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Conclusion

In the first chapter of this book I proposed aesthesis as a historiographical analytical category to understand the particular epistemic culture of the eighteenth-century Leiden anatomical collections. Quests for beauty and perfection in epistemic cultures are almost always described as either independent sides effect or subordinate to the process of gaining knowledge. Yet the search for beauty and perfection can be essential to and inextricably intertwined with gaining knowledge. The concept of aesthesis overcomes this common historiographical problem in describing and understanding epistemic cultures. Moreover, aesthesis distinguishes itself from the confused and often misused term aesthetic(s) by returning to the essence of Alexander Baumgarten's eighteenth-century *Aesthetica*: the science of things known through sensory perceptions, which is inextricably connected with a sense of beauty. This combination of sensory perception and a sense of beauty necessarily also includes the development of strategies to deal with the visceral disgust encountered in the processes of gaining knowledge. Aesthesis also differs from the early modern cultures of wonder and curiosity described by Daston and Park as it does not allow for the static display of uncontested single miracles – it relies heavily on bodily involvement with research materials. Moreover, aesthesis is largely tacit, not so much an individual attitude as an unnamed property of an epistemic culture. Because of these aspects, the materiality of the preparations created and used by the Leiden anatomists can be best understood through the concept of aesthesis. It is in this materiality that aesthesis substantiates. As the creating of preparations of human anatomy involves the rendering stable of otherwise perishable body tissue, and because anatomical preparations were frequently traded and exchanged, aesthesis also includes aspects of objectification, domestication and commodification. Because aesthesis enables an understanding of an epistemic culture accessible through objects, it transcends traditional historiographies such as biographies,

institutional histories and colonial history. Therefore it provides us with a new, integrated understanding of eighteenth-century Leiden anatomical preparations that were previously often seen as unrelated objects.

Gaining knowledge through sensory perception

It is difficult to pinpoint when aesthesis first emerged in Leiden anatomy. However, an analysis of the materiality of eighteenth-century mercury-injected preparations of the lymphatic system suggests that aesthesis is rooted in seventeenth-century experimentalism and chemical and anatomical practices. At the start of the eighteenth century mercury was associated with qualities like penetration, cleansing, and resurrection. Mercury and sulphur were the two basic elements of transmutational chemistry, the two opposites that could merge into one, wet and cold versus dry and hot, the queen and the king. The inherent redness of blood was a novelty, and in the Hippocratic humoural theory that was still predominant in the seventeenth century, blood was the hot, dry nourishment concocted in the liver to feed the organs. The mysterious lymphatic system, with its almost invisible fluids appeared to have to do something with the arterial system, yet was at the same time clearly distinct. What better way to visualize blood and lymphatic vessels than with hardening masses of red sulphur and silvery mercury? Its attractive silvery shimmer and its penetrating, resurrecting yet elusive character, made mercury the perfect material for anatomists to make visible a largely unknown, hard to discern bodily structure and to simultaneously prove their skills in the newly developed techniques of preparing and injecting hardening fluids into body vessels.

Although some handbooks on preparation instruments and techniques were available, these were far too general and unspecific to follow them like strict manuals. Becoming an anatomist meant not just learning the anatomy of the human body by heart from skeletons and anatomical atlases created by others, but acquiring skills of dissecting and preparing through endless hands-on practice, through trial and error. By the mid-eighteenth century, a skilled anatomist not only knew all the details of human anatomy, he could also display them to others in corpses and preparations; he had developed his own instruments, injection masses, and preservation methods. He stoically dealt with the gore and mess of dissection and decaying bodies in order to understand and display the perfect beauty of human anatomy. For young anatomists such as Eduard Sandifort, whose careers peaked in the second half of the century,

materials like mercury had lost their transmutational associations. Yet when the research of the lymphatic system intensified again in from the 1760s, mercury was still their material of choice for exploring it. After all, mercury remained a superbly penetrating, versatile substance, and because it is so hard to handle, an anatomist able to make a good mercury preparation was considered an accomplished anatomist well into the nineteenth century. From the materiality of the mercury-injected preparations, it becomes clear that refined practical skill and a reliance on one's own sensory perceptions were constant factors throughout the eighteenth century in Leiden anatomy, even if the meanings of certain materials were subject to change.

Seeking beauty and perfection

Albrecht von Haller in his 1774-1777 historiography of anatomists listed Bernard Siegfried Albinus as the first of the 'elegant anatomists', without substantiating what an elegant anatomist is. Albinus certainly strove for elegance, beauty and perfection, both in the refinement of his skills and in the anatomical preparations he created. However, as emerged from the analysis of mercury-injected preparations, a sense of beauty and elegance already played a part in the anatomical practices of Albinus' predecessors like Antony Nuck. The internal evidence of the materiality of preparations of limbs combined with female genitals and sensory organs by Frederik Ruysch and Albinus respectively shows that the latter was inspired the former's craftsmanship and hermeneutics, and used them to communicate his own findings and theories. In the early decades of the eighteenth century, the art of creating lasting wet anatomical preparations was still in its infancy. Human tissue was frequently combined with materials such as textile, lace, red wax and plants to direct the gaze of the observer and to invest preparations with both anatomical and allegorical meanings.

Creating anatomical preparations thus offered Albinus endless opportunities to investigate the functioning of the senses and the principles of life, while simultaneously creating preparations that served both as educational tools and proofs of his own perfect skills and sense of beauty. This multiplicity is best illustrated in two of his preparations. The first, a child's hand holding an eyelid with choroid membrane dangling from a string looks curiously natural at first sight, except for the lace-rimmed sleeve. The sleeve turns out to be a way of directing the gaze of the observer, literally covering up the reminder of the separation from the rest of the

body; its lace rim primarily determined by the fashion of the period. Yet on closer inspection it turns out that the arm too has been thoroughly objectified in the anatomists' investigation into the structure and functioning of the senses: the nails and skin have been removed, the veins injected with red wax. The second preparation is of a glove-like skin of a hand, dangling like a beautiful, refined flower from a sprig of a blossoming plant named *Senecio Elegans* by Albinus' contemporary Linnaeus. The preparation was used by Albinus to show that the skin consists of different layers, and that the sense of touch appears to be situated in the lower layers. At the same time it was a proof of his own refinement and elegance. Now damaged beyond repair, this fragile preparation is also a vivid reminder of why it is important that we study historical anatomical collections while they last – even when well looked after, they have an expiration date.

Dealing with disgust

Eighteenth-century anatomical practice was an exercise in dealing with the disgust; the anatomist had to overcome abhorrence with the damaged, putrefying body and apply all his knowledge and skill to transform it into elegant preparations that showed the ideal human body. For a long time the focus of anatomical preparations was on the ideal, healthy body, but in the course of the eighteenth century the diseased and deformed body became increasingly important for the anatomist's work. This meant that previously developed strategies to make preparations less disgusting, like the covering up of stumps with sleeves, were no longer sufficient. Eighteenth-century accounts of disgusting anatomical experiences do not support the supposition that we are simply queasier than our eighteenth-century counterparts. However, anatomists seeking beauty and perfection were keen on regulating the repulsive sensory aspects of anatomy and deployed various strategies for dealing with this disgust.

In the case of smallpox, this becomes very clear from a preparation by Albinus of an ear with a tiny smallpox mark. The apparent acquiescence with which the perfection-obsessed Albinus accepted this blemish on a preparation that was essentially about the sense of hearing opens up to the omnipresence of the ravages of smallpox in eighteenth-century medicine and society. Lay people and anatomists alike regulated the anguish caused by smallpox, its lasting marks and the topical debate on inoculation through poetry. Yet literary strategies could not solve all

disgust in anatomical practice, as appears from the case of a dog with a cleft palate from the Leiden anatomical collections. However horrifying severe congenital deformities like cleft palate and anencephaly were, eighteenth-century anatomists like Van Doeveren and Sandifort researched them to find out how they originated, and what was their purpose. These were beautiful monsters, in the sense that what is perfect or beautiful is completely fulfilling its purpose; but not necessarily pretty. Van Doeveren's aesthesis, his quest for beauty and perfection in anatomy, led him to interpret monstrosities as yet another proof of nature's astonishing power. The strange combination of revulsion and admiration evoked by eighteenth-century preparations of birth defects can be understood through Korsmeyer's concept of the sublate: they bring home general truths in a particularly vivid manner, and their suggestion of death and decay ensures that the insights they provide are grasped not only with the mind but also with palpable somatic resonance. This book has shown that the experience of disgust upon the confrontation with deformity and ugliness in human anatomy is a form of core disgust that has not changed substantially since the eighteenth century, and aesthesis was as much about dealing with these negatives of the sensory-informed acquisition of knowledge as it was about its positives of beauty and perfection – actually, the two opposites are inextricably connected.

Commodifying the body

Commodification of (parts of) the dead human body, rendering it stable and tradable, and connected to that its objectification and domestication, was an aspect of eighteenth-century aesthesis in anatomy that becomes most vividly clear in preparations shipped back from colonies to the dominant centre of knowledge. The materiality of ten preparations of fetuses and newborns of supposedly African and Asian descent from the long eighteenth century in the Leiden anatomical collections forms an unexpected window on how the aspects of aesthesis did not only influence anatomists in Leiden, but also medical men who were apparently familiar with Leiden anatomy but who travelled to the colonies. Although a lack of sources makes it impossible to define exactly who made these preparations, their materiality is a very rich source of information about their possible origins. Decorations of strings of coloured beads around necks, waists and limbs unearth knowledge of tribal traditions and indigenous medical knowledge on the eighteenth-century West African coast. Notwithstanding the atrocities of the slave trade in this era and area, the preparations

of 'African' babies are not simply the commodification of the exotic other, but also the material remains of a profound interest in human variety and the knowledge and habits of other peoples.

Something similar is the case with two preparations of 'Asian' babies, probably from the Dutch East Indies. These preparations have also been decorated with bead strings, this time of yellow beads that probably symbolize an apparently long forgotten treasure of the island Timor: carnelian beads. The 1778 VOC weapon penny now at the back of the necklace was arguably originally on the chest of the foetus, like the silver snuff boxes worn as pendants on carnelian bead necklaces by affluent Timorese in the eighteenth century. A rattle-like berry in the hand of one of the babies appears to be nutmeg, a commodity highly valued by European colonialists and the indigenous population alike. The many meanings and uses of nutmeg, medical, political and social, combined with the yellow beads and the VOC 'pendant' and the fact that these preparations were made most likely in a period when the Dutch were quickly losing power in the East Indies, make these preparations tremendously rich objects with a variety of meanings. The maker of these preparations was undoubtedly a man with medical training, who purposefully combined a human foetus with these decorations to show his anatomical and medical skills, his sense of elegance and beauty and his cultural and political awareness so he could stabilize and ship these bizarre yet endearing babies to what to him must have been the dominant centre of knowledge, of aesthetics.

The end of aesthetics

The end of aesthetics in Leiden anatomy is as hard to determine as its emergence, and like most epistemic cultures it only disappeared gradually, not overnight. Tracing changing uses, preparations and meanings of bones in the eighteenth-century Leiden anatomical collections provides us with insights about the end of aesthetics. From the disappeared materiality of the skeleton with which Albinus literally wrestled for the creation of his anatomical atlas, we learn that this period, the first half of the eighteenth century, was the absolute heyday of aesthetics in anatomy. The wet bone preparations made by Wouter van Doeveren show that aesthetics was still influential in the second half of the eighteenth century, with anatomists gauging their own skills and elegance to those of their predecessors and teachers. However, in this period, the

importance of the aspects of aesthesis started to change, in concurrence with the disciplinary shift in anatomy and physiology described by Cunningham.

The traditionally theoretical discipline of physiology became increasingly experimental, and Albinus' work on osteogenesis led his successors to new research programs on and understandings of bone diseases. Hence bone pathology became an important part of hands-on anatomy and physiology teaching at Leiden University. This meant that the small Leiden collection of pathological bone preparations needed to be expanded quickly. As preparation techniques and skills were now more widely spread, it became less important for anatomists that each and every piece in their collection was a result of their own sensory involvement and a proof of their own elegant anatomical skills. Moreover, this meant that pathological preparations and collections were increasingly popular commodities, and that old preparations were invested with new uses and meanings. Dealing with disgust remained an important part of the epistemic culture of anatomy, but the accent shifted from concealing the disgusting in preparations to investments in practical facilities such as a well ventilated and heated preparation room in the basement of the university's anatomical theatre to decrease nasty smells.

The previous shows that aesthesis in anatomy was disappearing by 1800; the importance of its various aspects for the discipline were changing. Some of them, like the search for and display of beauty and perfection in anatomy and anatomical preparations, were waning, while others, like commodification and exchange, became more important. Reliance on one's own sensory perceptions and experiments remained important, but was increasingly complemented with the use of preparations and handbooks created by others. Aesthesis thus becomes insufficient as an analytic concept for nineteenth-century anatomy; aesthesis was a particular epistemic culture of the long eighteenth century.

The future of historical anatomical collections

By using aesthesis as an analytical category and the materiality of anatomical preparations to understand the epistemic culture of which the eighteenth-century Leiden anatomical collections are the result, I have put the actual objects that constitute these collections centre-stage without losing sight of the actors, work and social structures from which they emerged, thus transcending traditional

historiographical categories. The concept of aesthesis can also be applied in future research on epistemic cultures, not necessarily anatomical ones, to gain a better understanding of the role of ideals of beauty and perfection, sensory perception, dealing with disgust and commodification in processes of gaining knowledge. In the case of the eighteenth-century Leiden anatomical collections, aesthesis helps to understand the sometimes seemingly paradoxical elements that played such an important role in the creation and initial use of these preparations: life and death, a quest for beauty and perfection and dealing with the disgusting corporeality of anatomical practice, gaining knowledge through relying on one's own senses and the directing of the senses of others, creating preparations to prove one's skills and to commodify and explore the exotic other.

Although this book is not primarily about the display of anatomical collections, the new understanding it provides of the eighteenth-century Leiden collections may hold some implications for the preservation and display of both these and other historical anatomical collections. It is desirable and understandable that the keepers of historical anatomical collections want to thread carefully when it comes to publicly displaying human remains – even if they are over three centuries old and anonymous. However, as the medical collections curator and scholar Ken Arnold has pointed out, it is very well possible to display historical anatomical collections without creating a freak show, and the sensational aspects of medical history actually can be a key to the special significance of the subject. As this book has once again made clear, preparations like these are as much cultural as medical heritage, and they convey complex information about past epistemic cultures and social conventions. Moreover, it is apparent that they can only be properly understood by the contemporary lay visitor when additional information about their origins and materiality is provided. Hence it is expedient to display them, preferably not as singularities but as the material results of a bigger culture, in a contextualized public environment like a science museum.

The fragility of many historical anatomical preparations means that displaying them may cause conflict with preservation issues, and the sheer magnitude of some historical collections may mean displaying them is just not an economically feasible option. However, modern technology, either used independently or within the museum space can forestall these problems. Wonderful examples can be found for

example on the website of the Kunstkamera, the website of the Groningen University anatomical collection, at the London Hunterian Museum, and at the Utrecht University Museum. On the Kunstkamera website, the remaining preparations of Frederik Ruysch can be searched and viewed from different angles, and descriptions are linked to preparations wherever possible. When the old Groningen University anatomical collections was no longer used for teaching and donated to the Groningen University Museum, it was too big to integrally put it on display at the museum. Therefore curators created a website that is a virtual tour of the old anatomical collection, in its original cabinets. Each preparation is clickable, so a magnified image can be seen together with a description. By doing this, the original display space is virtually preserved and the entire collection remains accessible. At the London Hunterian Museum, a substantial part of the eighteenth-century Hunter collection is on public display, and almost all preparations can be found in an online database too, provided with images, descriptions, and source references. At the Utrecht University Museum, space and preservation considerations have led curators to select the early nineteenth century anatomical cabinet of professor Jan Bleuland for almost integral display. As the original cabinets are unsuitable for large explanatory plaques, these have been replaced with touch screens in front of the cabinet that allow visitors to access additional information on each preparation.

The eighteenth-century Leiden anatomical collections are at least as rich as the examples mentioned above, and should not be the exclusive domain of physicians and paramedics in training and a couple of historians of medicine. The selection of preparations from this collection on permanent display at the Leiden Museum Boerhaave is a good start, but it would be even better if the entire collection was made accessible for a general public. Doing so digitally would have several advantages. In terms of cost and accessibility, both initially and in the long run, a digital exhibition would be much cheaper than a physical display. Preservation issues are also likely to be easier to manage this way. The Leiden collections are very well maintained and managed now, and this book has shown how important it is to preserve this kind of material culture – after all, materiality is a unique source to increase our understanding of past epistemic cultures. Displaying them both physically and digitally increases their chances of survival. The additional benefit of displaying the collections digitally would be that when some of these fragile preparations eventually perish (and some of them inevitably will), although a small

part the materiality of the collections is lost, the understanding of the remaining preparations will benefit from the documentation on what is no longer there.

However, whatever the gains of the digital age may be for collections like these, digitalization can never be a replacement for the actual objects themselves. A photograph, no matter how high its quality, can never entirely capture the essence (or agency, or aura) of the actual encounter with the object. In fact, digital access to collections can never be more than a starting point – it actually accentuates the need to preserve and present the materiality of the actual objects. This also becomes clear when we think of other databases of cultural heritage, like those of art museums. It is wonderful that anyone with an internet connection can now look at Picasso's *Guernica* anywhere in the world – yet no one will argue that because of this there is no longer any reason for the Reina Sofía Museum to keep it on display, or to keep it at all. The experience of studying the painting online is absolutely incomparable to seeing it on display in Madrid. Its size, the structure of the paint on the canvas, the silent awe in which other visitors look at it: none of this experience can be fully communicated through any medium.

The same goes for these preparations. It was standing eye to eye with them (sometimes literally) that made them whisper, that evoked the questions I tried to answer in this book. This experience is shared by scientists, historians, philosophers, curators and artists from all over the world, as appears from the diversity of the signatories of the 2012 Leiden Declaration on Anatomical Collections.¹ Hence, if the materiality of these preparations is lost, something essential and irreplaceable is lost forever. It is therefore of the utmost importance that we keep looking for ways to preserve these collections and to simultaneously make them accessible and understandable for generations to come.

¹ See Appendix II