CORRUPTER OF BODIES?

An analysis of the *Verhandelingen* of the Batavian Society of Arts and Sciences (1778-1794) on managing the health of the citizens of Batavia

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Figure 1 View of the island and the city of Batavia. ca. 1780 [1754], copperplate, 25 x 39 cm. Imagebase, Universiteitsbibliotheek Vrije Universiteit, http://imagebase.ubvu.vu.nl, accessed 17.04.2019.

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On average, ships of the Dutch East India Company took eight months to reach Batavia. My five-month journey has been shorter but filled with new experiences and hurdles nonetheless. I wish to express my gratitude for all the help I have received on my journey.

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INTRODUCTION

> *BATAVIA! BATAVIA! wacht U van murmureering. Zyt veel eer verwonderd, dat er niet meer dan één, door Uwe rotkoortzen, en de menigvuldige andere ziektens van Uwen besmettende dampkring zijn weggerukt.*[1]
>
> *Van Hogendorp, 1780*

Josua van Iperen (1726-1780) was a successful doctor in Batavia, the headquarters of the Dutch East India Company in Asia.[2] Until suddenly, he died. In the speech written in his honour, his death was on the influence of the harmful atmosphere. At first, it had seemed that van Iperen was adjusting, even thriving, but in the end, a fever had gained the upper hand over his body.[3] During the early modern period, these fears about the dangerous effects of a new place on the human body were widespread among European travellers. For example, William Bradford (1590-1657), in his *History of Plymouth Plantation*, writes that "the chang of aire, diate, and drinking of water, would infecte their bodies with sore sicknesses, and greevous diseases".[4] Even more so than just their health, their physical bodies were threatened. An example that appeals to the imagination is Diego Andrés Rocha's (1607-1688) treaty on "the origins of the Indians". He writes that Spaniards who consume the native food of the Indians and are exposed to their climate will eventually end up just as "toasted and discoloured".[5]

This illustrates the link between the body and the environment that was part of the general medical legacy of the time. Based on writings from Antiquity by Hippocrates of Kos (c. 460-c. 370) and Galen of Pergamon (129-ca. 210), it contends that the health of the body is affected by the external influences, also called 'non-naturals'. The medical thought about these six external factors, namely air, water, food, exercise and rest, retention and evacuations, and the passions, states that the body is subject to hazardous changes when travelling, both in Europe and overseas.[6] This medical system did not present the body as a fixed entity, but rather

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[1] Willem van Hogendorp, "Redevoering Der Inentinge Tot de Ingezetenen van Batavia, Na Haare Terug Komste van Samarang," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 343.
[2] Batavia is modern-day Jakarta, in Indonesia.
[3] Harmanus Wachter, *Lyk- En Lofreden Op Den Weleerw. En Zeer Gel. Heer J. V. Iperen. A.L.M. Ph. Dr. Lid van Verscheiden Genootschappen En Predikant Te Batavia, Uitgesproken Door Deszelfs Amptgenoot En Vriend* (Amsterdam: J. Allart, 1781), 26-27.
[4] William Bradford, *History of Plymouth plantation, 1606-1646,* ed. William Davis (New York: Charles Scribner's Sons, 1908), 29.
[5] Cited in: Rebecca Earle, *The body of the conquistador: food, race, and the colonial experience in Spanish America, 1492-1700* (Cambridge: Cambridge University Press, 2013), 46.
[6] David Gentilcore, *Food and Health in Early Modern Europe: Diet, Medicine and Society, 1450-1800* (Londen: Bloomsbury Publishing, 2015), 11-14, 75-79.

as flexible and in constant exchange with the environment.[7] The body was constantly threatened to be out of balance in a new place which endangered its physical and emotional state.[8]

1. Fears and hopes in Batavia

Van Iperen's story illustrates this enduring hope that the body could go through a period of adjustment, also called seasoning or acclimatization, and then be healthy. The historical literature likewise testifies to the optimism of the Dutch when it comes to managing these corrupting external influences and successfully living in a different climate.[9] However, this optimism that settlement was possible did not mean there were no anxieties about the high mortality rates in and around Batavia.[10] Initially, when the city was claimed as the centre of the VOC's trade network in Asia in 1619, Batavia was considered a healthy place, but after a few decades, this reputation changed completely.[11]

Consequently, the VOC increasingly feared their plans would go up in smoke as they witnessed the significant death toll of their enterprise and, therefore, they undertook measures to improve the health of its employees. Schoute argues in his work from 1929 that the state of medical knowledge under the supervision of the VOC, a trading company, was poor. He attributes this to the lack of investments in scientific research and the low numbers of physicians employed by the VOC. Schoute also mentions the great influence of the opinions of surgeons, the Council of the Indies, and the Gentlemen XVII on medical matters in the eighteenth century. Only in the hospitals, there were improvements. The inability of medicine to reduce the death toll was, according to Schoute, a consequence of the underdevelopment of the natural sciences, and was one of the causes why the VOC stopped its activities in 1795.[12]

Historians writing on the nineteenth-century medical debates in Batavia show that the Hippocratic-Galenic legacy of the link between place and disease was still used to explain illnesses in that century, as these ideas were flexible enough to be incorporated into newer

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[7] Rebecca Earle, *The body of the conquistador*, 3.
[8] Sara Miglietti and John Morgan, "Introduction: ruling 'climates' in the early modern world," in *Governing the environment in the early modern world: theory and practice*, eds. Sara Miglietti and John Morgan (Florence: Taylor & Francis, 2017), 22–37.
[9] Hans Pols, "Notes from Batavia, the Europeans' Graveyard: The Nineteenth-Century Debate on Acclimatization in the Dutch East Indies," *Journal of the History of Medicine and Allied Sciences* 67, no. 1 (2012): 120.
A. de Knecht-van Eekelen, "The Debate about Acclimatization in the Dutch East Indies (1840-1860).," *Medical History. Supplement*, no. 20 (2000): 85.
[10] Hans Pols, "Health and Disease in the Tropical Zone: Nineteenth-Century British and Dutch Accounts of European Mortality in the Tropics," *Science, Technology and Society* 23, no. 2 (2018): 324–39.
[11] Adriënne Zuiderweg, "Een Verblijfplaats Voor Onsterfelijken: Een Impressie van Het Culturele En Literaire Leven Op Batavia (1619-1811)," *Literatuur* 17 (2000): 140.
[12] Dirk Schoute, *De Geneeskunde in Den Dienst Der Oost-Indische Compagnie in Nederlandsch-Indie* (Amsterdam: De Bussy, 1929), 327-33.
de Knecht-van Eekelen, "The Debate about Acclimatization," 73.

theories. Pols claims that starting around 1750, British and Dutch physicians used this flexible discourse on acclimatization to minimalize the influence of the climate and emphasize immoral and unintelligent behaviour causes of disease. He only discusses one physician from the eighteenth century, namely, the Englishman James Lind, and focuses his article on the beginning of the nineteenth century.[13] De Knecht-van Eekelen argues that the physicians in Batavia continued to defend the possibility of acclimatization because the Dutch government needed people to believe they could settle healthily and happily there. About the two earlier centuries, she writes that the ideas of the physician Jacobus Bontius (1592-1631), who wrote a treatise on the non-naturals called *De medicina indorum libri IV*, were still accepted. She follows most of Schoute's arguments, namely that scientific research in the time of the VOC was mainly done out of personal interest, and places the first real efforts at the beginning of the nineteenth century, both by doing of the British administration and the Dutch. Even if before this, a learned society called the *Bataviaasch Genootschap der Konsten en Wetenschappen* had been founded in 1778, de Knecht-van Eekelen focuses on its hiatus starting in 1792 and only credits the society for their contributions to therapeutics.[14]

This Batavian Society of Arts and Sciences was indeed only active from 1778 until 1792, after which it did not publish a volume of its *Verhandelingen* (Treatises) until 1814.[15] However, these *Verhandelingen* contain many publications on how to improve the health of the population in Batavia. This thesis will show that the intellectuals' texts were brimming with optimism to manage their surroundings and confidence in the ability of their bodies to adapt to the climate. Van Iperen belonged to this group of European male writers living in Batavia who investigated different aspects of the city and its surroundings.[16] The works of these authors can shine a light on the ideas of late eighteenth-century employees of the VOC. At the end of his article from 2018, Pols invited historians "to look beyond the most prominent medical voices by analysing the accounts offered by lesser-known doctors who attempted to make sense of local conditions."[17] This thesis will aim to uncover the thoughts of the members of the Batavian Society when it came to managing the health of the population in Batavia. In the first part, the ways in which the authors of the *Verhandelingen* drew on the Hippocratic-Galenic framework will be analysed. It draws on Riley's work about eighteenth-century medicine of the environment or "environmentalism". This term refers to the many studies that were then carried out to

[13] Pols, "Health and Disease in the Tropical Zone, 324-26"
[14] de Knecht-van Eekelen, "The Debate about Acclimatization in the Dutch East Indies (1840-1860)," 70-73.
[15] Harry A. M. Snelders, "Het Bataviaasch Genootschap van Kunsten En Wetenschappen in de Periode 1778 Tot 1816," *Documentatieblad Werkgroep Achttiende Eeuw* (1979): 74.
[16] When talking about the Europeans in Batavia, this thesis refers to the Dutch, Germans, Flemish, Brabanders, French, Swiss, English, Scottish, Danish, Walloon, and occassionally a possible other nationality of employees of the VOC.
[17] Pols, "Health and Disease in the Tropical Zone," 336.

understand the environmental factors causing disease.[18] The three first chapters aim to show which factors the Batavian Society focused on and believed they could manage. In the second part, the arguments that the physicians used to minimize the impact of the environment on the outcome of inoculation will be examined.

The aim is not to discover what the effect of medical advice published in the *Verhandelingen* was on the actual health of the population nor on the downfall of the VOC. Rather, this thesis wishes to explore two cultural aspects of Batavia at the end of the eighteenth century. First, it aims to understand how the settlers looked at their environment by asking why some external influences were emphasized and others minimized. This question is inspired by David's statement that "nature" is something subjective. His goal is to explore how ideas about the environment are social constructs that serve as instruments of authority, identity, and rebellion.[19] This is why it is interesting to look at which factors the settlers tried to control; it gives insight into their perception of their physical surroundings. Second, this thesis has the purpose of uncovering the way settlers understood their own bodies and, more specifically how they conceived of it in relation to natives' bodies. This topic is linked to the history of the body, a field of study about how people perceived bodies, both their own and others'. Perceptions and imagination shape reality; the body becomes changeable and, above all, historically given. The cultural historian then has to consider how this body was constructed by external factors.[20] Of course, both the topic of the perception of nature and the body are linked to each other because of how they are co-constructed.

2. State of the field[21]

The historical field of how medical ideas have been interpreted, changed, and used in the colonial project, has been flourishing over the last few years. Historians have emphasized that medical theories were flexible and could be applied for different purposes. Researchers have analysed the changing discourses, both the official political discourses and bottom-up exchange of information, which used medical thinking to promote the idea that the settlement will be successful. For example, they have noted how colonists redefined their theories about places and bodies to keep this framework consistent with their new experiences and perceptions.[22]

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[18] James C. Riley, *Eighteenth-Century Campaign to Avoid Disease* (London: Palgrave Macmillan, 1987), xii.
[19] David Arnold, *The problem of nature: environment, culture and European expansion* (Oxford: Blackwell, 1996), 1, 3, 39-45, 76.
[20] Barbara Duden, *The women beneath the skin: a doctor's patients in eighteenth-century Germany* (Cambridge: Harvard University Press, 1998).
[21] The majority of the work for this subchapter has been carried out for the bachelor's thesis *Lichaam als Laboratorium: De ontwikkeling van de omgang met de medische "niet-natuurlijken" in de vroegmoderne globaliserende context* at Ghent University, 2017-2018.
[22] Karen Ordahl Kupperman, "Fear of Hot Climates in the Anglo-American Colonial Experience," *The William and Mary Quarterly* 41, no. 2 (1984): 213, 240.

One significant overarching goal of the literature has been to study the colonists' views on the adaptability of their bodies and related to this, the different strategies to prevent diseases. Most historians agree that in early modern times, colonists believed that their bodies could acclimatise or get used to the, often but not always, unhealthy environment. However, the theories and strategies to help this acclimatisation or 'seasoning' did differ. For instance, historians have first pointed out the importance of using technologies for reconstructing the landscape of the homeland, suiting houses and clothes for maximised coolness, and keeping to an overall moderate lifestyle. Overall, the colonists' behaviour was what could cause or prevent disease.[23]

Scholars also turned to the study of the colonists' hopes surrounding the protective power of importing and eating foods from the motherland.[24] Some dissenting voices, such as Rome, argue that colonists did believe local species to be healthy or, at least, that colonists thought eating local food was useful in certain cases.[25] Gentilcore draws on the socio-political framework to explain why especially the French and English imported their food: they had already acquired a strong national identity.[26] Earle argues that emotions of nostalgia, which fall into the category of the non-natural of the passions, were detrimental to the constitutions of the Spanish. This explains why they ate known foods to lessen these negative feelings. Additionally, Earle uses the terms 'Spaniard' and 'European' interchangeably as she believes her findings to apply to Europeans in general.[27] In conclusion, the study of how colonists prevented diseases makes for an eclectic picture with mainly complementary and sometimes contradictory findings. Above all, the findings point to how flexible the Hippocratic-Galenic framework was and how

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Mark Harrison, *Climates and Constitutions: Health, Race, Environment and British Imperialism in India, 1600-1850* (New Delhi: OUP India, 1999), 1-3.
Andrew Wear, "Place, Health, and Disease: The Airs, Waters, Places Tradition in Early Modern England and North America," *Journal of Medieval & Early Modern Studies* 38, no. 3 (2008): 459-62.
[23] Michael R Hill, "Temperateness, Temperance, and the Tropics: Climate and Morality in the English Atlantic World, 1555-1705" (PhD diss., Georgetown University, 2013), 240-48.
Kupperman, "Fear of Hot Climates in the Anglo-American Colonial Experience," 240.
[24] Karen Ordahl Kupperman, "The Puzzle of the American Climate in the Early Colonial Period," *The American Historical Review* 87, no. 5 (1982): 1288-89.
Trudy Eden, "Food, Assimilation, and the Malleability of the Human Body in Early Virginia," in *A Centre of Wonders: The Body in Early America*, ed. Janet Lindman and Michele Tarter (Ithaca: Cornell University Press, 2001), 29-32, 39-40.
Rebecca Earle, "'If You Eat Their Food...': Diets and Bodies in Early Colonial Spanish America," *The American Historical Review* 115, no. 3 (2010): 688.
Rebecca Earle, "Climate, Travel and Colonialism in the Early Modern World," in *Governing the Environment in the Early Modern World: Theory and Practice*, ed. Sara Miglietti and John Morgan (Florence: Taylor & Francis, 2017), 22–23, 26-27.
[25] Alan Rome, *The English Embrace of the American Indians: Ideas of Humanity in Early America* (Springer Palgrave Macmillan, 2017), 103.
Mark Harrison, "'The Tender Frame of Man': Disease, Climate and Racial Difference in India and the West Indies, 1760-1860," *Bulletin of the History of Medicine* 70, no. 1 (1996): 78.
[26] Gentilcore, *Food and Health in Early Modern Europe,* 23, 76-77.
[27] Earle, "Climate, Travel and Colonialism in the Early Modern World," 22-23, 26-27.

each specific colonial context shaped the theories surrounding the non-naturals. In conclusion, the literature has first shown how ideas about the six non-naturals were instrumental in explaining, constructing and maintaining differences between bodies. Moreover, it can be concluded that one of the non-naturals, such as food could be deemed more important to manage than another. Historians themselves also often focused on one factor in particular in their research.

Next, historians have shown how colonists can, in return, use these theories from Galenic-Hippocratic medicine as tools to shape the social hierarchies in the colonies to create differences between bodies. Historians have argued that a flexible view on bodies, in which they could adapt to another climate, changed into the conceptualisation of fixed bodies. This process is dated anywhere from the seventeenth century to the nineteenth.[28] For example, Chaplin discusses seventeenth-century North America, where the English used the idea of a fixed body linked to one's place of birth to claim their inherent physical superiority. Chaplin called this a "racial idiom" rather than racism.[29] However, in the beginning, colonists were quite likely to adopt at least some indigenous practices. This gathering of local practices was prominent among the Dutch in the East and West Indies and the English in the East Indies.[30]

Scholars writing about the Iberian colonies are the most prone to take a strong stand about the development of racism in early modern times. Jorge Cañizares-Esguerra and Carlos López Beltrán state that the Spanish colonies brought forth a racial discourse that preceded the European Scientific Revolution, making these colonies 'laboratories of modernity'. This conclusion is based on the finding that creoles and the European elite both used Hippocratic-Galenic thought to create social categories based on physical characteristics. While these medical ideas were used to create fixed and different bodies, these bodily categories remained relatively fluid. This meant that the belonging to one category or the other was a point of discussion, rather than a fixed fact.[31] Distinctions were also often moral. Historians of food show that the ideas and practices surrounding food changed from a physical distinction based on medical theories to a

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[28] Harrison, *Climates and Constitutions,* 11-16.

[29] Joyce Chaplin, "Natural Philosophy and an Early Racial Idiom in North America: Comparing English and Indian Bodies," *The William and Mary Quarterly* 54, no. 1 (1997): 229–32, 241, 247-48.
Joyce Chaplin, *Subject Matter: Technology, the Body, and Science on the Anglo-American Frontier, 1500 - 1676* (Cambridge: Harvard University Press, 2001), 158.

[30] Harrison, *Climates and Constitutions,* 48.
Harold John Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven: Yale Univ. Press, 2007), 208.
Stephen Snelders, *Vrijbuiters van de heelkunde: op zoek naar medische kennis in de tropen, 1600-1800* (Amsterdam: Uitgeverij Atlas, 2012), 213-16.

[31] Jorge Cañizares-Esguerra, "New World, New Stars: Patriotic Astrology and the Invention of Indian and Creole Bodies in Colonial Spanish America, 1600-1650," *The American Historical Review* 104, no. 1 (1999): 36, 68.
Carlos López Beltrán, "Hippocratic Bodies. Temperament and Castas in Spanish America (1570-1820)," *Journal of Spanish Cultural Studies* 8, no. 2 (2007): 253, 28-85.

moral distinction, thus creating a social hierarchy.[32] Cagle has nuanced the literature on racial typologies under Iberian colonial rules by emphasizing that this discourse 'masked quotidian colonial realities that fostered invention and collaboration'.[33]

This overview of the state of the field shows the lack of studies on colonies from nations that started out later have not been. The almost exclusively Anglo-American literature has mainly focused on the colonies in the Americas, namely those of the Iberian Peninsula and the English. Asian settlements and colonies have been studied less. Mark Harrison and Suman Seth, however, both wrote a monograph about attitudes towards the Indian climate and their interrelatedness with ideas about race. Harrison concludes that, overall, the British were optimistic about the possibility of acclimatization in India before 1800. The fears of degeneration crystallized around 1820 because the British power shifted from a commercial to a territorial one which led to the colonization of the inner parts of the country. While witnessing the high death tolls of this undertaking, physicians, historians and naturalists claimed that bodies can be divided into groups that each had inherent characteristics that do not change in a new place.[34] More than ten years later, Harrison wrote a book about medicine in the entire British Empire but also only focused on the late eighteenth and early nineteenth century when it came to the discussion of race.[35]

Seth studies the same geographical area but differs from Harrison by not taking military medical texts as the main sources. Not focusing as much on the military sources makes it possible to focus on race in the eighteenth century. It was not until around 1750 that some physicians considered race as a cause of disease while debating the abolishment of slavery. This way to study the relationship between medicine and racism differs from the previous literature because the aim is not to look at which diseases were caused by the same environmental factors that also led to the differences between bodies.[36] From the 1780s onward, a distinct category of tropical diseases, as opposed to temperate ones, came into being. These two developments are interrelated because medicine constructed differences and these differences became part of medical theories and practices. It must be said that the medical difference between bodies that

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[32] Eden, "Food, Assimilation, and the Malleability of the Human Body in Early Virginia," 30-34, 38
Earle, "If You Eat Their Food...," 712-13.
Earle, *The Body of the Conquistador,* 4, 10.
[33] Hugh Cagle, *Assembling the Tropics: Science and Medicine in Portugal's Empire, 1450–1700* (Cambridge: Cambridge University Press, 2018), 20-21.
[34] Mark Harrison, *Climates and Constitutions: Health, Race, Environment and British Imperialism in India, 1600-1850* (New Delhi: OUP India, 1999), 1, 5, 13, 17-18, 216-18, 224. In this book, Harrison expands on the argument he had made in an article from 1996: Mark Harrison, "'The Tender Frame of Man': Disease, Climate and Racial Difference in India and the West Indies, 1760-1860," *Bulletin of the History of Medicine* 70, no. 1 (1996): 68–93.
[35] Mark Harrison, *Medicine in an Age of Commerce and Empire: Britain and Its Tropical Colonies 1660-1830* (Oxford University Press, 2010), 89-103.
[36] Suman Seth, *Difference and Disease: Medicine, Race, and the Eighteenth-Century British Empire*, Global Health Histories (Cambridge University Press, 2018), 7-9, 18-19.

Seth identifies is one between black and white bodies. Furthermore, he states that overall in orthodox medical writings, physicians follow Hippocrates's framework and do not write about inherent physical differences but about dissimilarities between the cultures and customs. All humans come from the same source, this is called monogenism, but since their physical and moral characteristics differ, people can be placed on a spectrum. Therefore, some bodies are more susceptible to certain diseases than others depending on what they are used to, rather than because of inherent and fixed characteristics.[37]

Other historians who have, geographically, taken a more global approach and have looked at the economy, have written about how historical actors also created similarities between bodies. Harold Cook considers the increasingly global market for medicine in the seventeenth century as one of the most important reasons for the transition from an individually to a universally conceptualised body. Commerce led to the acceptance that certain drugs, so-called medical simples, induce the same medical effect for everybody regardless of their specific humours or where they lived. He does mention that his vision is rather speculative and that he wants to shine a new light on the subject by taking a materialistic approach within a subject that is dominated by cultural history. He is an advocate of combining the study of cultural lifestyles with an economic story. Trade, he argues, also influenced the shaping of the body.[38] Londa Schiebinger also nuances the importance of racial views on the body by looking at drugs and the economy. She asserts that even though from the second half of the eighteenth centuries scholars started to pay attention to racial differences, when testing medications in the Caribbean, physicians considered human bodies to be uniform as they used enslaved Africans to test medications.[39]

In short, over the last years, the relationship between medicine and racism in the early modern colonies has been studied under many different angles. Among others, Harrison, Seth, Cook, and Schiebinger have shown that the political and economic system of the colony influences and is influenced by ideas about race in multiple ways. This makes the Dutch case of Batavia interesting since it was the Asian headquarters of a global trading corporation. As a society, it had characteristics that were linked to its purpose in commerce. It was a settlement where, almost exclusively, men from multiple European countries stayed for a few years to gain wealth. They often married local, young, women from different Asian ethnicities which also gave

[37] Suman Seth, *Difference and Disease: Medicine, Race, and the Eighteenth-Century British Empire*, Hardback, Global Health Histories (Cambridge University Press, 2018), 21, 281-84.
[38] Harold Cook, "Markets and Cultures: Medical Specifics and the Reconfiguration of the Body in Early Modern Europe," *Transactions of the Royal Historical Society* 21 (2011): 123–124, 130, 143-45.
[39] Londa Schiebinger, "Medical Experimentation and Race in the Eighteenth-Century Atlantic World," *Social History of Medicine* 26, no. 3 (2013): 364, 381-82.

them more power locally. The result was a very mixed society with a mestizo culture that greatly differed from the motherland.[40]

2. Methodology and sources

The literature on colonial medicine has often proceeded in a mixed way when it came to theoretical frames. This is demonstrated by the occurrence of intellectual-social and intellectual-cultural approaches. Reflecting on the cultural history of medicine, Mary Fissell writes that social and intellectual history became intertwined.[41] This blending of methods can be a starting point to explore ideas about physicality within a broader social, political, and economic whole. In this way, the importance of early modern knowledge systems is not to be underestimated to better understand past societies. Then, the reciprocal influences between theory and social structures can be analysed.

The texts in this thesis have been studied using discourse analysis. The overall approach is intellectual history as it looks at the ideas of historical actors in texts. However, from these ideas, it then tries to uncover more implicit views on bodily identity and distinction. This aim to uncover what ideas tell us about the period and how the place and time influence the writings, makes this thesis a combination of intellectual and cultural approaches. Lastly, following historians such as Harold Cook and Londa Schiebinger, the economic story of the Dutch East India Company is taken into account as part of the larger, also cultural, framework that cannot be overlooked when trying to interpret the choices and motivations of the writers.

The first six *Verhandelingen* form the main body of sources. The volumes in this series were almost the only publications from the Batavian Society until the middle of the nineteenth century. The minutes from the meetings were only published from 1857 onward and four years earlier the Batavian Society started its own journal. Some archival documents from the eighteenth and nineteenth centuries have been printed in van der Kinderen's *Gedenkboek*.[42] The six volumes have been entirely read and compared with other sources that contextualize and contrast their content. This has been done through a combination of close-reading and using digital tools such as word searches. Therefore, both the printed version and the digitized version of the *Verhandelingen* have been consulted.[43] The other texts are the reports made for the

[40] Jean Gelman Taylor, *The Social World of Batavia: European and Eurasian in Dutch Asia* (Madison: University of Wisconsin, 1983), xxv-xxvii, 8, 52, 59-64, 68.
[41] Mary Fissell, "Making meaning from the margins: the new cultural history of medicine," in *Locating medical history: the stories and their meanings*, eds. Frank Huisman and John Harley Warner (Baltimore: Johns Hopkins University Press, 2004), 369.
[42] Hans Groot, *Van Batavia Naar Weltevreden: Het Bataviaasch Genootschap van Kunsten En Wetenschappen, 1778-1867*, Verhandelingen van Het Koninklijk Instituut Voor Taal-, Land- En Volkenkunde (Leiden: KITLV Press, 2009), 1, 10.
[43] The printed versions have been consulted at the Special Collections of Utrecht University. These have all been printed in Batavia, except the fourth volume which was printed in Amsterdam and Rotterdam

investigations of the government, and other intellectual texts from the seventeenth and eighteenth centuries. This thesis also analyses a few visual sources. These are drawings from Jan Brandes; his work has documentary value.[44] The focus lies mostly on their descriptive or 'iconographic' value, but just like texts, when looking at the images, they also reveal an underlying layer or iconological level.[45] Views and experiences of historical actors not linked to the Batavian Society do not figure prominently in this thesis, because its aim is to detangle the thoughts of the members. The literature has already focused on some aspects of the day to day life in the colonies, Furthermore, unfortunately, many journals and letters written in Batavia have disappeared or have been damaged which limits the amount of this kind of material.[46] For these reasons, personal documents have not been used.

This thesis will argue that the *Verhandelingen* added to the knowledge on how to control bodies and the environment at the end of the eighteenth century in Batavia. The authors generally advised ways to manage humanmade problems in the environment or to exert control over the body. The members of the Batavian Society were aware of the negative impact of different environmental factors, but remained optimistic that especially through small-scale interventions focused on water, air, and food, the health of the population could be bettered. Furthermore, these measures were aimed at everyone without noting differences in how certain bodies would react to them.

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because of the fourth Anglo-Dutch war. The digitized versions are all made by the Biodiversity Heritage Library digitization project, Harvard College, at biodiversitylibrary.org, except the first volume is digitized by Leiden University, and can be found at delpher.nl. The first and third volumes are second editions printed in Amsterdam and Rotterdam, but apart from a different lay-out in the *Voorbericht* of the third volume, they are identical to the version from Batavia. The references in this thesis are based on the digitized versions.

[44] Max de Brujin and Remco Raben, eds., *The World of Jan Brandes, 1743-1808: Drawings of a Dutch Traveller in Batavia, Ceylon and Southern Africa* (Zwolle: B.V. Waanders Uitgeverji, 2004), 9-12.

[45] Peter Burke, *Eyewitnessing: The Uses of Images as Historical Evidence* (Ithaca: Cornell University Press, 2001) 34-45.

[46] Marijke Barend-van Haeften, "Maar sal die moode evenwel niet volgen' Egodocumenten van vrouwen uit de VOC-tijd," *Indische Letteren* 10 (1995): 99.

Part I
Managing the environment

In his plan written up for the governmental investigation of 1794, François van Boeckholtz (unknown-1802), a successful military man and then the governor of Banda, explicitly linked the declining health of the Batavian population with the decline of the VOC.[47] Four years before the official downfall of the VOC and the handover of its territories in Asia to the English, van Boeckholtz sounded the emergency alarm. If Batavia wants to avoid total ruin, the city needs to become a healthy place to live. According to him, it is incontestably true that the unhealthiness of the city is the cause of half of the Company's troubles. Since Batavia is the capital city of the VOC's trade in Asia, and thus its prosperity, as long as its centre is not taken care of, the wellbeing of the Company will not improve.[48]

He deplores the efforts and deceased people who have given their lives for all the riches. He estimates the European dead count at twelve thousand individuals, of which a fourth have died because of Batavia's salubrity and the bad circumstances on the ships and also mentions that the local population suffered in Batavia too. He harshly writes that all those that claim to love their country cannot say this truthfully if they do not try with all their heart to improve the condition in Batavia. Crucial is his belief that Batavia's locality is not inherently unhealthy; their ancestors chose the best place they could, from a military and health perspective, but over time many factors made the city unhealthy. He firmly believes that Batavia can and has to be made healthy again in a communal effort to save the settlements.[49]

While van Boeckholtz's appeal was particularly strong, it can be considered an endpoint in a list of texts about advice on how to improve the situation in Batavia health-wise. Especially in the second half of the eighteenth century, the Batavian Society and the governments in the Dutch Republic and Batavia were concerned with the situation. The first part of this thesis will look at what the writers of the *Verhandelingen* focused on when it came to bettering the health

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[47] The Banda Islands, located two thousand kilometers east of Java, were one of the first territories that were brutally conquered by the Dutch under Jan Pieterszoon Coen (1587-1629). In 1621 this conquest led to near extermination of the Bandanese. After importing slaves, the nutmeg grown on Banda became one of the VOC's most valuable export products.
Martine Julia van Ittersum, "Debating Natural Law in the Banda Islands: A Case Study in Anglo–Dutch Imperial Competition in the East Indies, 1609–1621," *History of European Ideas* 42, no. 4 (2016): 459–501.

[48] François van Boeckholtz, *Staatkundige Aanmerkingen Weegens de Ongezondheid En Legging van de Stad En Casteel van Batavia, 1794*, (The Hague: Nationaal archief, Hoge Regering van Batavia, inventory number 1010), 27-28.

[49] van Boeckholtz, *Staatkundige Aanmerkingen,* 29-30.

of the population, and compare this to two key texts written for the government: governor-general Jacob Mossel's advice from 1753 and the previously mentioned contribution of François van Boeckholtz from 1794.

First, a historical overview of environmental medicine is given, as well as the context needed to understand the aims of the Batavian Society. The next two chapters discuss all the external factors, starting with air and water, and following up with the five remaining non-naturals, namely food, exercise and motion, rest and sleep, evacuations and retentions, and the passions. The government and the Society both focused on changing the water and air around them. They also both discussed many of the same environmental problems. However, the investigations for the government tended to concern large-scale measures. They wished to intervene in the landscape in and around Batavia to eliminate or lessen the harm brought on by bad places. The writings in the *Verhandelingen*, however, also discuss smaller-scale improvements. They saw undertaking these kinds of measures as possible. Unlike the texts written for governmental investigations, the *Verhandelingen* discuss more individualistic advice; it follows the legacy of the health regimen of the non-naturals. Many texts published by the Batavian Society discussed food. A few also advise on rest and exercise, sleep and waking, excretions and retentions, and the passions. The writers were generally optimistic that the settlers could manage their health despite the harmful outside influences.

CHAPTER 1. FROM HIPPOCRATES TO ENVIRONMENTAL MEDICINE IN THE BATAVIAN SOCIETY

1.1. The history of environmental thinking in medicine

During early modern times, different medical theories had their rise and fall.[50] Still, the theory of the humours was the dominant paradigm. Even when, after the Scientific Revolution in the seventeenth century, it was, intellectually speaking, giving its final blow, this medical model only disappeared slowly in practice.[51] Early modern medicine has its roots in authoritative texts from antiquity and the Islam world. Dozens of medical treatises are attributed to Hippocrates of Cos (c. 460 BC-370 BC) Despite the fact various authors probably wrote them, these texts are traditionally considered to contain the first medical theories based on observation.[52] According to Hippocrates, the body consisted of blood, mucus, black bile, and yellow bile. Diseases were a sign that one of these four humours was out of balance. Each humour had its fixed combination of the properties hot or cold and dry or wet. These properties created the physical and moral character of the body.[53]

The second important intellectual from antiquity is Aristotle (384 BC- 322 BC). Aristotle was a natural philosopher who was interested in medicine and who added a political interpretation to the air, water, places-tradition. Hippocrates had attributed certain characteristics to certain people; for example, he wrote that people living in cold places were less skilled and intelligent. To this, Aristotle added that this explains their low degree of political organization and limited hegemony. These ideas then later influenced medicine, mainly through the writings of Galen of Pergamon (c. 130-c. 210).[54] Galen indeed synthesized the writings of his predecessors remarkably, although some works have probably also apocryphally been attributed to him. Galen's work is considered important for the development of the genre of early modern medical handbooks. These books aimed to prescribe an appropriate regimen for each body, depending on the individual's humours. Galen's contributed by emphasizing the importance of food for health; many early modern health guides testify to this. Hippocrates's theory of the influence of air, water, and places gave way to the six non-naturals: air, food and drinks, exercise and rest, sleep, retention and evacuation, and the passions of the soul.[55]

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[50] Andrew Wear, *Medicine in Society: Historical Essays* (Cambridge: Cambridge University Press, 1992), 137.
[51] Miglietti and Morgan, "Introduction: Ruling 'Climates' in the Early Modern World," 8.
[52] Nancy Siraisi, *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice* (University of Chicago Press, 2009), 1-2.
[53] John Esposito, *The Oxford Encyclopedia of the Islamic World* (New York: Oxford University Press, 2009), 546.
[54] Siraisi, *Medieval and early Renaissance medicine, 2-3*.
[55] Antoinette Emch-Dériaz, "The Non-naturals Made Easy," in *The Popularization of Medicine, 1650-1850* (Londen: Routledge, 1992), 134–36.

During the Enlightenment, medical thought was characterized by different ways of thinking and debates with little consensus.[56] Eighteenth-century medicine was a blend of various new and old ideas. Hippocrates's legacy was still dominant, while Galen's humoural system was officially done away with.[57] Galen had been the most prominent medical authority in the West throughout the Middle Ages. However, during the Renaissance, academic physicians took a resurging interest in the Hippocratic treatises. Over the sixteenth century, different groups of physicians were incorporating the Hippocratic tradition into their medicine and breaking Galen's near-monopoly. For example, the physician Thomas Sydenham (1624-1689) preferred Hippocrates's style of medicine based on empirical observation and experience by gathering case histories.[58] The non-naturals were woven into new views on the body and disease. Also, in the seventeenth century, knowledge of anatomy changed significantly. The body had been mapped out in detail, mainly thanks to Andreas Vesalius' dissections. William Harvey (1578-1657) changed the classical view on blood by proving the existence of circulation.[59]

In the same century, two new branches of medicine were especially influential.[60] A major group was iatrochemistry or chemical medicine practiced by the Paracelsians and Helmontians. It started in the sixteenth century when Paracelsus (c. 1493-1541) sought to gather knowledge on Hippocrates beyond what Galen had written about his corpus.[61] The iatrochemists studied the properties and uses of chemicals such as acids and alkali. This system of medical explanation stayed until the end of the seventeenth century. However, their more long-term addition to medicine was one of the first steps towards an ontological view of disease.[62] Galen had modelled disease as a bodily state brought on by humoural imbalance; disease was part of the body and unique.[63] Starting with Paracelsus, diseases slowly became conceptualized as entities that existed independently from the body and were specific.[64] The iatrochemists thought that small particles went through the body. This was an important step towards the idea of corpuscules in medicine, and it was another view on how the environment acted on a permeable body.[65]

Iatromechanists or medical mechanicists were interested in mathematical rules and physical laws. Human bodies followed those laws just like heavenly bodies. The medical theory of the iatromechanists might seem contrary to that of the iatrochemists, but in practice, both

[56] See, for example, chapter 4 with the debate on inoculation.
[57] Siena, "Pliable Bodies," 33-34.
[58] Jole Shackelford, "The Chemical Hippocrates: Paracelsian and Hippocratic Theory in Petrus Severinus' Medical Philosophy," in *Reinventing Hippocrates*, ed. David Cantor (Aldershot: Ashgate, 2002), 59.
[59] Siena, "Pliable Bodies," 34-35.
[60] Siena, "Pliable Bodies," 35.
[61] Shackelford, "The Chemical Hippocrates," 60.
[62] Mary Lindemann, *Medicine and Society in Early Modern Europe*, (Cambridge: Cambridge University Press, 2010), 16, 100-103.
[63] Siena, "Pliable Bodies," 37.
[64] Lindemann, *Medicine and Society in Early Modern Europe,* 16.
[65] Siena, "Pliable Bodies," 35.

strands of thought incorporated elements from each other.[66] Iatromechanic scholarship consisted of disparate contributions until Herman Boerhaave (1668-1738) combined the different theories at the beginning of the eighteenth century. The body was conceived as a machine responding to laws and consisted of fluids and solid parts made of fibres. William Cullen (1710-1790) added nerves to this model. Overly loose or rigid fibres caused disease. Especially overstimulation of nervous fibres led to illness. Similarly to the iatrochemists, medical mechanics held that external particles could invade the body; these tiny substances corrupted the fibres.[67] Even though iatrochemistry and iatromechanics became prominent, especially in popular culture references to the humours and their related temperaments persisted. Furthermore, some physicians did not agree with either of the two new systems.[68] In short, early modern medicine is most accurately defined as a blend of innovation and tradition without one definition of health or the body.[69]

All these diverging strands of medicine and contradictions made the body changeable through discourse, or as Kevin Siena writes, 'pliable'. Moral values could be impressed unto the body through medical discourse. When a place or lifestyle was associated with certain values, the people in that place or living that lifestyle were associated with those values as well. The physical and moral were interrelated in a world where the body was conceived as changeable due to its physical surroundings. This was the outcome of a view on the environment that not only paid attention to physical aspects but also to the moral values ascribed to them.[70]

In the eighteenth century, many studies were carried out to understand the environmental factors causing disease. While studying this 'medicine of the environment' or environmentalism, the physician found himself to be close to other fields such as astronomy, botany, chemistry, political institutions, criminal law, and economics.[71] This was the outcome of a seventeenth-century, not-exclusively-medical fascination with explaining different phenomena of the natural world. Nature had become a significant object of curiosity. Religion played a crucial role in this process. The Leibniz-Clarke controversy illustrates two different views on how the workings of Nature related to God's creation of the world. Samuel Clarke believed that the world was constantly guided by a divine hand. Isaac Newton (1643-1727) and Gottfried Wilhelm Leibniz (1646-1716), however, thought that Nature followed the mechanics made by a God, just like a clock follows the mechanics that the clockmaker put in place in

[66] Lindemann, *Medicine and Society in Early Modern Europe,* 15.
[67] Siena, "Pliable Bodies," 35-37.
[68] Lindemann, *Medicine and Society in Early Modern Europe,* 19.
[69] Gideon Manning, "Health in the Early Modern Philosophical Tradition," in *Health*, ed. Peter Adamson (Oxford: Oxford University Press, 2019), 194.
[70] Siena, "Pliable Bodies," 33-34.
[71] James C. Riley, *Eighteenth-Century Campaign To Avoid Disease* (London: Palgrave Macmillan, 1987), xii

advance.[72] In either case, Nature was understood to follow a certain order, which meant that it was possible to understand how Nature worked and to manipulate it.

This belief that the natural world could be manipulated placed a part of the responsibility of undertaking action against widespread diseases caused by man's habitat, in man's hands. Physicians understood epidemics as a sign of discord between humans and their environment and thus as something they could make more balanced. Furthermore, Riley argues that this overlap between medical and non-medical thinking about nature has made the environmental approach to health so convincing for over a century. Environmentalism was more than thought; it led to the taking of measures. For example, the contemporary take on quarantine changed. Rather than keeping ill people contained in one place, physicians kept healthy people away from pathogenic places and tried to change these sites.[73]

Furthermore, in the eighteenth-century, the thinking about healthy bodies, in the plural, became more generalized. In the century of the Enlightenment, health became conceptualised as a social good. Even if governmental measures to preserve the health of groups are clearly recognizable in the fifteenth-century responses to the bubonic plague, in the eighteenth century these efforts became more constant and were incited by the concern that disease and economic decline were related. Public health was first an initiative to bring on population growth.[74] This means that the Hippocratic-Galenic framework was deployed in more large-scale projects to manage the health of the population.

Beyond the belief that the environment influenced humans and that the latter were able to influence their surroundings in return, environmentalism had no single program, theory, practitioners, or practice.[75] Even the idea of environment or climate was not uniform.[76] There were thus different strands of scientific endeavours and writings. The link between health and the environment was studied systematically by physicians and physicists interested in meteorology, starting in the 1660s in England and Ireland. They tried to find out whether certain diseases and epidemics correlated to specific kinds of weather.[77] Riley calls this environmental

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[72] Steven Shapin, "Of Gods and Kings: Natural Philosophy and Politics in the Leibniz-Clarke Disputes," *Isis* 72, no. 2 (1981): 193-94, 201.
[73] Riley, *Eighteenth-Century Campaign to Avoid Disease,* xvi, 19, 145.
[74] Tom Broman, "Health in the Eighteenth Century," in *Health*, by Peter Adamson (Oxford: Oxford University Press, 2019), 239-44.
[75] Matthias Heymann, "The Evolution of Climate Ideas and Knowledge," *Wiley Interdisciplinary Reviews: Climate Change* 1, no. 4 (2010): 586.
[76] Miglietti and Morgan, "Introduction: Ruling 'climates' in the Early Modern World," 2-3.
[77] Theodore S. Feldman, "The Ancient Climate in the Eighteenth and Early Nineteenth Century," in *Science and Nature: Essays in the History of the Environmental Sciences*, ed. Michael Shortland (Oxford: British Society for the History of Science, 1993), 31-33.
Jan Golinski, *British Weather and the Climate of Enlightenment* (Chicago: University of Chicago Press, 2007), 142.
Riley, *Eighteenth-Century Campaign to Avoid Disease,* 9.

pathology.[78] Physicians such as Sydenham, John Arbuthnot (1667-1735), John Huxham (1672-1768), and William Hillary (1697-1763) thought that they could find regularities through keeping a daily narrative journal of the weather. The latter two, among others, used instruments such as barometers and thermometers to gather data. Not only physicians recorded the weather and used instruments. In the eighteenth century, there was a broader public movement that kept weather diaries in the hope of uncovering more about nature and its laws of the weather. All these observations and measurements were a way to combine the empirical approach with Hippocrates' writings from antiquity. This international Neo-Hippocratic project of compiling medico-meteorological journals was at its peak from around 1730 until the end of the eighteenth century. In the end, the many observations proved unable to show the specific interrelatedness between weather and certain diseases.[79]

Another flourishing genre was medical topography; long descriptions of the healthy and unhealthy factors in a certain place such as a city or country based on observations of nature. Multiple physicians used the empirical method to prove the effects of certain factors on the body.[80] These were, among other things, winds, stagnant water, and emanations from the earth and rotting matter such as corpses and vegetables.[81] Other physicians disproved certain parts of Hippocrates' treatises. Overall, however, the traditions of air, water, and places were accommodated to the contemporary physicians' theories.[82] This Hippocratic revival helped voyagers make sense of new worlds.[83] Cagle writes that already during the first voyages of the Portuguese to West Africa, Hippocratic environmentalism proved a more useful framework than Galenic medicine.[84] Furthermore, incited by mercantilist thought, understanding the influence of environmental factors helped nation-states to build their own identity, use the exotic resources at their disposal through trade, and take proactive measures.

Valencius writes that the history of medical geography tells "the history of efforts to assert control over territory both intellectual and physical." A key term here is 'control' and how it develops for the individual and the state.[85] This thesis uses this view on medical geography and applies it to the broader term of medical environmentalism. It considers all the efforts to exert agency over an environment to make the people living there healthier based on the actor's use of ideas from the Hippocratic-Galenic framework. This agency does not have to be successful;

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[78] Riley, *Eighteenth-Century Campaign to Avoid Disease,* 20.
[79] Golinski, *British Weather and the Climate of Enlightenment,* 79, 140-50.
[80] Genevieve Miller, "'Airs, Waters, and Places' in History," *Journal of the History of Medicine and Allied Sciences* XVII, no. 1 (1962): 133.
[81] Riley, *Eighteenth-Century Campaign to Avoid Disease,* 16, 18, 39.
[82] Miller, "'Airs, Waters, and Places' in History," 137-40.
[83] Conevery Bolton Valencius, "Histories of Medical Geography," *Medical History. Supplement*, no. 20 (2000): 10.
[84] Cagle, *Assembling the Tropics,* 43.
[85] Valencius, "Histories of Medical Geography," 11-13.

rather, what is important is the belief that a change in exerting control is possible. What matters is the object of this change and how the actors tried to achieve it.

1.2. An intellectual society in Batavia: a means of control through knowledge?

Stereotypically, the VOC is painted as a Company that invested little in the sciences and was only concerned with the success of its commerce. The money they would invest in innovation went towards improving their agriculture. This reputation has been nuanced by historians who have shown the different kinds of intellectual activity in Java. Different authors published books on the Dutch East Indies. For example, Jacobus Bontius' *De medicina Indorum libri IV*, François Valentyn' *Oud en Nieuw Oost Indiën*, Everardus Rumphius' *Amboinsche Kruidboek*, and Hendrik Adriaan van Reede tot Drakestein's *Hortus Malabaricus.*[86] The independent amateur astronomer Johan Maurits Mohr (1716-1775) spent a part of his fortune on building an observatory in Batavia.[87] In the 1760s, different consecutive Mason lodges were founded and shortly after dissolved.[88] Still, no organized group of European intellectuals nor consistent publications of their work had existed before the Batavian Society of Arts and Sciences.

The Batavian Society had its roots in a combination of Jacobus Cornelis Mattheus Radermacher (1741-1783) individual efforts and a project in the Dutch Republic to create a new overarching Society for the whole country. Radermacher came from a prominent Dutch family and had started to work for the Company when he was sixteen. In 1757, he married the stepdaughter of a highly placed employee of the VOC called Reinier de Klerk (1710-1780), which helped him rise in the ranks. Between 1763 and 1767, Radermacher went back to his home country and participated actively in its intellectual life.[89] Inspired by the thriving Societies of well-to-do middle-class men, Radermacher wanted to create an independent intellectual circle in Batavia. This was at least in part because he believed that a Society would help Christianise the population through the arts and sciences. The Company did not break its reputation of investing little in knowledge that was not directly useful and had little interest in Radermacher's plan.[90]

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[86] Harry A. M. Snelders, "Het Bataviaasch Genootschap van Kunsten En Wetenschappen in de Periode 1778 Tot 1816," *Documentatieblad Werkgroep Achttiende Eeuw*, 1979, 63.
Jacobus Bontius, *Bontius Tropische Geneeskunde. Bontius on Tropical Medicine.*, ed. Martinus van Andel, vol. 10, Opuscula Selecta Neerlandicorum de Arte Medica (Amsterdam: Sumptibus Societatis, 1931).
[87] Snelders, "Het Bataviaasch Genootschap," 62.
[88] Lian The and Paul W Van der Veur, *The Verhandelingen van Het Bataviaasch Genootschap : An Annotated Content Analysis*, Papers in International Studies Southeast Asia Series 26 (Athens: Ohio University Center for International Studies, 1973), 1.
Snelders, "Het Bataviaasch Genootschap," 60
[89] The and Van der Veur, *The Verhandelingen van Het Bataviaasch Genootschap,* 1.
[90] Snelders, "Het Bataviaasch Genootschap," 66.

The foundation of the Batavian Society needed an extra incentive; this was the creation of the *Oeconomische Tak van de Hollandsche Maatschappij der Wetenschappen,* in 1777. This part of the *Hollandsche Maatschappij,* a society founded in 1752, would be focused on sciences that would improve the wellbeing of the country, such as trade and agriculture. De Klerk, Radermacher, and Jeremias van Riemsdijk were promoted to directors of the *Hollandsche Maatschappij* in the Dutch East Indies. However, when the latter died, Radermacher and de Klerk created an independent society. Following the spirit of its beginnings with the *Hollandsche Maatschappij,* the main aim of the new society was focused on doing practical research that could improve the settlement, be it through ameliorating its commerce, agriculture, or overall prosperity.[91] Its motto was "Ten Nutte van het Algemeen".[92] On April 24, 1778, the Batavian Society was officially founded when high officials of the VOC gave their blessing to the society. Many of them became members so that the Batavian Society was majorly made up of intellectuals and (former) military and political elite who were residing in Batavia. This trend continued in the following years because high-ranking employees of the Company were automatically members. Locals, however, were not allowed to join. [93] In 1778, there were 192 members in total, and they came from all of the Dutch territories. By 1791, this number had increased to 241.[94] Being part of the Batavian Society could be a springboard to an esteemed position in a scientific society in the United Provinces of the Netherlands, or in short, a means to acquire more prestige in the motherland.[95]

While the Society had to help answer questions for the government in Batavia and the Dutch Republic and its directors were all high government officials, the Batavian Society was more than simply an extension of the local government. In their first *Verhandelingen*, the Society claims that their aim is broader than serving to answer the questions of the Company:

> *Het Genootschap sluit geheel en al, buiten den kring zyner onderzoekingen, alle berichten, die de Oostindische Compagnie eenigzins zouden mogen aangaan ; maar zal daar tegen alle Kunsten en Wetenschappen pogen te bevorderen ; en al wat de natuurlyke Historie , Oudheden , Zeden en Gewoonten der Volken aangaat , zal het zelve gretig ontvangen.*[96]

[91] Snelders, "Het Bataviaasch Genootschap," 64, 68.
[92] The and Van der Veur, *The Verhandelingen van Het Bataviaasch Genootschap,* 2.
[93] Adriënne Zuiderweg, "Een Verblijfplaats Voor Onsterfelijken: Een Impressie van Het Culturele En Literaire Leven Op Batavia (1619-1811)," *Literatuur* 17 (2000): 140.
[94] Snelders, "Het Bataviaasch Genootschap," 75-76.
[95] Adriënne Zuiderweg, "Een Verblijfplaats Voor Onsterfelijken: Een Impressie van Het Culturele En Literaire Leven Op Batavia (1619-1811)," *Literatuur* 17 (2000): 140.
[96] "Voorbericht," 1781, 9.

The first part refers to the VOC's policy of secrecy and specifically means that political ideas will not be discussed in the *Verhandelingen*. However, their interest went further than the questions that the government had for them and included many aspects of the Dutch East Indies.[97] They were interested in "de gedachten der Inlanders" and invited the members to ask questions to the natives. This knowledge was meant to help answer the questions they listed in the introduction of their *Verhandelingen*, and to generally discover more about the region.[98] During the meetings, the members were invited to read on different topics; they could borrow and read the books from Radermacher's private collection, as well as consult his rarity cabinet.[99] The Batavian Society was thus indeed focused on practical knowledge that would help the settlement but not limited to it.

To share all the information as part of contributions in their *Verhandelingen,* the Society relied heavily on its management board to host general assemblies, write, and edit its publications. The *Verhandelingen* contained many contributions to important issues in the Dutch East Indies. Everything is written in Dutch, and almost all the entries concern the Asian settlements. Only when there were not enough pieces to make a full edition, topics not related to Asia were allowed, as was the case in the sixth volume where a general piece about music was added.[100] The directing members almost always wrote the major part of each edition. The sixth edition was the first volume with a majority of contributions written by the members. The redaction, consisting of the directing members, probably set contributions from outsiders more quickly aside, since only a fifth of writings sent in were published in the four first *Verhandelingen*.[101] The change in the sixth edition is probably due to the death of five of the six directing members before 1785. They had contributed to the majority of the first four volumes thus their passing greatly influenced the content of the *Verhandelingen*.[102]

The official printer of the government, and thus not the printer of the city, published the *Verhandelingen*.[103] This shows the complicated ties that linked the Batavian Society to the government. The Batavian Society actively undertook to share their work with Dutch intellectuals all over the world.[104] Each *Verhandelingen* was produced in a thousand copies and

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[97] Snelders, "Het Bataviaasch Genootschap," 76.
[98] "Voorbericht," 1781, 19-20.
[99] Zuiderweg, "Een Verblijfplaats Voor Onsterfelijken," 140.
[100] Hans Groot, *Van Batavia Naar Weltevreden: Het Bataviaasch Genootschap van Kunsten En Wetenschappen, 1778-1867*, Verhandelingen van Het Koninklijk Instituut Voor Taal-, Land- En Volkenkunde (Leiden: KITLV Press, 2009), 120.
"Voorbericht," 1781, 22.
[101] Groot, *Van Batavia Naar Weltevreden,* 120-121.
[102] The and Van der Veur, *The Verhandelingen van Het Bataviaasch Genootschap,* 5.
[103] Adriënne Zuiderweg, "Een Verblijfplaats Voor Onsterfelijken: Een Impressie van Het Culturele En Literaire Leven Op Batavia (1619-1811)," *Literatuur* 17 (2000): 138-40.
[104] Groot, *Van Batavia Naar Weltevreden,* 115.

sent to other Dutch settlements and the Netherlands.[105] Their plan to receive input from outside of Batavia was successful. Different entries were sent in, especially for the so-called prize questions, and the European authors often won medals.[106] These prize questions are an important aspect of the *Verhandelingen* because they reflect poignant issues that required answers. When one year after the foundation of the Society, the first issue of the *Verhandelingen* was published, it already contained forty-six questions to be answered. Most of the replies were expected at any point in time. Two questions had to be answered before June 30, 1779, and five special questions had to be answered before either June 1780 or June 1782. The last five questions were deemed a priority by the colonial government, consisting of the Governor-General and the Council of the Indies, and the Gentlemen XVII since their answers would especially benefit the VOC. These were the "Prys-vraagen", written out to both benefit the colonial settlement in a practical way and the writer in a monetary way, either in the form of a medal or in cash.[107]

On top of sending their publications to Western Europe and inviting all Dutch-speaking writers to answer questions, the Society also gave money to learned societies in the Dutch Republic. In return, the *Hollandsche Maatschappij* at Haarlem, *het Bataafsch Genootschap der Proefondervindelijke Wijsbegeerte* at Rotterdam and *het Zeeuwsch Genootschap der Wetenschappen* at Vlissingen wrote out prize questions about a topic they could choose. The outcome was successful because for almost half of the questions an award was granted to the winning contribution. However, not all of them concerned the Dutch East Indies.[108] This thesis focuses solely on the *Verhandelingen* of the Batavian Society out of practical considerations for its length but also to avoid considering the intellectual activity of the Batavian Society simply as an extension of the Dutch culture in the Republic. The editors Jeroen Dewulf, Olf Praamstra, and Michiel van Kempen in the collection of essays in *Shifting the Compass*, which discusses Dutch literature written in a colonial and postcolonial context, applied this change of perspective. They avoided seeing this literature as part of the periphery of Dutch writing by placing the colonies in the center of their attention.[109] Comparative research that also looks at the relations between the different societies could be fruitful for the future.

Previous comparative research by Snelders, who looked at the percentage that was attributed to each scientific discipline, has shown that the Batavian Society published

[105] "Voorbericht," 1781, 24-25.
[106] Groot, *Van Batavia Naar Weltevreden,* 120-121.
[107] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 9-30.
[108] Groot, *Van Batavia Naar Weltevreden,* 112-14.
[109] Jeroen Dewulf, "Introduction," in *Shifting the Compass: Pluricontinental Connections in Dutch Colonial and Postcolonial Literature*, ed. Jeroen Dewulf, Olf Praamstra, and Michiel van Kempen (Newcastle upon Tyne: Cambridge Scholars Publishing, 2012), 3.

significantly less on medical topics than the learned societies in the Netherlands. Instead, in Batavia, much attention was given to agriculture and geography. A nuance lies in the fact that he compares different periods and, consequently, different numbers of journals with each other. For example, he takes the period of 1779-1792 for the Batavian Society, in which they published six volumes, and compares it with the period 1754-1793 of the *Hollandsche Maatschappij,* during which thirty volumes came out.[110] So he does not take into account that the percentages that each journal dedicates to a certain topic might shift over time. However, more significantly, the hard distinction between disciplines hides that disciplines were not strictly delineated and separate from each other. Indeed, many essays on agriculture and geography contributed to medical knowledge because knowledge of the environment was crucial for their understanding of health. This thesis will show that virtually all the essays on medicine in the *Verhandelingen* mention either the specific conditions of the locality such as the air, water, and geography or drew on the legacy of the non-naturals. This makes it worthwhile to investigate the specificities of medical knowledge in Batavia.

In the eighteenth century, before the founding of the Batavian Society, it was the government that incited medical research and was responsible for most of the written documents about how to improve the health of the population. Especially in the second half of the century, the Gentlemen XVII in the Netherlands and the local government in Batavia took this matter seriously: there were four official investigations. For each of them, long reports and data were created and measures were proposed. The Gentlemen XVII initiated the first three in the years 1753, 1768, and 1786. The local government of Batavia started the fourth investigation in 1794.[111] To give more insight into the specific characteristics of the Batavian Society, this thesis will add a comparison of the advice of this society with that of the guidelines in two key texts from the first and the fourth investigations. This comparison will not involve the middle two investigations because they discussed the situation in the hospitals. The advised measures in the hospitals were focused on cleaning and ameliorating the meals. While this early hygienist thought is linked to Hippocratism, it is not as relevant for this thesis as the two other investigations that look at broader environmental phenomena and factors. Considering the early ties between the government and the Batavian Society, such as overlapping members and aims, a comparison between the health advice of the government and the Society is worth investigation. This will show the specific programme of the Society by revealing what each party focused on and how positive they were about the possibility of ameliorating certain problematic environmental influences.

[110] Snelders, "Het Bataviaasch Genootschap, 88"
[111] Peter Harmen van der Brug, *Malaria en malaise: de VOC in Batavia in de achttiende eeuw* (Amsterdam: De Bataafsche Leeuw, 1994), 193-96.

CHAPTER 2. AIR AND WATER FAR AND WIDE

2.1. Taking in the surroundings

When describing Batavia, the writers of the *Verhandelingen* paid great attention to its geographical factors, especially the hot air and masses of water. In the first *Verhandelingen*, Radermacher and van Hogendorp write that Batavia is one of the most charming cities of Holland since houses with gardens were built after 1730. They consider their port one of the most beautiful bays in the world. Outside of the city and until where the mountains start, lay delightful countryside villas.[112] This manner of starting their description of the city positively is reminiscent of travel diaries. Furthermore, emphasizing Batavia's beauty with Holland as a point of reference not only helps faraway readers understand its allure but also shows how Batavia was comparable in value to the motherland. Most importantly, like the landscape of the Dutch Republic, water was omnipresent in and around the city. The kingdom of Jakarta is an island with a sea in the north and the south.[113]

Unlike the Dutch Republic, Batavia was a city in the "heete gewesten".[114] The sun made the atmosphere luminous, and it could be blinding and corrupting.[115] The sun also had positive effects; it cleared up the fog caused by the swampy ground every morning.[116] The air was usually not only warm but also moist and changing. The combination of these properties was thought to cause putrid fevers. For example, the surgeon David Bylon attributed the cause of the dengue fever to dirty hot and moist air, caused by the rain. The stomach was affected because the air bound itself with saliva or stayed in the body through the *vasa absorbentia,* tubes that took the air into the body if it could not be let out properly.[117] The moisture in the air also leads to more rust than at home.[118]

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[112] Radermacher and van Hogendorp, "Beschryving van de Stad," 43.
[113] Radermacher and van Hogendorp, "Beschryving van Het Koningryk," 19.
[114] Bicker, "Antwoord Op de Vraag," 1.
[115] Josua van Iperen, "Beschryvinge van Eenen Witten Neger van Het Eiland Bali," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 327.
[116] Jacobus Cornelis Mattheus Radermacher and Willem van Hogendorp, "Beschryving van de Stad Batavia," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 43.
Jan Andries Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage. Welke Zyn de Oorzaaken Der Meeste, Vooral Epidemique, of Gewoone Ziektens van Batavia, Inzonderheid van de Rotkoorze? En Welke Zyn de Geschikste Middelen, Die Tot Voorkominge En Tot Geneezinge Derzelve, Voortaan Moeten Worden Aangewend?," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel*, (Batavia: Egbert Heemen, 1780). 492.
[117] Bylon, "Korte Aantekening, Wegens Eene Algemeene Ziekte," 22-23.
[118] Jacobus van der Steege, "Bericht, Van de Proefnemingen, Met Den Door Kunst Gemaakten Magneet," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 114.

The knowledge of the seasons also revolved around the heat and moisture in the air. It was generally accepted that the year was divided into two seasons. Almost all the contributions from the *Verhandelingen* that mention the seasons agree that the dry or east monsoon is from May until November, and the wet or west monsoon from November until May. The latter was considered the unhealthy one because the heat, especially from July until October, causes many illnesses. The wet monsoon is still very hot, but the rainfall cools it down.[119] On the other hand, especially from July until October, almost no rain falls.[120] In short, when describing Batavia's geography and climate, writers paid much attention to the water all around them. In line with how they perceived the landscape, the lion's share of the early measures to improve the health of the population went towards managing this water.

This focus on the rivers and seas was to a great extent a consequence of the Dutchmen's skills regarding the management of water. The landscape of the Dutch Republic and the area around Batavia both had an omnipresence of water therefore it is unsurprising that the Dutch saw opportunities for improvement. Their overemphasis on a certain factor in the environment is typical: different nations stressed outside factors on health differently. The Galenic-Hippocratic paradigm was not a singular tradition but evolved and depending on the geographical context. Cavallo and Storey's edited volume *Conserving Health in Early Modern Culture* has shown that this could be a consequence of multiple causes. For example, medical periodization could influence which factor was deemed the most important. The dissemination of Hippocratic ideas indeed brought the emphasis on air, water, and place back. Another reason they give is that a certain local element could be a sign of whether that place was healthy or not. For example, in Italy in the sixteenth century, the success of the agricultural produce was linked to the healthfulness of that locality after the nobility became greatly involved in the agriculture and was invested in this aspect of their area.[121]

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[119] Jacobus Cornelis Mattheus Radermacher and Willem van Hogendorp, "Beschryving van de Stad Batavia," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 44-46. "Aanmerkingen over de Vraage: Welke Zyn de Beste En Spoedigst Voortkomende Wortelen, Om Het Behoeftig Gemeen, by Misgewas van Graanen Te Spyzigen?," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 281.

[120] Jan Hooyman, "Vervolg Der Verhandeling over Den Tegenwoordigen Staat van Den Land-Bouw, in de Ommelanden van Batavia," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 519.

[121] Sandra Cavallo, "Introduction. Conserving Health: The Non-Naturals in Early Modern Culture and Society," in *Conserving Health in Early Modern Culture: Bodies and Environments in Italy and England*, ed. Sandra Cavallo and Tessa Storey, Social Histories of Medicine (Manchester: Manchester University Press, 2017), 6, 20.

Similarly, the Dutch had greatly invested in managing their rivers the Meuse, Rhine, and Scheldt as well as the North Sea.[122] Since the Middle Ages, the inhabitants of what is now called the Netherlands actively transformed their natural world. This was done in great part by controlling their water resources, a practice that stood out for its great scale compared to other regions at the time. These interventions made it possible to engineer their landscape and use natural resources for human purposes.[123] In this way, the water management infrastructure completely changed between the tenth and fourteenth centuries. Techniques used were among others, the building of dam and sluice works, dykes and polders.[124] This was done through a long process of intense discussion between the different localities sometimes leading to lawsuits.[125] In short, over the centuries, they had focused on managing water and had acquired skills.

2.2. At the foot of the mountain: deviating the rivers

It is thus not surprising that the Dutch applied their technological heritage to the situation in and around Batavia. Indeed, the waterways were one of the first natural elements that were changed. Writing about their history, the authors of the *Verhandelingen* share more insight into the measures taken in the first decades of the settlement and who initiated them. The government has led many, but not all, initiatives. The physician Jacobus Bontius had already written in the 1620s that the stagnant waters present in the countryside were harmful because of their vapours.[126] In the *Verhandelingen*, this history has not been forgotten. Andries Teisseire, a former member of the college of the officials of the Dutch water boards and directing member of the Batavian Society since 1789, writes that the stagnant pools with their nefast vapours were one of the first problems the settlers had to overcome. At that time, these vapours were brought to the city by the wind coming from the mountains. The excess water was either dried out or led to a river. The forests were also cut down, and the land was mined. Teisseire considers these early measures successful.[127] They were also sustainable, according to him. While describing the rivers in the countryside, Teisseire wrote the following: "Natuur en kunst hebben te zamen

[122] Erik van der Vleuten and Cornelis Disco, "Water Wizards: Reshaping Wet Nature and Society," *History and Technology* 20, no. 3 (2004): 291.
[123] Ellen F. Arnold, "An Introduction to Medieval Environmental History," *History Compass* 6, no. 3 (2008): 905.
[124] H. van der Linden, "De Nederlandse Waterhuishouding En Waterstaatsorganisatie Tot Aan de Moderne Tijd," *BMGN - Low Countries Historical Review* 103, no. 4 (January 1, 1988): 535, 541, 549.
[125] Milja van Tielhof, "Op zoek naar het poldermodel in de waterstaatsgeschiedenis," *Tijdschrift voor geschiedenis* 122, no. 2 (2009): 151.
[126] Teisseire, "Beschryving. van Een Gedeelte Der Omme- En Bovenlanden Dezer Hoofdstad," 2.
[127] Teisseire, "Beschryving. van Een Gedeelte Der Omme- En Bovenlanden," 1-3.
Andries Teisseire wrote a description and short history of the countryside for the sixth *Verhandelingen*. He bases his observations on his own experience with the area and the people. Starting from youth, he spent eight years with the native inhabitants. The following seventeen years, he had different properties and he was also involved in the agriculture.

gewerkt om deze stad met genoegzaam Water te voorzien". He believes few efforts were needed to bring different rivers together in one point because of how the rivers were initially positioned. At the end of the eighteenth century, different deviated and original rivers were still united in and around the city.[128]

Another significant change regarding the situation of the water, was intervening in the course of rivers. According to the contribution of the Lutheran preacher Johannes Hooyman different measures were taken. Starting in 1647, the High Council, the captain of the Chinese Bingam, and the attorney Johannes Ammanus dug canals in the unoccupied lands around the city to aid the agriculture and shipping. Overall, these canals were mainly dug to help the economy. Ammanus even funded the digging of canals himself. Even though different groups undertook action, Hooyman repeatedly lauds the efforts of the High Council of the East Indies in particular. He mentions their persistent work to better the agriculture, such as the canals and deviating rivers but also raising the level of the ground. In the seventeenth century, the High Council either organized or authorized many measures to improve the rivers and use of the land around the city for building houses or agriculture. Hooyman blames the limited success on the immensity of the work, which contrasts with the available inhabitants that can help. Especially the control over the countryside was lacking, and many owners, such as the Chinese, had their own plans. He blames these Chinese owners of sugar mills for the obstruction of the Tangerang river because they do not intervene.[129] Apart from changing the waterscape to help the economy, another incentive was that the citizens needed city canals with clear water.

Since the Great River in Batavia was too weak to to provide water for all the inhabitants of the city, the river Sidani or Tangerang was deviated in two places to bring more water towards the city.[130] In 1677, a group led by the *landdrost* or steward Vincent van Mook made the first deviation to the Sidani to procure the west side of Batavia with clear water. The Sonthar was likewise deviated towards the city by digging a canal.[131]

Jacob Mossel mentions many of the same measures as the *Verhandelingen*, such as the initial bad air from the swamps in the mountains that was solved through cutting down trees and deviating rivers. Almost the entire text discusses problems relating to air and water with solutions such as cutting and planting trees, changing the course of rivers, and building dykes and sluices. But mainly, Mossel discusses the problem with the beaches north of the city: they

[128] Teisseire, "Beschryving. van Een Gedeelte Der Omme- En Bovenlanden," 10-16.
[129] Jan Hooyman, "Verhandeling, over Den Tegenwoordigen Staat van Den Land-Bouw, in de Ommelanden van Batavia," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 185-88.
[130] Radermacher and van Hogendorp, "Beschryving van de Stad," 44.
[131] Groot, *Van Batavia Naar Weltevreden,* 73.
Hooyman, "Verhandeling, over Den Tegenwoordigen Staat," 186-87.

are becoming muddy and forming a sandbank. All these interventions require changing the landscape and concern keeping harmful vapours away and controlling how much water goes where.[132] In short, due to a combination of their technological heritage and the Hippocratic revival, the Dutch in Batavia placed much emphasis on deviating rivers, cleaning mud, and lessening the impact of floods and droughts to improve the health of the city inhabitants.

2.3. A Sisyphean task? The marshes near the sea

These great-scale measures to control the water resources stagnated in the second half of the eighteenth century. This impasse was caused by the lack of a solution to what they perceived to be their greatest health problem: the sandbank near the sea north of the city. Nothing seemed to help get rid of all the excess mud. This was problematic because the damps it caused were considered to be very harmful. The idea that swamps create fumes that infect the atmosphere is associated with the Italian physician Giovanni Maria Lancisi (1654-1720). It was a common theme in the environmentalist theory in the eighteenth century.[133]

The government had already tried to find a solution to get rid of excess mud after the earthquake of January 4 and 5, 1699. The river Ciliwung had less water than before due to obstructive debris from the mountain. This mud caused obstructions in the shipping. In 1703, a mechanic called Jeronomo Mitz and his partner Jacob Faas invented a mud mill and asked to be able to clean out the sludge from the bay. The Company at first witnessed that the machine worked and agreed to pay them twenty-five thousand guilders in total if the solution proved the be sustainable. However, it turned out that all the hope and efforts were in vain; despite the initial enthusiasm the situation had not improved long-term.[134]

This drawing on the next page is from the sketchbook of Jan Brandes (1743-1808), a preacher and artist who travelled to many places such as Batavia, Ceylon, Cape Town, and Sweden. De Bruijn and Raben have shown that his work has documentary value.[135] As the writing says, Brandes copied it on January 18, 1788, from the drawing of a steersman. It illustrates what could be observed from the sea, namely the very high blue mountains with a few clouds in the background and underneath them, the swamps and trees that make up the sandbank next to the sea. There are also more than a dozen ships and a few buildings between the sandbank and the mountains, where Batavia lies. More importantly, this drawing not only shows what could be

[132] Jacob Mossel, *Copie-Memories van GG Jacob Mossel En de Daarop Genomen Besluiten Door de Raad van Indië, 1750-1754. VII: Betreffende de Sterfte in Batavia, 1753* (The Hague: Nationaal archief, S.C. Nederburgh [levensjaren 1762-1811], 1606-1809 en van de familie Nederburgh, 1456-1965], inventory number 293), 1-16.
[133] Riley, *Eighteenth-Century Campaign to Avoid Disease,* 18.
[134] Snelders, "Het Bataviaasch Genootschap," 66.
[135] de Brujin and Raben, eds., *The World of Jan Brandes,* 9-12.

observed but also testifies to how the landscape was seen. The focus lies on three elements: first the imposing mountains, next the navigable sea, and third the green swamps. These were precisely the elements of reference that repeatedly came back in the *Verhandelingen* and especially in the writings made for the government. The sandbank was a well-known problem.

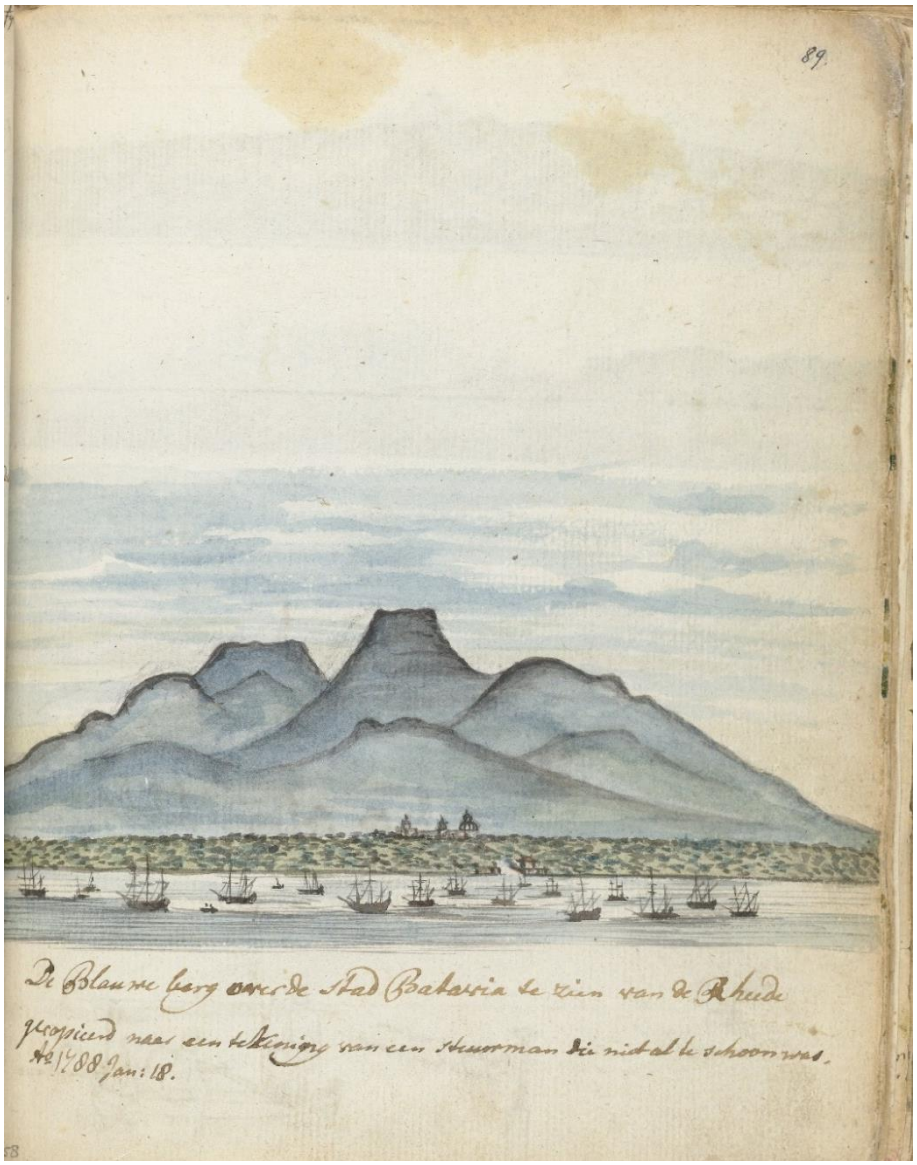

Figure 2 Jan Brandes, The Blue mountain and the city of Batavia. 1788, water-colour painting over drawing, 195 x 155 mm. Rijksstudio, Rijksmuseum Amsterdam, https://www.rijksmuseum.nl, accessed 25.11.2019.

The Batavian Society repeatedly asked for a solution against the creation of the sandbank near the sea. The initiative had come from the government, and finding a solution was deemed of great importance. Starting in the first *Verhandelingen,* they published the following prize question: "Welke zyn de oorzaken der aanspoelinge van den Modder, aan de Zeestranden van Batavia , daar dezelve voormaals zuiver , zandrig en schoon waren?" The impetus had been given by the first chief director of the Batavian Society and governor-general Reynier de Klerk (1710-1780), who promised to compensate the winner with five hundred "rijksdaalders". More

specifically, he asked if it could be a consequence of the pier and what measures could be undertaken to remove the muddy swamps. His suggestions are to either build dykes, or lead more water to the bay. He believes this can be done by changing the pier or digging water passages in the neighbouring islands. The Batavian Society follows his reasoning and asks for drawings to clarify the geography. Also, they requested that the answer was sent in before the 30th of June, 1780.[136] In the second volume, this deadline was extended to December 1780.[137]

One answer came on time under the device "Nihil suadio quam quod imitari posse confido" which means 'I recommend nothing than that which I trust can be imitated". Still, the directing members and governor-general de Klerk did not have their answer; the submission failed to give explanations and solutions for what was asked.[138] An extract from the minutes of the meeting of February 5, 1781, of the directing members gives more details about their decision. They objected to many of the authors, such as what was the cause for the sandbank. The author attributed this unhealthy phenomenon to the digging of the Mookervaart river. The directing members, the Lutheran preacher Johannes Hooyman (unknown-1789) in particular, retorted that this was not true. After counting the amount of mud that came from the direction of the Mookervaart, he concluded that this was not greater than that of the others canals and was normal.[139] Hooyman also disagrees with the solution of digging out the mud, he writes:

> *Alzo het aangespoelde zeestrand, uit een verzameling van velerlei verrotte stoffen bestaat die eene dodelijke damp onder hare bovenkorts besluijten, meene ik dat het wezen van den grond bij het uitgraven, de aller gevaarlijkste gevolgen voor de gezondheid der Ingezetenen zal na zig sleepen (…)."*[140]

He bases his opinion on the observations of the rising number of deaths after the digging projects in the 1730s and 1740s. The Society thus thanks the author for their knowledge, zeal, and good will to help the common good, but they regretfully cannot award him the prize.[141]

The Society decided to add a gold medal to the five hundred "Rijksdaalders" of the governor-general" and to put even more emphasis on the extreme importance of the question. They wrote that they were looking for a way to improve the health of the population and hoped that the mud could be removed as much as possible. They changed what they thought to be the cause of the

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[136] "Voorbericht," 1781, 26-27.
[137] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 18-19.
[138] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 13-16.
[139] T.M. der Kinderen, *Het Bataviaasch Genootschap van Kunsten En Wetenschappen Gedurende de Eerste Eeuw van Zijn Bestaan, 1778-1878: Gedenkboek* (Batavia: Ernst, 1878), LXV-LXVI.
[140] der Kinderen, *Het Bataviaasch Genootschap,* LXVI.
[141] der Kinderen, *Het Bataviaasch Genootschap,* LXI-LXVII.

mud: they attributed it to the earthquake of the twenty-second of January 1780. The observations following this natural disaster testify that the earthquake caused the water from the mountains to run down faster. Consequently, the stream sweeps even more mud down than before and takes it into the sea and the canals.[142]

As has been mentioned before, the observation that the earthquake influenced the course of the rivers and led to an excess of mud, was not new. In the very first volume, Radermacher and van Hogendorp give an overview of the influence of the seismic activity on the waterways. They write that different earthquakes brought on by the mountain Gedé led to major changes in the course of the river Ciliwung. In 1699 the heaviest earthquake led to water flooding the city. Almost every year, there is at least a slight tremor from inside the earth. Another major upheaval happened in 1684 and in the authors also mention the years in 1761, 1769, 1772, 1775, and 1779.[143] Furthermore, in Radermacher's text on the earthquake of 1780 in the second volume, he writes that this natural disaster caused, among other things, many grave illnesses. Many people died from putrid fevers caused by the fumes emanating from the wet soil when it was drying.[144] It seems that the authors went back to the government's initial interpretation of the cause of the problem when at the beginning of the eighteenth century they observed a link between the earthquake of 1699 and the creation of a sandbank.[145]

The editors of the third *Verhandelingen* did not know whether digging a path in the sandbank would be a good enough solution or whether they should eliminate it. Hoping that someone would solve their acute problem, they set the new deadline for February 1784.[146] Only repeating the question and the reward, the Society republished the same question and changed the deadline to December 1784 in the fourth edition.[147] In the fifth edition, the directing members excuse themselves for the overabundance of their contributions and attribute this to the lack of answers on their prize questions.[148] Lastly, in the sixth edition, they extend the deadline for the prize questions to 1790 without publishing all the questions again.[149] The

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[142] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 13-16.
[143] Radermacher and van Hogendorp, "Beschryving van Het Koningryk," 2.
[144] Jacobus Cornelis Mattheus Radermacher, "Bericht Wegens de Zwaare Aardbeving, van Den 22. January 1780," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen,1780), 52-53.
[145] Mossel, *Copie-Memories van GG Jacob Mossel,* 4.
[146] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 13-16.
[147] "Voorbericht," 1786, 19.
[148] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vijfde Deel* (Batavia: Pieter van Geemen, 1790), 1.
[149] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Zesde Deel* (Batavia: Pieter van Geemen, 1792), 19.

marshes were considered a problem which caused much harm to the health of the population. Both the governor-general de Klerk, before he died in 1780, and the Batavian Society were willing to give a great recompensation for whoever solved the problem of the sandbank. However, despite their consistent waiting, no satisfactory answer was sent in.

Despite the lack of an overall solution, some authors did write on the sandbank. Two texts in the *Verhandelingen* discuss this issue. While no entire contribution was devoted to this topic, a few small parts explain what the writers thought about the unhealthy vapours caused by the mud. In the second volume, the ex-military man Jan Andries Duurkoop (unknown-unknown) comments upon the swamps and suggests a way to halt the exodus of the population caused by their unhealthy fumes. Inhabitants chose to live further from the sea, even to the point of leaving Batavia.[150] He agrees with the legitimacy of their fear, writing the following:

> *Niemand kan of mag 'er aan twyfelen, of het aangroeiende Zeestrand en de vermodderde buitenschorren, ten Noorden van Batavia, een schadelijke opdamping geven die de Zeewind stedewaards en landwaards in wordt overgevoerd (...)*[151]

The unhealthy fumes especially come over the northside of Batavia and the areas of the *Jaagpad*, *Houtkap*, and east of these two places. Still, while he might agree with the reason why these people are moving elsewhere, he proposes a solution for this trouble. First, he recommends building wide fosses that can be filled by the sea. The mud from these fosses can then be used to plant trees. These antjak and warung trees will at least partly protect the city from the winds coming from the sea.[152] This solution does not change the root of the problem, but it diminishes the harmful influences of the fumes from the swamps.

In the sixth edition, Teisseire does not have any solutions to offer, but he writes about the different wind directions. In Bontius' time, the south wind, coming from the stagnant pools in the mountains, was considered unhealthy. At the end of the eighteenth century, it is the northern and northeastern wind from the swamps between the *Vinkevaart* or the Angiol river and the Sonthar river, which harms the inhabitants' health. At the turn of the seasons, from the good to the bad monsoon, the west winds blow and bring fumes from the swamps towards the city.[153]

[150] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 508.
[151] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 507.
[152] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 495, 507-508.
[153] Teisseire, "Beschryving. van Een Gedeelte Der Omme- En Bovenlanden Dezer Hoofdstad," 2-3.

2.4. Redirecting the focus: other water-related solutions

Despite the impasse when it came to solving the mayor health problem relating to water, the sandbank, the *Verhandelingen* show that other solutions for other water troubles were found. One of these issues was the canals in the city. The problem was that the canals dried out after the rainy season, even with the river deviation. There was either a drought or a flood. The latter happened every seven years, according to Radermacher and van Hogendorp, such as in 1771 and 1778.[154] Hooyman reports the solution of the local farmers to this type of weather. In times of drought, they constantly run around with baskets to water their crops and when the rivers spill over its bank in the rainy seasons, they wait for the land to dry up and plant new seeds. While Hooyman is impressed by their hard work and perseverance, something still had to be done about these extremes.[155] The city could not work around the situation because they wished to provide its inhabitants with easy access to fresh water all year round. The Batavian Society persisted with publishing a prize question that asked for a solution for the canals, but they did not ever award this medal, nor did they publish a valuable contribution specifically on ameliorating the canals.[156]

The focus on water thus did not go away, but it did shift. Rather than focusing on misfortunes brought on by natural disasters, the measures changed to taking care of humanmade problems. The causes of the filthy waters in the city were searched in past measures and current practices. This was not only done by the authors of the *Verhandelingen* but other writers as well. For example, an anonymous author who wrote a series on Batavia about whom it is not known if they were affiliated with the Batavian Society, blamed governor-general Gustaaf Willem van Imhoff (1705-1750) for aggravated the problem of the drought in the Great River. In the 1740s, he made a deviation in the area of Buiten-Zorg. This deviation, the Slokkan irrigated the rice fields and ended in the river Sonthaar. These changes were undone by the end of the eighteenth century as the course of the Great River had been restored through deviating the Sidani river or Tangerang. This river flowed into the sea, and its original course did not procure the city with water. As has previously been said, it was the largest source of water for the city. Close to its delta, a canal was dug and connected to the city: the Mookervaart.[157]

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[154] Radermacher and van Hogendorp, "Beschryving van de Stad," 44.
[155] Hooyman, "Vervolg Der Verhandeling over Den Tegenwoordigen Staat," 519.
[156] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 16.
[157] "Tiende Boek. Over de Luchtsgesteldheid En de Voornaamste Ziekten Der Indische Gewesten," in *Batavia, de Hoofdstad van Neêrlands O. Indien, in Derzelver Gelegenheid, Opkomst, Voortreffelyke Gebouwen, Hooge En Laage Regeering, Geschiedenissen, Kerkzaaken, Koophandel, Zeden, Luchtsgesteldheid, Ziekten, Dieren En Gewassen, Beschreeven.* (Amsterdam; Harlingen: Petrus Conradi; Volkert van der Plaats, 1783), 11-14.

Another humanmade cause was the filth thrown in the rivers. It was well-known, even in the *Hollandsche Maatschappij* after corresponding with the Batavian Society, that the inhabitants around Batavia threw their garbage in the rivers. They wrote a prize question to find a solution to this problem, which went as follows: "welk is het beste middel om een sterke schuring en afvoering deezer vuile stoffen te verkrijgen en te onderhouden en aan Batavia een zuivere en gezonde lucht te bezorgen?"[158] The inhabitants of the city also threw their filth into the water, which led to dirty canals. Despite prohibitions by the government, the practice continued. Slaves were responsible for cleaning the canals, but no system was set in place to then get rid of this dug up dirt.[159]

The anonymous author who wrote a series of books on Batavia describes these efforts to clean the canals as unsuccessful. Daily, one hundred people are employed by the city to dig up the filth that the Javanese and other easterners throw in the river. This litter contaminates the wells of the city. Only the rainwater is drinkable because the wells of the city are contaminated by the swampy soil and the rivers. The mud caused an almost unbearable stench. So the author concludes about the practice of digging out the canals: "(…) dan dit geneesmiddel, hoe noodzaakelyk ook, is byna zo erg als de kwaal (…)".[160]

For these problems, the *Verhandelingen* did offer a solution. Especially Jan Andries Duurkoop's prize-winning essay helped out. He won a golden medal in 1779 with his contribution about how to improve the health of the inhabitants of Batavia by tackling, among other things, the water in the city.[161] Interestingly, he set finding an answer to the problem of the canals and marshes near the sea aside. Instead, he focuses on solving other issues. He offered more practical solutions to problems related to water. First, he writes about the sewers and cesspools. Duurkoop advises not to make them deeper than the rivers and to lay grids on them as filters. These grids should then be cleaned, and the sewers should be rinsed out, under supervision of the city government who should be able to take action if the inhabitants do not do their duty well. [162]

Second, Duurkoop brings up a way to give all the inhabitants, both rich and poor, drinking water. He recommends making a deviation to the network of canals and citadels. The water is first filtered in the southern citadel by big and small rocks and then diluted with clear water. Then this drinkable water is brought to the northern water. This water is deviated towards the city. He was thorough in his additional remarks to make the water run smoothly, such as cleaning out the citadels but only at night to not hinder the inhabitants and that the

[158] "Voorbericht," 1787, 7.
[159] Zuiderweg, "Een Verblijplaats Voor Onsterfelijken," 134.
[160] "Tiende Boek. Over de Luchtsgesteldheid," 1-3.
[161] Groot, *Van Batavia Naar Weltevreden,* 109-10.
[162] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 490-508.

container should be watertight. Duurkoop also takes on a moralising tone, writing that many people and especially slaves are too lazy to get water. Therefore, small, leaden pipes should be connected to the bigger aqueducts to lead the water all around the city.[163]

All of these measures were for Batavia specifically. In the later volumes, two references are made as to how Batavia relates to other places when it comes to health. This shows that interventions are very place-depended. For example, Teisseire writes that at one hour of travel from the city the air is already healthy, and in the mountains as well.[164] François van Boeckholtz wrote a medical geography of Salatiga, in Central Java. He describes the places as perfectly healthy with a temperate climate, pure air coming from the mountains, and no epidemics. The food is inexpensive and abundant. He shares his own observations of forty-six Europeans, men, women, and children, over two years. None of them fell ill nor died, whatever their diet was or which season it was. In general, people age healthily and remain strong.[165] This means that the unhealthiness of a place is very localized and goes against the idea that all the tropics are nefast for European bodies. The influence of a habitat on the body depends on a complex of factors, which means that an island such as Java is divided into different zones.

His text written for the investigation of the government in 1794 shows more clearly that places can differ in healthiness depending on causes for disease caused by mankind. If Batavia is now unhealthy, this is indeed partly caused by vapours from swamps. However, according to van Boeckholtz, daily experience has shown that litter has worsened the condition of swamps, canals, pools, and gutters. Sometimes this filth even caused swamps that were not harmful to create bad fumes. Cleaning and a committee that supervises this activity would greatly improve the situation. The swamps and sandbank have to be dug out and bad water should be drained.[166]

Thus, while the same areas are indicated as causing disease, he shines a light on how the bad practices of the inhabitants led to the aggravation of the situation and to new unsanitary places. He focuses his advice on ameliorating the situation by tackling these human habits. This is not surprising since it is highly likely that he had read the *Verhandelingen* since he wrote a contribution to the sixth volume. In short, even swamps were not always causes of disease, and the island of Java was not itself seen as necessarily unhealthy. The new focus on what the humans themselves did that made their entourage debilitating and the belief that this can be solved shows their optimism. Indeed, the island that is their new home does not always have a strange and dangerous natural environment. The difference is that van Boeckholtz still focuses more on

[163] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 490-508.
[164] Teisseire, "Beschryving. van Een Gedeelte Der Omme- En Bovenlanden Dezer Hoofdstad," 2-3.
[165] François van Boeckholtz, "Opmerking over de Gelegenheid Als Gezondheid van Salatiga," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Zesde Deel* (Batavia: Pieter van Geemen, 1792), 18–22.
[166] van Boeckholtz, *Staatkundige Aanmerkingen,* voor berigt, 1-29.

large scale interventions in the landscape, such as draining swamps that were a legacy of the earlier measures of the government. It seems that advice relating to great changes in their physical surroundings was characteristic of the advisory texts for the government.

2.5. Going up: different emanations causing putrid air

While managing water remained important throughout the eighteenth century, controlling bad air increasingly took over in prominence. Here, a shift in medical ideas was the driving factor. Air had received more attention in medical texts, most famously in John Arbuthnot's essay from 1733 titled *An Essay Concerning the Effects of Air on Human Bodies.* Arbuthnot, a physician, mathematician, and satirist, had read and compiled the information from many books and essays on environmentalism to come up with a general theory. He thought that air caused disease but not by influencing the humours. Their intermediary role was not needed anymore as air directly worked on the body. The other non-naturals were not done away with, but the first of them became significantly more important, and its workings were explained differently. The new environmentalist program was concerned with finding the harmful qualities of the atmosphere that could lead to illness.[167] Consequently, many different sources of bad air were observed.

This change in how the air was conceptualized nuances Annemarie de Knecht-van Eekelen statement that Bontius views on the tropical climate "were still taken for granted" until the beginning of the nineteenth century. She emphasizes how Bontius considered the heat and constitution of the air as the cause of many diseases, such as fevers and lung diseases. Then she makes a parallel with the contents of the writings of later authors.[168] While it is true that Bontius stayed a point of reference, later authors especially mentioned his texts on natural history, the ideas on the relationship between health and air had changed.[169] For Bontius, air impacted the body through the intermediary of the humours. He explicitly summed up the non-naturals: "air, meat and drink, sleep and watching, motion and rest, what ought to be discharged, and what retained in the body. The afflictions also of the mind."[170] The ways air could be harmful included its moisture, which could be observed in how it made metals rust. He also mentions the winds

[167] Riley, *Eighteenth-Century Campaign to Avoid Disease,* xvi, 10, 15-16.
[168] de Knecht-van Eekelen, "The debate about acclimatization," 71-72.
[169] Josua Van Iperen and Willem van Hogendorp, "Beschryvinge van Eenen Witten Neger van Het Eiland Bali," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 313-14.
Friedrich Baron van Wurmb, "Beschryving van de Groote Borneeosche Orang Outang of de Oost-Indische Pongo," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 249-253.
Josua van Iperen and Fredrik Schouwman, "Beschryvinge van de Wou-Wouwen," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 392.
[170] Bontius, "Dialogues," 54-55.

from the mountains that bring dangerous vapors with them from the stagnant swamps there.[171] Even though the late eighteenth-century authors also discuss swamps, they did not necessarily conceive of the factor air as working through the same mechanism as Bontius had in mind. This makes it ambiguous to understand what precisely the late eighteenth-century authors meant when they talked about the harmful effects of air.

It is thus essential to consider the specific characteristics of late eighteenth-century medicine in Batavia. One aspect that characterizes their views on air is that the environmentalists were looking for a link between the diseases and the constitution and properties of the air by making careful observations with instruments.[172] Instruments helped the Batavian Society to keep a record of the air pressure, which they write did not undergo much change, and the heat which was also consistently high. They also relied on other equipment such as compasses and studied the power of magnets in medicine through electric experiments.[173] During one of their meetings, Guillaume Pieter le Dulx gave a demonstration of the characteristics and positive aspects of the atmosphere. He mainly used an air pump.[174] The Society mourned his early death shortly after the presentation, and also that le Dulx' great insights had died with him.[175]

While the Batavian Society did use instruments to understand the air, their main measures to control this factor were not actually based on these findings. Instead, they relied on the rich legacy of knowledge about harmful causes. For example, inspired by contagion theory, environmentalism not only held that swamps infected the atmosphere, but also emanations from other sources. Anything that was rotting, such as food or deceased people, was often thought to cause disease through releasing matter in the air.[176] The Lutheran preacher Johannes Hooyman, who was one of the directing members since the foundation of the Batavian Society, writes about the fumes caused by the fertilizers. These were made out of *tay-minjak* or the left-overs of biscuits made out of peanuts, which were then fermented in water. Especially when the soil is dry, this mixture causes a horrible stench. According to Hooyman, even though this fertilizer is effective, it goes against the moral of the Dutch and harms public health because it harms people's "dierlijke vochten" or fluids. Hooyman writes that no one has managed to convince him that the emanations from this fertilizer were healthy. Still, he does not know what would work better than this.[177]

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[171] Bontius, "Dialogues," 57-63.
[172] Bylon, "Korte Aantekening, Wegens Eene Algemeene Ziekte," 23.
[173] Radermacher and van Hogendorp, "Beschryving van de Stad," 45.
[174] Harry A. M. Snelders, "Het Bataviaasch Genootschap van Kunsten En Wetenschappen in de Periode 1778 Tot 1816," *Documentatieblad Werkgroep Achttiende Eeuw*, 1979, 77.
[175] "Voorbericht," 1792, 17.
[176] Riley, *Eighteenth-Century Campaign to Avoid Disease,* 18-19.
[177] Hooyman, "Verhandeling, over Den Tegenwoordigen Staat," 200.
Hooyman, "Vervolg Der Verhandeling over Den Tegenwoordigen Staat," 517-18.

The Batavian Society was also concerned with the bad air caused by their graveyard. In the first prize questions of the first volume, they ask: "Welke zyn de bekwaamste plaats, de onkostbaarste wyze, en de gevoegelykste middelen, om de Lyken, in plaats van in de Kerken en op de Kerkhoven dezer Stad, op eenen genoegzamen afstand van Batavia, ter Aarde te besteken."[178] The answers were expected before June 1779 and should include drawings as well as a cost estimate.[179] While no answer was sent in concerning only this question, the prize-winning Jan Andries Duurkoop did comment on the salubrious graves in his essay on how to ameliorate the unhealthiness of Batavia. In the Portuguese graveyard outside of the city, coffins with half-decayed corpses are reopened to bury newly diseased people. The older corpses are then burnt in piles. This is very unhealthy because the opened graves lead to foul-smelling and infectious air. As a solution, the Company should repurchase a piece of land they had sold to the natives because it was unhealthy there. This piece was forty-five *morgen,* which equates to about forty-five hectares. It lay between the *Horendragers pad* and the *Zuiderweg,* as well as between the Angiol and Sonthar rivers. This public graveyard will be large enough to keep every deceased body under the ground for over fifty years.[180]

Duurkoop also had advice on other sources of filthy emanations that were not rotting vegetables or humans. First, he remarks that the leather manufactories cause awful smells. The breeding places for the pigs release a horrible stench into the air. These two sources contaminate the air coming from the mountains, which is considered the healthy and purifying one. Duurkoop suggests relocating the leatherworkers and pigs and cleaning the filth they left behind in their former place. The second source which infects the air from the mountains are fifteen lime ovens. Duurkoop mentions the measures from the High Council in 1753 to build the ovens further from the city. However, since nothing has changed, he insists the ovens can be placed near the *Groninger weg*. The lands can be purchased for 1500 pennies. Duurkoop mentions that certain physicians still believe that the fumes from burning limestone purify the air. Not believing their advice, Duurkoop rhetorically asks how this could be the case when in other places such as the Netherlands, these ovens are placed far from the cities. The dark smoke also disproves what the physicians say.[181]

Lastly, the twelve arak distilleries just outside of the city infect the air with their emanations. As with the two other sources of unhealthiness for the city, Duurkoop recommends to move them. He suggests to place them near the deserted Amanus canal and paying the factory owners 4000 pennies for the loss of income they will suffer because of the move.[182] In the same

[178] "Voorbericht," 1781, 25.
[179] "Voorbericht," 1781, 24-25.
[180] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 502-503.
[181] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 505-506.
[182] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 505-506.

volume of the *Verhandelingen,* Hooyman paints a more positive picture of the contemporary arak distilleries by writing about their history.[183] In the 1690s, a decree forbade arak factories from operating inside the city if the owners sell their distillery or move to China. This should limit the infected air in the city. While this resolution was very precise, it had significant long-term effects: by 1713 there were only three factories left in the city.[184]

Duurkoop and Hooyman were both not physicians; the former was a military man and the latter a preacher. The discussion on air thus also comes from outside of medical circles; it had become part of environmentalist thinking shared among intellectual middle-class men. Duurkoop openly calls out the physicians who say that fumes from lime ovens purify the air. They both point out harmful sources in their physical surroundings by relying on their knowledge of the city. Duurkoop also comes with solutions, mainly to relocate the causes for these filthy emanations to less populated areas and to zones where the wind does not pick up the fumes and bring them towards the city. His advice is highly practical as it details where the graveyard and the factories should go as well as how much this costs. Duurkoop is optimistic that he can counter the ill effect brought on by these human causes for infected air, similarly to how he hopes to change humanmade water problems.

2.6. The familiar habitation in the foreign habitat

Previously, the purifying effects of certain winds have been discussed. For example, the prize-winning author Jan Andries Duurkoop considered the winds coming from the mountains necessary to clean the air in the city.[185] These were processes of air circulation and purification taking place outside. However, one of the main practices of the environmentalists was improving ventilation in closed spaces. This was another way in which air was an important factor.[186] And indeed, apart from discussing winds, Duurkoop also gave out advice on how to manage the air circulation inside of closed spaces such as houses. He wrote that he would leave the important questions of the canals and the marshes near the sea up to the High Council and Batavian Society, believing that they would soon concern themselves with these matters.[187]

Instead, he focused on more manageable aspects to better the health of the population, both targeting epidemics and individual illnesses. He looked for their causes in the "morsigheid van zaamenwooninge en andere huishoudelyke misbruiken van het volk." An important aspect of these common wrongdoings was poor ventilation. Houses contained emanations from people

[183] Groot, *Van Batavia Naar Weltevreden,* 32, 73.
[184] Jan Hooyman, "Vervolg Der Verhandeling over Den Tegenwoordigen Staat van Den Landbouw in de Ommelanden van Batavia," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 177.
[185] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 504.
[186] Riley, *Eighteenth-Century Campaign to Avoid Disease,* 30.
[187] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 491-92.

and objects such as respiration and sweat for the former, and lamps and candles for the latter. He explicitly points out health-problems caused by unwise human behaviour will be easier to solve. Solutions to these problems do not require to fight Nature, but are in the hands of the wise and powerful government.[188]

Duurkoop offers a long list of precise and substantiated improvements, some of which have already been mentioned. The ways of improving houses were the first on his list. There are four categories of improvement. First, the author discusses the windows, doors, and other openings. Duurkoop writes that the inhabitants should go back to using the earlier casement windows instead of the newer glass windows with sliding frames because the former let more air pass through. The circulation in the whole house will be better again; emanations will be able to escape outside. A simple test can show whether the air in a space is filthy or not. A bucket of water should be left inside the house for a whole day and night. If the air is impure, the water will be warm and foul-smelling, and the water surface will look slimy. He also advises not to place doors towards the north, since the harmful winds come from this direction. The windows on this side should also be small, but on the three other sides, they should be larger.[189]

Figure 3 Detail from Jan Brandes, Living room with son Jantje and slave Flora. 1784, water-colour painting over drawing, 195 x 155 mm. Rijksstudio, Rijksmuseum Amsterdam, https://www.rijksmuseum.nl, accessed 25.11.2019.

Figure 4 Jan Brandes, Tea visit in European house. 1779-1785, water-colour painting over drawing, 155 x 195 mm. Rijksstudio, Rijksmuseum Amsterdam, https://www.rijksmuseum.nl, accessed 25.11.2019.

Two water-colour drawings by Brandes reveal the two different kinds of windows that Duurkoop refers to. The drawing on the left, dating from 1784, shows the casement windows in Brandes' house. Until the middle of the eighteenth century, these leadlight windows were common in Batavia. It is daytime, so they are wide upon, unlike at night when Brandes closed them to guard off the bad, cold air.[190] The drawing on the right likely dates from the beginning

[188] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 492, 494-98.
[189] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 494-98
[190] de Brujin and Raben, *The World of Jan Brandes, 1743-1808,* 155-56.

of the 1780s and shows a mestizo woman and a European women with their slaves while drinking tea. It is not clear where in Batavia this house was located. Behind them are the newer windows, those that Duurkoop does not recommend because they do not allow the house to be adequately ventilated. Indeed, the window on the right shows that it only slides open until halfway.

The second issue that Duurkoop mentions are that the fumes from the house go up and cause bad air upstairs. He suggests making an opening under the roof on the side of the house to let them out. Third, he claims that the heat from the sun can have negative effects. The strong air and heat can be kept outside as much as possible by building a gallery around the house. Such a gallery can be seen in the next image. It is a water-colour painting over a pencil drawing by Brandes showing the gallery of his estate in the countryside of Batavia.[191] Lastly, houses should be high. The best houses are higher than fifteen feet, do not have low ceilings, and are raised two feet above the ground.[192]

Figure 5 Jan Brandes, Gallery with son Jantje and slave Bietja. 1784, water-colour painting over drawing, 195 x 155 mm. Rijksstudio, Rijksmuseum Amsterdam, https://www.rijksmuseum.nl, accessed 25.11.2019.

[191] de Brujin and Raben, *The World of Jan Brandes, 1743-1808,* 155-56.
[192] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 497.

The German VOC servant and public prosecutor Johan Adam Cellarius who lived in Cochin, India, also wrote about the raising of houses above the ground to combat moist air. He mentioned that the Malaysians and Javanese raise their houses six to seven feet above the ground to promote good health. Cellarius uses this example as a way to convince the locals in his region of India, the Malabars, to elevate their houses as well. The main reason he cites is that in this way, they will be saved from the floods.[193]

Bernard Wolf (unknown-unknown) agrees with Duurkoop that ventilation is essential. Air without any movement in a closed-off space is the most unhealthy air. He also gives other advice on how to keep the air inside a house healthy. He recommends burning gunpowder, juniper berries, or sandalwood. Especially the first one will make the air denser and elastic again. Hot and dry air can be improved by cooking vinegar or having plants inside. The latter option he mentioned for those who were financially well off.[194] This comment clearly shows that not everyone had the same agency and choice when following health advice.[195]

Duurkoop pays attention to these people who are less wealthy and their precarious situations. Slaves, for example, the latter often live in small spaces upstairs. These rooms are more at risk of letting harmful winds from the marshes in the north inside and contain the most humid evaporated air coming from downstairs. This is why the circulation of air is especially important in the rooms of slaves. Unfortunately, their spaces often have tiny windows that do not let any air flow through the room. Therefore, Duurkoop recommends placing shutters or a chimney. The existing doors and windows could benefit from chambranles. The south side of the room can let the air escape through windows or holes.[196] By not making distinctions in how the family is treated versus how the slaves live, Duurkoop not only implies that their bodies react similarly to bad air, but also that something should be done to better the health of everyone. Ventilation is a technology with a general utility.[197] Not only in the sense of not specific to one place, as Riley intends this term to mean, but also to all bodies.

The descriptions of the good and bad influences of winds on the body can be closely linked to the genre of medical geography, which looks at all the geographical and topographical factors of a region to assess its strengths and weaknesses relating to health. Ventilation was one

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[193] Johan Adam Cellarius, "Aantekeningen over de Spraak, Weetenschappen En Kunsten Der Mallabaaren," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 332.
Anjana Singh, *Fort Cochin in Kerala, 1750-1830: The Social Condition of a Dutch Community in an Indian Milieu* (Leiden: Brill, 2010), 105.
[194] Bernard Wolf, "Fluxus Ventris, of de Buikloop," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 49-50.
[195] Siena, "Pliable Bodies," 49.
[196] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 494-97.
[197] Riley, *Eighteenth-Century Campaign to Avoid Disease,* 91.

of the technologies of environmentalism used to manage the effects of these winds, as well as the heat and harmful emanations caused inside the house. These fumes could come from the family and its servants, as well as from objects and dirt. Although these emanations were smaller, and due to this reason deemed more manageable, the reasoning behind their unhealthiness came from the same environmental thinking that considered the emanations from marshes as agents of disease. All these places were conducive of disease and part of the same mechanism: harmful qualities of the air.[198]

The house became a space where damaging influences were not only created but also cleansed and changed through knowledge of how the house should be built. Duurkoop, who was not a physician, has a more holistic view on how to tackle the bad air inside than Wolf. He considers the outside influences on the house, such as the water, heat, and winds, as well as the factors inside. Wolf, however, only focuses on the factors inside the living quarters. Duurkoop is also more optimistic about implementing his changes on how buildings are set up than about fighting Nature. According to him, the ways of the government are easier to change than the ways of rivers, mountains, and the sea. Especially the factor air is given more prominence. This change of focus, according to what could be managed, was a gradual one. Neither water nor air was ever entirely out of the equation, and they were linked to each other through phenomena like vapours. What the *Verhandelingen* did was bringing in new ideas on how to better the health of the population by taking care of humanmade causes for bad water and air.

This decreased attention to solving problems relating to water and increasing focus on how to improve the air is similar to the change between Mossel and van Boeckholtz's text. To improve the air, van Boeckholtz advises many of the same measures as Duurkoop: relocating the graveyards near the city, cutting certain species of trees, and planting better ones such as the pisan tree. He believes this species is ideal; it can be planted by using the mud from the marshes because it takes up the most moisture from the soil, it does not grow too high, its leaves are large and provide coolness, and it grows quickly. The pinang tree likewise would absorb the moisture from the mud, but it grows too high and therefore does not let air circulate, which is important for good quality air.[199] The notes on the following drawing of Brandes indeed confirm that the pinang tree could grow very tall. He says they could be sixty feet tall, which is twenty meters. His own trees were fifty feet tall.[200] Another measure that van Boeckholtz advises the government to take, is to relocate the rice fields further from the city to avoid their bad vapours. He also encourages them to build houses in accordance with the climate.[201] As with van Boeckholtz's

[198] Riley, *Eighteenth-Century Campaign to Avoid Disease,* x.
[199] van Boeckholtz, *Staatkundige Aanmerkingen,* voor berigt.
[200] de Brujin and Raben, *The World of Jan Brandes,* 172.
[201] van Boeckholtz, *Staatkundige Aanmerkingen*, 13-16.

advice on measures to take concerning air, he promotes more large scale interventions, such as planting trees, than the authors in the *Verhandelingen*.

Figure 6 Jan Brandes, Pinang tree near estate. 1779-1785, water-colour painting over drawing, 195 x 155 mm. Rijksstudio, Rijksmuseum Amsterdam, https://www.rijksmuseum.nl, accessed 25.11.2019.

CHAPTER 3. THE LEGACY OF THE NON-NATURALS

Apart from air, environmental medical thinking accounted for five other external factors that could play a role in regulating health and disease in the body. As was also the case with the previous chapter, this chapter will show how, in practice, Hippocratic and Galenic thinking was combined. Whereas in the discussion on air, the issue was the unclear line between where both legacies began and ended, this chapter shows how the Hippocratic-Galenic framework worked as a legacy that tried to understand the link between the environment and health to preserve wellbeing.[202] References to the non-naturals, namely food, motion and exercise, sleeping and waking, evacuations and retentions, and the passions did not necessarily mention the term "non-natural" or refer to Galen. This knowledge had become incorporated into general medical teaching and thinking.[203] Overall, what distinguished these five non-naturals was that they were applied as small-scale measures. This shows again how the advice in the *Verhandelingen* differs from that of Mossel and van Boeckholtz. The latter two proposed to intervene in the physical surroundings on a larger scale.

3.1. A myriad of food to discover

The settlers were very open to learning about and incorporating new foods. This interest can be found in Bontius's writings about the fauna and flora of Java which included detailed advice on what to eat and drink and what to avoid. Six out of the eight dialogues, or chapters, were dedicated to different foods such as fruits, meats, roots, herbs, and alcoholic drinks.[204] Next to their acceptance of the local food, the employees of the VOC also experimented with planting European crops. In their description of different aspects of the Javanese culture and nature, Radermacher and van Hogendorp present the settlement as having a myriad of both European and local foods. Many European vegetables and legumes have been planted successfully, except for cauliflower. The fruit trees can be planted and bring on fruits, for example, peaches and apples, but they do not taste as good as in Europe. There are no European grains in Java. Java is rich with inexpensive foods such as indigenous ananas, grapefruit, durion, trong, cadjang, pinang nut, and oblie.[205] So while they planted European foods, they were not trying to replace the local

[202] Cavallo, "Introduction. Conserving Health: The Non-Naturals in Early Modern Culture and Society," 3. Mary Lindemann, *Health & Healing in Eighteenth-Century Germany* (Baltimore: Johns Hopkins Univ. Press, 2005), 264.
[203] Saul Jarcho, "Galen's Six Non Naturals: A Bibliographic Note and Translation," *Bulletin of the History of Medicine* 44, no. 4 (1970): 376–77.
[204] Bontius, "Dialogues," 63-95.
[205] Jacobus Cornelis Mattheus Radermacher and Willem van Hogendorp, "Beschryving van Het Koningryk Jaccatra," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 25-26.

foods in favour of the crops from the motherland out of fear of degenerative effects. This is unlike what historians have written about the English and Spanish in America.[206]

One of the first questions the Batavian Society asked, concerned this oblie or standard vegetables of the natives. The Society called these "Spys-wortelen", implying that they are a kind of edible roots of a plant. They inquired what exactly this food was and how to cultivate and cook it. Lastly, the prize question challenged the writers to answer what influence the consumption of this food has "op Gezondheid en Ongezondheid van het Volk?" Bonus points were granted to those that would donate a few "Spys-wortelen" after they have been dug up.[207] This question both testifies to the interest of the Society in a local food as well as their hopes for and their fears of its effect on their bodies. In another question, they ask to substantiate with good evidence which medical plants, fruits, and roots are used by the natives. They ask to be careful and sure of their analysis to avoid any dangers.[208] Again, curiosity, value, and danger lie close to each other.

The Batavian Society probably refers to this same food in another of their questions, this time a prize question: "Welke zyn de beste en spoedigst voortkomende Wortelen, om het behoeftig Gemeen, by misgewas van Graanen te spyzigen?" Unlike the other two questions whose solution was not published, this question was answered in the third volume.[209] Remaining optimistic and praising, the anonymous author starts by presenting Java as a happy and fertile island. The preparations for a possible famine are only for safety measures since it does happen that drought leads to an unfavourable turnout of the amount of rice that was harvested. The farmers on Java grew different types of rice. This required a thorough knowledge of when each crop had to be sown. This meant that the success of the harvest heavily depends on the farmer's insight in when the seasons begin and end. Still, sometimes unpredictable weather patterns occurred, and the diversity of crops and knowledge of the seasons did not suffice to counter the harmful effects of the abnormal seasons.[210] The author presents a solution to this problem of

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"Elfde Boek. Handelende over de Gewassen, Die in de Nabuurschap van Batavia Gevonden Worden," in *Batavia, de Hoofdstad van Neêrlands O. Indien, in Derzelver Gelegenheid, Opkomst, Voortreffelyke Gebouwen, Hooge En Laage Regeering, Geschiedenissen, Kerkzaaken, Koophandel, Zeden, Luchtsgesteldheid, Ziekten, Dieren En Gewassen, Beschreeven.* (Amsterdam; Harlingen: Petrus Conradi; Volkert van der Plaats, 1783), 49, 53.

[206] Trudy Eden, "Food, Assimilation, and the Malleability of the Human Body in early Virginia," in: *A Centre of Wonders: The Body in Early America*, edited by Janet Lindman and Michele Tarter (Ithaca: Cornell University Press, 2001), 29-32.
Rebecca Earle, "'If you eat their food…': Diets and Bodies in early colonial Spanish America," *The American Historical Review* 115, n° 3 (2010): 688.

[207] "Voorbericht," 1781, 28.

[208] "Voorbericht," 1781, 44.

[209] "Voorbericht," 1781, 10.

[210] Radermacher and van Hogendorp, "Beschryving van Het Koningryk," 27.
"Aanmerkingen over de Vraage: Welke Zyn de Beste En Spoedigst Voortkomende Wortelen, Om Het Behoeftig Gemeen, by Misgewas van Graanen Te Spyzigen?," in *Verhandelingen van Het Bataviaasch*

scarcity. They write that when the rice harvest is unsuccessful, other types of food can sustain the population:

> *Doch in zulk een geval, verleend ons de goedevoorzienigheid, eene menigte van Boom – Veld – en- Aard-vruchten, die schamele en behoeftige Menschen niet verlegen laaten, maar hun daarenteegen een gezond en aangenaam voedzel verschaffen.*[211]

After having discussed the types of grains the natives eat in the East and West Indies, the author moves on to the edible fruits growing on trees such as the kalappus, and the legumes such as peas and beans. The legumes are considered good to eat and called cadjong by the Javanese. Then they give a list of twenty-four different "Aard-vruchten". The Javanese named these oebies, and Linnaeus refers to them as Dioscorea. This category is composed of tuber and root crops from the tropics. The anonymous author, however, states that "Aard-vruchten" can be placed under the umbrella of the potatoes. Overall, these are the crops that the prize question was aiming at. They offer good prospects in times of famine due to their fast growth of seven months. In comparison, fruit such as the kalappus growing on the "brood-boom" also called soekon or Radermachia after Radermacher, takes at least five or six years to appear after the tree has been planted. Also, tubers and roots often conserve for a year. The author paid particular attention to note favourable growing periods and unfavourable times of conservation. For example, the oebi boulait or jammes was, at first sight, a good choice because it only needs four months to grow, but its downside is that it spoils quickly.[212] The optimal vegetable combined the best of both worlds and was healthy for the settlers' bodies.

Of the twenty-four, only four species are recommended: the oebi bouton, ubi jay or soccan, next the kalady, timboel or mallas, then the oebi merra, or roode patatte, and lastly the oebi poeti or witte patatter. Linnaeus had named all these species; respectively, Dioscorea alate, Arum colocasia, and the latter two are both from the species Convolvulus only differing in colour. To describe them to the reader, the author compares their aspects to known vegetables such as cucumbers and winter pears. They write about the similarities and differences between the shapes, sizes, and colours of these known foods and the ones in Batavia. Lastly, twenty other species are mentioned, but the author advises against eating them as they are not widely cultivated and involve certain precautions not to be dangerous. For example, the oebi cajou, capoer or simpon is almost too hard in texture to eat, and the juice of the bark of the gadong is nefast for humans.[213]

Genootschap, Der Kunsten En Weetenschappen. Derde Deel, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 280–81.

[211] "Aanmerkingen over de Vraage," 280-81.

[212] "Aanmerkingen over de Vraage," 282-96.

[213] "Aanmerkingen over de Vraage," 282-98.

Overall, the author is very positive about falling back on the food of the natives in case the rice is scarce. Many fruits, legumes, and vegetables are not only healthy but tasty as well, and offer the inhabitants a broad palate of culinary choices. Still, the author is careful with their recommendations, especially when it comes to tubers and roots. Only one-sixth of the species is considered entirely safe. These dangers, however, are not linked to the specific characteristics of the settlers' bodies, but to the characteristics of the foods. For example, that their consistency is too hard, that they require too much effort to eat or spoil too easily. In short, the dangers were linked to practical characteristics of the tubers and roots, rather than the effect they would have on the bodies' humours.

Vegetables and legumes were rarely mentioned as something to avoid when ill. An exception is when one has diarrhea. Cabbage and legumes that retain much air and should not be consumed if one has loose bowels.[214] The question of whether fish and meat could be consumed, was more difficult. The condemning of eating meat and drinking strong alcohol drinks was relevant at the end of the eighteenth century. About the roughly thirty thousand cows in Java, Radermacher and van Hogendorp have to say that they make cheese that is less good than in Europe and that their meat is in general neither healthy nor tasty. The latter can be improved through fattening them. Wild meat also lacks the taste it has in Europe. In the river deltas, many sorts of good fish are found, such as the cacap, pampus, koeroe, rays, and combong. This is not the case for the species in the rivers, namely carp, koerami, and eels. Similar to the previously mentioned author on food to be consumed if a famine strikes, van Hogendorp and Radermacher compare local fish with known species. The authors do not comment on whether the bats that are eaten by the locals, can be consumed.[215]

When ill with certain diseases, the consumption of meat and fish is especially discouraged. For example, Bernard Wolf wrote that those suffering from diarrhea should avoid eating these foods as they increase the alkalines in the gut. Wolf also recommends rice as the best food to consume.[216] Animal products are also counterproductive if one has smallpox because this is a putrid illness, and these foods are putrid as well, so they aggravate the situation. Moreover, the heat was also known to cause more putrid diseases.[217] For other illnesses, certain meat products were seen as beneficial. In case someone had rabies, broth made from meat was advised. The physician Jacobus van der Steege wrote on rabies and recommended cooked rice and bouillon for the patients who were suffering vehemently, incapable of drinking water or tea.[218]

[214] Wolf, "Fluxus Ventris," 47.
[215] Radermacher and van Hogendorp, "Beschryving van Het Koningryk," 30-32.
[216] Wolf, "Fluxus Ventris," 47-48.
[217] Bicker, "Antwoord Op de Vraag," 72-73.
[218] van der Steege, "Bericht, Weegens Een Doodelyke Watervrees," 272, 273, 276.

Food and drinks were also considered as part of medication.[219] Wolf writes that the natives, adopt a diet of only rice and fish when they suffer from diarrhea.[220] The physician Jacobus van der Steege also writes on the natives' simple diet and considers it a possible reason for their great capability of recuperating from diseases and injuries.[221] Here the interest in the practices of the locals was seen again. Overall, many of the authors writing for the *Verhandelingen* recommend recipes made from lemons, fruit such as rhubarb and mangoes, and rice.[222] Medicine had a limited stock. As a solution to this problem in the hospitals, Duurkoop suggested only to use the finite stock of medicine on those that will survive. The diseased who had been written off as soon-to-be-dead only received the other kind of medicine: food and drinks.[223]

A key theme around food in relation to health, and the non-naturals in general, was moderation. If consumed in moderation, a certain food could help to ease or even get rid of a disease, but when overconsumed, it could be the cause of disease.[224] The city surgeon David Bylon wrote a contribution on dengue for the second edition of the *Verhandelingen*. According to him, an unrestrained diet of overabundance in food and drinks is one of the reasons why people who have just overcome the illness fall ill with it again, this time more heavily.[225] The concept of moderation was also why Josua van Iperen's death had come so unexpected; he had observed this principle until his very last day.[226] Duurkoop recommends keeping the sailors as separate from the population of Batavia as possible. He fears their unruly behavior, the usual cause of their illnesses, will have a bad influence on the citizens.[227]

What explains the great openness of the European settlers for the consumption of local food? The main reason is probably that the primary goal of the VOC, exporting local produce, would not accord with a desire to paint the local food as unhealthy. Agriculture for trade was a

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[219] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 509.
[220] Wolf, "Fluxus Ventris," 47.
[221] Jacobus van der Steege, "Nader Bericht, Aangaande de Inënting Der Kinderziekte, Te Batavia," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 333–35.
[222] "Elfde Boek. Handelende over de Gewassen," 40-41.
David Bylon, "Korte Aantekening, Wegens Eene Algemeene Ziekte; Doorgaans Genaamd de Knokkel-Koorts," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 24.
Wolf, "Fluxus Ventris," 38, 48.
Jacobus van der Steege, "Bericht, Weegens Eene Doodelyke Watervrees," in *Verhandelingen van Het Bataviaasch Genootschap, Der Kunsten En Weetenschappen. Derde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1787 [1781]), 272.
[223] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 509.
[224] "Elfde Boek. Handelende over de Gewassen," 41.
[225] Bylon, "Redevoering Der Inentinge," 22.
[226] Wilhelm Johan van Gorkom, *Ongezond Batavia, Vroeger En Nu: Noodzakelijkheid van Een Organieken Stedelijken Gezonheidsdienst* (Batavia: Javasche Boekhandel & Drukkerij, 1913), 3.
[227] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 512.

key part of their project.[228] Second, the eating of certain foods was also encouraged and discouraged out of practical reasons. For example, the eating of buffaloes was actively discouraged. Even though cows were considered unflavourful, the consumption of their meat was stimulated to halt the diminishing number of buffaloes. These animals were very useful in agriculture and needed to be spared for this reason.[229] Not in Batavia, but in their settlement on Banda, in Lonthor, the military men struggled to find food due to the dry land. They had to rely on what they find, such as wild cats, dogs, turtles, and poor quality bread made out of sago flour.[230] This shows that while in theory, meat and certain types of meat in particular, were considered unhealthy and not tasty, compromises were made out of economic or military necessity.

Lastly, fears about changing into locals, or having corrupted humours due to nostalgia for the foods of the homeland were absent in the *Verhandelingen*. Diaries and recipe books from Batavia might reveal that these anxieties were present, but the texts in the *Verhandelingen* are generally very positive about the native food. This is greatly due to their belief that as long as one eats moderately, they will have a diet that does not cause disease. When it came to making changes to the diet compared to the Dutch Republic, this advice usually consisted of eating only a moderate amount of corrupting foods or avoiding certain foods during a certain illness. These guidelines were very generalized as there was no particular advice based on criteria such as gender, age, or ethnicity. The settlers did not use food distinctions based on bodily characteristics to separate themselves from the local population.

3.2. The settler's optimistic regimen

Van Boeckholtz's texts for the investigations of the government barely mention health advice relating to four non-naturals: motion and exercise, sleeping and waking, evacuations and retentions, and the passions. Mossel does dedicate more or less a total of one of the sixteen pages to measures relating to these factors. He mentions how overeating fruit, especially if it is unripe, is unhealthy as well as the bad effects of drinking excessive amounts of liquor. He also writes that the decline of Batavia fostered feelings such as envy and hatred promote the melancholic temperament which combined with the wet climate is especially dangerous.[231] The newly arrived people can be given a laxative or bled to adapt better. Soldiers have to be fed, clothed,

[228] de Knecht-van Eekelen, "The Debate about Acclimatization in the Dutch East Indies (1840-1860)," 73.
[229] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel* (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786), 18-19.
[230] "Negende Boek. Over Den Koophandel Der Hollansche Compagnie in de Indien," in *Batavia, de Hoofdstad van Neêrlands O. Indien, in Derzelver Gelegenheid, Opkomst, Voortreffelyke Gebouwen, Hooge En Laage Regeering, Geschiedenissen, Kerkzaaken, Koophandel, Zeden, Luchtsgesteldheid, Ziekten, Dieren En Gewassen, Beschreeven.* (Amsterdam; Harlingen: Petrus Conradi; Volkert van der Plaats, 1782), 85.
[231] Mossel, *Copie-Memories van GG Jacob Mossel,* 9-10.

and can consume a bit or the liquor arak even in hot days if it is diluted with water. Bodies can be kept warm with a drink of tamarind or rhubarb and ginger water. Proper habits as regard to bathing, cleaning their living quarters, and not sleeping outside are also recommended.[232] Apart from exercise, he thus discussed all the non-naturals very shortly.

In the *Verhandelingen*, these four non-naturals are also proportionally less mentioned than air, water, and food. There is also only one author who explicitly mentions and sums up the non-naturals. This author also speaks about temperaments and recommends prescribing drugs and a lifestyle which accords with the temperament of the inoculated.[233] Still, advice about these factors is not absent. The knowledge of the non-naturals had become part of advice on regimens to follow. The humours were not referred to directly anymore as a way to explain diseases in the body, but their legacy had survived in advice on the four temperaments.[234]

There are a few mentions of motion and exercise. Duurkoop attributes the high number of deaths in the military during governor Gustaaf Willem van Imhofs's time, in the 1740s, to unnecessary physical exercise. Once assigned, they stayed at the same military post; the situation was orderly and calmer for the military men. Before 1744, there were even too many soldiers for the available places, which stands in stark contrast with Duurkoop's time, the 1780s. The key to healthy soldiers is to live in accordance with the hot climate which means wearing out the soldiers as much as possible.[235] Not only physical exercise could be tiring and harmful for the healing body, but also mental effort. Therefore, Wolff advises not to think too much and deeply.[236]

The impact of sleep and rest on health also received a few mentions in the *Verhandelingen*. The climate dictates when to rest as daily life was organized around the heat. The day was divided into four parts: the morning, forenoon, afternoon, and evening. Bontius had already written about this; he recommended to go outside and work in the morning and evening because it is cooler.[237] Radermacher and van Hogendorp mention a daily schedule that represents the usual way of living for decent employees. Work was done before noon, lunch was a time to eat with friends, and between two and four in the afternoon, it was a good time to rest. Mild sports and entertainment took place in the late afternoon, followed by another meal until eleven.[238] This summary shows an interesting overlap with Mossel's advice of laying down between two and four as well, implicating that the schedule organized around the heat was well-known and repeatedly recommended.

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[232] Mossel, *Copie-Memories van GG Jacob Mossel,* 15-16.
[233] van Nielen, "Antwoord Op de Vraag," 92, 113, 149.
[234] Lindemann, *Health & Healing in Eighteenth-Century Germany,* 263-64.
[235] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 511-12.
[236] Wolf, "Fluxus Ventris," 40, 48.
[237] Bontius, "Dialogues," 57-63.
[238] Radermacher and van Hogendorp, "Beschryving van de Stad," 69.

Another time that was dedicated to resting was while or after being ill. Bylon recommends dengue patients not to start one's daily activities too soon.[239] For diarrhea, Wolff prescribes taking emetics in the evening so that after vomiting, one can go to bed. Rest was so crucial that the patient should take a sedative made out of opium.[240] Teisseire mentions how European owners of estates with attached farms visit their house a few times a year to rest and unwind, especially if their health has deteriorated.[241]

Mentions of the passions were very sparse. This non-natural was only mentioned by the European physicians who discussed smallpox variolation and by the Batavian-based ex-military man Duurkoop. The latter advises keeping the soldiers in good spirits. He writes of continuing to offer them "zulk een onbekrompen, vrolyk maatig en zuiver bestaan". Cutting out any excesses and simplifying their life will yield the best results for their military service.[242] Lambertus Bicker recommends easing the inoculated's fear, any fear but in particular the fear of dying. Petrus-Matthys van Nielen adds sadness to the list as well as getting too heated in one's emotions. The most fruitful state of mind to get through the illness alive is a calm and happy one.[243] Likewise, these authors are the only ones to pay much attention to evacuations such as bleeding, a practice they did not recommend.[244] Mossel's advice to bleed the newcomers thus did not find any supporters anymore at the end of the eighteenth century.

In general, moderation was important. For example, for the inoculated, van Nielen neither bans nor encourages more rest and exercise but advises to keep to one's habitual regimen while staying moderate. Too much movement leads to an excess of heat, which only aggravates the fever.[245] Moderation was a key aspect of early modern health regimens.[246] Another crucial element was acclimatization, or physically getting used to the climate. This process was, for example, mentioned by Jacobus van der Steege.[247] This theory of getting used to

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[239] Bylon, "Korte Aantekening, Wegens Eene Algemeene Ziekte," 22.
[240] Wolf, "Fluxus Ventris," 40, 48.
[241] Andries Teisseire, "Beschryving. van Een Gedeelte Der Omme- En Bovenlanden Dezer Hoofdstad, Doch Inzonderheid van de Zuid- Westlyke, En Westlyke Landen, Benevens de Bebouwing, Der Gronden, Levens-Wys, En Oefveningen Der Opgezetenen; Mitsgader de Fabryken, En Handel in Dezelve," in *Verhandelingen van Het Bataviasch Genootschap Der Kunsten En Weetenschappen. Zesde Deel* (Batavia: Pieter van Geemen, 1792), 6-9.
[242] Duurkoop, "Bekroond Antwoord Der Vyfde Algemeene Prysvraage," 511-12.
[243] Petrus-Matthys van Nielen, "Antwoord Op de Vraag," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel* (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786), 114, 145.
Lambertus Bicker, "Antwoord Op de Vraag," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel* (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786), 76.
[244] van Nielen, "Antwoord Op de Vraag", 151, 197.
Bicker, "Antwoord Op de Vraag," 51, 83.
[245] van Nielen, "Antwoord Op de Vraag," 151-52.
[246] Lindemann, *Health & Healing in Eighteenth-Century Germany,* 264.
[247] van der Steege, "Bericht, Van de Proefnemingen," 111.

a new physical environment, was also why Josua van Iperen's death was unexpected. There had indeed been some early signs that he was not adapting, but this feeling of being unwell quickly went away. Van Iperen himself declared to be as healthy as he had been in the Republic.[248] The principles of moderation and acclimatization testify to the optimism of the settlers that they could live in Batavia.

These two principles, combined with the relatively little attention to problems relating to the four non-naturals that have just been discussed, indicate that the Europeans believed that they could manage these influences. The way that Mossel quickly sums up what can be done about factors that are not related to air and water, reveals his lack of fears about these elements. While the authors of the *Verhandelingen* do write more about these non-naturals, none of them seems to pose a grave problem for the health of the population. Most of the advice that voiced concern was about not doing something too much: not exercising or overthinking, not sleeping too much, not overeating fruit. These actions could all be remediated.

One possible reason for the lack of attention to the harmful effects of the four last non-naturals is that emphasizing these problems would only create more fears. Hill Curth wrote that the non-naturals were a way to relieve an individual's feelings of helplessness and in this way, help their well-being.[249] The case of the VOC shows how this action of diminishing anxieties works for larger groups too. This helped the well-being of the Company. The VOC already had trouble with finding new and talented recruits. Mossel complained about the lack of experienced employees.[250] The pressure of the declining wellbeing of the Company meant that writing on the deteriorating situation of health in Batavia had to balance on a fine line between showing the dangers and making these problems surmountable. Managing the few issues with food, exercise, sleep, evacuations and retentions, and the passions gave the inhabitants agency, and in consequence, presented the VOC as not helpless when it came to the health of their employees.

The general discourse about health in Batavia did not blame the bodies of the Dutch for the decline in health. Mossel found the vast number of French, Flemish, and Brabantine recruits deplorable because their bodies did not acclimatize well.[251] There were no references that the Dutch could not solve their health problems. The government turned towards large-scale environmental measures such as deviating rivers and cutting down trees. The *Verhandelingen* added knowledge on how to improve the health of the inhabitants by writing on cleaning filth, ventilation, and control of the own body through moderation. The recommendations of the writers of the Batavian Society were more focused on managing the body and countering

[248] Wachter, *Lyk- En Lofreden,* 26-27.
[249] Louise Hill Curth, "Lessons from the Past: Preventive Medicine in Early Modern England," *Medical Humanities* 29, no. 1 (2003): 19-20.
[250] Mossel, *Copie-Memories van GG Jacob Mossel,* 16.
[251] Mossel, *Copie-Memories van GG Jacob Mossel,* 16.

humanmade causes of bad air and water. They conceptualized the area of control they had as close to their bodies and own actions, proclaiming optimism about these measures.

The Dutch in Batavia thus did not use the medicine of the non-naturals to create harsh bodily differences between them and the multiple communities of locals such as the Javanese and Chinese. This does not mean that their society was not highly hierarchical but that they used other strategies. For example, the city was divided into districts and the society relied on the work of many slaves.[252] Also, Batavian society was organized through economic divisions between the elite and the poor, with the military in between. Status was equated with someone's rank in the Company and shown through following regulations, mainly written by Governor-General Rijcklof van Goens (1678-1681) and Mossel. These rules organized outward signs of wealth and power such as the outside of carriages and clothing.[253]

Furthermore, strict lines between white and Asian were difficult to draw. The Europeans adopted many local customs; something that travellers commented upon negatively. Marriage with prominent local families was a way to gain status, some high officials married a Batavian woman. However, mostly they tended to marry someone who was as white as possible. Mixed marriages were more common in the lower ranks. Still, their children, especially after a few generations, were not excluded from rising in the ranks but these cases were few and far between. Usually, these children were tainted with a stigma. In short, divisions based on status were both sometimes intertwined with racial notions and sometimes more decisive than race.[254]

Some medical advice does refer to the economic position of whomever it concerns. For example, as had been said, Teisseire wrote about the wealthy landowners returning to their estates for a relaxing vacation and Wolf recommended that the rich invested in plants to ameliorate the air inside their houses.[255] Cultural prejudices also account for comments that depict the locals as different. For example, the Javanese are depicted as lazy and apathetic people; the idea that people living in the tropics would lack self-discipline was a well-known prejudice.[256] According to the authors, the Javanese mainly eat rice and only cultivate as much

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[252] Remco Raben, "Batavia and Colombo. The Ethnic and Spatial Order of Two Colonial Cities 1600-1800" (PhD diss., Leiden University, 1996), 291, 296.
Taylor, *The Social World of Batavia,* 4.
[253] Taylor, *The Social World of Batavia,* 66-67.
[254] Ulbe Bosma and Remco Raben, *De Oude Indische Wereld, 1500-1920*, De Geschiedenis van Indische Nederlanders (Amsterdam: B. Bakker, 2003), 67-72.
[255] Wolf, "Fluxus Ventris," 49.
Teisseire, "Beschryving. van Een Gedeelte Der Omme- En Bovenlanden Dezer Hoofdstad," 9.
[256] Radermacher and van Hogendorp, "Beschryving van Het Koningryk," 33-35.
Valencius, "Histories of Medical Geography," 16.
Nicolaus de Graaff, Marijke Barend-van Haeften, and Hetty Plekenpol, *Oost-Indise Spiegel*, Boekerij "Oost En West" (Leiden: KITLV, 2010), 42-43.

as they need. However, this difference is not due to the food they eat or the different constitution of their body. Mainly, Radermacher and van Hogendorp emphasize that the Javanese are poor.[257]

To conclude, the *Verhandelingen* focused more than the government on their belief in managing people through their behaviour, houses, and relocating some industries. The contributions in the *Verhandelingen* did not cover the external and large-scale influences of air and water to the same extent as Mossel and van Boeckholtz. Rather, they paid attention to solutions that were easier to manage. They reinforced the idea that the Dutch could adapt to their new physical environment, therefore encouraging the belief that they could be healthy there. The general discourse emphasized similarities between bodies rather than differences, and the latter were not fixed but part of a flexible spectrum.

[257] Radermacher and van Hogendorp, "Beschryving van Het Koningryk," 33-35.

Part II
Inoculation and environment

Part one has shown the significance of the Hippocratic-Galenic legacy in the quest to better the health of the population in Batavia. The settlers were preoccupied with managing the harmful outside influences that this different place and its hot climate had on their health. While the solutions they and their compatriots in the Dutch Republic brought forward were debated, the importance of paying attention to the physical surroundings of Batavia remained a common theme. This concern for the influence of the environment on health was also applied to the practice of inoculation. Indeed, one of the founding fathers of the Batavian Society of Arts and Sciences, Willem van Hogendorp, issued and paid for a contest concerned with studying whether variolation works as well in Batavia as in Europe. The winner could expect to receive a sum of one hundred ducats.[258]

Despite heated debates during the eighteenth century, in the second half of this century inoculation was generally considered a successful practice in Europe, although it was only practiced on a relatively small scale.[259] The possible effect of the Batavian climate on the outcome of inoculation was uncertain and an important concern; Hogendorp's request was the third prize question in the first edition of the *Verhandelingen*. His aim was not only to find out whether smallpox variolation in the eastern settlements would yield results similar to those in Europe, but to know the substantiated reasons of why this was the case. Based on observations made in Europe, van Hogendorp first states that the chances of dying from natural smallpox are significantly higher than passing away as a result of inoculation. According to him, rarely one person in a thousand dies following the medical procedure, while the mortality rate of smallpox is hundred-and-thirty to a thousand.

Next, van Hogendorp moves on to asking different sub-questions, explaining that information on these topics is lacking. First, he wonders what the best and easiest way of inoculating is in a hot region. Second, he inquires what measures the physician should take during the whole process of variolation. Third, he asks what diet or regimen should be

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[258] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 25-26.
Groot, *Van Batavia Naar Weltevreden*, 76-77.

[259] Ian Glynn and Jenifer Glynn, *The Life and Death of Smallpox* (London: Profile, 2005), 71-75.
Willibrord Rutten, *"De Vreselijkste Aller Harpijen": Pokkenepidemieën En Pokkenbestrijding in Nederland in de Achttiende En Negentiende Eeuw: Een Sociaal-Historische En Historisch-Demografische Studie* (Houten: Hes & De Graaf, 1997), 202.

prescribed for those engrafted with smallpox matter.[260] In short, van Hogendorp uses the ideas about the difference between a temperate and hot climate as well as the legacy of the non-naturals to understand the procedure of inoculation better. This trend to seek to understand health through the lens of environmentalism follows the pattern presented in the previous chapter.

The initial deadline for submissions was June 1780, but this date changed to December 1781.[261] When no answer had been sent in on time, the date was delayed until four contributions were received for the fourth edition published in 1786. This delay was not surprising since postponing the date happened quite often when questions were not sufficiently or timely answered. However, what is unexpected is that the two published answers downplay the importance of environmental factors. The physician Lambertus Bicker, based in Rotterdam, won the one hundred ducats, and Petrus-Matthys van Nielen, a doctor from Utrecht, was his runner up.[262] Two more contributions to the topic were already published in the first volume and written by the physician Jacobus van der Steege.[263] The latter practiced his profession in Batavia and was a directing member of the Batavian Society, which is why he could not win any medals for his contribution and had already published it earlier.[264]

The authors or contents of the two contributions which did not get published nor win any prizes are not mentioned in the *Verhandelingen*, but their mandatory devices were published in the introduction. These short phrases were sent with the text to anonymize the authors to avoid any unfair treatment. For example, in case one participant would be preferred because of their reputation based on previous achievements.[265] These short sentences were: "Quidnam Sapientius est praeceteris experientia?" and "Natura exposcit, ratio probat, religio permittit insitionem variolarum". The first translates to "What wisdom is there from previous experience" and the second one means "Nature demands, reason proves, religion allows inoculation."[266]

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[260] "Voorbericht," 1781 [1779], 25-27.
[261] "Voorbericht, 1781 [1779]), 25.
"Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel* (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786), 12.
[262] "Voorbericht," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel*, (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786), 12-17.
[263] Jacobus van der Steege, "Bericht, Nopens Den Aart Der Kinderziekte Te Batavia: Tot Hoe Verre Men Met de Inenting Derzelve Alhier Gevorderd Is, En Wat Daar by Is Waargenoomen," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Eerste Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1781 [1779]), 71-82.
van der Steege, "Nader Bericht"; van der Steege.
[264] "Voorbericht," 1781, 23.
Groot, *Van Batavia Naar Weltevreden*, 77.
[265] "Voorbericht," 1781, 22.
[266] "Voorbericht," 1786, 14.
The unpublished texts can probably be found in the archives of the Batavian Society in Jakarta but the author did not consult them. An analysis of the unpublished material could be fruitful for further research.

Nothing more will be said about these two contributions because to uncover the knowledge that the Batavian Society thought worth applying, the published answers are the most important sources. The winning answers reflect the information valued by the redaction board consisting of the directing members of the Batavian Society.

Bicker, van Nielen, and van der Steege all maintain variolation in the Asian settlements is as likely, if not more likely, to have a positive outcome as in Europe.[267] How do these physicians combine this statement with the general trend to emphasize environmental influences? Furthermore, the authors not only argue against negative influences of the climate but also share a positive belief in the use of a straightforward method of inoculation for everyone. They bring the individual aspect of health regimes to a minimum. Rather than highly individualized medicine mediated by the regimens of the non-naturals, the quest for better health becomes more general. The authors base their conclusions on population numbers. This use of more abstract thinking about individual bodies means they can be counted and interchanged with each other. After a short introduction to the history of inoculation with the purpose to better understand the treatises that will be studied, four major trends that brought on this development will be discussed: the prevalence of quantification and empiricism, the reasoning behind the minimization of environmental factors, the simplification of the procedure of variolation, and the generalization of health regimens.

[267] van der Steege, "Bericht, Nopens Den Aart," 81.
Bicker Lambertus, "Antwoord Op de Vraag," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel*, Second edition (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786 [1782]), 22.
Petrus-Matthys van Nielen, "Antwoord Op de Vraag," 103.

CHAPTER 4. THE HISTORICAL BACKGROUND OF INOCULATION

4.1. The whereabouts of smallpox

Smallpox, called "kinderpokken" (children's pox) or "kinderziekte" (children's disease) by the Dutch because it mainly killed the young, was probably already known in some parts of the Indonesian archipelago before the Europeans settled there. Peter Boomgaard cites no evidence that the region of Java, in the West where Batavia is, was hit by smallpox before the seventeenth century. He does, however, identify three arguments that smallpox was known in other parts. First, the first European colonists arriving in the Indonesian archipelago, namely the Portuguese in the sixteenth century, already knew that smallpox epidemics had a regular pattern. Consequently, the disease was known already before they arrived. Second, a new disease kills adults and children in equal proportions, which was not the case for the children's disease. Third, the Indonesian archipelago had traded with China and India for at least a millennium, areas confirmed to have known smallpox.[268] Boomgaard recognizes that the first two arguments are not completely convincing, but the third one is enough to make the presence of smallpox in Indonesia before the Portuguese and Dutch presence at least highly likely.

There is, however, little doubt that the Dutch were struggling with the illness since close after their arrival. In a letter from 1618 to the Gentlemen XVII, Governor-General Jan Pieterszoon Coen (1587-1629) writes about a periodic illness that comes back every seven or eight years, and that is more lethal than the European's most feared disease, the plague. These two characteristics were then routinely associated with smallpox even though the epidemic cycles could, in fact, vary depending on the population size. At the turn of the nineteenth century, the cycle of smallpox epidemics in Java was three years. Other typical features were its relatively low rate of infection, which also depended on the population size and density, as well as its course in two stages: an acute febrile one followed by the eruption of the pustules. Afterward, if the sufferer survived, at least they had acquired life-long immunity.[269]

One way the inhabitants of the rural and not densely populated areas of the archipelago protected themselves against smallpox was by fleeing as soon as the disease broke out. There were two major systems of thought that encouraged running away from diseased people. First, the view that a demon caused the disease and second the view that this illness was contagious. In both cases, running from the cause of the disease, be it an evil spirit or the infected people,

[268] Peter Boomgaard, "Smallpox, Vaccination, and the Pax Neerlandica, Indonesia, 1550-1930," *Bijdragen Tot de Taal-, Land- En Volkenkunde / Journal of the Humanities and Social Sciences of Southeast Asia* 159, no. 4 (2003): 592-93.
[269] Glynn and Glynn, *The Life and Death of Smallpox*, 36-37.
Boomgaard, "Smallpox, Vaccination," 591-93, 596.

could lessen one's chance to contract smallpox. It would be stereotypical to assign the first reason to the natives and the second to the colonists. Rather, the ethnic population was divided between the two sets of references. Furthermore, the tactic of running away was not that widely used: all ethnic groups living in towns and cities did not take to their heels, probably due to the higher frequency of epidemics in these areas. These numerous outbreaks were both less lethal and also quite inescapable.[270]

4.2. How inoculation travelled

Starting around 1775, the town citizens in Java and Sumatra could turn to another method to combat smallpox: inoculation. This method consisted of bringing healthy people, especially children, into contact with human smallpox matter to go through a lighter version of the illness while acquiring immunity.[271] The practice of inoculation had already existed for a long time before the inhabitants of Java became acquainted with it. According to the *Encyclopédie*, *ou dictionnaire raisonné des sciences* edited by Denis Diderot (1713-1784) and Jean d'Alembert (1717-1783) between 1751 and 1772, it was the best medical discovery of all time. However, the person to be credited for this discovery is unknown.[272] Even the exact area of origin of inoculation is uncertain. Different stories, ranging from a Buddhist master to a summoned immortal, relate the tales of inoculations happening around the year 1000 in China. The earliest references to inoculation in Chinese medical writings, however, date from the sixteenth century.[273]

Bengal, in India, is another region about which there are stories of a tradition of inoculation since the eleventh century, although this cannot be corroborated. In his treatise, *An account of the manner of inoculation for the small pox in the East Indies* from 1767, the ex-governor of Bengal, John Zephaniah Holwell (1711-1798) places the earliest inoculations in Bengal at around 1600.[274] The discussion about the origin of inoculation is not a mere triviality. The antiquity of either a disease or the medicine around it can rhetorically be used to scorn a place, for example by calling it the vile origin of a dangerous epidemic. Or, on the contrary, it can be used more positively to aggrandize one's writing. Holwell did this in his treatise when he emphasized that it concerned "the manner of inoculation in the place of origin of the disease".[275] According to physiologist Ian Glynn and historian Jenifer Glynn, it was from Bengal that the

[270] Boomgaard, "Smallpox, Vaccination," 600-601.
[271] Boomgaard, 'Smallpox, Vaccination," 602, 610.
[272] Uta Janssens, "Matthieu Maty and the Adoption of Inoculation for Smallpox in Holland," *Bulletin of the History of Medicine* 55, no. 2 (1981): 246.
[273] Glynn and Glynn, *The Life and Death of Smallpox,* 48-49.
[274] Glynn and Glynn, *The Life and Death of Smallpox,* 51.
[275] Harish Naraindas, "Preparing for the Pox: A Theory of Smallpox in Bengal and Britain," *Asian Journal of Social Science* 31, no. 2 (2003): 310.

practice spread to the Balkans and the Ottoman Empire.[276] Unfortunately, they do not give any further evidence for this statement.

Inoculation became known in Europe in the early eighteenth century. The Royal Society of London had received reports of the procedure since around 1700.[277] The most commonly known story is how the practice spread from the Ottoman Empire to the British elite by Lady Mary Wortley Montagu (1689-1762). She was married to the British Ambassador in Constantinople, where she witnessed the practice. That the inoculations in the Ottoman Empire were carried out by women, inspired Lady Mary. This stood in contrast with, for example, the British physician William Wagstaffe (1685-1725) who denigrated these women, believing that Great Britain was making a fool of itself by giving any acknowledgment to a method coming from a backward country and practiced by "a few ignorant women".[278] Lady Wortley Montagu is remembered as having a fascination for rebellious acts. She sought to make the practice accepted in England by way of example and propaganda among the elite. She is often credited as the first member of the European elite to variolate her children in 1717. While she should be credited for her publicity and enthusiasm, Lady Wortley Montagu was not the first wife of the British ambassador in the Ottoman Empire to inoculate her children; the sons of the previous ambassador had already been immunized.[279]

Starting in the 1720s in Holland, the practice of inoculation spread to the American Colonies and the European Continent. This was stimulated by the Huguenot refugees and English intellectuals who lived there. Still, the adoption of inoculation in European society was certainly not a matter of course. As in England, propaganda was essential to making the practice accepted in medical circles, even though Holland was then known for its outstanding medical teaching. People feared the disease - the century eighteenth century was also surnamed the Age of Smallpox – but sometimes they feared inoculation more as different groups strongly advocated against it. Clerics claimed inoculations went against predestination. Physicians were cautious as they were unconvinced that it did, in fact, lead to immunity.[280] Its origin as a folk practice was also one of the many arguments. A rebuttal in medical writings at that time to make a foreign theory or practice more accepted was to stress its benefit for their Western country.[281]

The field of debaters was very diverse. A great number of defenders were not physicians but non-professionals. Many scholars or *philosophes* were involved in the debate. This were men who carried out different intellectual pursuits; the French philosopher and writer François

[276] Glynn and Glynn, *The Life and Death of Smallpox,* 52.
[277] Glynn and Glynn, *The Life and Death of Smallpox,* 52.
[278] Frédérique Apffel Marglin, *Smallpox in Two Systems of Knowledge* (Helsinki: World Institute for Development Economics Research, 1989), 12-13.
[279] Glynn and Glynn, *The Life and Death of Smallpox,* 52-53.
[280] Janssens, "Matthieu Maty and the Adoption," 246-47.
[281] Naraindas, "Preparing for the Pox," 310.

Marie Arouet known as Voltaire (1694-1778) is a telling example of this type of scholar. Lady Wortley Montagu was likewise not a physician.[282] Furthermore, not all Churchmen objected to the practice, as was illustrated in 1752 by Bishop Maddox of Worcester with his sermon delivered before the governors of the Smallpox and Inoculation Hospital in London.[283] The discussion around inoculation thus was not merely a medical question debated by physicians, but a topic that preoccupied different social categories.

4.3. Cheating death? Different practices of inoculating

Over the centuries and depending on where it was practiced, the whole process of inoculation varied significantly. There have been different ways of bringing patients into contact with human smallpox matter purposefully. For example, in China, this was done by filling the patient's nose with cotton balls full of powder from smallpox pustules or use a tube to blow the powder into their nostrils. The whole procedure around the event also came in different shapes; the treatment before, during, and after it could vary greatly. Furthermore, wherever variolation had been introduced, smallpox had come before it, including the therapeutics for it. Thus, when looking for the best way to variolate and manage the, albeit less intense, disease, the way to treat the normal course of smallpox was of great importance as a model.

The Persian scholar Abu Bakr Muhammad ibn Zakariyya al-Razi (c. 865-925), known in the West as Rhazes, wrote the first work on the disease, *Treatise on the Smallpox and Measles*. This book then became the illnesses' work of reference for multiple centuries.[284] Rhazes was well versed in the work of Greek authors such as Euclid of Alexandria (c. 350 BC-c. 250 BC) and Hippocrates and believed that, as a man of science, he should work towards building upon these works to uncover new findings. Rhazes both described smallpox itself, namely as a seasonal disease which mainly endangered children, and the treatment he believed suits it best. In line with the paradigm of the four humours, the scholar recommended bloodletting if someone was suspected of having fallen ill and certainly when the disease showed its first signs. Next, he also gave instructions on sweating and the proper diet. At first, the patient had to both drink and bathe in ice-cold water. Then, when the pustules started to appear, the patient was instructed to take scalding baths to sweat a considerable amount.[285]

In the West, the focus on heat became commonplace and consisted of keeping patients warm with many layers of clothing and leaving them in a closed-off room without ventilation. This manner of treating smallpox started to change when the English physician Thomas

[282] Janssens, "Matthieu Maty and the Adoption," 246-47.
[283] Janssens, "Matthieu Maty and the Adoption," 249.
[284] Rutten, *De Vreselijkste Aller Harpijen,* 30.
[285] Glynn and Glynn, *The Life and Death of Smallpox,* 21-25.

Sydenham (1624-1689), inspired by Rhazes' cold treatment, started to promote the cold regimen, and not only for the beginning but for the entirety of the disease.[286] This regimen consisted of cold baths and promoting fresh air and light clothes. Furthermore, Sydenham maintained, quite controversially, that the physician should intervene as little as possible. The English physician had based this statement on the observation that the rich died more often than the poor while the latter received less treatment than the former. Lastly, Sydenham also differed from Rhazes in his instructions regarding bleeding, which he believed should be limited to a small amount and the beginning of the illness.[287]

In the eighteenth century, a debate still raged about the best method to treat smallpox. In general, cold treatments prevailed over heat treatments, but these cold procedures often still included a hot part. For example, Robert Sutton (1708-1788), his son Daniel Sutton (1735-1819) and their forty-seven partners, administrated it to the many people they inoculated.[288] Likewise, the Dutch physician Herman Boerhaave (1668-1735) and the English physician Thomas Dimsdale (1712-1800) were advocates of a cold regimen.[289] An exclusively cold treatment, consisting of mainly cold water and air, also existed. It had been promoted to treat fever and natural smallpox in Britain, for example by John Floyer (1649-1734) in his work *Psykhroloysia* (1702). Nonetheless, it was only in 1767 that this sort of exclusively cold regimen was used as a preparatory treatment for inoculation. Arguing that the cool regimen was the best one during the variolation of smallpox based on the long-standing positive experience of the Indians, was something that William Cullen (1710-1790), one of the most prominent physicians in the eighteenth century, also did.[290] Here, a folk practice became a way of legitimizing a certain method because of its seniority, rather than something to defend because it was foreign.

Another point of debate concerned the medicine to be used before, during, and after the procedure. The whole process was perceived as mysterious and expensive due to the different medications and treatments available. The Suttons had understood this situation very well and saw opportunities to enrich themselves. They made a single medicine leading them to earn a fortune by selling their secret pills, which were mercury pills, to which they attributed their successful inoculations.[291] Unsurprisingly, this far-reaching secrecy and fraudulent practice led to considerable criticism against the Suttonian method in general, notably from Jan Ingenhousz

[286] Naraindas, "Preparing for the Pox," 325.
[287] Glynn and Glynn, *The Life and Death of Smallpox,* 41.
[288] Janssens, "Matthieu Maty and the Adoption," 250-52.
[289] Glynn and Glynn, *The Life and Death of Smallpox,* 77.
Suman Seth, *Difference and Disease: Medicine, Race, and the Eighteenth-Century British Empire*, (Cambridge University Press, 2018), 62.
Janssens, "Matthieu Maty and the Adoption," 251.
[290] Naraindas, "Preparing for the Pox," 329.
[291] Glynn and Glynn, *The Life and Death of Smallpox,* 76-77.

(1730-1799) and Matthieu Maty.[292] The Suttonian method let to a simplification of the procedure of variolation.[293] This effect is mainly due to Thomas Dimsdale's highly successful book, *The Present Method of Inoculating for the Smallpox* (1767), which was in line with this method and disseminated this knowledge in the international medical community through its multiple editions and translations. An essential difference between the Suttons and Dimsdale was that the latter re-established a full preparation. Sutton had significantly shortened this step, but a near-absent preparation was associated with itinerant inoculators and therefore, frowned upon by the learned elite.[294] In short, there was no one way to inoculate, but a range of debated possibilities, just as there was not one way to treat smallpox.

Nowadays, wild smallpox virus has wholly been eradicated, a process that is associated with Edward Jenner's publishing of his discovery of the smallpox vaccine in 1798.[295] While a highly successful undertaking, it was not a strictly linear one where vaccination necessarily replaced inoculation. In Europe, the new vaccine quickly replaced inoculation. But in the colonies like Spanish Guatemala and British and Portuguese India, the two practices coexisted.[296] In many of its regions, variolation was well established, and vaccination was not a convincing winner.[297] The problem was that the smallpox vaccine, based on live cowpox matter, was difficult to preserve. First, the transport had to be rapid enough that the vaccine would still be viable.[298] Second, the cowpox matter had to survive the heat without any powerful refrigeration techniques.[299] Since the vaccines encountered these difficulties, it did not quickly replace inoculation everywhere. Instead, the preference for the one over the other depended on the situation. This means that the traditional story of a uniform native resistance to vaccination brought there by their colonial oppressors instead of the local practice of inoculation, is not as straightforward. At least until inoculation was prohibited in many regions of India after 1865, the colonial and local authorities did not necessarily promote vaccination but instead chose one or the other depending on specific conditions.[300]

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[292] Janssens, "Matthieu Maty and the Adoption," 252.
[293] Naraindas, "Preparing for the Pox," 327.
[294] Philip H. Clendenning, "Dr.Thomas Dimsdale and Smallpox Inoculation in Russia," *Journal of the History of Medicine and Allied Sciences* 28, no. 2 (1973): 118.
Naraindas, "Preparing for the Pox," 327.
[295] Boomgaard, "Smallpox, Vaccination," 590.
[296] Cristiana Bastos, "Borrowing, Adapting, and Learning the Practices of Smallpox: Notes from Colonial Goa," *Bulletin of the History of Medicine* 83, no. 1 (2009): 141.
[297] Niels Brimnes, "Variolation, Vaccination and Popular Resistance in Early Colonial South India," *Medical History* 48, no. 2 (2004): 199–228.
[298] Martha Few, "Circulating Smallpox Knowledge: Guatemalan Doctors, Maya Indians and Designing Spain's Smallpox Vaccination Expedition, 1780-1803," *British Journal for the History of Science* 43, no. 159 Pt 4 (2010): 533.
[299] Marglin, *Smallpox in Two Systems of Knowledge,* 49.
[300] Brimnes, "Variolation, Vaccination and Popular Resistance," 228.
Marglin, *Smallpox in Two Systems of Knowledge,* 49.
Cristiana Bastos, "Borrowing, Adapting, and Learning," 161-62.

CHAPTER 5. HOW TO PROVE SUCCESS? NUMBERS AND EXAMPLES

After inoculation had been known and practiced for about half a century in Europe, it was introduced in colonies in Java in the late 1770s and 1780s by both the British and the Dutch.[301] This thesis does not explore to what extent this practice successfully saved lives, but investigates the perception of the members of the Batavian Society about how successful inoculation was and could be. To understand how a plan to variolate the inhabitants in and around Batavia would work, they started with the legacy of environmental medical thinking. The authors, Lambertus Bicker, Petrus-Matthys van Nielen, and Jacobus van der Steege, all agreed that inoculation is neither bad nor dangerous, and downplay the influence of their physical surroundings on the outcome of variolation. They differ in their explanation of why the environment in Batavia does not hinder variolation. The writers first defended the precondition that inoculation led to positive results in Europe. The arguments they have used fall into, broadly, two categories: quantitative arguments and arguments from exemplarity. These two terms have been used by Eriksen to categorize arguments from the debate on smallpox variolation in Europe.[302] Together, these arguments aimed to legitimize both Hogendorp's prize question and their own text by showing all the benefits of variolation, on an individual level and for the Dutch empire.

5.1. The big numbers

In the first half of the eighteenth century, and especially in England, data on mortality caused by inoculation was gathered to find out whether it was a successful way of preventing death. For example, John Arbuthnot, who wrote the previously mentioned treatise on the properties of the air, gather data on smallpox mortality in London from 1707-1718. The debate on inoculation was one of the first times a medical treatment was questioned through quantification.[303] Quantification refers to the activities of "counting, measuring, calculating, estimating, or combining any of these methods."[304] At the time, the word "quantification" was not used. Instead, the scholars spoke about political arithmetic and medical arithmetic, depending on what was studied. In the two following chapters, the term quantification will be preferred because this is the word most commonly used by academics in the literature on the eighteenth century. It is

[301] Boomgaard, "Smallpox, Vaccination," 602-603.
[302] Anne Eriksen, "Advocating Inoculation in the Eighteenth Century: Exemplarity and Quantification," *Science in Context* 29, no. 2 (2016): 213.
[303] Edward Huth, "Quantitative Evidence for Judgments on the Efficacy of Inoculation for the Prevention of Smallpox: England and New England in the 1700s," *Journal of the Royal Society of Medicine* 99 (2006): 262–63.
[304] Andrea Rusnock, *Vital Accounts: Quantifying Health and Population in Eighteenth-Century England and France* (Cambridge: Cambridge University Press, 2002), 2.

distinct from mathematics because quantification is referential. Quantified numbers are always assigned to something concrete in the world, such as objects or living beings. These numbers can refer to entities observed through empirical observation, such as a tree, or they can designate values of a humanmade scale of grading, such as how beautiful a tree is. Quantification is also different from statistics. This is a term preferred for the nineteenth century and later. Indeed, by then, two developments had taken place. First, new statistical methods had been invented that made it possible to analyse large quantities of data. Second, the governments and scientists were convinced of the usefulness of numbers for bringing improvement.[305]

At first, numerical arguments were not self-evidently convincing. The success of this sort of reasoning is due to a long process of many efforts. Assigning numbers to things and people in a widespread manner started in different ways. For example, the rise of production and consumption led to a generalization of giving objects monetary value to make them into commodities. The act of counting considerable numbers of people on a great scale also has its roots in Renaissance Italy and the early modern slave trade. Then, during the eighteenth century, these numerical practices of counting and measuring became essential characteristics of science, as can be illustrated by the wide interest in instruments such as barometers and thermometers that made it possible to gather large amounts of data. These scientists actively convinced other scholars who gave more power to their arguments.[306]

Eriksen and Rusnock have argued that medical arithmetic played an important part in the eighteenth-century debates about inoculation.[307] Counting populations made it possible to compare mortality rates and argue for the need to take preventive measures. The driving force, or fear, behind these measures was often that Western European writers were concerned with how small the population was where they lived. They were thinking about how to promote growth.[308] Influenced by the late seventeenth-century theory of mercantilism, which states that a nation should increase its wealth by maximizing exports, an abundant and healthy population was associated with strong commerce. This meant that the wellbeing of a nation could be substantiated through numbers. An example of defending inoculation by falling back on this numerical argument was Voltaire in his influential essay *Sur l'insertion de la petite vériole* (1731).[309]

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[305] Rusnock, *Vital Accounts,"* 1-3.
Huib J. Zuidervaart, "An Eighteenth-Century Medical–Meteorological Society in the Netherlands: An Investigation of Early Organization, Instrumentation and Quantification. Part 1," *The British Journal for the History of Science* 38, no. 4 (2005): 410.
[306] Rusnock, *Vital Accounts*, 1-3.
[307] Eriksen, "Advocating Inoculation in the Eighteenth Century," 235.
Rusnock, *Vital Accounts,* 44.
[308] Rusnock, *Vital Accounts,* 4, 43.
[309] Clendenning, "Dr.Thomas Dimsdale and Smallpox Inoculation in Russia," 116.

Therefore, it is unsurprising that the academically schooled physician who received the first prize for answering van Hogendorp's question, Lambertus Bicker, recommends variolation as an excellent way to make the population increase. In his contribution to the *Verhandelingen,* he despises smallpox for all that it has cost society. Luckily, he writes, in the eighteenth century, a correct calculation of those who have died and those who have been saved can be made. This calculation shows clearly how disastrous smallpox is for society. Bicker writes: "(…) dat zy de Maatschappy van tyd tot tyd geweldig verwoest, verärmt, en, in zeer veele opzichten, ongelukkig maakt."[310] Based on mortality lists in England, France, and Germany, Bicker argues that at least 1 person in 12 dies from smallpox. This use of the formula '1 in n' rather than a percentage was typical. He equals this to a chance of 1 in 12 to die from smallpox throughout someone's whole life. He makes no distinction between the mortality rates of children and adults. Considering that not everyone has smallpox during their life, the real chance to survive it if one is so unlucky to be infected is 1 in 7 or 8. The physician from Rotterdam bases this on the computation from the 'Heelen Geneeskundig Gezelschap' from the same city, to which he contributed himself.[311]

Another calculation that Bicker mentions is based on mortality lists from England, made by going to every house in a few cities. It shows that just under 15 percent of those who have natural smallpox, so again one in seven, dies from it. If one bases their ratio on the patients of the Smallpox Hospital in London from 1746-1756, the rate is a staggering 25 percent. Bicker keeps on listing death rates from all over the world to emphasize how needed variolation is. He declares he has an enormous number of examples but keeps to a list of about three pages. For example, John Murray (1723-1792 observed that 270 out of 300 Swedish children died from smallpox. Bicker studied death rates in Holland (5320 in total), Copenhagen (1117 in 1756), and Naples (16000 in 8 years). Bicker also knows that during the epidemy in Batavia around 1767, the death toll rose to one-third of the 1371 infected.[312]

According to Bicker, the number of deaths due to inoculation is a lot lower. To prove this, he sums up ratios of people who died from variolation in different places. He begins by mentioning the sermon from the Bishop of Worcester Isaac Maddox (1697-1789) who claims a ratio of three deaths out of 1500 inoculated Londoners. According to him, the Suttonian method diminished this number to one in a thousand or even less. For example, twenty out of 7000 died. Ingenhousz and Dimsdale together inoculated around 4500 people in 1769 without a single unlucky case. Johann Leuthner (1740-1814) counts 23 deaths out of 107624 and Murray, again about Sweden, experienced no one dying out of almost 3000. Petrus Camper (1722-1789) writes

[310] Lambertus Bicker, "Antwoord Op de Vraag," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel*, (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786), 3, 8.
[311] Bicker, "Antwoord Op de Vraag," 8-9.
[312] Bicker, "Antwoord Op de Vraag," 9-13.

about an inoculation campaign in Russia focusing on the nomads under the rule of Catherine the Great (1729-1796), who herself had been inoculated by Dimsdale. Here the number for 1778 is five deaths out of 5649 cases. In the Netherlands, no one of the more than 500 variolated died.[313]

Finally, he calculates how many people could be saved if inoculation was practiced on a large scale. Bicker does this by first stating that the chances to die from inoculation are a thousand times smaller than dying from natural smallpox. To make his argument even stronger, he multiplies the number of unfortunate cases dying from inoculation tenfold. So from one hundred persons who would have died from smallpox, ninety would still live if they have been inoculated.[314] This means that if out of a group of 100 people, no one would survive smallpox without a vaccine, only ten would die as a result of the vaccine itself. This makes it ten times less likely to die for each individual.

Bicker presents inoculation as the best option on a personal level. This means that he believed every individual who reads the *Verhandelingen,* would make a wise choice if they decide to get variolated. On a population level, Bicker concludes that in 25 years, the inhabitants of Holland would have grown by more than 100.000 persons, without counting the children that those people, saved from dying due to smallpox, would procreate. Moreover, inoculation would also make the population happier and healthier, even those who were lucky enough to survive smallpox. This is because the survivors were often disfigured and disabled for life through the loss of body parts or functions such as eyesight, and due to having many irregularities in the face from the pustules. These serious disadvantages do not occur during the softer version of smallpox brought on by inoculation. Children can even keep on playing, not being in any serious pain.[315]

This attention to the long-term misery that smallpox brings both to individuals and to society as a whole is also clear from the testimony of van Hogendorp, the man who asked the prize question. Writing about the situation in Batavia, he writes: “Ik verkoos den landweg, en bezocht, ô Batavia, Uwe Omme- en Bovenlanden Hemel! Wat eene verwoesting richt, in dezelven, de natuurlyke Kinderziekte niet aan!”. There, an elderly man had lost his eyes, and a young man had to accompany him at all times. Therefore, both men were useless for agriculture. Smallpox was also dangerous for women: a newlywed bride had become paralyzed and therefore barren.[316] The implication here is, of course, that she will never contribute to a rising and prospering population.

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[313] Bicker, "Antwoord Op de Vraag," 14-17.
Clendenning, “Dr.Thomas Dimsdale and Smallpox Inoculation in Russia,” 109, 121-23.
[314] Bicker, "Antwoord Op de Vraag," 18.
[315] Bicker, "Antwoord Op de Vraag," 18-19.
[316] van Hogendorp, “Redevoering Der Inentinge,” 334

The physician who won the second prize, Petrus van Nielen, does not emphasize exact numbers as much as Bicker did. Instead, he keeps to the general argument that inoculating saves lives and benefits society by not wasting so many useful members. It comes down to convincing all those people who would die of smallpox because they, wrongly, do not trust inoculation. Van Nielen hopes that in all the places in the East Indies where the Dutch are present, inhabitants will come to see the light and agree to be inoculated. According to him, these settlements are important for the subsistence of the United Provinces of the Netherlands. It is his duty, he enunciates, and the duty of every citizen, to take the wellbeing of their country and its inhabitants to heart. By emphasizing that the Batavian Society does this, he defends and legitimizes the society's aims and existence.[317]

Van Nielen's argument that choosing the be inoculated is a duty because the settlements are crucial for the prosperity of the Dutch Republic, goes further than the general argument that variolation is needed for population growth. The sense of urgency goes deeper. Helping the welfare of the Republic is seen as a moral duty. Jacobus van der Steege, who published his medical experience with inoculation in Batavia in the first *Verhandelingen*, explicitly mourns the loss of wealth caused by those who died from smallpox. He writes: "Immers niets is eenvoudiger, en tot dit oogmerk beter, dan de Inenting; eensdeels om de slaaven te beveiligen, en ten anderen, om den inlander te overtuigen. Ik zwyge nog van het bewaaren van een gedeelte der bezittingen van de inwooners deezer Colonie, welke nu, door den dood van die ongelukkigen, met haar ten grave daalen." Van der Steege emphasizes that, especially during epidemics, inoculation would preserve the lives of many slaves and in the process, maintain the Republic's wealth.[318]

Van Hogendorp, the man who had asked the question about variolation, did not shy away from addressing the government directly. "Gy weet, dat, in de menigte des Volks, der Vorsten heerlykheid bestaat; en ik kome, om het zelve te vermenigvuldigen," he promises.[319] The relevance of a campaign for inoculation is made clear to the statesmen by emphasizing that a growing population benefits their power too. In this way, the intellectual legitimizes his pursuit as not only something for the welfare of his compatriots but also for the power of the United Provinces of the Netherlands as a whole. To summarize, he shows what he can do and is doing for his country.

Eriksen, following Seth, contends that "even if it was argued that inoculation served 'the common good,' for a long time this was conceptualized in terms of individuals, not institutions,

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[317] Petrus-Matthys van Nielen, "Antwoord Op de Vraag," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Vierde Deel*, (Rotterdam; Amsterdam: Reinier Arrenberg; Johannes Allart, 1786), 88-89, 114.
[318] van der Steege, "Bericht, Nopens Den Aart Der Kinderziekte," 75, 81.
[319] Willem van Hogendorp, "Redevoering Der Inentinge Tot de Ingezetenen van Batavia, Na Haare Terug Komste van Samarang," in *Verhandelingen van Het Bataviaasch Genootschap, Der Konsten En Weetenschappen. Tweede Deel* (Batavia: Egbert Heemen, 1780), 351.

and even less in terms of nations or states." Building on the work of Daston on probability, Eriksen writes that inoculation propaganda was aimed at individuals who had to make a rational choice concerning their survival rather than thinking about a group.[320] It is true that calculations about large numbers of people do not necessarily lead to the conceptualization of a population. However, Bicker, van Nielen, and van Hogendorp's arguments link the individual's choice of inoculation with the employees' duty towards the VOC and the statesman's engagement to the Dutch Republic. It is still up to the individual to be inoculated but they were explicitly reminded that as citizens, they should think about the welfare of their country. This argument is more concrete than mentioning "the common good". They mourn the real, material damage that all the early deaths have caused. Again, numbers are useful to show the state of a nation's wellbeing. As has been mentioned in part one, the VOC was under serious pressure at the end of the century, so this might have impacted the writers' pleading tone.

5.2. The making of a standard course for inoculation

Collecting the data about populations that the three physicians could use to prove that inoculation saved lives, had been a laborious endeavour. Mortality rates of a significant amount of people, such as a whole city, were collected through a largescale network of correspondents. The individual inoculators often kept and sent case histories to the medical arithmetician who compiled these stories and transformed them into quantitative information. As long as inoculation was an unfamiliar process, physicians published extensive accounts of the course of artificially induced smallpox abundantly. Once readers were acquainted with the procedure, these descriptions were left out.[321]

Van der Steege, the physician who stayed in Batavia from 1774-1788, wrote such a description of his observations of how the illness manifested itself in the archipelago. By analyzing this new situation, he can conclude that "Het schynt my verder toe; dat het beloop der ziekte hier wat spoediger voortgaat, als in 't Vaderland; en in dien opzigte eenigzins gemakkelyker is."[322] Van der Steege first inoculated his own son who was four years old. The physician was absolutely convinced of the usefulness of inoculation. Conveniently, he variolated his child on the first of August by making three little stabs in his left arm without any preparation. He then sums up what happened: nothing on day two, the colouring of the punctures into yellow or orange on day three, the colouring and bumping of two of the little wounds in red on day four, five and six. Then, the pustules followed on days seven and eight, as well as pain in the armpit

[320] Anne Eriksen, "Advocating Inoculation in the Eighteenth Century: Exemplarity and Quantification," *Science in Context* 29, no. 2 (2016): 236-37.
[321] Rusnock, *Vital Accounts,* 55-56.
[322] van der Steege, "Bericht, Nopens Den Aart," 81.

and a fever. The height of the disease took place on day nine with more pain, no hunger, and a tongue that showed that his son was ill. He slept very badly but succumbed to sleep in the morning of the following, tenth, day, still suffering from a strong fever until noon. A convulsion marked the betterment of the disease and the appearance of about thirty red, suppurating spots. At last, they dried out. He inoculated twelve other people after his son and noticed a quite regular pattern in the course of the disease. The pustules always erupted on the ninth day, except in two cases: it happened later for a baby and earlier for a girl who almost did not suffer from them at all.[323]

Unlike van der Steege, who describes the specific progress of inoculation of his different patients, Bicker only gives a general overview of the procedure of inoculation, already based on a distillation of cases. According to him, it is "de nieuwe, eenvoudigste en beste wyze van inënten, die tegenwoordig algemeen in, gebruik is, overäl zeer gelukkig geöeffend wordt".[324] He is referring to the Suttonian method. Contrarily to Van der Steege, Bicker does not describe cases in Batavia. However, he considers the way he inoculates as standard practice at the time, which he says was carried out everywhere. Bicker places himself in the tradition of Sutton, Dimsdale, and William Watson (1717-1787), but also strays from their example by following the stance of Angelo Gatti (1724-1798) that healthy subjects should not go through any preparation.[325] The course of the disease in Europe has already been observed and published many times, so his purpose is different from Van der Steege's. Bicker's overview is an ideal type based on what happened to most people. The aim is to show the regularities and how well the procedure works, based on what he has experienced during his many years as a medical practitioner. It gives the reader an idea of what they can expect based on empirical studies of past cases.

Bicker's inoculation begins with one or two shallow punctures made on the outside of each arm with a lancet. He notices an orange or red bump on day 2, one day earlier than Van der Steege when he observed his son. From there, on the fifth and sixth day, a tingling feeling spreads to the whole arm until the armpit and makes it sore and stiff. Again, this is about a day earlier than the other description. Between the fifth and seventh day, a pustule filled with clear liquid starts to form. About two days after this, the fever and feeling of illness settle in. Bicker also mentions the tongue that specifically shows that the patient is ill. The eruption of the red dots of the pox happens around the eleventh or twelfth day, but this can take a few days overall. They have usually dried out by day sixteen or seventeen.[326]

Bicker also notices some differences depending on the person, for example, four people had two phases of pustules: one short light one and one that was more normal. Furthermore, the

[323] van der Steege, "Bericht, Nopens Den Aart," 76-79.
[324] Bicker, "Antwoord Op de Vraag," 54.
[325] Bicker, "Antwoord Op de Vraag," 50-51.
[326] Bicker, "Antwoord Op de Vraag," 58-64.

number of pustules can greatly vary from person to person, depending on, for example, their constitution, whether they have followed the physician's advice correctly, and their age. Bicker tells the reader that children of a few years old usually only have fifty to a hundred pox pustules, while babies can have over a thousand. In general, apart from some people who have none even though they have all the other symptoms, the patient has between fifty and three hundred red dots. In any case, the symptoms are lighter than if the disease had been natural. At last, Bicker sums up four different special cases.[327] As Bicker presents the process, the physician should follow a standard procedure, and only fall back on exceptions in case of deviancy from this standard. An estimated number of days is dedicated to each step, as well as the expected number of pustules that corresponds with this step.

The winner of the second place, Van Nielen, similarly includes a general overview of all the symptoms. He even adds that this was not required for the contest, but that he wishes to help the physicians who might have never witnessed an inoculation or read about it since "de Schriften over de Inënting, zoo als ook in de Voorstelling zelve bekend word, in de Colonie weinig voor handen zyn."[328] He bases his descriptions on his experience in Europe and the colonies. Just like Bicker, his method follows Sutton and Dimsdale, since this has become standard practice in Europe. The course of the disease is quite similar to what Bicker wrote: red bumps on day two, the pain in the armpit starts around day six, fever on day seven. The main difference is that van Nielen writes that the pustules usually dry out earlier, by day ten, and do not ulcerate.[329]

This standardized overview of the course of the disease was used in a propagandistic work by van Hogendorp. In 1779, he published 'Sophronisba of de gelukkige moeder door de inëntinge van haare dochters'; a story aimed at the mothers in Batavia to convince them to inoculate their children. This work of fiction details how Sophronisba, the wife of Lysander, a highly placed statesman in one of the biggest cities of Holland and also a scholar interested in art and science, came to see how beneficial inoculation is. Misguided by the advice of her family doctor, she thought inoculation was very dangerous. Lysander, who had read the works of, amongst others, Charles Chais (1701-1785), Thomas Schwencke (1694-1767), de la Condamine, Dimsdale, Tissot, and Gatti, had for two years tried to convince her to inoculate their two daughters, but his efforts had been in vain.[330]

Finally, after having asked the physician to leave his house for a few months, Lysander inoculated his daughters behind his wife's back. When he told her afterward, she fainted. When

[327] Bicker, "Antwoord Op de Vraag," 65-70.
[328] Bicker, "Antwoord Op de Vraag," 181.
[329] van Nielen, "Antwoord Op de Vraag," 171-83.
[330] Willem van Hogendorp, "Sophronisba of de Gelukkige Moeder Door de Inëntinge van Haare Dochters. Europeesche Geschiedenis, Ter Leezinge Voorgesteld Aan de Moeders van Batavia," in *Geneeskundige Propaganda-Geschriften* (Batavia: Javasche Boekhandel & Drukkerij, 1921), 1-4.

coming to herself again, she came to see that all her fears had been for nothing. Sophronisba expressed her shame at being so wrong and blind, promising to listen to her husband in the future. In the end, both daughters happily survived without much pain, and the family was grateful for all this happiness. Instead of this happy ending, the old physician lived a tragedy: he committed suicide after losing his young and beautiful wife, his son, and witnessing his two daughters become disfigured by smallpox.[331] "Ach! Hadde ik myne kinderen maar ingeënt!" he cried out after his wife had passed away.[332] Now, it was Sophronisba's duty to persuade all the mothers to be as happy as her and never fall into the same depths as the physician had, regretting his choice too late.[333] According to van Hogendorp, the best way to do is, is by showing how happy they are.[334]

While the work is a fabricated story, van Hogendorp does base his description of the course of inoculation on Bicker's scientific work published in the Netherlands, as he writes on page 31. He has decided to base himself on Bicker's work because of his renown among some inhabitants of Batavia, and his writings have already convinced parents. Van Hogendorp has respect for Bicker, who comes from the same city as him: Rotterdam. He does not fear that his readers will look down on him for almost copying Bicker's work and not relying on his own experience witnessing inoculation in Batavia. Van Hogendorp writes: "Myn doelwit is alleenlyk nuttig te zyn; en, of ik daar toe zyne of myne woorden gebruike, het doet niets ter zaake."[335] His objective is not to add to medical knowledge but to inform the broader public and above all to convince them of the beneficence of variolation.

The standard course of inoculation based on empirical evidence, served as an example. The vast amount of cases the standard is based on consolidates the claim. These cases were seen as fundamentally equal, which made it possible to count them. On a conceptual level, this means that one standard can be applied to everyone, to everybody and every body. This also implies that one individual can be replaced by another individual. This concept can be called interchangeability.[336] In short, the observation of many cases was not only used to compare mortality rates of the artificial and natural smallpox to show how inoculation would make the population increase, but also to create a specific example of what both a patient and the physician could expect. It served as a convincing positive precedent that the inoculation would have a great outcome and that the process should not be looked at with any apprehension nor

[331] van Hogendorp, "Sophronisba of de Gelukkige Moeder," 5-67.
[332] van Nielen, "Antwoord Op de Vraag," 58.
[333] van Nielen, "Antwoord Op de Vraag," 69.
[334] van Hogendorp, "Redevoering Der Inentinge," 339.
[335] van Hogendorp, "Sophronisba of de Gelukkige Moeder Door de Inëntinge van Haare Dochters. Europeesche Geschiedenis, Ter Leezinge Voorgesteld Aan de Moeders van Batavia," 31.
[336] Anne Eriksen, "Advocating Inoculation," 213.

anxiety. By basing his story of a successful physician's years of experience, van Hogendorp strove to fight prejudices by presenting the readers with an example that gave them hope.

5.3. Striking examples stronger than numbers

In the pro-inoculation texts, the use of examples went further than either showing that the artificially induced illness almost always went well or applying this knowledge to a fictional scenario. Arguments by exemplarity went hand in hand with quantitative thinking. Often, the inoculation of royals and other persons from the elite were successful arguments to defend the cause of the inoculators. Here, who was variolated counted more than what the numbers showed. One person was not exactly equal to another, at least not when it came to the power to convince people. Therefore, regarding the importance of numbers, both types of arguments were at odds with each other.[337]

These qualitative arguments, based on the success stories of elite people, could put a lot of weight on the scale for inoculation. Even to the point that stories of the origin of inoculation in a country were modified. For example, officially, a group of anonymous children were the first to be inoculated in the kingdom of Denmark-Norway. The procedure was carried out in two places at around the same time in 1754 by the vicar Thun in the province of Ribe and the surgeon Fabricius in Holstein. The story that is remembered is about the Baroness Bernsdorff about six months later even though the procedure was unsuccessful, and she suffered from smallpox afterward which disfigured her face for life. Someone's position in society was also linked to them having plenty of positive qualities, which made their decision to inoculate themselves or their children more authoritative.[338]

In Batavia, it was Jacobus Johannes Craan (1728-1780), a member of the Council of the Indies and someone with 'an outstanding character', who inoculated his two youngest sons at the beginning of 1779 and inspired many others. Van Hogendorp, Van der Steege, and Bicker all mention that the honorary Craan is the one responsible for encouraging others, most remarkably the native population, to inoculate themselves and their children.[339] To explain this positive event, Van der Steege even added a second article that he had written later to the first treatise of the Batavian Society.[340] In the first article, he had expressed his concern with how much prejudice and resistance there was in and around Batavia. The indigenous population was difficult to convince, even with examples. They needed to see and experience the benefits of

[337] Eriksen, "Advocating Inoculation," 234-35.
[338] Eriksen, "Advocating Inoculation," 234-35.
[339] van Hogendorp, "Redevoering Der Inentinge," 337.
van der Steege, "Nader Bericht," 333.
Bicker, "Antwoord Op de Vraag," 41.
[340] van der Steege, "Nader Bericht," 333-35.

inoculation. Van der Steege suggested showing this on slaves, who often died from smallpox. He also found an explanation for the reticence of both the natives and the settlers. Indeed, there was no evidence that variolation had been carried out in the area before, apart from one testimony that a few years ago two slaves had been inoculated.[341]

Van der Steege was surprises that between the publication of his first and second text, many people in and around Batavia had let him inoculate them. He had previously thought that there was no other option than to wait until a new generation of physicians would make inoculation widespread. This experience even made him come back from his prejudices about the indigenous inhabitants, about whom he wrote: "(…) hoe bijgelovig anders ook, evenwel geene hardnekkigheid genoeg bezit, om de waarheid tegen te spreeken". According to him, this does not apply to many 'civilized' people, whose unwillingness to see the truth stands in the way of inoculation.[342]

That an honorary man like Craan had put his faith in the process of inoculation was one aspect that gave his example its strength. That he chose his sons was another. This choice was considered an expression of fatherly love.[343] That van Hogendorp uses this example to prove that Craan was an honorary man implies that van Hogendorp considered the expression of love for a child by inoculating them a good moral quality. The process where inoculation is seen as a morally good reflects the outcome of another process that started to become rooted in society: the emotional value of the child in the family and society.[344] At least in the higher classes in Western Europe, children were not so much considered as valuable for what they could economically bring to the family and society as what their emotional value was. A child brought the parents happiness.[345] Van Hogendorp's character Sophronisba is a play on this moral quality of parental love. He emphasizes how happy parents are that their sons prosper, and their daughters are beautiful. When he calls on the mothers to share the news of their happiness to convince others, he calls them exemplary and happy women: "O Gy; voorbeeldige Moeders! Die, als andere SOPHRONISBA'S, gelukkig door de inënting van Uwe kinderen geworden zyt!"[346]

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[341] van der Steege, "Bericht, Nopens Den Aart," 74-77.
van der Steege, "Nader Bericht," 333-35.
Bicker, "Antwoord Op de Vraag," 41.
[342] van der Steege, "Bericht, Nopens Den Aart," 74-77.
van der Steege, "Nader Bericht," 333-35.
Bicker, "Antwoord Op de Vraag," 41.
[343] van der Steege, "Nader Bericht," 334.
Bicker, "Antwoord Op de Vraag," 3.
[344] Catriona Seth, *Les rois aussi en mouraient : Les Lumières en lutte contre la petite vérole* (Paris: Les Editions Desjonquères, 2008), 134-36.
[345] Ton Zwaan, *Familie, Huwelijk En Gezin in West-Europa: Van Middeleeuwen Tot Moderne Tijd* (Amsterdam: Boom, 1993), 231.
[346] van Hogendorp, "Redevoering Der Inentinge," 338-39, 355.

While Craan was the most successful example, he had not been the first one. Van Hogendorp explains how van der Steege had been the first to inoculate his only son in the Dutch East Indies. His example had been strong because he was himself a physician and only had one son. Moreover, the variolation had been successful. “Maar gij wierdt niet getroffen door de kracht van het voorbeeld,” van Hogendorp writes. Another physician, P. Hoffman, who inoculated his only daughter, also did not manage to become the one that everyone looked up to.[347] It had to be a high-ranking politician who could convince and guide natives and settlers alike to inoculation. Not everyone was equal when it came to the power of persuasion. Numbers were only compelling up to a certain point. According to Van der Steege, examples were far superior arguments to convince the native population who had to experience the cases themselves. Quantitative arguments do indeed lack a clear and tangible link with reality. Without the precondition that the numbers refer to cases that are equal to the situation at hand, the arguments of quantity lose their value.

Lastly, one case in which the power of examples over quantitative arguments is apparent is when an inoculation goes badly. Only one such case had the power to be detrimental to the propagandist’s cause, even if the number of successes was great. These unfortunate cases were often explained in more detail in prose because, in these moments, numbers proved to lose their persuasiveness. Even one case can be repeated as an argument to show why inoculation does not work.[348] In his address to the population of Batavia, van Hogendorp informed everyone of his displeasure with the inhabitants banning the procedure from their houses after a little girl of four years old had died. Thoroughly, he explains that she had seemed perfectly healthy and that there had been no indication that she would not be capable of going through the inoculation. Neither the parents nor the physician had overlooked anything. Nonetheless, her passing had inspired many rumours, not least against the parents and the physician but also against van Hogendorp himself.

To defend inoculation, van Hogendorp presents the population with a thought experiment: if they were to take a hundred people from the city and wait three weeks, would they be surprised that at least one of them died? Therefore, he concluded, the little girl must have died from another illness, which would have happened in any case. The course of the inoculation proves this too: the fever already settled in on the first day and the rash on the third. Surely, every physician can agree that this is an absolutely unlikely course. Instead, van Hogendorp attributes these symptoms to “eene kwaadäartige stoffe, die niets gemeens met de kinderziekte hadt”. In total, van Hogendorp dedicated almost a quarter of his speech to reassuring the population not to fear inoculation after this tragic incident. He did this by explaining the event,

[347] van Hogendorp, "Redevoering Der Inentinge," 336-37, 348-49.
[348] Eriksen, “Advocating Inoculation,” 236.

rather than by only using numbers and showing that one in a hundred people had died shortly after having been inoculated.[349]

[349] van Hogendorp, "Redevoering Der Inentinge," 335, 339-343

CHAPTER 6. INOCULATION: ONE SIZE FITS ALL?

The three physicians whose answers on the prize question were published, Petrus van Nielen, Lambertus Bicker, and Jacobus van der Steege, all minimize the impact of the Batavian climate on the process of inoculation. The previous chapter has shown how quantitative arguments based on many observations, and arguments from exemplarity based on examples from the elite, were a crucial first step in their essays. Next, they each drew on the Hippocratic-Galenic framework in different ways to make their point. As has previously been said, historians have emphasized how flexible this framework is. Physicians could argue a great variety of points, depending on which factors they ascribed the most importance to. Likewise, the framework was adaptable to fit various social and political conditions, as is shown by how variable the medical theories about environmental factors were between different colonies.[350] By looking at how multiple physicians answered the same question on the influence of the Batavian climate on inoculation, it is possible to distinguish various kinds of environmental thinking. This chapter will ask the question of how the three physicians, each in their own way, disabled fears about inoculation not working in the East Indies due to the environment. Van Nielen puts forward the concept of seasoning, Bicker emphasizes the importance of fresh air, and van der Steege grounds his argument on his own experience in Batavia.

6.1. Three theories downplay environmental influences

Van Nielen referred to Hippocratic and Galenic ideas more explicitly than the two other physicians. He relies on comparisons between different places to prove his point. Van Nielen concludes that environmental factors do not negatively influence inoculation in the East Indies because the body becomes accustomed to the outside influences. Ultimately, they do not have any effect on the body anymore. Both the natives and those who have lived in a place for a while, are preserved from harmful outside forces. The term he uses is “gewoonte”. As an example of a physician who adheres to this theory, he mentions the Dutch physician Camper because he procures the inoculated with either hot or cold air depending on what they are used to.[351] This concept was widespread under the name of seasoning in English-speaking colonies, as has been mentioned earlier. Pols has written about the optimism of the settlers that they could live a healthy and happy life far away from their country of birth.[352] Even though this idea was quite common, Van Nielen does not refer to it as an established theory that did not need to be proven

[350] Hans Pols, “Health and Disease in the Tropical Zone: Nineteenth-Century British and Dutch Accounts of European Mortality in the Tropics,” *Science, Technology and Society* 23, no. 2 (2018): 336.
[351] van Nielen, “Antwoord Op de Vraag,” 105-106.
[352] Hans Pols, “Notes from Batavia, the Europeans’ Graveyard: The Nineteenth-Century Debate on Acclimatization in the Dutch East Indies,” *Journal of the History of Medicine and Allied Sciences* 67, no. 1 (2012): 120.

anymore. Instead, he defends his case with numbers such as temperatures, rainfall, and mortality statistics of different diseases.

Van Nielen argues his point with a series of comparison-based inductions using an amalgam of data from all over the globe. First, he looks at the similarities and differences between Europe and the East Indies. Since inoculation has led to a decline in the mortality caused by smallpox, van Nielen looks at whether this situation can be replicated in the settlements. He explicitly draws on the legacy of the six non-naturals, factors known to influence the human body, to determine what could have an impact on the course of inoculation. He divides the non-naturals in two categories: those that can be managed and adapted to the conditions at hand by the physician and the patient, and those that are outside of their control. Air is the only factor in the latter category. The rest of the non-naturals are considered manageable by the individual with the help of his doctor; these factors are food, rest and sleep, motion and exercise, retentions and evacuations, and the passions. Therefore, it is the only factor that could determine that inoculation cannot be carried out well in the East Indies; it escapes what medicine can do.[353]

Van Nielen attributes a significant amount of agency to humans themselves to manage their health, even in another place. His answer does not reflect the fears of other colonists, for example, that the climate corrupts their food or the difficulty to manage one's emotions while being separated from the motherland and family. Next, he groups the climate of all the places of the tropics together under two common denominators: hot and humid. An analysis of the temperature in places in the East Indies, West Indies, and Europe shows that the temperature is not necessarily always higher in the tropics, but it is more consistently hotter than in the temperate zone. Likewise, the long rainy period, or the winter, is unhealthy because the humidity causes putrefaction in the body and, therefore, disease. The dry season is less dangerous than the wet season in great part due to the winds coming from the direction of the sea. This air purifies the air of noxious vapours and keeps the atmosphere cooler and drier overall. In general, drier places and those located near the sea are better, as well as those higher in altitude. For this part, van Nielen based his data exclusively on reports he has read. For example, data published in the *Verhandelingen* of the *Hollandsche Maatschappij der Wetenschappen*, and written by individuals in the seventeenth century such as Bontius and the Jesuit Claude de Bèze (1657-1695).[354] The disparate numbers illustrate how warm cities such as, among others, Batavia and Sumatra are, and how much rain falls in Bombay in one year. For van Nielen, the data supports the prevailing theory about putrefaction brought on by hot and humid air, as well as the swamps caused by this climate.

[353] van Nielen, "Antwoord Op de Vraag," 90-92, 113-14.
[354] van Nielen, "Antwoord Op de Vraag," 93-102.

Van Nielen follows up with debunking this "a priori"-theory based on his own experience. He compares illnesses believed to be caused by the scorching air with their counterparts in Europe and concludes that they are neither more difficult to cure nor more dangerous in the tropics. The physician substantiates his claims with a list of how many people died from these illnesses in the East Indies over about three years, according to the English physician Ives. Without giving any numbers, he states that people from the same class in Europe were more likely to die.[355] From this, he concludes:

> *Als het Climaat gene zoo schadelyke invloed op de ziekten veroorzaakt, dat daar door de geneezing merklyk verhinderd werde, is het niet waarschynlyk dat het zelve, nopens de gevolgen van de gevolgen van de Inënting, eene nadeeliger uitwerking zal hebben."*[356]

Instead, it is the competence of the physician that leads to a good result, as well as the general health of the patient. The environmental factors still play some part in the outcome; the physician should choose the best place and moment to inoculate based on local conditions and the seasons. For example, the rainy season is not a good period to inoculate because of the prevalence of diseases. Finally, van Nielen sums up different places in the East and West Indies, where inoculation has been carried out successfully. He also mentions that inoculation had been practiced in the Bengals, Circassia, China, and Constantinople before it was introduced in Europe.[357] To conclude, van Nielen puts the responsibility of inoculation into the hands of the physician, who should be capable, and the patient, who should stay the master of himself. Moral characteristics influence the course of the disease, rather than environmental factors even if these are not completely left out. Although the environment can still have an impact on inoculation, this influence is caused by highly local and seasonal factors, which means that not all places in the tropics are necessarily unhealthy. Van Nielen defends inoculation as a successful worldwide tool to preserve human lives.

This sort of broad analysis was often carried out by physicians living in Europe, rather than the settlements.[358] Van Nielen mentions that he has experience with being a physician in the tropics, but he does not elaborate on this further. He writes: "Myne ondervinding in de geneezing van dezelve ziekten, in beide deze Waereld-oorden, heeft my hier in volkomen bevestigd." He uses this reference to his "ondervinding" that the illnesses in Europe and the tropics are often the same.[359] In the introduction of the *Verhandelingen*, he is introduced as a

[355] van Nielen, "Antwoord Op de Vraag," 102-105.
[356] van Nielen, "Antwoord Op de Vraag," 105.
[357] van Nielen, "Antwoord Op de Vraag," 108-13.
[358] Pols, "Health and Disease in the Tropical Zone," 336.
[359] van Nielen, "Antwoord Op de Vraag," 103.

physician from Utrecht and the director of the *Provinciaal Utrechts Genootschap van Kunsten en Wetenschappen*, which was founded in 1773. Because he had won the second prize for van Hogendorp's prize question on inoculation and the climate, the Batavian Society requested van Nielen to join their society as a corresponding member.[360] Van Nielen published two works in Utrecht in 1775.[361] Since the Batavian Society does not mention that he had previously been to Batavia, and he had clearly been active in Utrecht in the years prior to the prize question, he probably had not visited the settlement before writing his answer. He does not mention the country where he went. In conclusion, it is likely that with "myne ondervinding", he means the research that he has done using the reported data instead of his experience as a physician in the tropics. Seth has shown that the eighteenth-century British physicians writing about illnesses in the British Empire were expected to have at least some personal local experience to be accepted as authoritative.[362] Van Nielen's purposefully vague sentence is probably a response to this expectation that he could not meet.

Lambertus Bicker was a physician residing in the Netherlands as well. It is certain that he never visited Batavia.[363] The Hippocratic-Galenic legacy is clear in Bicker's statement, where he claims it is generally known that medications do not work the same everywhere.[364] Like van Nielen, Bicker also groups the tropics as one, and unlike him, he also takes the latitude of places into account.[365] Bicker quickly comes to the same conclusion as his colleague physician:

> *Zie daar dan de Inënting in allerlei oorden der Waereld, zoo wel onder de verzengde, als onder de gemaatigde luchtstreeken; zoo wel aan geene als aan deze zyde van de Evennagtslyn, en in Volkeren van allerlei art en leevenswyze, met de gelukkigste gevolgen in 't werk gesteld.*[366]

However, his explanation is different than van Nielen's theory: Bicker attributes the success of a procedure to the patient's exposure to a fresh and dephlogisticated air as well as following an adequate regimen.[367] Dephlogisticated or free air was air without phlogiston. Phlogiston was a widespread eighteenth-century theory founded by George Ernst Stahl (1660-

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[360] "Voorbericht," 1786, 14.
[361] Petrus Matthys van Nielen, *Verhandeling over de oorzaaken van het bestaan des leevens, zonder spysen, of zelfs zonder spys en drank, en over de oorzaaken, kentekenen, onderscheid, voorzegging en geneezing van de spyswalging, of afkeer tegen het gebruik van voedzels. Ter gelegenheid van eene zeven-jaarrige spys-dervinge in de persoon van Maria van Dyk [...]* (by J. C. ten Bosch, 1775).
Tissot Auguste André David Tissot, Petrus Matthys van Nielen, and Tieme van Gijsbert, *Onanismus, of, Verhandeling over de Ziekten, Oorspronglyk Uit de Zelfbesmetting* (Utrecht: Paddenburg, 1775).
[362] Seth, *Difference and Disease, 279*.
[363] P. C. Molhuysen and P. J. Blok, eds., *Nieuw Nederlandsch Biografisch Woordenboek. Eerste Deel* (Leiden: A. W. Sijthoff's Uitgevers-Maatschappij, 1911), 345-348.
[364] Bicker, "Antwoord Op de Vraag," 6.
[365] Bicker, "Antwoord Op de Vraag," 25-32.
[366] Bicker, "Antwoord Op de Vraag," 32.
[367] Bicker, "Antwoord Op de Vraag," 32.

1734) that sought to explain combustion. This phenomenon was attributed to a component, phlogiston. According to the theory, when an object burned, the phlogiston was liberated and released into the air. Breathing also released phlogiston into the atmosphere. When the atmosphere contained great amounts of this matter, this could lead to, for example, lightning and thunder.[368]

Van Nielen mentions "de verkoelende antiphlogistique geneeswyze" as part of the trend of the cooling practice of Sydenham and Boerhaave but he does not give it any further thought or explanation.[369] For Bicker, the winner of the first prize of the contest, phlogiston is also linked to the cooling regimen of these physicians. This practice puts the patient into contact with air from outside where there was less phlogiston than inside. This was because it was released by the residents. The air does not have to be cold, but the coolness helps with the symptoms of inoculation. However, even though it might relieve symptoms, his own experience has shown that the changes in temperature taking place over a year, do not influence the outcome of inoculation. Instead, the best way to help the patient is by exposing them to free air by opening windows and letting them go outside in the morning and evening. Lastly, Bicker substantiates his view with messages about the successes of inoculation from Van der Steege. Bicker also adheres to the belief that inoculation can be carried out better in the tropics than in the cold north because the temperature is more constant.[370] To summarize, Bicker minimizes the influence of environmental factors on the course of inoculation and attributes the successful completion of this procedure to mainly one thing: the control of phlogiston. This factor can be managed everywhere on earth. He still advises to follow an appropriate regimen as well, and to be aware that the effectiveness of drugs depends on where on earth they are administrated. This shows the lasting Hippocratic-Galenic legacy. Similarly to van Nielen, he believes that the extent to which humans have control over the influence of the environment on their health, is significant. Phlogiston in the air can be controlled through proper ventilation.

Van der Steege differs from the other two physicians because he resided in Batavia for fourteen years. He had been inspired by van Hogendorp to publish his experience with inoculation in Batavia to incite people to go through the procedure. Van der Steege notices differences between places and bodies when it comes to how lethal natural smallpox is. Generally speaking, there are more people who survive smallpox in Batavia than in Europe, this statement holds true for both natives and European settlers. However, when comparing those born in Batavia with the settlers who were not, the former die in greater numbers, an

[368] Jaime Wisniak, "Phlogiston: The Rise and Fall of a Theory," *Indian Journal of Chemical Technology* (2004): 732–733.
Bicker, "Antwoord Op de Vraag," 37.
[369] van Nielen, "Antwoord Op de Vraag," 127.
[370] Bicker, "Antwoord Op de Vraag," 33-41, 70-72.

observation which does not accord with what was expected from the theory of the humours: Europeans have humours with "scherpheid en bederf" when they are ill unlike the natives who have a good constitution thanks to their simple food. Instead, he ascribes two other reasons for the differing mortality rates. First, he mentions their wrong, cold treatment of submerging the patient when the fever is at its summit. Second, he follows a theory from Camper who observed that those with a "doorschijnend en dof vel" have the greatest number of pustules. Therefore, Europeans, not having such skin, suffer less.[371] This case shows that the theory of the humours had run its course.

While Van der Steege divides people according to how transparent their skin is, this distinction is not the same one as between dark and white skin. The white-skinned people from Nias in Indonesia suffer as much as the dark-skinned inhabitants of Malabar in India, while the Boeguinese and Balinese are relatively saved.[372] When it comes to inoculation, the physician noticed similarities. He observed a very similar course of the disease in each of his sixty inoculated subjects: European children, Malabar, and Nias slaves alike. The recovery was quicker than in Europe. He concludes, based on his observations, that inoculation can be carried out perfectly for everyone in the East Indies.[373] In short, Van der Steege first refutes that inherent characteristics such as the transparency of someone's skin account for the difference in mortality rates. Instead, he divides people according to medical knowledge and practice. Van Nielen likely had to find a balance between accounting for some observed differences in how prominent the disease was in some groups of people, and abating anxieties. Therefore, the variations in outcome were mainly attributed to a manageable factor, the treatment. Van der Steege maintained that the non-controllable factor, the translucency of the skin, would not be a problem because it only affected the number of pustules, and not whether the inoculated would die. This does not prove that there were no prejudices against certain groups based on the characteristics of their skin, but it shows that a local physician circumvented these ideas to promote inoculation as a general tool.

6.2. Toward a standardized regimen

The three authors did not only argue that the process of inoculation was similar for everyone, but they also prescribed a standard regimen for all the inhabitants. This shows again how the physicians emphasized similarities between bodies. The key idea behind the regimen was

[371] van der Steege, "Bericht, Nopens Den Aart," 71-73.
[372] van der Steege, "Bericht, Nopens Den Aart," 74.
Erica Charters, "Making Bodies Modern: Race, Medicine and the Colonial Soldier in the Mid-Eighteenth Century," *Patterns of Prejudice* 46, no. 3–4 (2012): 231.
[373] van der Steege, "Bericht, Nopens Den Aart," 80-82.
van der Steege, "Nader Bericht," 335.

simplicity. Van Nielen's device for his essay, which was probably inspired by Hermann Boerhaave, illustrates this well: "Simplex Sigillum veri" or "Simplicity is the sign of truth".[374] The preparation, medicine, and regimen during the artificially induced disease all worked towards establishing a standard method for everyone while doing away with unnecessary and sometimes harmful precautions and steps. The three physicians all agree that there should be no preparation or a very minimal one. Van Nielen remarks that most regimens are unnecessary and that often the preparation debilitates the patient: "(…) gezonde Gestellen, heft men vrugteloos gefolterd". These harsh regimens, often with strict rules about food and heavy bloodletting, destroy the body's capacity to fight against disease and could never fit everyone. In early modern medicine, the active factor that worked to get rid of illness was conceptualized as an inherent bodily force called Nature.[375] Medicine was then centred around assisting Nature in the recovery of health:

> *(…) het is de ons onbekende werking van de Natuur alleen, die dit vergif ontbindt en uitleid; en welke ontbinding door gene van de genoemde middelen kan verhaast, maar wel vertraagt worden."*[376]

According to Van Nielen, a preparatory regimen is not needed for a good convalescence, since the procedure has been carried out successfully among all people and classes. Still, the physician prescribes a simple regimen based on the patient's ordinary regimen and the principle of moderation. A patient's everyday regimen was based on their temperament. Van Nielen warns against excessive drinking of alcohol and recommends avoiding meat, fish, spirits, and wine. Those who consume these foods and frequently drink should keep on using them in small doses. He advises to purge mildly once or twice with a laxative to prepare the body; this is the most important step that everyone should follow. Next, he recommends healing other illnesses if possible. Exercise and rest should be in line with the patient's usual regimen, but neither should be done in excess. Likewise, married couples are allowed to sleep together if this does not lead to a lack of restraint. The emotions should be as constant as possible. Lastly, the air should be cool and fresh.[377] Bicker prescribes a similar but even more succinct regimen. In like manner, he advises strongly to purge the day before the inoculation. He adds spices, milk, butter, cheese, eggs, and fermented drinks in general to the list of foods to avoid.[378] Van der Steege cares for all his patients in the same way and does not prescribe any preparations.[379]

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[374] van Nielen, "Antwoord Op de Vraag," 88.
[375] van Nielen, "Antwoord Op de Vraag," 147-148.
Hannah Newton, "'Nature Concocts & Expels': The Agents and Processes of Recovery from Disease in Early Modern England," *Social History of Medicine* 28, no. 3 (2015): 465.
[376] van Nielen, "Antwoord Op de Vraag," 149, 189.
[377] van Nielen, "Antwoord Op de Vraag," 142, 149-52, 155.
[378] Bicker, "Antwoord Op de Vraag," 51-52.
[379] van der Steege, "Bericht, Nopens Den Aart," 79.

The regimen van Nielen recommends during the inoculation, illness, and recovery is very similar to the preparation. He adds the non-consumption of butter, oil, and milk to the list. The physician also warns against moving too much and exposing the patient to intense cold. Nonetheless, cold baths are all right.[380] Bicker's regimen for the inoculation is very similar to van Nielen's. In all the normal cases, he advises the same things as in the preparation. He adds free fresh air, cooling drinks, such as lemon water, and well-digestible crops to the regimen. The physician should try to keep the patient's spirits happy and without fear. He only recommends the use of medications, other than mild purgatives, in specific difficult cases.[381] Van der Steege's technique consists of following the patient's habitual diet while leaving out meat and milk. He does not use any medications other than a purgative on the ninth day after the inoculation.[382] The instruction of Bicker and van Nielen are very similar. Van der Steege's prescription is more simple but follows the same general trends of keeping to what the patient is used to and avoiding useless medical steps. To conclude, the recommended regimen is both personal and universal; it leaves room for individual adaptation while giving the same list of guidelines for everyone.

The three physicians are all transparent about who has inspired their method. Van der Steege mentions his teachers Gualtherus van Doeveren (1730-1783) and Camper.[383] Bicker also cites these two Dutch authors as well as their international colleagues such as Chais, Tissot, Schwencke, Dimsdale, and more than twenty others who are related to inoculation in some way or the other.[384] As has already been mentioned, Bicker follows the new way to inoculate, by which he mainly means only preparing by purging mildly, using a lancet covered in recently collected pox matter to shallowly puncture the patient's arms, and using a cold regimen. He credits, among others, Sutton, Gatti, Sydenham, Boerhaave, Dimsdale, Watson, and Schwencke. This new method had worked very well in and outside of Europe and should be applied in the Dutch East Indies as well.[385] Bicker presents the application of the theory of phlogiston to inoculation as his method. He does not take sole credit for it since he writes that it is known since Antiquity that free and fresh air is beneficial for hot illnesses and that other contemporary physicians have shown this through experiments. He does not mention any actual names of his colleagues, so this statement probably reinforces his own observations.[386]

Van Nielen mentions even more names than Bicker.[387] He favours the practice of the Brahmins. These were itinerant inoculators from Bengal. Their manner is the best one for the

[380] van Nielen, "Antwoord Op de Vraag," 162, 190-194.
[381] Bicker, "Antwoord Op de Vraag," 70-85.
[382] van der Steege, "Bericht, Nopens Den Aart," 79.
[383] van der Steege, "Bericht, Nopens Den Aart," 76.
[384] Bicker, "Antwoord Op de Vraag," 5-6, 10-16, 18, 21, 23-25, 27-29, 32-34, 37-38, 40, 46, 50, 72.
[385] Bicker, "Antwoord Op de Vraag," 33, 50, 53-54.
[386] Bicker, "Antwoord Op de Vraag," 35-37.
[387] van Nielen, "Antwoord Op de Vraag," 89, 94-97, 100-103, 107, 110, 115-18, 120, 126-28, 131-33, 137-139, 141, 144-48, 151, 162, 164, 168-75, 184, 196.

tropics, he writes. Van Nielen begins by giving a long and detailed overview of different physician's theories methods for every stage of inoculation. He especially agrees with Dimsdale, but also utters strong critique against him, for example, because he uses mercury pills. Afterward, he concludes that the best practice, the one very similar to what Bicker called the new way of inoculating, is very close to that of the Brahmins. He refutes the technique of the Chinese. Overall, the Brahmins' method and general way of inoculating in Europe are very similar, he argues. They both recommend the use of cooling air, food, and water. The Brahmin do practice pouring cold water repeatedly on the patient's head, and van Nielen suggests this should be replaced by cool baths. Likewise, the itinerant inoculators from Bengal apply a compress with pox matter on the punctures they made rather than putting it directly on the lancet but, van Nielen maintains, this does not make a difference.[388] Thus he concludes "Deze gantsche wyze van inënten verchilt niet dan zeer weinig van die der Braminen: Zy is alleen meer of min omstandig, naar maate der byzondere omstandigheden."[389]

By arguing that the practice of the Brahmins is very similar to the generally and widely applied method in Europe, van Nielen doubly defended his stance that inoculation would work well in the East Indies. First, the method had already been applied successfully in the tropics by natives. Second, the positive outcome that had been carried out in Europe could be replicated in its overseas settlements. Van Nielen mainly draws on John Zephaniah Holwell's writings about the Brahmins.[390] This is interesting because Holwell tried, by arguing that the Indians had used the cold method successfully for a very long time, to validate and legitimize the Suttonian method. His treatise, which came out in 1767, also emphasized the similarities between the two ways of inoculating, namely, a milder preparation and a cool regimen. The main difference was the Brahmin's month-long preparation that strictly forbade the consumption of fish, butter, and meat.[391] Overall, van Nielen's and Holwell's point of view shows how thinking about medical methods became increasingly global. Positive and long-standing examples from one continent were drawn on to justify its use on another continent. In this process, the categories of east and west were blended.

To summarize, both the course of inoculation and the regimen prescribed before, after, and during this process became modelled on a standard. The three physicians were optimistic that this model presented a realistic projection of what a patient could expect, regardless of their different place of birth or where they lived. Bicker, van Nielen, and van der Steege believed that inoculation was a successful tool to manage the health of individual bodies in Batavia.

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[388] van Nielen, "Antwoord Op de Vraag," 117, 175-76, 179, 188, 192-94, 198.
[389] van Nielen, "Antwoord Op de Vraag," 198.
[390] van Nielen, "Antwoord Op de Vraag," 163-67.
[391] Naraindas, "Preparing for the Pox," 310, 326-27.
van Nielen, "Antwoord Op de Vraag," 164.

Consequently, they hoped that inoculation would help the wellbeing of the VOC by limiting the severe human and economic cost of their enterprise. When the physicians mentioned differences in the procedure they advised for someone, these dissimilarities were either cultural, such as eating the food they are used to, or depended on other medical problems that the patient had. Overall this chapter has shown that the physicians differed in their explanations on why inoculation works perfectly well in the Dutch East Indies, and the specifics of the regimen they prescribed. Despite the disparities in their explicatory models, they all implicitly or explicitly move away from the highly individualized Galenic regimens and move towards the view of an abstract, universal body by arguing that the same principles lead to the same results everywhere. The physicians do not discuss how inherent bodily characteristics account for differences in how a native reacts to inoculation versus someone born elsewhere. If someone adhered to their usual and moderate regimen, they could successfully survive inoculation regardless of where they were born and lived.

CONCLUSION

This thesis aimed to uncover the thoughts of the members of the Batavian Society when it came to managing their health in Batavia. This was a place with very different physical surroundings than where they were born. The previous chapters have looked at which outside influences they tried to control and how their views shifted over time. On a cultural level, this thesis tried to analyse how the European inhabitants of Batavia perceived their environment through the lens of its impact on their bodies and those of the natives. This exploration was done by executing a discourse analysis of the first six *Verhandelingen,* and placing them next to other sources that contextualized and contrasted the content of the main source. The analysis showed that the authors in the *Verhandelingen* shared new measures to control their bodies and the environment around them. Specifically, their advice was aimed at either managing humanmade problems in the environment, such as factories and unadequate houses, or exerting control over their body, for example, by following a moderate regimen or getting inoculated. These measures were aimed at all the inhabitants of Batavia and sustained the colonial project by propagating optimism about living a healthy life in Batavia.

The first chapter pointed to the specificities of eighteenth-century medicine; it was a combination of old and new ideas, as well as closely related to disciplines such as topology, meteorology, chemistry, and ethnology. The observations of the natural world of the Dutch East Indies in a broad sense, such as the mountains, the seas, and the habits of the people, played a crucial role in the medicine of the Batavian Society. The second chapter pointed to the change in advised environmental interventions in the last two decades of the eighteenth century. The *Verhandelingen* show that physicians and non-physicians promoted to take on humanmade causes of unhealthy air and water through solutions that were deemed more manageable, such as ventilation and cleaning. Also, more attention was given to air as it became to most important external factor influencing the body. This shows that the importance of a non-natural could change over time depending on what was deemed controllable. The measures stand in contrast with the large-scale interventions in the natural landscape in the seventeenth century and the advice in the eighteenth-century governmental investigations that continued to promote these great interventions. In short, the writers of the *Verhandelingen,* unlike those for the government, were less inclined to promote measures that required a significant agency over their environment. As a point of nuance, van Boeckholtz's text from 1794 did also include measures to undo past human wrongdoings, but the advice was still focused on large-scale solutions. The third chapter showed the prominent attention to food present in the *Verhandelingen,* and the moderate discussion of the other non-naturals. Overall, regimens were considered controllable, and the lack of attention to issues related to them testifies to the settlers' optimism that through

practicing moderation, problems relating to the non-naturals could be dissolved. This advice was applicable to everyone.

Chapter four illustrated the long history of smallpox treatment and inoculation, as well as how these practices have travelled all around the world and were heavily debated. The last two chapters showed the concern of the Batavian Society with the implications of Galenic-Hippocratic medicine for inoculation in Batavia. The work of three physicians who defended that variolation would work just as well in Batavia as in Europe, was published. The fifth chapter shows how, to prove that inoculation works in different places, they combined medicine of the relationship between place and disease with quantitative arguments and arguments from exemplarity, both of which were a legacy of debates on inoculation in Europe. These arguments implied that, at least to some extent, a patient was presented with a standard of what to expect during inoculation which helped the patient make a rational decision. The authors made this decision also into a moral duty by invoking the influence of inoculation on the wellbeing of the Dutch Empire.

The final chapter has shown that multiple explanations could be used to prove inoculation worked well in Batavia, and these theories all took agency away from the outside factors in the environment. Instead, the outcome of inoculation was put into the hands of the physician and the patient, be it through adequately ventilating, not consuming anything in excess, or not getting inoculated while suffering from another disease. These medical writings also served a propagandistic function. Especially Van Hogendorp's fictional work is a prime example of propaganda based on medical knowledge. The Batavian Society likely published their writings because of the belief that inoculation was absolutely needed to help the settlement, and the medical essays diminished anxieties about environmental factors by making them either irrelevant or controllable.

These findings on the eighteenth century show similarities with conclusions from the literature on the nineteenth century. For example, the importance of trade and national interests and the part they play in how optimistic the medical texts were about the possibility to acclimatise. Medical writings from both centuries testify to the presence of the legacy of the non-naturals and the use of data on mortality to substantiate arguments regarding the link between place and disease. There are thus multiple parallels between the two centuries. However, both de Knecht-van Eekelen and Pols analysed texts written by physicians to come to these conclusions, while medical measures in the eighteenth century were written by powerful and/or educated European men who had not always studied medicine. Instead, they were tradesmen, governors, and military men, such as Willem van Hogendorp, Jacobus Radermacher, and Jan Andries Duurkoop. The exceptions were the texts on specific illnesses, prophylactics, and treatments as these were written by people with at least some medical schooling such as the

surgeon David Bylon and the physician Jacobus van der Steege. Boundaries between disciplines were relatively fluid, and at least a great part of the medicine of the environment was open to contributions from members regardless of their education. In conclusion, a great part of the work from the nineteenth-century physicians in Batavia follows the same line as the earlier efforts by the elite and middle-class men from the Batavian Society.

Their perception of the environment helped the settlers to shape their bodily identity. This body had been conceptualised as strong enough to combat harmful outside influences. The medical advice was uniform and did not distinguish between bodies. However, such a standard view on what a healthy interaction between the body and the environment was, can just as well be a knowledge tool to build a colonial empire. While the science under the VOC might not be thought of as, for example, similar to how the British used knowledge for empire building, the Dutch still had their own colonial ideology tied to their political and economic goals.[392] Uniform advice gave the VOC more authority in managing the health of the inhabitants because it meant that health could be improved by applying the same measures to everyone. However, it is not because the authors of the *Verhandelingen* saw similarities between bodies that their view is necessarily inclusive of all bodies. Advice is based on an ideal: a standard solution for a standard body. It, therefore, leaves out many dissimilarities and experiences from certain groups. For example, Gentilcore has written that dietary advice in early modern Europe was written with men in mind while women were left out.[393]

In short, the settlers in Batavia favoured a universal view on the body while, at least in their advice on health measures published in the *Verhandelingen,* they discarded many individualistic aspects in medicine. This thesis focused on the city of Batavia, therefore, it would be fruitful to study if the same conclusion could be found for other parts of the Dutch colonial empire. Such a comparison-based approach could give more insight into why a certain group is conceptualised as mainly uniform when it comes to how their body reacts to prevention, disease, and treatment. In Batavia, Dutch bodies initially reacted to the new physical environment, but they could acclimatise. Through managing humanmade causes of disease and practicing moderation when it came to the non-naturals, they could even thrive. Probably, it was this optimistic standard in the face of a city in decline that played a part in why Josua van Iperen kept his optimism and stated that he was just as healthy in Batavia as in the Dutch Republic.[394] Unfortunately for him, his body lost control over the environment.

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[392] Deepak Kumar, "The Evolution of Colonial Science in India: Natural History and the East India Company," in *Imperialism and the Natural World*, ed. John M. MacKenzie, Studies in Imperialism (Manchester: Manchester University Press, 1990), 51, 63.
Jurrien van Goor, *Prelude to Colonialism: The Dutch in Asia* (Hilversum: Uitgeverij Verloren, 2004), 3, 99-103.
[393] Gentilcore, *Food and Health in Early Modern Europe,* 7.
[394] Wachter, *Lyk- En Lofreden,* 27.

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