinguish aesthesis from this sensory sensibility is an added, inherent sensibility for elegance and perfection.[22] How, then, did aesthesis motivate the Leiden anatomists towards scrutinizing and attempting to manipulate the beauty, perfection, elegance, and disgust encountered in these sensory perceptions of the material body?

Beauty, perfection, elegance

Initially, it might seem strange that in an epistemic culture so dominated by sensory perception and the visceral, material body of both the anatomist and the anatomized subject, there is room at all for considerations of beauty, elegance and perfection. Yet when we consider the responses evoked by the material remains of the eighteenth-century anatomical preparations, both in the time they were made and today, it soon becomes clear such considerations must have played a part. After the initial gut responses - those cries of 'yuk' or 'ugh' - many people cannot help but be mesmerized by the wonder of body parts, or even of entire bodies, that look vividly alive in some cases, of the organs that have been injected and mounted with such refinement and care that one cannot help but wonder how something like that can be made in the first place, and how they withstand the ravages of time in the second. Peter the Great was so impressed with the beauty of the body of a boy that the Amsterdam anatomist Fredrik Ruysch (1638-1731) had preserved as a whole that he kissed it when visiting Ruysch's cabinet in 1697, and on his second visit purchased the entire collection of over 2,000 preparations and shipped it to Russia. Contemporary examples of the appreciation of the refinement and eerie beauty of historical anatomical preparations can be found in coffee-table books and blogs devoted to them.[23]

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[22] The work of Pamela Smith is a wonderful example of this. Other works that have contributed greatly to the understanding of the role of sensibility and sensory perception in epistemic cultures are, amongst others, Alpers 1983, Shapin & Schaffer 1985, Riskin 2002, Smith 2004, Roberts 2005, Roberts et al 2007, Schickore 2007.

[23] I.e. Gould & Purcell 1992, Fuchs & Fuchs 2000, De Rooy & Van den Boogaard 2009, http://morbidanatomy.blogspot.com/.

When we take a closer look at what eighteenth-century anatomists said and did concerning the reaching for beauty, perfection, and elegance in their work, it quickly becomes clear that this striving was closely connected to the sensory knowledge and materiality of anatomical practice. For example, the aforementioned Camper explicitly linked the importance of sensory perceptions to his quest for beauty when writing about endlessly measuring, and even cutting in half, the heads of deceased people of different ages and races: 'I have tried to derive from the foundations of Nature itself the characteristics of true beauty in our heads'.[24] His teacher, the famous Leiden professor of anatomy Bernard Siegfried Albinus (1697-1770) opened his 1736 dissertation on the arteries and veins of the human intestines with the words: '*First I will deal with the arteries and veins in man's intestines, now that I have obtained the opportunity to show these matters with* ***exceptional skill and elegance*** *(…).*'[25] Here we read, on the one hand, that the exceptional, manual skills of the anatomist - his craftsmanship- is needed in order to know, and make perceivable, subtle anatomy, while on the other hand he calls his craftsmanship elegant. The concept of aesthesis helps to define and understand this combination of reliance on sensory perceptions and the pursuit of beauty and perfection – because here that is precisely what elegance means.

Eighteenth-century Leiden anatomy has previously been described as subtle and 'elegant' by Luyendijk-Elshout in the twentieth-century meaning of the word: appearing pleasantly because of its refined design.[26] Yet we should not forget that elegance in eighteenth-century Latin ('elegantia') has a double meaning: it refers both to refined taste and to precision and perfection. So in generating tactile and visual perceptions in dissection, acting with, and searching for, a certain kind of refined beauty and perfection is necessary as well: elegance contributes to the creation of knowledge, and thus has epistemic value.

The epistemic value of elegance and perfection can be linked to the early modern equation of beauty and perfection to health and happiness. This equation derived from the work of the ancient Greek medic Galen (AD 129-c.210), which was

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[24] Camper 1791 p. 96: *"Ik heb getracht uit de gronden der Natuur zelve de kenmerken van het waare schoone in de hoofden van ons afteleiden."*
[25] B.S. Albinus, 1736, p. 1: *"Primum autem faciam in arteriis et venis intestiorum hominis, nactus opportunitatem artificio singulari, eoque eleganti, (…), expressas exhibendi."* (hyphen mine).
[26] Luyendijk-Elshout 1983, 1989.

still widely read among eighteenth-century anatomists such as Albinus.[27] Galen connected the sculptor Polycletus' idea that beauty is found in well-proportioned limbs to the stoic Chrysippus' statement that health is the symmetry of elements in the body.[28] Following the growing importance of the experiment in the seventeenth century, throughout the course of the eighteenth century rational analysis of sensory perception and the understanding of the rules of beauty and perfection became increasingly important. This also meant that 'symmetry' or 'harmony' no longer sufficed as an answer to the question of what beauty and perfection entailed. The issues that arose from knowledge gained through sensory cognition as well as from the criticism of taste in the fine arts were first extensively addressed by the German philosopher Alexander Baumgarten in his 1735 *Meditationes philosophicae de nonnullis ad poema pertentibus* and in his 1750-58 *Æsthetica*. The latter title was derived from the Greek αίσθητικ-ός, meaning material things perceptible by the senses (as opposed to immaterial, thinkable things), and which would quickly become a thoroughly ambiguous term. Few words have changed meaning so often, are so ambiguous and yet used so carelessly, as 'aesthetics' and its derivatives, making it a potentially dangerous word with which to describe eighteenth-century practices and objects; this is something I will address in the next section.

Disgust

The attempts to approach beauty and perfection rationally also implied that perfection might be understood through its negatives: the repulsive, the disgusting, and the ugly.[29] As mentioned earlier, there was no shortage of these negatives in eighteenth-century anatomy, as it could be a rather gory affair – (although B.S. Albinus was allegedly famous not only for his eloquence and preparation skills, but also for his capability of never soiling his sleeves while dissecting[30]). Disgust was certainly something many people felt on first entering a dissecting room, as shows from a letter of 1801, written by freshman medical student Hampton Weekes to his

[27] Nutton 2005, 2008.
[28] Santing 2007, p. 486-487.
[29] Just as ethics is commonly mistaken as a synonym for the understanding of 'what is right' instead of for the understanding of right *and* wrong, aesthetics is commonly mistaken for the understanding of beauty only: another reason to use the concept aesthesis, which entails both beauty (perfection, elegance) and ugliness (deformity, disgust).
[30] Von Haller 1774-1777, vol. II, p. 126, lists Albinus as the first of what he calls the 'perfect anatomists', a title he unfortunately does not elaborate upon.

father Richard Weekes. He recounted how he dragged an unsuspecting visitor along to see the dissection room:

"... says he I never smell't such a stink in my life, began to spit about & hung back I could not help laughing, however I got him as far as the door just peep'd in & saw 3 or 4 subjects, there was only one young man there who was wishing to finish a subject, for bloodvessels, - he no sooner saw him but soon turn'd round keep'd on spiting & twisting about so we came down, tho: I did not tell you he said he was shure he should be sick, shure he should be sick."[31]

And although an anatomist might be expected to have been able to deal with the gore and mess of death and dissection more easily than others, the eighteenth-century Leiden anatomists were certainly not immune to the unnerving effects of our 'partibility'.[32] For example, the Leiden anatomy professor Wouter Van Doeveren (1730-1783) was frequently called upon for help with difficult births. In the case of a woman who had been in labour for three days, but whose child had died with the head stuck in the birth canal, Van Doeveren saw himself forced to sever and remove the head of the child with an instrument called a Levret's hook, named after its developer with whom Van Doeveren took classes in obstetrics while studying in Paris. Subsequently he could slowly pull out the remaining body of the child. Although the treatment was considered successful as the woman survived, Van Doeveren was appalled and exclaimed in a letter to a physician friend: 'Nothing I desire more than to never having to use that again!'[33] But dealing with the disgusting insides of the body and with severed body parts was of course inevitable for anatomists and other medical men; paradoxically, it was of course also a manner in which to gain access to knowledge about the beauty and perfection of the human body. This, for example, shows in the writings of the Dutch lawyer and poet Willem Bilderdijk (1756-1831), who, though never having officially studied medicine, gave a detailed account of a dissection and used it to show that under all the bloody mess there is indeed

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[31] Weekes in Ford 1987, p. 51.
[32] Miller 1997, p. 27 states that *"There are few things that are more unnerving and disgust evoking than our partibility. (...) Part of death's horror is that it too is a severance of body and soul and then, via putrefaction, of the body's integrity."*
[33] Van Doeveren. MS UvA: *Letter to J. Tak*, UB: HSS-mag.: Y 123.0.

something of profound beauty, and tried to persuade his reader of both the necessity and pleasure of anatomical explorations.[34]

Similarly, medical men and other visitors respond in wildly varying ways to anatomical collections. As mentioned before, Peter the Great was so enchanted with Ruysch's preparations that he did not hesitate to kiss them. Conversely, the Leiden anatomy professor Jacob Johannes Rau (1668-1719), according to the German student Erndl, repeatedly said that Ruysch used 'wicked Arts' to make his preparations – although this may have been said from sheer envy.[35] Although not the focus of this book, I have found that these extremes are still present today: many of the slides containing images of the preparations accompanying my conference papers on the collections have been met with initial disgust from the (academic) audience, who are only later to be won over and led to appreciate the morbid beauty of the preparations. That the variety in responses from audiences has little to do with the age or particular looks of the individual preparations shows from the huge popularity and controversy that surrounds exhibitions like Gunther von Hagens' *Bodyworlds* and the American *Bodies*.[36]

Why, then, do anatomical dissections and preparations, and sometimes even drawings, often evoke initial disgust, even though this often seems to subside after a while? First, it might be useful to distinguish between 'core' and 'moral' disgust. The former is the kind of disgust that is viscerally responsive to foul or potentially contaminated things within close proximity; it is a protean emotion that may protect us from harm. The latter, however, has as its objects (or representations) people or behaviours that transgress social norms. These two forms of disgust are not always easy to separate.[37] Indeed, when first seeing an anatomical preparation, core disgust is evoked because, in general, dead bodies and separated body parts are not normally the kind of things we want to encounter in close proximity – even the suggestion makes us shiver, which is what seems to happen at those conferences. Simultaneously though, anatomical preparations may evoke moral disgust, as the social acceptance of putting human bodies and body parts in liquid-filled jars is limited to very specific

[34] Bilderdijk 1783, appendix V, p. 127-140.
[35] Erndl 1711, p. 65-6.
[36] The *Body Worlds* exhibitions provoke debate both in mainstream media and a variety of scholarly fields, such as feminist theory, (medical) anthropology and sociology. See i.e. Walter 2004, Greer 2008, Scott 2011.
[37] Korsmeyer 2011, p. 4.

purposes and circumstances. Only when we have satisfactory proof that this particular object does not represent the transgression of social norms, are we willing to accept it – which is mostly what happens at those conferences where I provide the preparation with its historical context and explain its significance and meaning.[38]

Obviously, the level of satisfaction with the proof of social acceptability is, to a certain extent, something which is arbitrary, as shows from the fact that there are still wildly varying opinions on the acceptability of both the Ruysch preparations and modern anatomical exhibitions. Moreover, disgust can also be used as a means, for example, to entertain, moralize, or to educate, sometimes simultaneously. This was the case with a skull affected by syphilis kept in the Ruysch collection. It was the skull of a prostitute, and therefore a vivid moralizing example of the effects of promiscuous behaviour, slightly disgusting because of its origins and pathology, but entertaining to observe when held against the light as this clarified the thin patches in the bone, and served as a lesson on both human anatomy and venereal disease. After the skull broke – probably it had been dropped on one of the trips to a window or candle – Rusych turned it into an equally moralizing preparation by putting the fragments in a jar and positioning an infant's foot on top of them, an allegory of innocence trampling debauchery.[39] By transforming a broken preparation into a new preparation with a strong allegorical meaning, Ruysch not only regulated the evocation of disgust in his visitors, he commodified the prostitute's skull for a second time. This brings us to the next aspect of aesthesis.

Commodification

Aesthesis in anatomy inevitably involved the related activities of commodification, domestication, and objectification. Commodification, turning something that is not by nature commercial into, or treating it as, a commodity, can be done to almost anything that occurs naturally: plants, animals, humans, but also water and landscapes.[40] Like slavery, prostitution, relics, headhunting, and corpse medicine, anatomical preparations are a form of commodification of the human body. Yet unlike most other forms of commodification of the human body, the creation of

[38] For more on deformity, ugliness and disgust in the eighteenth-century Leiden anatomical collections see Chapter 4.
[39] Ruysch *Thesauri*, vol. VII (1707), p. 9, no. XIV.
[40] On the commodification and exchange of naturalia in the early modern period see i.e. Cook 2007, Smith & Schmidt (eds) 2007, Dupré & Lüthy 2011.

anatomical preparations was not aimed at the consumption of the body or its services, nor at stabilizing it for primarily symbolic, ritual or decorative reasons (although these could also play a role). Making an anatomical preparation is first and foremost aimed at rendering knowledge, gained through sensory perception and experimentation with the body, stable and tradable. Sometimes this tradability was only of secondary importance, as for the many anatomists and collectors who made anatomical preparations primarily for their own research and teaching collections. In certain other instances it was the prime concern of the maker, as was the case with preparations that were made with the explicit intention of viewing by paying visitors and to be sold eventually.[41] This could also be the case when the maker wanted to ship preparations back to Europe. This shipping back of commodified bodies – human, animal, and botanical - ensured the maker stayed connected to the centre of knowledge.

In some cases, commodification also involved the explicit objectification of the human body, and was aimed at directing the gaze of the observer. The lace-rimmed sleeves and collars on the preparations of Ruysch and Albinus are an example of this: by covering up the stumps of limbs and necks, our eyes are diverted from the disgust-evoking sites of mutilation of the body, and are instead steered at the preparation itself.[42] Although clearly human, the preparation has become a commodity; an object that simultaneously is what it represents, although its meaning often stems from, and transcends, its materiality.[43] Moreover, the division of the body into parts ensures that the preparation does not primarily represent an individual. To use a term coined by Samual Alberti, the preparation has become a dividual: together with other preparations it forms a composite, multi-authored person, consisting of parts that originate from different places.[44]

On other occasions, commodification of the human body involved both the domestication of the exotic other, and of indigenous knowledge. We should keep in mind that commodification was almost never a simple accumulation, and direct

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[41] For the advertisement and sale of anatomical preparations in the Low Countries in the late seventeenth and early eighteenth centuries, see Margócsy 2008 & 2011.
[42] See chapter 3.
[43] On this property of anatomical preparations see Rheinberger, 2010, p.233-234 and Huistra 2013 (forthcoming). Brown 2001, p. 4-5, describes the meaning of the object beyond its materiality as its 'thingness'.
[44] Alberti 2011, p. 71, 128.

distribution, of knowledge. Processes of transformation and manipulation were necessary to create stable, meaningful objects out of the ambiguous materials initially accumulated. This could also lead to rather incidental objects being redistributed and accepted as European 'universal' knowledge.[45] This seems to be the case with the late eighteenth-century preparations of 'African' and 'Asian' human foetuses in the Leiden collections: decorating them with beads and plants was simultaneously an inquiry into indigenous medical knowledge and a way to make a claim about their geographical origins.[46]

Thus it can be said eighteenth-century aesthesis is a mode of thinking and working, a simultaneously philosophical and practical, mainly tacit, approach to questions of, and quests for, sensory perception-based knowledge, beauty and perfection, evoked by bodily material perceptible to the senses. Dealing with disgust takes up a special place within aesthesis, being both necessary because of the visceral character of practicing anatomy, and useful in directing users' perceptions of anatomical preparations and drawings. Commodification is inevitably an aspect of aesthesis as it is aimed at preserving and spreading knowledge about perishable bodies in lasting objects. Because of its tacit character, aesthesis is expressed primarily in the materiality of what remains of these anatomical practices: anatomical preparations, drawings, and every now and then in writings. But before I discuss why aesthesis is characteristic of the eighteenth-century Leiden anatomical collections, I will clarify what distinguishes aesthesis from aesthetics.

Aesthesis, not aesthetics

As we have seen, aesthesis is an eighteenth-century word, used by medical men of the time to describe a certain sensibility to sensory impulses from the world around them. I argue that this word can be used as a heuristic concept to understand the epistemic culture of which the eighteenth-century Leiden anatomical collections are the material remains. Yet what needs to be clarified is how aesthesis is different from the confusingly similar term aesthetics. The concept aesthetica is of course undeniably connected to Baumgarten, who published his *Aesthetica* between 1750

[45] Schmidt 2011, p. 133-134.
[46] See chapter 5 for more on these preparations.

and 1758.[47] However, the emergence of the word 'aesthetica' in the mid-eighteenth century is not a bolt from the blue. In the preceding century, both the visual arts and natural philosophy had increasingly started to depend on perception and experiment, making the hand and the senses, especially the eye, important tools in gaining knowledge about the 'Book of Nature'.[48]

In order to be able to explain this combination of mental and practical activity in gaining knowledge, Baumgarten argued that there are two levels of cognition, namely logic - comparable to the Aristotelian *scientia* - and the lower level of aesthetics - comparable to Aristotelian *artes* - which is autonomous and has its own laws. The object of logic is to investigate the kind of perfection proper to thought, to analyse the faculty of knowledge; the object of aesthetics is to investigate the kind of perfection proper to perception. (Reflections, §§ 115-116). Aesthetics is "the science of sensory cognition" (scientia cognitionis sensitivae; Aesthetica, § I)."[49] From a Cartesian point of view, a science of perceptions is inherently paradoxical, as it is difficult, if not impossible, to submit perception to an exact and systematic treatment. However, as Eagleton remarks, there must be some way for reason to penetrate the world of perception while maintaining its absolute power – a delicate balance Baumgarten was attempting to establish within his work.[50]

It is thus in a sense partly based on the Baumgartian definition of aesthetics that I use *aesthesis* – to designate an attitude that entails both the investigation of the kind of perfection proper to perception and a science of, and based on, sensory cognition. But aesthesis is not the same thing as aesthetica or aesthetics. In order to clarify this, the historical and contemporary confusion linked to the term aesthetica has to be unravelled. The acceptance and use of the concept 'aesthetica' and its derivatives was neither quick nor widespread. In England as late as 1842 the word was still frowned upon by some as silly and pedantic.[51] Although Baumgarten coined the term, the rise of aesthetics as an independent discipline, a philosophy of art or more generally of beauty and taste, cannot easily be pinpointed to a specific place or

[47] Baumgarten 2007.
[48] See i.e. Smith 2004.
[49] Baumgarten 2007 (1750-8), p.10-11, Beardsley 1975, p.156-157.
[50] Eagleton, 1990, p. 15.
[51] De Bolla 1989, Guyer 2005, p. XI, Gwilt, 1842, p.673.

period. Recently it has been presented both as particularly German and British, either in the nineteenth or the eighteenth century.[52]

The period 1711-1735 has been marked as 'the foundational quarter century of the discipline', but by 1735 there certainly was not an academic philosophical discipline referred to as 'aesthetics' anywhere in western Europe.[53] A lot of eighteenth-century writing we would now describe as aesthetic theory was simply referred to by contemporaries as art theory or as discussion about taste, whereas theories referred to as aesthetics in the eighteenth century would now more likely be described as 'cognition theory'. Moreover, our contemporary discourse of aesthetics or philosophy of art has been determined largely by the work of Immanuel Kant, in particular by his third critique, the 1791 *Critique of Judgment*.

In 1787, Kant wrote in the first paragraph of the first part of his *Critique of Pure Reason*: 'The science of all the principles of sensibility a priori, I call transcendental aesthetic', explaining in a footnote that, at the time, only the Germans used the word 'aesthetic' to indicate what others call the critique of taste. As this German discourse was widely translated in Dutch and read and discussed in the Dutch learned societies and salons, it is likely that the educated Dutch also associated 'aesthetic' and its derivatives with questions of taste.[54] Kant goes on to argue that Baumgarten tried in vain to subject the criticism of the beautiful to the principles of reason, thus incorporating its rules into a science. He therefore felt it was advisable

"...to give up the use of the term as designating the critique of taste, and to apply it solely to that doctrine, which is true science -the science of the laws of sensibility- and thus come nearer to the language and the sense of the ancients in their well-known division of the objects of cognition into 'aiotheta kai noeta' [perceived things and things known through reason]."[55]

Subsequently however, Kant does not apply this suggestion entirely consistently himself. In his philosophy, he distinguishes between transcendental

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[52] Guyer 2005, p. XI claims aesthestics as a discipline was predominantly shaped in eighteenth-century Britain, whereas Hammermeister 2002, p. X defines it as a fairly recent development grounded in German philosophical thought.
[53] Guyer 2005, p. XI.
[54] Onnasch 2006, p. 143-147.
[55] Kant 2003 (1787), p. 62, footnote p.920, English quote from the Meiklejohn translation.

aesthetics on the one hand, which entails the aforementioned science of the laws of sensibility, and aesthetic judgment on the other, which entails judgments of taste and beauty.[56] Apparently, Kant eventually felt the judgment of taste to be so heavily dependent on the laws of sensibility that 'aesthetic' was needed as an adjective to designate these judgments correctly. It is not surprising that this subtle distinction between transcendental aesthetics and aesthetic judgment in Kant's overall complex metaphysics was lost on many. However, some of Kant's ideas on beauty, in particular the disinterestedness, both moral and otherwise, of judgments of taste as discussed in his 1791 *Critique of Judgement*, have been very deeply ingrained in our contemporary thinking about art and beauty. In fact, diffused neo-Kantianism is to be found everywhere in Europe for much of the nineteenth and early twentieth centuries.[57] Combined with the confused use of 'aesthetics' both in the past and the present, it can therefore be hard to understand the pre-Kantian meaning of aesthetics in its own right. The main subject of this book focusses on the work of people who nonetheless fall mainly into this pre-Kantian period. In addition to this, it is worth noting that the popular and philosophical reception of Kant's work in the Netherlands did not gain momentum until well after 1790.[58]

In the course of the nineteenth and twentieth centuries the term 'aesthetics' has come to be used as a synonym for philosophy of the arts, although 'aesthetic' and its derivatives have recently even been adopted as 'a sentimental archaism for the ideal of beauty', removing the word still further from its original etymological and philosophical meaning.[59] From this brief epistemological history of aesthetics it becomes clear that the meaning of the word in the eighteenth century was possibly even more ambiguous than it is now, and that this 'new discipline' certainly did not have clear boundaries at the time. Surprisingly, even historians of art and science recently have been imprecise in applying the term aesthetics to historical objects, methods and theories. When discussing objects or works of art, 'aesthetics' is used to

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[56] On transcendental aesthetics see *Critique of pure reason*, on aesthetic judgment see *Critique of Judgement* (Kant 2003).
[57] Cheetham 2002, p. 4.
[58] Onnasch 2006, p. 143-147.
[59] Baumgarten, 1735, 2007, Beardsley 1975, p.156-159, OED online, consulted 17 August 2009. Recent work by anthropologists such as Meyer (2006) and Pinney (2006) on corporeal and emotional responses to images by observers has also revived the notion of aisthesis, in the 'earlier, pre-Kantian sense of aesthetics denoting our total sensory experience of the world and our sensitive knowledge of it'. (Lehmann & Roodenburg 2008, p.10) I have chosen to use 'aesthesis' instead of 'aisthesis' to distinguish my approach from the anthropological/art historical approximation.

refer to visual features, particularly stylistic or decorative elements. The art historian Julie Hansen, for example, speaks of the 'aesthetics' of the work of the Amsterdam anatomist and man-midwife Frederik Ruysch, taking the paintings of the surgeons' guild as a starting point, and writes: '…Ruysch should be appreciated first and foremost as an artist'.[60] This is rather anachronistic, as she uses the words 'art', 'science' and 'artist' in their twentieth century meanings, without explaining that they meant something quite different at the time, as in the case of 'aesthetic'. Hansen ascribes post-Kantian ideas of the artist (autonomous, creative, difficult personality) to Ruysch and the painters of his time, ignoring the fact that 'the artist' was an entirely different concept in the late seventeenth and early eighteenth centuries, and that art and science were largely undivided territory in early modern times.[61]

The separation between art and anatomy, artist and anatomist in the eighteenth century was not as straightforward as our contemporary categories suggest. As Smith has pointed out, 'arts' has long referred to skilled manual operations in general, which we would now categorize mainly as 'crafts' and not quite as the fine arts we now think about upon considering the word.[62] Therefore, 'artists', or artisans, as Smith prefers to call them, who made anatomical illustrations were often not just visual artists, but also jointly poets, tradesmen, administrators, or anatomists. Their commissioners often considered them skilled craftsmen, not the autonomous, unpredictable genius we often take 'the artist' to be. This is simply because the problematic concept of the artistic 'genius', in the sense of the visionary, powerfully possessed artist, did not emerge until the late eighteenth century: it is a thoroughly Romantic concept. Indeed, for most of the eighteenth century, it was 'ingenuity', natural cleverness and inventiveness necessary for the craftman's skills of both natural philosophers and artisans that were appreciated most.[63]

Similarly, anatomists were never just anatomists; they mostly thought of themselves primarily as natural philosophers and their work included activities we would associate with physicians, astronomers, physicists, philologists, theologians, philosophers, governors, publishers, collectors, and agriculturalists. For example,

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[60] Hansen 1996, p. 678.
[61] Also see Jorink and Ramakers 2011.
[62] Smith 2004, p. 27.
[63] Schaffer 1990 p. 82-82 and Shapin & Schaffer 1985, p. 129-131. In Latin, 'genius' originally applied to the personal deity that watched over an individual's fate.

Leiden anatomy professor Wouter van Doeveren was also an avid private collector, a city physician, a forensic medic, and one of the central figures in the Dutch smallpox and cattle-plague debates. His colleague Sebald Justinus Brugmans held doctorates in philosophy and medicine, taught logic, metaphysics, natural history, astronomy, botany and medicine, was head of the national Military Medical Services twice and strongly influenced national policy through his reports on cattle-plague, his proposal for the foundation of a veterinary college, and his contributions to the first national pharmacopeia. Moreover, he was one of the founders of the new Leiden drawing academy and owned a large private art collection. In this light, our modern categories of art and medicine become fluid, maybe even superfluous.

Despite this recent rethinking of categories, historians of science are also still remarkably careless with the use of the word aesthetic in their work. Even when methods or theories are referred to as 'aesthetic' the implicit meaning of the word often seems to be solely 'beautiful' or even 'artistic', as appears to be the case when Jardine, for example, discerns three types of aesthetic appraisal that may be counted in favour of a theory or hypothesis, such as those which 'bring out' certain aesthetic virtues in the (representations of) phenomena that they try to explain. Not once is it made explicit just what exactly is meant by 'aesthetic virtues', although the attentive reader suspects it has something to do with pleasant visual elements.[64] Ball too, in his recent work on the beauty of chemistry, explains fairly well what he means by 'beauty', but subsequently uses 'aesthetic' as a synonym for beauty without further consideration.[65]

This confusion explains why I do not want to use 'aesthetica' or 'aesthetic(s)' when discussing the eighteenth-century Leiden anatomical collections: the first is too exclusively Baumgartian, the second too eroded and thus empty and confusing. Nevertheless, it remains the fact that the Greek αίσθητικ-ός, material things perceptible by the senses, the dual meaning of investigation of the kind of perfection proper to perception, and a science of sensory cognition found in the Baumgartian 'aesthetica', played a central role in the genesis of the eighteenth-century Leiden anatomical collections. Even though aesthetica and aesthetics do not seem to appear in the vocabulary of the eighteenth-century anatomists, I argue that this is one of

[64] Jardine 1991: 195-206.
[65] Ball 2005, Introduction p. 8, 10 & chapter 10.

those cases in which something is so obvious it does not need to be mentioned explicitly by those involved.

However, if I want to use the word in any shape or form in order to help explain an eighteenth-century phenomenon, we need to have more sense of what it meant at the time. An obvious source to start with is contemporary dictionaries, and as we have seen, Barrow's medical dictionary does indeed give a definition of aesthesis. General explanatory dictionaries of Dutch were few and far between in the eighteenth century; what was available were mainly reprints from seventeenth century dictionaries.[66] None of the editions of Meijer's *Lexicon* which appeared between 1720 and 1770, or Van den Werve's or Weiland's Dutch dictionaries of 1742 and 1799 respectively, mention 'aesthetica' or a derivative thereof.[67]

It should be remembered, however, that Dutch was a predominantly vernacular language at the time and academic discourse in the late eighteenth-century Netherlands was still mainly in Latin. Neither does the search need to be limited to general or art dictionaries; as we have already seen, aesthetics first appeared in the philosophical work of Alexander Baumgarten, and, at this time, the arts and sciences were not strictly separated knowledge domains. Anatomy itself was habitually referred to as an art, in the Aristotelian sense, by its practitioners well into the nineteenth century, a skilled manual and sensory practice paired with the more mental and rational *scientia* of physiology to map and understand the human body.[68] Anatomical knowledge and skills were also of great importance for visual artisans such as painters and sculptors, and the skills and knowledge of those artisans were in turn indispensable for anatomists in mapping the body and developing knowledge. It was not unusual, therefore, for the anatomist and artisan to frequently be one and the same person. The most vivid Dutch example was again Petrus Camper, who not only published on human and animal anatomy, but also on drawing techniques, fossils, shoes, and megalithic graves, and skilfully illustrated almost all his work himself. Even in the cases where the anatomist could not compete with the draftsman, he was almost always passionate about depicting anatomy, possessed at least basic drawing skills and was often closely involved in both drawing academies and learned societies, institutions which were frequently found under the same roof

[66] Niederländische Philologie 2009.
[67] Weiland 1799.
[68] See Cunningham 2002, 2003 on this divide and how it shifted.

by the late eighteenth century. In his 1790 addresses for the newly opened Amsterdam society for arts and sciences Felix Meritis, Amsterdam anatomy professor Andres Bonn (1738-1817) said:

"Meanwhile Anatomy *equally deserves to be called the torch of the Drawing Arts as that of the Art of Medicine: I will reckon it no small honour that I also may enlighten your artistic exercise with it."*[69]

Upon closer investigation aesthesis not only transpires in the anatomical preparations, but in all facets of the anatomists' work and lives, and explains the fascinating, though confusing, diversity in materials and visual appearances these collections display. The eighteenth-century Leiden anatomical preparations are the result of a profound eighteenth-century *aesthesis* which includes both the continuous use of sensory perception as a source of knowledge and a permanent tacit quest for finding and understanding beauty, as well as dealing with the disgusting aspects of anatomy, along with the desire to commodify and objectify the human body. Notwithstanding the often confusing and confused meanings of its paronyms, the term will become precisely requisite for what is needed in understanding the eighteenth-century Leiden anatomical collections. Although I suspect that aspects of aesthesis also permeate other anatomical collections of the time – particularly those of the Scottish Monro brothers, who studied anatomy in Leiden -, and that Leiden was an important hub in spreading it, I limit myself to the Leiden collections here.

Why is aesthesis characteristic of eighteenth-century Leiden anatomy?

What makes aesthesis such a central concept in understanding the Leiden anatomical discourse of the long eighteenth century? Obviously, eighteenth-century natural philosophy and anatomy were subject to changes. Answers to questions concerning the fundamental entities the universe is composed of, and how these interact with each other and the human senses, were manifold. Sensory perception, particularly vision, was not securely established in relation to notions of truth-to-nature and

[69] Bonn 1790, p. 61: *"Dewijl ondertusschen de Ontleedkunde verdient de fakkel der Tekenende Kunsten, gelijk die der Genees- en Heelkunst, genoemd te worden: zal ik het mij tot geen geringe eere rekenen, ook uwe kunstoeffeningen daarmede te mogen voorlichten."*

fact.[70] Nor was the academic community any longer unanimous in acknowledging particular past achievements in the field of anatomy as the foundation for its practice – the eighteenth century would become the century in which the ancients would lose their position as the first and foremost authority of reference for anatomists. Whereas Bernard Siegfried Albinus continues to preface virtually all his written work with perfunctory references to classical canon in anatomy, starting with Galen, his successors had virtually abandoned this custom by the end of the eighteenth century.[71] This led to many controversies, some of which lingered for decades.

Moreover, Dutch natural philosophy and anatomy were strongly rooted in traditions of (self-)representation, craft, and trade.[72] Thus, conversion of impressions and sensations into imagination and ideas through active awareness, or consciousness of, the role of beauty, perfection, and taste therein was of great importance to natural philosophers in Europe in the middle of the eighteenth century. This is apparent not only in the rationalist oriented work of Baumgarten, with its strong focus on the cognitive aspects of sensory perception, but also from the more emotively reasoned work of Mendelssohn, who investigated the pleasure derived from sensory-perceived objects.[73] Sense perceptions were the most important source for gaining knowledge. Regardless of whether most attention was paid to the cognitive or the pleasurable aspects, both are found in virtually all philosophical work of the period, such as Hume's 1748 *An Enquiry Concerning Human Understanding* and Offray de la Mettrie's *l'Homme-Machine* from the same year, as well as in the work of the Dutch philosopher Frans Hemsterhuis, a close friend of Leiden-trained anatomist Petrus Camper. Hume thus reflected on anatomy:

"The anatomist presents to the eye the most hideous and disagreeable objects; but his science is useful to the painter in delineating even a Venus or an Helen. While the latter employs all the richest colours of his art, and gives his figures the most graceful and engaging airs; he must still carry his attention to the inward structure of the human body, the position of the muscles, the fabric of the

[70] On scientific images and the historical development of concepts like truth-to-nature, trained judgement and objectivity, see Daston & Galison 2007. On the relationship of sensory perceptions and fact in the seventeenth century, also see Clark 2007.
[71] Cunningham 1997.
[72] Alpers 1983, Pickstone 2001, p. 64-7.
[73] Hammermeister 2002, p. 13-14. Collingwood 1938, p. 306, Graham 1997, p. 34.

bones, and the use and figure of every part or organ. Accuracy is, in every case, advantageous to beauty…"[74]

These sensory perceptions were hugely important for Hume as he held that ideas are nothing more than the products of 'compounding, transposing, augmenting or diminishing the materials afforded us by the senses and experience'.[75] La Mettrie mentions beauty and the beautiful twelve times in total in a text of merely 20,000 words, and in admiration of the physician Johann Conrad Amman, who taught deaf-mutes to speak, he writes:

"He who has discovered the art of adorning the most beautiful of kingdoms [of nature], and of giving it perfections that it did not have, should be ranked above an idle creator of frivolous systems, or a painstaking author of sterile discoveries."[76]

Near the end of his treatise he concludes: 'Experience has thus spoken to me in behalf of reason; and in this way I have combined the two'.[77] Hemsterhuis, although lacking a systematic philosophy, also reasons along the same lines. In his 1769 letter on sculpture, he had already observed that beauty is found in those objects of perception which provide the soul with the greatest number of ideas in the shortest time possible, and in his 1771 work on man and his rapports goes on to argue that:

"The science or knowledge of man consists of ideas which he acquires through the senses and from those of rapports which exist between those ideas. The first are isolated, and represent isolated objects, the others derive from the existence of a certain number of the first, which the intuitive faculty can grasp at once."[78]

Five years later, in his treatise on the reality of appearances, Hemsterhuis boldly concludes: "I sense and therefore I am."[79] Once again, it appears that sensory perception is inextricably connected to both questions of beauty, or perfection, and to

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[74] Hume 1748, p. 4 (section I, §5).
[75] Ibid., p. 11 (section II, §13).
[76] La Mettrie 1943 (1748), p. 102.
[77] Ibid., p. 149.
[78] Hemsterhuis 2001 (1771), p. 91, 501-503.
[79] Ibid., p. 135. It has been suggested to me that Hemsterhuis took this idea from the work of Johann Gottfried von Herder (1744-1803). However, as far as I have been able to trace it, Von Herder first ventilated a similar statement in his 1778 *Plastik* (1809 ed., p.244), so three years later than Hemsterhuis (also see Pochat 1986, p. 429, Barasch 1990, p.165-171). In fact attention to sensory perception as a source of knowledge is fairly common in late eighteenth-century philosophy, so even though Hemsterhuis' thought was probably not original, it was an accurate reflection of the epistemological philosophy of his age.

gaining knowledge in the eighteenth-century mind. This dual philosophical stance had far-reaching practical implications, as we will see in the work of the Leiden anatomists.

It is likely that the aforementioned philosophical works were fairly well-known among scholars and educated men, disseminating on the social level through the particularly eighteenth-century phenomenon of the 'society'. Learned, philosophical, and royal societies for the advancement of the arts and sciences sprang up all over Europe, often as reactions against the perceived fossilization of the universities. In the heterodox Netherlands with its well-established print industry and book trade and lack of intellectual nationalism, the universities functioned fairly well in comparison to those in the neighboring countries. The room for experimental research and Cartesianism in Dutch universities, most notably Leiden University, might explain the fact that Dutch non-university academies were few and not as grand and modern as those in Paris and London. [80] The first and only notable learned society in the eighteenth-century Netherlands was the Hollandse Maatschappij der Wetenschappen (Dutch Science Society) of Haarlem. This society was only established in 1752 and acknowledged as 'societas litteraria' by the States of Holland under protest from Leiden University in 1760, as the University feared the loss of its unique status would damage its reputation.

However, educated men, (and occasionally women too), soon started founding societies and associations all over the country, independent of the universities. These were mostly utilitarian in character, that is, they aimed at informing and educating citizens and their ambit was mostly local. In Amsterdam alone, over ninety reading circles, freemasonry lodges, societies for music, medicine, mathematics, and archery were counted in the second half of the eighteenth century.[81] Some of the learned societies, mainly outside the Netherlands, were large, formal structures, such as the English Royal Society, but everywhere there were numerous small, informal, local groups meeting on a regular basis to discuss art, sciences, politics, and sometimes

[80] McClellan 1985, introduction p. xxii.
[81] Bots 1976, p. 12-15 and McClellan 1985, p. 123-125.

even religion. These groups were essential for the enlargement of intellectual enterprise and its integration in society.[82]

Most anatomists, both in the Netherlands and abroad, were members and attendants of such societies and salons and maintained numerous international contacts with colleagues and acquaintances. This also meant that foreign visitors might not only have chosen to visit a university, but also attended society meetings as well, interacting with university professors in this setting – something we know Dutch anatomists also did when abroad. For example, the anatomist Petrus Camper, a former Leiden student, attended meetings of the Royal Society and the Royal Academy when in London. And there were of course the extensive social networks too: academics and men of learning visited each other at their homes to discuss the latest developments in their field, and students used letters of introduction written by supervisors to pay home visits to academics in foreign cities. Wouter Van Doeveren (1730-1783), professor of anatomy at Leiden University from 1770 until 1783, spent about a year in Paris after his studies in Leiden in 1752-1753. There he not only took classes with famous anatomists, he also visited degree ceremonies, theatres, and famous scholars in their homes, such as Nollet and Reaumur.[83] It is often quite difficult to trace these contacts as many of them were either never registered or any documentation on them was lost, but it is clear that this entanglement of academic, societal, and social exchanges made for a vibrant culture of knowing.

Although some have dismissed the eighteenth century as a period of decline with little international significance for Dutch academia, Leiden University was still a fairly respected institution in the second half of the eighteenth century.[84] The Leiden anatomists were part of extensive international networks maintained through letters, visits, and the exchange of gifts, books, and favours, as will become clear throughout this book. They owned and discussed contemporary literature from the Netherlands and abroad covering a wide variety of topics. For example, in Albinus' library we find works by Leibniz, Hunter, Buffon, Boyle, Descartes, and Van Doeveren owned copies of works by Baumgarten, Mendelssohn, Hume, Offray de la Mettrie and Buffon.[85]

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[82] McClellan 1985, introduction p. xxii.
[83] Van der Zwaag 1970, p. 15.
[84] I.e. Jacob & Mijnhardt 1992, Israel 1995, p.1049-1051.
[85] Van Doeveren 1784, p. 226-231.

Apart from these exchanges, the relationship between observation and experiment shifted several times from the early seventeenth until the mid-nineteenth century.[86] Similar tendencies are noticeable in eighteenth-century anatomy, both in Leiden and elsewhere. For example, by the end of the eighteenth century, to simply claim that a skull was from a particular country or area was no longer enough, for some anatomists, to prove the existence of this region and its inhabitants, and they resorted to taking and filing endless measurements of skulls to distinguish certain categories into which particular 'species' of humans could be made to fit. Another example of an increasing suspicion of singular and unverifiable sensory perceptions among anatomists in the second half of the eighteenth century can be found in the increase in collections containing multiple specimens with a similar pathology or birth defect.[87] However, the scope of this work is limited to the eighteenth-century Leiden anatomical collections, and to aesthesis which offers a unique opportunity to access and understand the particular materiality of the preparations.

The place and added value of aesthesis in the field

What difference does aesthesis make in writing a history of science, or a history of art or medicine for that matter? Why is it a unique, new perspective, and what does it add to this particular topic, the history of the eighteenth-century Leiden anatomical collections? As noted earlier, aesthesis in the present book is used in its eighteenth century, non-disciplinary sense, to refer to an epistemic culture, a mode of thought and practice, a tacit approach to questions of, and quests for, sensory perception-based knowledge, beauty, and perfection evoked by bodily material perceptible by the senses. This key concept, to my knowledge, has not before been clearly defined, let alone used in writing a history of science.

That the notion of aesthesis is essential to, and an enhancement of, the history of science and medicine is demonstrated by the fact that it benefits both the general way in which we deal with, and understand, historical medical and scientific objects, as well as historical notions of beauty and perfection, and more particularly by its being a key with which to unlock anatomical preparations, together with its practices and objects, in the eighteenth century. It will appear from the cases discussed in this

[86] Daston 2011, p. 82.
[87] See chapters 6 and 4 of this book for more on these examples.

book that the seeking and displaying of beauty and perfection, as well as sensory perception as being a source of knowledge, play essential roles in Leiden anatomy in this period. As this seeking and displaying are almost entirely tacit and material, the concept of aesthesis is essential in identifying and understanding them.

Second, although attention to the role of sense perception in the history of science has increased in recent years, the unique eighteenth-century combination of this with the search for beauty and its rules can only be explained through aesthesis. For example, Riskin has successfully proposed the notion of 'sensibility' as key to understanding French empiricism in the same period, but this concept does not cover the quest for beauty so obvious in Leiden anatomy, and thus lacks the breadth required for this study.[88] Schickore has persuasively shown that the visual culture of the microscope, contrary to that generally maintained in existing accounts of eighteenth-century microscopy, indeed played a considerable role in anatomical research and in the validation of concrete results.[89] However, Schickore's account does not explain the diversity of visual features of collections such as those in Leiden, nor does it take into account that aesthesis is as much about the other senses as about vision, and that beauty and perfection are as equally involved as matters concerning sensory perception. Sensibility and visual culture might be useful notions for understanding French empiricism and eighteenth-century microscopy, but it is impossible to understand the Leiden collections without the hybrid notion of aesthesis, which covers both the importance of the entire spectrum of sensory perception in understanding human anatomy and the issues of beauty, knowing, and taste arising in and from this discourse.

Finally, this coining of the concept of aesthesis and the subsequent inquiry into the role of aesthesis in eighteenth-century Leiden anatomy is based on, and will add to, recent historiographic exercises on notions such as agency, object, and locality. The centrality of the *unheimliches* historical object and the study of evolving and mutating epistemological concepts were inspired by Daston's *Things that talk* (2008) and her earlier work on facts and objectivity.[90] This is clear from my examination of the confused idea of 'the aesthetic', which we have long used to organize ideas of

[88] Riskin 2002.
[89] Schickore 2007, p.6-82.
[90] Daston, 1992, 1998, 2008.

beauty and perfection in the history and philosophy of science. By coining the concept of aesthesis, I take the exercise a step further. My proposition of aesthesis as an analytical and descriptive concept for an epistemic culture and objects stems from the inquiry I made into the use of the term 'aesthetics'. This theoretical exercise is inspired by, and is a contribution to, both material culture studies and the historical epistemology Hacking advocates: the need to examine the ideas we use to organize knowledge and inquiry, and to propose, advocate, or refute theories of knowledge.[91] Last but not least, I hope that this book will reveal the preparations in the eighteenth-century Leiden anatomical collections in all their glorious complexity. After all, this book is a historical study of objects of science and medicine as produced by people with bodies, situated in time, space, culture, and society, and struggling for credibility and authority, to paraphrase the subtitle of Shapin's recent monograph.[92]

Conclusion: Aesthesis as analytical category for an epistemic culture

In this chapter, I have defined aesthesis as a useful historiographical analytical category to describe an eighteenth-century epistemic culture. Aesthesis was largely tacit, based in sensory perceptions and materiality, and its most important characteristic is that its epistemic culture was strongly concerned with seeking and bringing out beauty, perfection, and elegance in both its objects and its makers. In addition, it also entailed the quest for beauty and elegance for dealing with the inevitable disgust connected with doing anatomy, and the commodification, objectification, and domestification of the other, both exotic and familiar. This chapter has explained that although related, aesthesis is fundamentally different from the confused and vague term 'aesthetics'. Although aesthesis might not be particular to eighteenth-century Leiden anatomy, it certainly strongly influenced the material characteristics of the Leiden anatomical preparations, and it is very likely that Leiden acted as an important hub in the spreading of it. Finally, the concept of aesthesis emerged from, and contributes to, the field of historical epistemology, and is essential in understanding the eighteenth-century Leiden anatomical preparations as material objects that stem from a particular epistemic culture, and which is communicated in their materiality.

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[91] Hacking 2002, p. 8-9.
[92] Shapin 2010.

As promised, I will now move on to the actual preparations. Each chapter examines the aesthesis of anatomy starting from one or more preparations from the Leiden collections, as aesthesis is grounded in materials and objects. These objects are after all the formal, tangible representatives of eighteenth-century Leiden anatomy. Although the preparations are often considered to be the primary constituents of the anatomical collections, it is impossible to consider them without related drawings and texts. As Goodwin has pointed out, ignoring the graphic representations of a discourse "would be missing both a key element of the discourse that professionals engage in and a central locus for analysis of professional practice."[93] Drawings of anatomical specimens do not simply mirror the actual specimens or written texts, they complement them, organizing phenomena in a different way than would preparations and text. Moreover, every act of mapping anatomy, whether it is by making a preparation, writing a text or making or ordering a drawing, is also an act of representation.[94] Both the tacit and explicit beliefs of its maker(s), the contemporary state of the art of anatomy, as well as social, economic, political, and even allegorical symbols, are unavoidably interwoven within the final product.

Through analyzing the situations in which these objects were made and used, I aim to provide a better understanding of them as historically-laden objects.[95] As it is impossible to do this for each and every object in the anatomical collections, I have chosen a number of cases, primarily based on the criteria of the why-questions they evoke, as I believe that these questions will arise with those people who care for them, use them, and see them time and again. Moreover, I have chosen these particular preparations as the analysis of their materiality unveils an enormous complex of eighteenth-century ideas, ideals, and knowledge about anatomy, physiology, medicine, natural philosophy, chemistry, beauty, sensory perception, practice and theory, the human body, as well as networks of, and relationships between, actors, both human and objects. Although some may seem exceptional or unique, they are actually excellent representatives of major research and teaching topics within eighteenth-century Leiden anatomy. This analysis will contribute to the understanding of these objects as historical scientific and cultural actors, and also

[93] Goodwin 1994 p. 611.
[94] Also see De Rijcke, 2010.

indirectly to the careful use and display of these unique collections in the years to come.

My contribution to knowledge is twofold. This book is the first to explain eighteenth-century Leiden anatomical collections as the material results of changing ideas about the importance of elegance and perfection in anatomy. Second, with aesthesis, I offer a theoretical framework for finally understanding the wildly diverse and confusing materiality of the eighteenth-century Leiden anatomical collections, a framework that has also the potential to be used not only in the study of other eighteenth-century collections of anatomy, but also for collections such as those of natural history or scientific instruments.