

Preprint of M.M.A. Hendriksen, “The disappearance of lapidary medicine: Skepticism about the utility of gemstones in 18th-century Dutch medicine and pharmacy”, in: Michael Bycroft & Sven Dupré (eds), *Gems in the Early Modern World: Materials, Knowledge, and Global Trade, 1450-1800*, Basingstoke: Palgrave, 2018. pp. 197-220.

The repudiation and persistence of lapidary medicine in 18th-century Dutch medicine and pharmacy

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Until the eighteenth century most medical practitioners and natural philosophers were persuaded of the positive effects of at least some gemstones on the human body. This paper argues that as the place of chemistry in universities was consolidated in the eighteenth century, natural philosophers became increasingly critical about the role of minerals, and particularly gemstones, in medicine. However, a complex set of social and economic factors meant that this new, critical understanding of gemstones as *materia medica* in academic chemistry and medicine only slowly transpired in apothecary handbooks and pharmacopeia, and probably in everyday medical practice too.

Although the decline of lapidary medicine in the eighteenth-century has been signalled by others before, little attention has been paid to the causes of this decline.¹ I argue that the persistent presence of gemstones in eighteenth-century Dutch pharmaceutical handbooks appears to have been the result of conservative guilds and possibly the demands of a few wealthy patrons. Moreover, I suggest that it was primarily the acceptance and development of chemistry as an academic discipline that caused the eventual decline of lapidary medicine; the Dutch situation provides a particularly interesting case study here as one of the most important European universities around 1700 was that of Leiden. In the late seventeenth century, medical

¹ Nichola Erin Harris, “The Idea of Lapidary Medicine : Its Circulation and Practical Applications in Medieval and Early Modern England: 1000-1750” (PhD thesis, Rutgers University, 2009), 197.

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professors started to establish chemical laboratories within universities in order to facilitate empirical research on natural phenomena and materials in general and on *materia medica* in particular; the next step in “reading the book of nature”.² They mainly based their chemical experiments on existing alchemical literature, but they simultaneously renounced traditional hermetic descriptions of chemical processes and tried to dissociate academic chemistry from quackery, metallic transmutation and promises of eternal life.³

The Dutch professor of medicine, botany and chemistry Herman Boerhaave played a decisive role in the new scepticism about gemstones as *materia medica*, even though his objections were theoretical rather than experimentally founded. In order to understand the influence of his teaching and ideas on practical pharmacy, a brief outline will be given of the role of gemstones in medicine before 1700, followed by a discussion of Boerhaave’s work and its reception among his students and other medical professionals in both the northern Netherlands and England. Finally, the academic, professional, social and economic factors that led to the persistent yet reticent recurrence of gemstones in Dutch apothecary handbooks throughout the eighteenth century are analysed.

1. Gemstones in medicine: a very brief introduction

² Harry A. M. Snelders, *Van Alchemie Tot Chemie En Chemische Industrie Rond 1900*, vol. 1 of *De Geschiedenis van de Scheikunde in Nederland* (Delft: Delftse Universitaire Pers, 1993), 34-42. Eric Jorink, *Reading the Book of Nature in the Dutch Golden Age, 1575-1715* (Leiden & Boston: Brill, 2010).

³ Marieke M. A. Hendriksen, “Boerhaave’s mineral chemistry and its influence on eighteenth-century pharmacy in the Netherlands”, forthcoming article.

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As Nichola Harris has demonstrated in her 2009 PhD thesis, lapidary medicine, that is to say, the use of stones in medicine, and the idea that stones could heal, either by wearing them on the body in jewellery or powdering them and mixing them into medicinal substances such as electuaries, creams, lotions, pills and potions, were widespread until the eighteenth century.⁴ However, it is important to notice that gemstones were not an isolated category in early modern mineralogy and medicine. They were understood as directly related to specific elements in the cosmos, namely the planets, and it was from these relations that their medicinal powers were explained.⁵

Moreover, gemstones are rare, much rarer than other stones. It is therefore not surprising that they were often found in recipes that also included other rare ingredients, not only minerals, but substances of animal and vegetable origin too, such as pearls, coral, gold, silver, unicorn horn, bezoars, and exotic herbs and flowers. The most typical example is probably the gem electuary, a paste of ground gemstones including sapphires, emeralds, garnets, chalcedony and amber, mixed with herbal and some zoological ingredients like ivory and musk and bound with sugar or honey. The recipe probably came out of the medieval Arabic pharmaceutical tradition--the work of Mesuë the Younger (AD 1015) has been suggested as the original source--and was

⁴ Harris, “The Idea of Lapidary Medicine.”

⁵ For example, Albertus Magnus in his thirteenth-century *Book of Minerals* argues that the kind of stone that is formed in the earth is determined by a formative power that descends from the heavens through the influence of the stars. The supposed formation of the seven metals under the influence of the seven planets is probably the best-known example of this process. See Albertus Magnus, *Book of Minerals*, trans. Dorothy Wyckoff (Oxford: Clarendon Press, 1967), xxvi-xxvii, xxx-xxxiii, xxxv.

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prescribed for a wide array of ailments, ranging from melancholia and nightmares to syphilis and the plague. Obviously the high cost of all those rare and exotic ingredients limited prescription to the extremely wealthy, yet according to a recent study by Christopher Duffin, around 1600 the recipe evolved, and more readily available materials were included.⁶

There are also indications that faith in the curative powers of gemstones made the sale of artificial gemstones as the real thing a lucrative business. The 1662 edition of Jan Bisschop’s *Pharmacica Galenica & Chymica*, a widely used Dutch apothecary handbook, was extended with an appendix for aspiring apothecaries. It contained a separate section devoted to how ingredients for drugs should be selected, and how fakes could be detected. The author warns that “Hyacinthus” (an orange-red transparent variety of zircon) is faked with lead glass, but that this can be detected because lead glass is softer and heavier than the real gemstone.⁷ The inclusion of gemstones in apothecary handbooks persisted in the eighteenth century. In a 1720 updated reprint of apothecary Nicholas Culpeper’s 1659 *School of Physick*, rubies, granate

⁶ Christopher J. Duffin, “The Gem Electuary,” in *A History of Geology and Medicine*, ed. C.J. Duffin, R.T.J. Moody, and C. Gardner-Thorpe (London: Geological Society of London, 2013), 81–111.

⁷ “Hyacinthus wordt vervalscht met glas van loot/maer men wordt dat door het gewicht ende hardigheydt haest geware/want dit glas is sachter ende swaerder dan den Hyacinthus.” Jan Bisschop, *Pharmacica Galenica & Chymica, Dat Is Apotheker Ende Alchymiste Ofte Distilleer-Konste : Begrijpende de Beginselen Ende Fondamenten Der Selver. Verdeylt in Acht Boecken, Tot Onderwijsinge Der Apothekers / Door Een Liefhebber Derselver Konste Nieu Licht Der Apotekers En Distilleerkonst* (Amsterdam: Joannes van Ravesteyn, 1662), 24, 34.

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(garnet), diamonds, topaz, jasper, and lapis lazuli are still listed as simples. Although the editor subsequently noted that this is “...the old Dispensatory, which is now like an Almanack out of date”, he still included a recipe for the gem electuary, calling not only for pearls, ivory, coral, roses, and spodium (bone ash), but also for hyacinth, garnet, emerald, and an assortment of vegetable ingredients.⁸ These examples show that the idea that gemstones had curative properties remained popular, yet few seventeenth-century natural philosophers appear to have developed extensive theories about these properties. An exception is Robert Boyle, with his *Essay about the Origine and Virtues of Gems* from 1672.

Boyle opened his essay by distancing himself from “the more received doctrine, that gems are made of earth and water finely incorporated and hardened by cold”, in other words, from Albert Magnus’s Aristotelian explanation of the composition of gemstones.⁹ Boyle was critical about the medicinal virtues of hard and costly gemstones like diamonds, rubies, and sapphires, but did not reject the possibility that other, less hard gems do have curative properties. The hypothesis that he proposed was twofold:

First, that many of these Gems, and Medical Stones, either were once *fluid* Bodies, as the transparent ones; or in part made up of such substances as were

⁸ Nicholas Culpeper and John Allan, [*Pharmacopoeia Londinensis, or, the London dispensatory*](#) (London: Nicolas Boone, 1720), 49-51, 154.

⁹ Robert Boyle, preface to *Essay about the origine & virtues of gems : wherein are propos'd and historically illustrated some conjectures about the consistence of the matter of precious stones, and the subjects wherein their chiefest virtues reside* (London: Printed by William Godbid, and are to be sold by Moses Pitt, 1672), i-ii.

once fluid: And secondly, That many of the real Virtues of such Stones may be probably derived from the *mixture* of *Metalline* and other Mineral substances, which (though unsuspectedly) are usually incorporated with them: And the *Greatness* of the Variety and Efficacy of those Virtues may be attributed to some happy Concurrent Circumstances of that Commixture.¹⁰

Boyle subsequently discussed a series of first- and second-hand observations of and experiments on minerals and gemstones, touching on their various natural occurrences, shapes, textures, colours, and compositions that support this hypothesis. Six “circumstances” were cited in the argument, but most importantly, Boyle supported the idea that the colour of gemstones is caused by some sort of metallic substance by arguing that the colour of most gemstones will be altered or lost if the stones are put in the fire, “which being a thing that happens to divers fossil Pigments (of which some I employ to tinge Glass)”, as he put it. To strengthen his argument, he listed gemstones that change colour in the fire, like Indian garnet and agate. The fact that coloured gems are often found near metal mines or veins of metallic ore was cited as additional circumstantial evidence for the “metalline” nature of the colour of gemstones.¹¹ Moreover, Boyle stated that he even managed to tinge rock crystal by immersing it in mineral fumes, and wrote of the resulting coloured stones that “the beholders have generally believed them”, suggesting that they could pass for real gemstones.¹²

¹⁰ Boyle, *Essay*, 5-6. Hyphens in original.

¹¹ Boyle, *Essay*, 28-30. Some of these ideas, such as that the colour of gems was due to metals, were derived from earlier works, e.g. Biringuccio’s *De la pirotechnia* (1540).

¹² Boyle, *Essay*, 40-41.

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When it came to the supposed medicinal virtues of gemstones, Boyle decidedly distanced himself from any “Magical and other Extravagant properties”; instead, he wanted to focus on “the True and Medical Virtues that belong to Gems”. To the objection that the mineral substances in gemstones could never influence the human body because they were locked up in the stones, indigestible, and unconquerable by bodily heat, Boyle listed a number of counterarguments. First of all, he wrote, he relied on the “very credible Testimony of eminent Physicians and Patients”, who had assured him gemstones had medical virtues. Furthermore, the influence of some naturally magnetically and electrically charged stones on the human body is generally known, and a substance does not necessarily have to be ingested to influence the body.¹³ More proof of the potential influence of metallic substances on other materials and the human body without the need to dissolve them, in Boyle’s eyes, was found in antimonial cups which were used to make emetic wine, and in the use of water in which mercury had soaked to kill intestinal worms.¹⁴ These arguments taken together, Boyle hoped, meant that:

...you will not think it absurd to conjecture, both that some precious Stones may have Medical Virtues, and that divers of these may be ascribed to the Mineral substances, whereof they participate or consist...¹⁵

Although the *Essay about the Origine & Virtues of Gemstones* was not Boyle’s most well-known work, Boyle’s influence as an experimental chymist and one of the founders of the Royal

¹³ Boyle, *Essay*, 105-109.

¹⁴ Boyle, *Essay*, 119.

¹⁵ Boyle, *Essay*, 122.

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Society on his contemporaries, especially on his fellow countrymen, was substantial. Hence it is no surprise that lapidary medicine was still widespread in early eighteenth-century English medical and pharmaceutical handbooks. Yet in the course of the eighteenth century, this started to change, and I argue that it was a Dutch professor who was one of the driving force behind this change.

2. The decline of lapidary medicine: the influence of Boerhaave’s chemistry One of the most famous academic chemists in the eighteenth century was Herman Boerhaave (1668-1738), professor of botany, chemistry, and medicine at Leiden University between 1701 and his death in 1738 (Figure 1). Students flocked to his lectures from all over Europe, and his works were widely translated and read, both during his lifetime and long after his death. One of Boerhaave’s most widely used works was his chemistry handbook, the *Elementa Chemiae*, first officially published in 1732, after an unauthorized edition had already appeared in 1724 (Figure 2).¹⁶ In

¹⁶ Herman Boerhaave, *Elementa Chemiae, Quae Anniversario Labore Docuit in Publicis, Privatisque Scholis*, (Leiden: Isaak Severinus, 1732). The edition used here is Herman Boerhaave, *A New Method of Chemistry : Including the History, Theory, and Practice of the Art: Translated from the Original Latin of Dr. Boerhaave’s Elementa Chemicæ, as Published by Himself. To Which Are Added, Notes; and an Appendix, ... With Sculptures*. Translated by Peter Shaw, (London, 1741), which is a reliable translation of the *Elementa*. For extensive discussion of Boerhaave’s chemistry, see Rina Knoeff, *Herman Boerhaave (1668-1738): Calvinist Chemist and Physician* (Amsterdam: Edita, 2002), and John Powers, *Inventing Chemistry. Herman Boerhaave and the Reform of the Chemical Arts* (Chicago: University of Chicago Press, 2012).

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the *Elementa*, Boerhaave aimed to describe all available chemical theory and processes, rather than just pharmaceutically useful preparations.¹⁷ On gemstones he wrote:

[Gemstones] seem composed of a fine, perfect kind of salt and earth intimately mix'd; as glass is of salt and ashes fused by fire. (...) Those gems, which are tinged with some beautiful colour, approach to the nature of [crystal], only with the addition of some metalline pigment, or some fix'd fossil body, which is intimately mix'd and incorporated with them in their first formation: as may be gathered from the resemblance of colours, as well as from the manner of making glass.¹⁸

[Insert Figure 1 about here, with the following caption: Figure 1. *Herman Boerhaave*, portrait by Cornelis Troost, oil on canvas, 1735. Courtesy of the Rijksmuseum.]

[Insert Figure 2 about here, with the following caption: Figure 2: The title page of the official 1732 edition of the *Elementa Chemiae*.]

The analogy with the production process of coloured glass to explain the colour of gemstones was already used by Albertus Magnus in the second half of the thirteenth century, and was, as we have seen, repeated by Boyle, even though he did not agree with Albert on the formation and composition of gemstones.¹⁹ Albert argued that stones had medical or magical powers that

¹⁷ Boerhaave, *A New Method*, vol. I, 2.

¹⁸ Boerhaave, *A New Method*, 132.

¹⁹ Magnus, *Book of Minerals*, 42.

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were inherent in their form and imparted to them by the formal cause, the “formative” power of the heavens, and although Boyle denied the possibility of magical powers, he did maintain that the metalline substance in gemstones could medically influence the body. Boerhaave, who felt that a chemist should pay “no homage to occult qualities” and should rely solely on chemical analysis and physiology to explain the effects of substances on the human body, appears to have denied not only that gemstones had magical powers but also that they had any kind of particular medicinal effect.²⁰ He did not discuss gemstones in any more detail in the rest of his written chemical and medical work.

Although Boerhaave conducted extensive chemical experiments on many substances, including mercury, and published on these experiments, he never mentioned experimenting with gemstones. The reason Boerhaave paid no more attention to gemstones was most likely his reticence about the use of minerals, and particularly metals, in medicine. He argued that their corrosive nature was generally dangerous for the human body and that only iron and sometimes mercury should be used in very small amounts when all other options fail, and only under the supervision of an experienced physician.²¹ Given this stance on the medical use of metals and his view that gemstones were basically nothing more than crystals coloured with metalline pigment, it is not surprising that he paid no more attention to them in his work. Boerhaave’s only mention of something resembling a gemstone in a medical application is that of *Lapis Haematitis*, or bloodstone, a mineral that he identified as an ore of iron and not as a gemstone, because only transparent stones in his view were gemstones.

²⁰ Boerhaave, *A New Method*, vol. I, 74.

²¹ Boerhaave, *A New Method*, vol. I, 67-70.

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However, from a publication allegedly based on lecture notes by one of his foreign students, it appears that Boerhaave did discuss the supposed curative powers of gemstones with his students. The 1755 book *Boerhaave's Materia medica, or the druggist's guide* was “taken from the mouth of the great professor Boerhaave, in a course of Lectures” by a Dr James Carroll.²² The applications and doses described indeed largely adhere to Boerhaave's prescriptions and warnings. Yet a remarkable difference between Boerhaave's works and this book is the discussion of gemstones. Whereas Boerhaave mentioned only bloodstone as an iron ore in his *Materia Medica* and limited his discussion of gemstones in his *Elementa Chemiae* to their chemical composition, this English publication devotes individual lemmas to an array of gemstones, like crystal, beryl, sapphire, garnet, ruby, lapis lazuli, and malachite. Yet not all gemstones are useless in medicine according to this text: powdered crystal is recommended against gravel, and possibly as an astringent. Of most of these, Carol notes both their alleged medical use, and some denunciation thereof. Of lapis lazuli, for example, it is said that “It is a violent Emetic and Purgative, owing to the coppery Particles. It was recommended against Disorders of the Head, and as a Cordial and Sub-Astringent, in small Quantities.” However, “...it became on this Account an Ingredient in several Compositions, but it is not now used”.²³

From this discussion of gemstones it appears that students largely relied on Boerhaave's chemical understanding of gemstones to reject most of their traditional applications in

²² The book was published as Herman Boerhaave, *Boerhaave's Materia medica, or the druggist's guide, and the physician and apothecary's table-book. Being a compleat account of all drugs* (London: J. Hodges, 1755). It was supposedly an English translation of a Latin manuscript by James Carol, a former student of Boerhaave.

²³ Boerhaave, *Boerhaave's Materia medica*, 158.

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medicine. It remains a striking fact that although Boerhaave extensively researched the nature of metals and earths through experiments, in the case of gemstones he appears to have based his ideas on existing literature and his knowledge of other mineral substances, and by deduction declared gemstones useless as medical material--a point of view that was generally accepted by his students. That gemstones were no longer generally seen as medical material closer to Boerhaave's home appears from how they are discussed in one of the most important apothecary Dutch handbooks of the eighteenth century, namely the 1741 revised edition of the Flemish 1681 *Medicina Pharmaceutica*.²⁴ This work was commissioned by Boerhaave's successor Jerome Gaub and contained a new list of simples by the Leiden apothecary Johannes Schröder. Gaub felt it was particularly important that the book was in Dutch, not in Latin, because although apothecaries formally had to master Latin well enough to read recipes and pharmacopeia, this often turned out not to be the case, with all kinds of disastrous results.

The author of the original 1681 edition, Robertus Farvacques, discussed in quite some detail, and without criticism, the medicinal preparations and a wide spectrum of curative qualities of a number of stones, including lapis lazuli, sapphire, hyacinth (ruby), topaz, and garnet. Schröder's ideas were clearly different.²⁵ In the section of his list devoted to metals, minerals, and stones, Schröder gave an overview of where they were found and how they could be used in the apothecary shop. Schröder discussed many gemstones in more detail than Boerhaave. He did still list pulverised rock crystal as a cure for diarrhoea, and powdered lapis

²⁴ Robertus de Farvacques and Johannes Schröder. *Medicina Pharmaceutica, of Grootte Algemeene Schatkamer Der Drôgbereidende Geneeskunst*. Leiden: Isaak Severinus, 1741.

²⁵ Robertus de Farvacques, *Medicina Pharmaceutica, of Grootte Algemeene Schatkamer Der Drôgbereidende Geneeskunst* (Brussel: Francois Foppens, 1681), 126-30.

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lazuli was prescribed to strengthen the heart and to alleviate melancholy. However, Schröder was critical about the uses of other stones, especially when worn on the body. Schröder mentioned that the eagle stone (not a gemstone but a sort of hollow clay stone) was commonly believed to prevent miscarriage when worn around the neck, to ease labour when tied around the calf, and recommended by some in plasters to treat convulsions. However Schröder warned that its only real use is to stop bleeding and diarrhoea when taken in powdered form. About garnet and ruby he remarked that cordial powers were attributed to them, as well as the power to ward off melancholy and venom, but in his book they too served only in powdered form to curb sharpness in the body, to temper the flow of blood and faeces, and to dry. Similarly, Schröder said of sapphires that many uses are ascribed to them, which they do not possess, such as cordial, blood cleansing, and other powers. Basically, stones and gemstones in Schröder's list mainly qualified in powdered form to stop bleeding and diarrhoea; no other applications were mentioned. So even if he did not exactly ridicule the use of gemstones as an ingredient in pharmaceuticals or their direct application on the body, the attentive reader understands that the author sees them as rather pointless.

Schröder's book is not the only authoritative Dutch apothecary handbook from this period that subtly denounces the use of gemstones in pharmacy. Almost without exception, such books do list gemstones and even pharmaceutical recipes containing them, only to subsequently discourage their use.²⁶ Kornelis Elzevier (no family of the Leiden printer) in his

²⁶ E.g. Bisschop, *Pharmacica Galenica & Chymica*; Engelbertus Capueel, *Clarius et Majus Lumen Pharmacopaeorum* (Antwerpen: Weduwe van Jean François Lucas, 1724), and *Enchiridion Medicum; Oft, Medicyn-Boeksken* (Antwerpen: De Weduwe van C.I. Vander Hey, 1757). De Farvacques, *Medicina Pharmaceutica*. De Groot, Gerrit. *Pharmacopoea*

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1755 *Apothecary's Dictionary* listed various pharmaceutical preparations containing gemstones, but he noted the following after a recipe based on powdered emeralds: “I doubt

Amstelredamensis, of Amsteldammer Apotheek, in Welke Allerlei Medicamenten, Te Amsteldam (11th ed. Amsterdam, 1756). Kornelis Elzevier, *Lexicon Galeno-Chymico-Pharmaceuticum Universale, of Groot-Algemeen Apothekers Woordenboek, Vervattende de Voorschriften Der Samengestelde Geneesmiddelen, Die in Alle Bekende Dispensatorien Worden Gevonden. : Uit Meer Dan LXXX Zoo Oude Als Nieuwe Artsenyboeken by Een Gebragt* (Amsterdam: by H.Gartman, W.Vermandel en J.W.Smit, 1790). Pieter van der Eyk, *Nieuwe Nederduitsche Apotheek. : Op Eene Klaare En Verstaanbaare Wyze Onderwys Gevende Omtrent de Beste Dagelyks Gebruikt Wordende Geneeskundige Bereidingen; Waar in Inzonderheid de Scheikundige Bewerkingen, Volgens de Gronden Der ... Heeren Boerhaave, Geoffroy ... Zoo Duidelyk Beschreeven Worden* (Leiden: Pieter van der Eyk, 1753). Pieter van Hamel, *Pharmacopaea Hodierna, Ofte Hedendaegsche Apotheek; Waer in de Voornaemste En Meest in Gebruik Zijnd* (Amsterdam: M. Schalekamp, 1774). Wouter van Lis, *Pharmacopoea Galeno-Chemico-Medica... = Meng- Schei- ... / Wouter van Lis Meng-Schei- En Geneeskonstige Artseny-Winkel* (Amsterdam: Jan Morterre, 1747). Josph Franz von Jacquin and Gerardus Plaat. *Leerboek Der Algemeene En Artsenijkundige Scheikunde* (Leiden: by A. en J. Honkoop, 1794). *Pharmacopoea Amstelredamensis, of Amsteldammer Apotheek, in Welke Allerlei Medicamenten, Tot Amsterdam in 'T Gebruik Zynde, Konstiglyk Bereyd Worden* (7th ed. Amsterdam: Nicolaas ten Hoorn, 1714). *Pharmacopoea Roterodamensis Galeno-Chymica, of Rotterdamsche Galenische En Chymische Apotheek* (Rotterdam: Philippus Losel, 1728).

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whether stones and pearls are of the largest utility.”²⁷ I have found no proof of any of the listed lapidary recipes actually being prescribed or prepared, but the fact that they were still included in pharmacopeia by the mid-eighteenth century does suggest there was an ongoing interest in them. Van Lis in 1747 listed a variety of gemstones and their characteristics, but finished the paragraph with the remark that “Some have ascribed excellent powers to [these] gemstones: but while they cannot be dissolved by our warmth, I believe that Medicine can do without them.”²⁸

Van Lis is an interesting case because he started his career as an apothecary and brewer in Rotterdam, then gained a medical degree at Utrecht University with a former student of Boerhaave in 1745, and subsequently set up practice as a physician and apothecary in Bergen op Zoom, a city in the Austrian Netherlands where this combination was allowed. His dissertation, on the medicinal applications of Aloe, shows that Van Lis had great respect for Boerhaave and his work, and that although he did not agree with him on everything, he did seem to subscribe to his position on the use of mineral substances--namely that their use in medicine was limited, and the virtues of vegetable-based pharmaceuticals much greater. In the preface to his thesis he wrote:

(...) What about gold, precious stones, pearls and their preparations? I think, I say without venom; like everything that is hard and bright, whatever others may have claimed about them, they should serve as ornament rather than as medication. For they cannot be thoroughly digested, only a few taken from the

²⁷ Elzevier, *Lexicon Galeno-Chymico-Pharmaceuticum Universale*, 683.

²⁸ Van Lis, *Pharmacopoea Galeno-Chemico-Medica*, 109.

Preprint of M.M.A. Hendriksen, “The disappearance of lapidary medicine: Skepticism about the utility of gemstones in 18th-century Dutch medicine and pharmacy”, in: Michael Bycroft & Sven Dupré (eds), *Gems in the Early Modern World: Materials, Knowledge, and Global Trade, 1450-1800*, Basingstoke: Palgrave, 2018. pp. 197-220.

animals (Pedro del porco with volatile salt hosts a beneficial bitterness) have absorbing power, as well as crab stones...²⁹

Yet the fact remains that even though he took a critical stance regarding the use of metals and precious stones and metals in both his thesis and his apothecary handbook, Van Lis still did list gemstones extensively in the latter. He even included a recipe for Lapis de Goa, a man-made “stone” consisting of a mixture of luxurious ingredients, originating from an early eighteenth-century Jesuit priest in Goa, India, which was meant to have curative properties similar to animal bezoar or gallstones (Figure 3).³⁰ The original recipe was secret and closely guarded,

²⁹ Wouter van Lis, *Dissertatio Medica Inauguralis de Aloë* (Utrecht: Johannes Broedelet, 1745), “Praefatio”, verso 2: “Quid de auro, Lapidibus pretiosis, margaritis; & eorum praeparationibus sentiam, sine suco dicam; haec Omnia respectu duritiei & splendoris, quidquid alii de his etiam clamitent, plus ornament quam medicamento inservire censeo; nam plurima eorum digestion penitus subjecta non sunt, perpauca & illa quidem ex animalibus sumta, (Pedram del porco sale volatile amaro praeditam, si exceperis) vim absorbentem aequae ac lapides cancerorum possident...” Pedro del porco is the gallstone (bezoar) of the Indian or Malacca porcupine; crab stones, also known as crab’s eyes, are the stony concretions on the heads of crayfish. See Robert Hooper, *A New Medical Dictionary: Containing an Explanation of the Terms in Anatomy, Physiology ... and the Various Branches of Natural Philosophy Connected with Medicine* (Philadelphia: M. Carey & Son, 1817), 78, 113.

³⁰ Duffin, “Lapis de Goa: The “Cordial Stone,”” *Pharmaceutical Historian* 40, no. 2 (2010): 22–30.

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but Van Lis’s variation contained hyacinth, ruby, sapphire, topaz, emerald, pearls, oriental bezoar, white- and red coral, musk, ambergris, and leaf gold.³¹

[Insert Figure 3 about here, with the following caption: Figure 3. Lapis de Goa in a jar, 1650 – 1700, H: 9,5 cm Dm: 5,0 cm. Courtesy of Museum Boerhaave. Inventory number: V09980]

These sources strongly suggest that Boerhaave’s stance on the usefulness of gemstones as *materia medica* dominated pharmaceutical theory and practice in the eighteenth-century northern Netherlands, even though he apparently did not perform experiments on gemstones or test their alleged medical use himself, or extensively discuss them in writing. However, as Carol’s book suggests, Boerhaave may well have discussed gemstones as *materia medica* in his classes, possibly on request of his students. Whether he ever explicitly discussed Boyle’s arguments in favour of the medical use of gemstones in his classes remains unclear. But unlike Boyle, who had to rely on reports of practicing physicians about the medical application of gemstones, Boerhaave also occasionally saw patients himself, and had many “paper patients” who consulted him in writing.³² Moreover, although his work was still respected and widely read in the early eighteenth century, not least by Boerhaave himself, Boyle had died in 1691, when Boerhaave was still a young man. By the 1730’s, Boerhaave was an internationally respected professor of medicine, botany, and chemistry himself, and it is not hard to imagine

³¹ Van Lis, *Pharmacopoea*, 139.

³² See, e.g., Gerard A. Lindeboom and Herman Boerhaave, *Boerhaave’s Correspondence*, 3 vols. (Leiden: Brill, 1962); G.A. Lindeboom and Herman Boerhaave, *Boerhaave’s Brieven Aan Bassand* (Haarlem: Erven F. Bohn, 1957).

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that his students were more inclined to follow the teachings of this contemporary protagonist than those of Boyle.

However, the Dutch apothecary handbooks show that although the common opinion amongst both eighteenth-century academic chemists and apothecaries in the northern Netherlands was that gemstones, like metals and other exclusive ingredients, were of little or no medical use, apothecaries continued to list them as *materia medica* and to prepare them if asked to do so. This raises two questions: to what extent did academic chemistry like that of Boerhaave actually influence pharmaceutical practice? And which professional, social and economic factors played a role in the reserved but recurring listing of gemstones as *materia medica* in eighteenth-century apothecary handbooks?

3. Why gemstones would not disappear: academics, social and economic factors

In Boerhaave’s later life, his work and fame made Leiden University an internationally renowned centre for the study of medicine and chemistry. However, Boerhaave died in 1737, and his successor Gaub, although an actively experimenting chemist, never attracted the same numbers of students. Gaub published relatively little, and from his lecture notes it appears that he lectured about and experimented with numerous mineral substances, but not gemstones.³³ The economic and intellectual decline of the northern Netherlands in the eighteenth century has

³³ Hieronymus D. Gaub, “Chemiae Praxis. Notes of Lectures by an Unnamed Student.

Produced in Leyden”, Wellcome Library Manuscripts, call number WMS 4 MS.2479. H.D.

Gaub, “Dictata in Chemiam” Zeeuws Archief Middelburg, MS call numbers 6271, 6270.

Preprint of M.M.A. Hendriksen, "The disappearance of lapidary medicine: Skepticism about the utility of gemstones in 18th-century Dutch medicine and pharmacy", in: Michael Bycroft & Sven Dupré (eds), *Gems in the Early Modern World: Materials, Knowledge, and Global Trade, 1450-1800*, Basingstoke: Palgrave, 2018. pp. 197-220.

been vastly overstated by some historians, but the Dutch Golden Age was definitely over.³⁴ Moreover, learned and experimental societies were established relatively late compared to surrounding countries, which meant there was little in terms of experimental and intellectual infrastructure outside universities and private laboratories.³⁵ Meanwhile, regulations for the medical professions were established locally rather than on the national level, and Dutch apothecaries were in an ongoing process of professionalization, with apothecary guilds in some cities having only been established in the seventeenth or even eighteenth century. It is impossible to establish how many apothecaries had some sort of academic training, as records of qualified apothecaries, registered students, and graduates from this period are incomplete and dispersed.³⁶

As Gaub's commissioning of an updated apothecary handbook in the vernacular and Van Lis's pharmacopeia show, Dutch university professors of chemistry and academically trained physician-apothecaries were concerned with pharmaceutical practice, although they too

³⁴ For a nuanced view, see the essays in Margaret C. Jacob, Wijnand W. Mijnhardt (eds.), *The Dutch Republic in the Eighteenth Century: Decline, Enlightenment, and Revolution* (Ithaca: Cornell University Press, 1992).

³⁵ Hans Bots, *Van Universitaire Gemeenschap Tot Academische Kring. Enige Aspecten Met Betrekking Tot De Opkomst En Ontwikkeling Van Geleerde Academies En Genootschappen in West-Europa* (Amsterdam: Genootschap ter bevordering van Natuur-, Genees- en Heelkunde, 1976).

³⁶ Willem Frijhoff, "Medische beroepen en verzorgingspatroon in de Franse tijd: een dwarsdoorsnede", *Tijdschrift voor de geschiedenis der Geneeskunde, Natuurwetenschappen, Wiskunde en Techniek*, vol. 8.3, (1985), 94.

Preprint of M.M.A. Hendriksen, “The disappearance of lapidary medicine: Skepticism about the utility of gemstones in 18th-century Dutch medicine and pharmacy”, in: Michael Bycroft & Sven Dupré (eds), *Gems in the Early Modern World: Materials, Knowledge, and Global Trade, 1450-1800*, Basingstoke: Palgrave, 2018. pp. 197-220.

may have had primarily commercial motives for the publication of handbooks. As we have seen, the authors of such works apparently tried to strike a balance between, on the one hand, spreading modern insights about the (in)effectiveness of *materia medica* like gemstones and, on the other hand, meeting popular demand and honouring guild prescriptions that required apothecaries to keep particular gemstones as part of their basic stock of simples. They certainly made no attempts to transmit the broader physiological and chemical theory underlying the rejection of gemstones as *materia medica*, save for some brief remarks about the impossibility of digesting certain materials.

For apothecaries, social and economic considerations must have played a more important role than the desire to practice state-of-the-art medicine and pharmacy, even though academically trained natural philosophers and pharmacists were critical about the use of gemstones and other expensive ingredients with no proven health effects like gold, silver and pearls. I have not been able to find proof of the preparation or use of gem electuaries in the eighteenth-century northern Netherlands, but the ongoing listing of gemstones and gem electuaries in apothecary handbooks fits in a broader fascination with pharmaceutical recipes containing exclusive ingredients.

An example of this fascination was the yearly distribution of so-called My Lady Kent balls to the regents of the Delft hospital, a practice that continued at least until the 1780s as it was still registered in the minutes of the regents in 1781.³⁷ The hospital apothecary made these balls based on a recipe from the collection of Elisabeth Grey, Duchess of Kent (1581-1651). Some version or another of it can be found in many different pharmacopeia from the 1650s

³⁷ Henriette A. Bosman-Jelgersma, *Vijf Eeuwen Delftse Apothekers* (Amsterdam: Meesters, 1979), 183-4.

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onwards, often under the name “Pulvis Comitissae Kent”, and with largely corresponding ingredients. This is the recipe as it is listed in the 1741 Haarlem pharmacopeia: 2 drams of contrajerva root, 1 ounce of lobster pincers, 2 drams of red coral, 1 dram of oriental bezoar stone, and finally 2 drams each of pearls, white amber, and viper flesh. The ingredients were mixed in gum arabic and rolled into balls, which were coated with silver or gold leaf.³⁸ Although there are no actual gemstones in it, the similarities with other ingredients from the Medieval gem electuary are remarkable. The My Lady Kent balls were given to the regents as an expensive New Year’s gift and seem not to have been aimed directly at curing a particular affliction. They may have been intended as a sort of preventive medicine, but given the exclusiveness of the ingredients it may just as well have been a kind of corporate bonus, a status symbol.

Another reason why we still see not only exclusive ingredients such as ivory, pearls, and precious metals but also recipes containing gemstones in apothecary handbooks and inventories by the late eighteenth century is that the city pharmacopeia, the official books that most apothecary guilds published and that contained a list of all the ingredients an apothecary should keep in his shop, were revised very infrequently. By the 1780s, in many Dutch cities the most recent pharmacopeia dated from the beginning of the century. In Amsterdam for example, the *Pharmacopoea Amstelaedamensis renovata* that appeared in 1726 was only fully revised and replaced with the *Pharmacopoea Amstelodamensis nova* in 1792.³⁹ Until 1792, the official

³⁸ *Pharmacopoea Harlemensis Galeno-chemica: Senatus auctoritate munita* (Haarlem: Petrus van Assendelft, 1741), 130.

³⁹ Anton Wiechmann, *De Verzameling Medicijnen van Een Amsterdamse Stadsdokter* (Leiden: Museum Boerhaave, 1992), 12.

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apothecary handbook for the city of Amsterdam listed a range of gemstones to be kept as simples in the apothecary shop, like rock crystal, hyacinth, ruby, and garnet. The only recipe given for gemstones was the same as for the preparation of zinc and iron ore or oxide, pearls, mother of pearl, coral, crab eyes, and white amber: smooth on marble with rose water, grind until it no longer gnashes between the teeth when taken in the mouth. Shape into lozenges and dry them in the shade until hard. An application was not mentioned.⁴⁰

The lack of up-to-date information about *materia medica* and preparations in city pharmacopeia was discussed in other apothecary handbooks. As Wouter van Lis put it in the preface to his own pharmacopeia, which he published after he had moved away from Rotterdam:

Our Rotterdam Apothecary has come into the world so lacking, that it not only contains many prescriptions that cannot be prepared, but that also the quantity of the poisons is mistaken [...] because of which a Physician is greatly misled, to the disadvantage of his reputation, and the Sick person can expect very detrimental and wrong effects from such Cures.⁴¹

⁴⁰ [*Pharmacopoea Amstelaedamensis renovata*](#) (Amsterdam: Petrum van den Berge, 1726), 13, 136: “Super marmor tamdiu laeviga, cum aqua rosarum, donec ori inditus, nullum sub dentibus stridorem edat; deinde in pastillos regide in umbra siccandos.”

⁴¹ Van Lis, *Pharmacopoea*, preface. He referred to the official Rotterdam pharmacopeia from 1735.

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Although some writers of apothecary handbooks openly complained about the outdated city pharmacopeia, there was no real organized resistance or reform campaign against them. This can be partly explained by the organization of apothecary guilds and the role of the city pharmacopeia. Until their dissolution in the Napoleonic era, apothecary guilds were powerful institutions in many Dutch cities. Most of them had obtained the exclusive right to prepare and sell pharmaceutical preparations, and their pharmacopeia prescribed which simples an apothecary had to keep in his shop.⁴² The primary purpose of city pharmacopeia was the regulation of the trade and the prevention of accidents with opium and poisons, not giving a state-of-the-art overview of pharmaceuticals. Whereas opium overdoses and poisoning were realistic dangers in eighteenth-century medical and pharmaceutical practice, the chances of poisoning someone with a gem electuary were probably almost non-existent, given the exclusiveness of the ingredients.⁴³ So even if guilds were aware of the ineffectiveness of gemstones as *materia medica*, there was no pressure to remove them from the lists of compulsory simples to be kept in the apothecary shop.

The recipes for gem electuaries and the example of the distribution of My Lady Kent balls in Delft show that there was an ongoing interest among customers in pharmaceutical preparations containing gemstones and other exclusive ingredients. But the question remains how often such preparations were actually made. Moreover, the fact that pharmaceuticals containing gemstones and other mineral-based recipes continued to be included in Dutch pharmacopeia in the eighteenth century, but were almost always paired with warnings and reservations about their efficacy, suggests eighteenth-century Dutch medicine and pharmacy

⁴² Wiechmann, *De Verzameling*, 12.

⁴³ Bosman-Jelgersma, *Vijf Eeuwen*, 167-74.

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were still primarily plant-based.⁴⁴ This is supported by a survey of eighteenth-century manuscript household and pharmaceutical recipes from the collections of Museum Boerhaave in Leiden and Leiden University Library, very few of which contain mineral substances, and none of them gemstones.⁴⁵

Yet only in the 1790s did gemstones drop out of official pharmaceutical sources. In the new Amsterdam pharmacopeia of 1792, although My Lady Kent powder was still listed, only a couple of stones were mentioned, and none of these were actually precious stones or gemstones. They were metallic oxides and nitrates, and they were identified as such: *lapis calaminaris* and *lapis haematitis*, zinc and iron oxide respectively, and *lapis causticus or infernalis*, silver nitrate.⁴⁶ During the French occupation of the Netherlands (1795-1813)m gemstones, together with My Lady Kent powder and ingredients like pearls, crab eyes, and

⁴⁴ It should be noted that plant-based pharmaceutical preparations remained dominant until the discovery of the possibility of isolating plant alkaloids from 1804 onwards and subsequently of the artificial production of such alkaloids from 1886. See John P. Swann, “The Pharmaceutical Industries”, in *The Cambridge History of Science*, 8 vols (Cambridge: Cambridge University Press, 2002) VI: *Modern Life and Earth Sciences*, ed. By Peter J. Bowler and John V. Pickstone (2009), 127–28; A. F. P. Morson, “Operative Chymist”, *Clio Medica* no. 45 (Amsterdam: Rodopi, 1997), 34, 60, 79.

⁴⁵ Museum Boerhaave Library call numbers BOERH a 176, BOERH a 322, BOERH a 335, BOERH a 323, BOERH a 313, BOERH A 612, BOERH f18352. Leiden University Library call number MB: a 308, MB: a inst 26.

⁴⁶ *Pharmacopoea Amstelodamensis nova* (Amsterdam: Petrum Henricum Bronsberg, 1792), 190.

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coral, finally disappeared from Dutch medicine and pharmacy completely. In this Batavian Republic, the guilds were abolished, a state department of medicine was established, and a committee of professors of medicine wrote a new, national pharmacopoeia, the *Pharmacopoea Batava* or *Bataafsche Apotheek*.⁴⁷

The contrast between mid-seventeenth century city pharmacopoeia on the one hand and those from the 1790s and especially the 1805 Batavian pharmacopoeia on the other is immense in this respect, and can be explained by the developments in chemistry and their influence on pharmacy in France in the second half of the eighteenth century. Whereas the Netherlands had no institutional infrastructure for chemical research and experiment to speak of in this period, in France there was a strongly developed interest in and investigation of the mineral kingdom, which may have explained the French skepticism about the medical value of precious stones.⁴⁸ As the Dutch chemist and apothecary Johannes Kasteleyn complained in the preface to his 1786 work on pharmaceutical, economical, and working chemistry, chemists were divided about which doctrine was correct: Lavoisier’s was not widely accepted yet, and this division, Kasteleyn argued, influenced production and trade negatively.⁴⁹

⁴⁷ Sebald J. Brugmans et al, *Pharmacopoea Batava* (Amsterdam: Allart, 1805), S.J. Brugmans et al, *Bataafsche Apotheek* (Amsterdam: Allart, 1807). Also see Willem Frijhoff, “Medische beroepen”, 1985.

⁴⁸ Christine Lehman, “Alchemy Revisited by the Mid-Eighteenth Century Chemists in France: An Unpublished Manuscript by Pierre-Joseph Macquer”, *Nuncius*, 28 (2013): 165-216, 192.

⁴⁹ Petrus Johannes Kasteleyn, *Beschouwende En Werkende Pharmaceutische, Oeconomische, En Natuurkundige Chemie*, 3 vols. (Amsterdam: Willem Holtrop, 1786), vol. 3, vi-vii.

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The persistence of gemstones in eighteenth-century Dutch pharmaceutical handbooks thus appears to have been the result of conservative guilds and possibly the demands of a few wealthy patrons. The belief in magical or medical powers of gemstones would never entirely disappear--a quick Google search for “healing stone” is enough to see that it is alive and kicking even today--but after leading a marginal existence in eighteenth-century Dutch medicine and pharmacy because of Boerhaave’s scepticism, it was only decisively rejected by academics and pharmacists in 1805.

Conclusions

After centuries of wide acceptance, lapidary medicine started to crumble from the seventeenth century onwards, notwithstanding the endorsement of an intellectual heavyweight like Robert Boyle. In the northern Netherlands it all but disappeared after Boerhaave implicitly rejected it in his chemical handbook, and explicitly opposed it in his lectures. His criticisms were mainly theoretical, but because of his status and influence they resonated within practical pharmacy, even though the exact theory behind the rejection was relatively unimportant to apothecaries.

Gemstones did not disappear from Dutch pharmacy completely until the nineteenth century because academic criticisms of lapidary medicine were relatively indirect, and because professional, economic and social structures ensured their continued popularity. Academics did not reject lapidary medicine explicitly in writing, and sometimes there was no clear distinction between the academic community and commercially operating apothecaries, as we saw in the work of Gaub and Van Lis. The power of wealthy patrons and apothecary guilds, and the continued listing of gemstones and other exclusive ingredients in city pharmacopeia, as well as a popular fascination with the alleged medical powers of rare substances and objects, all contributed to the persistent presence of gemstones as *materia medica*, at least in writing.

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Economic decline, a lack of intellectual infrastructure, the absence of urgency and structured experimental research into the effectiveness of gemstones in medicine in the northern Netherlands in the second half of the eighteenth century meant there was little reason for academics and apothecaries to actively campaign against the listing of gemstones as *materia medica*. The incorporation of chemistry in the university curriculum in general and Boerhaave’s chemistry in particular ejected lapidary medicine from academic medicine. Given Boerhaave’s international influence, this raises the question of whether the disappearance of lapidary medicine in other regions and countries, most notably the southern Netherlands, France, England, and the German lands, followed a similar pattern, or whether economic and social particularities led to very different developments in those places.⁵⁰

This project has received funding from the Netherlands Organisation for Scientific Research (NWO) through the VIDI research project “Vital Matters” (2012-2017), and from the European Research Council (ERC) under the European Union’s Horizon 2020 research and innovation programme (grant agreement No 648718).

⁵⁰ Although some information is available on the situation in England--see e.g. Harris, “The Idea”, and Tom Blaen, *Medical Jewels, Magical Gems: Precious Stones in Early Modern Britain* (Crediton: The Medieval Press, 2012), 189-318--very little is known about the fate of lapidary medicine in France and the German lands.