

The Unpublished *Medicina contracta* of Arnold Geulincx

Andrea Strazzoni

Abstract: In this paper I provide a commentary on and edition of the unpublished and apparently incomplete *Medicina contracta* of the Flemish philosopher Arnold Geulincx (1624–1669). This short treatise, dating to c. 1668–1669, was not included in the edition of Geulincx’s works edited by J. P. N. Land, on the ground of its apparent unoriginality. However, it reveals the attempt, by Geulincx, to develop a medicine based on a new account of disease (intended in Cartesian-Platonic terms of the impossibility of the mind using the body through animal spirits), and integrating avant-garde solutions typical of iatrochemistry (in particular those of Franciscus Sylvius) and iatromechanics. The text, which I also consider in the light of Geulincx’s disputations in physiology, is moreover revelatory of his ongoing efforts in understanding the nature of respiration and its related diseases and conditions, such as apoplexy, and of his progressive, albeit not uncritical acceptance of Cartesianism.

Keywords: Arnold Geulincx; medicine; disease; Cartesianism; Platonism;

Contact: Andrea Strazzoni, Università degli Studi di Torino, Dipartimento di Studi Storici, Palazzo Nuovo, Via Sant’Ottavio 20, 10124 Torino, Italy; andrea.strazzoni@unito.it; ORCID:

<https://orcid.org/0000-0001-5552-2592>

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1. Introduction

In this paper I provide a commentary on and edition of the unpublished and apparently incomplete *Medicina contracta* of the Flemish philosopher Arnold Geulincx (1624–1669), lecturer and professor of philosophy at Leuven in 1646–1658 and at Leiden in 1659–1669. This text has been basically ignored in the vast secondary literature devoted to him, which concerns especially his logic, metaphysics, and ethics.¹ In logic, attention has been paid to Geulincx’s containment theory, according to which any antecedent in a demonstration includes its consequent.² In metaphysics, he has been studied as a proto-Kantian philosopher, as for him *modi considerandi* as the ideas of substance, part, cause, effect, and so on are indispensable tools in interpreting experience, and yet, potential sources of error as they are mistaken for external things.³ Attention, moreover, has been paid to Geulincx’s peculiar form of dualism, inspired on the one hand by René Descartes (1596–1650), and on the other by a Platonism mediated by Augustinianism. As Geulincx opposes not only (1) the immaterial realm (viz. a universal mind in which individual minds are its modes) to the material one (or extended substance), but also (2) the material realms of being (or immutable material substance, where singular bodies are modes) and the realm of becoming (viz. matter-in-motion, where bodies are parts of matter). Such themes were also addressed by Baruch Spinoza (1632–1677), though with different outcomes in the case of Geulincx, who instead of developing a theory of knowledge connecting these levels of reality (as Spinoza did), came to consider physics as a science of the apparent structure of the world, reflected by the contingency of natural laws or the impossibility of deducing them *a priori*,⁴ and to develop a view of the *conditio humana* as a state of passivity, resulting in an ethics focused on the cardinal virtues of obedience and humility.⁵ A condition based, first of all, on the axiom (accepted in late-Scholastic thought) “that which you do

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For an introduction to Geulincx, see Theo Verbeek, “Geulincx, Arnold (1624–69),” in *Routledge Encyclopedia of Philosophy*, ed. Edward Craig (London: Routledge, 1998), volume 4, 59–61, <https://doi.org/10.4324/9780415249126-DA037-1>; Han van Ruler, “Geulincx, Arnold (1624–69),” in *The Dictionary of Seventeenth and Eighteenth-Century Dutch Philosophers*, ed. Wiep van Bunge, Henri Krop, Bart Leeuwenburgh, Han van Ruler, Paul Schuurman, and Michiel Wielema (Bristol: Thoemmes Press, 2003), volume 1, 322–331; Han van Ruler, “Geulincx, Arnold (1624–1669),” in *The Cambridge Descartes Lexicon*, ed. Lawrence Nolan (Cambridge: Cambridge University Press, 2015), 332–333, <https://doi.org/10.1017/CBO9780511894695.119>.

- 2 Gabriël Nuchelmans, *Geulincx’ Containment Theory of Logic* (Amsterdam: Koninklijke nederlandse Akademie van Wetenschappen, 1988).
- 3 Hermann J. De Vleeschauwer, “Les antécédants du transcendantalisme. Geulincx et Kant,” *Kant-Studien* 45, no. 1–4 (1953): 245–273, <https://doi.org/10.1515/kant.1954.45.1-4.245>; Mark Aalderink, *Philosophy, Scientific Knowledge, and Concept Formation in Geulincx and Descartes* (Utrecht: Utrecht University, Publications of the Department of Philosophy, 2009).
- 4 Andrea Strazzoni, *Dutch Cartesianism and the Birth of Philosophy of Science: From Regius to ’s Gravesande* (Berlin-Boston: Walter de Gruyter, 2018), <https://doi.org/10.1515/9783110569698>, chapter 3.
- 5 Bernard Rousset, *Geulincx entre Descartes et Spinoza* (Paris: Vrin, 1999); Han van Ruler, “Introduction,” in Arnold Geulincx, *Ethics. With Samuel Beckett’s Notes*, ed. Han van Ruler and Han Uhlmann, trans. Martin Wilson (Leiden: Brill, 2006), xv–xlii.

not know how to do, you do not do,”⁶ in which we are actual actors only of a few mental acts, of which we have immediate awareness (affirmation, negation, love, and hate), while any interaction with the material world is determined by God. In fact, Geulincx’s interpretation of Descartes’s dualism led him to argue for the impossibility of communication between soul and body, whose corresponding perceptions or acts of will (in the mind) and movements (in the body) match each other only by virtue of divine power, and at the same time to consider the body (in Platonic fashion) as the mere instrument of the mind, for the reason that the succession of thoughts relies on the succession of bodily motions, as even God cannot produce ideas in us without bodies as instrumental causes.⁷

The interest in these logical, metaphysical, and ethical themes have also dominated the approach to Geulincx’s natural-philosophical writings, viz. his *Physica vera* (posthumously published in 1688), *Physica falsa sive ad mentem Peripateticam* (published by Jan Pieter Nicolaas Land), the section *Somatologia* of his *Metaphysica vera* (1691), some disputations of his,⁸ and two commentaries (1690, 1691) on Descartes’s *Principia philosophiae* (1644), the more specific scientific impact of which has received less attention.⁹ Notably, in his edition of Geulincx’s writings (1891–1893), Land omitted to publish – on the ground of their supposed non-original contents –¹⁰ or to use for the collations leading to his edition, some of the texts one can find in the undated and anonymous manuscript, extant at the Leiden University Library (BPL 1255), containing Geulincx’s *collegia* and labelled in its modern description as *Scholae Academicae ultimae ab auditore anonymo descriptae* (it being, however, unclear whether they were all used in lectures). The texts not used by Land include Geulincx’s *Medicina*, a version of his *Physica falsa* (as the manuscript contains two versions), and a version of the *Annotata praecurrentia* on Descartes’s *Principia* (published in 1690, but extant also as a manuscript). In particular, Geulincx’s *Medicina* lacks any

6 Arnold Geulincx, *Opera philosophica*, ed. Jan Pieter Nicolaas Land (The Hague: Martinus Nijhoff, 1891–1893), volume 2, *Metaphysica vera*, 150; translation from José María Sánchez de León Serrano, “Arnold Geulincx: Scepticism and Mental Holism,” in *Yearbook of the Maimonides Centre for Advanced Studies 2019*, ed. Yoav Meyrav (Berlin-Boston: Walter de Gruyter, 2020), 125–144: 132, <https://doi.org/10.1515/9783110618839-009>. Unless otherwise indicated, all translations are mine. See Andrea Sangiacomo, “Geulincx and the *Quod Nescis* Principle: A Conservative Revolution,” in *The Oxford Handbook of Descartes and Cartesianism*, ed. Steven Nadler, Tad M. Schmaltz, and Delphine Antoine-Mahut (Oxford: Oxford University Press, 2019), 450–464, <https://doi.org/10.1093/oxfordhb/9780198796909.013.28>.

7 Steven Nadler, “Knowledge, Volitional Agency and Causation in Malebranche and Geulincx,” *British Journal for the History of Philosophy* 7, no. 2 (1999): 263–274, <https://doi.org/10.1080/09608789908571028>; Strazzoni, *Dutch Cartesianism*, chapter 3.

8 In Arnold Geulincx, *Annotata maiora in Principia philosophiae Renati des Cartes* (Dordrecht: Ex officina T. Goris, 1691), 155–275; Geulincx, *Opera philosophica*, volume 2, 489–520. The index of Geulincx, *Annotata maiora in Principia* (unnumbered) provides details on them.

9 Gotthard Gronau, *Die Naturlehre Geulincx’ und ihr Zusammenhang mit der Naturlehre Descartes’*. *Inaugural-Dissertation* (Wolfenbüttel: Fischer, 1911); Michael Jaworzyn, “Caspar Langenhert’s Parisian ‘School of Egoists’ and the Reception of Geulincx’ Physics, from Occasionalism to Solipsism,” *History of Universities* 33, no. 2 (2020): 113–142, <https://doi.org/10.1093/oso/9780192893833.003.0006>.

10 Jan Pieter Nicolaas Land, “Arnold Geulincx and His Works,” *Mind* 16, no. 62 (1891): 223–242: 241.

edition, and has been considered only very recently by scholars.¹¹ Given its potential importance for a study of (1) the development of a Cartesian medicine at Leiden during the crucial decade of the 1660s,¹² (2) Geulincx's intellectual biography, and (3) the very metaphysical aspects of Geulincx's thought – as it addresses the crucial issue of mind-body interactions – it is now time to make his *Medicina* available in a more accessible form.

2. Dating

Providing a date for Geulincx's *Medicina* is not straightforward, as is the case for many of his works, which had, mostly, only posthumous editions.

As to the *terminus post quem*, assuming that the text did not undergo revisions which affected its references to other texts, we can date it after Geulincx's *Disputatio medica inauguralis de febribus* (mentioned in the *Medicina*), with which he graduated at Leiden in September 1658;¹³ also, we can date it after the completion of Geulincx's *Physica vera*, as the *Medicina* repeatedly refers to its sixth, last treatise, *De microcosmo*, of which it can ideally be considered as a continuation (I will come back to this in a moment). Moreover, as I discuss in section 3, the *Medicina* was certainly based on some ideas expressed by Franciscus Sylvius (1614–1672) in a publication of his of 1663 and by Regnier de Graaf (1641–1673) in 1664, and included an apparent development of ideas on the conarion discussed by Geulincx in a disputation of 20 December 1664. Thus, the *Medicina* was certainly completed, at least in its extant form, not earlier than 1665. As to the dating of the *Physica vera*, it refers twice to Geulincx's *Logica fundamentis suis restituta* (published during or after August 1662),¹⁴ and some of the contents of its introduction and treatises 1–4 (on body, motion, rest, and on physical hypotheses respectively) can be found, in some cases verbatim, in disputations 1–5 (out of six) of the *Disputationes physicae* presided over by Geulincx in July–October 1663 (disputations 1–3) and November–December 1664 (disputations 4–5).¹⁵

11 Joanna Usakiewicz, "Ciało ludzkie, jego funkcjonowanie i leczenie z okazjonalistycznej perspektywy Arnolda Geulincxa," *Studia z Historii Filozofii* 14, no. 1 (2023): 55–71, <https://doi.org/10.12775/szhf.2023.003>.

12 Evan Ragland, *Making Physicians. Tradition, Teaching, and Trials at Leiden University, 1575–1639. Volume 1* (Leiden: Brill, 2022), <https://doi.org/10.1163/9789004515727>.

13 The disputation is dedicated to Abraham Heidanus (1597–1678) only (so it is difficult to ascertain a clear master of Geulincx at Leiden, in medicine), and deals with the different kinds of fevers and with some of their cures (e.g. bloodletting or emetics), with little insight on the underlying physiological standpoints: nonetheless, Geulincx explains fevers in terms of bad nourishment of the innate heat of the heart, which is compared to the fire of kitchens, as he was to do in his *Medicina*; moreover, he discusses three causes of fever, namely (1) blood coagulation or compactness, (2) its being too rarefied and filled by spirits, and (3) its containing improper matter. See Arnold Geulincx, *Disputatio medica inauguralis de febribus* (Leiden: Apud Johannem Elsevirium, 1658), theses 1–2, 4, 6, 16, and 20–21.

14 Arnold Geulincx, *Logica fundamentis suis restituta* (Leiden: Apud Henricum Verbiest, 1662), 5; Geulincx, *Opera philosophica*, volume 2, *Physica vera*, 370 and 422.

15 As to the introduction, treatise 1 and disputation 1, cf. Geulincx, *Opera philosophica*, volume 2, 368 and 379, with

Moreover, disputation 4 (November 1664) is presented as a commentary on the first three disputations (though it focuses on the first), and is not matched by a separate treatise in the *Physica vera*. However, some of its contents can be noticed in the first treatise,¹⁶ so that we can assume that treatises 1–4 were completed after November 1664, at which point Geulincx used some materials from disputation 4 to prepare or finalize the text of the *Physica vera*. In turn, disputation 6, held in December 1668, includes some contents of treatise 5 (on cosmology) and of treatise 6 (*De microcosmo*).¹⁷ We can therefore hypothesize that the preparation of the materials of treatises 5–6 took place in 1668, and that the *Medicina* was thus prepared in 1668–1669, roughly coeval with the *Annotata maiora* (or *Latiore*) on Descartes’s *Principia*, finalized in 1669 (as it refers to the disputation on cosmology of December 1668,¹⁸ and to a *Disputatio physica de incendio Aetnae* held in June 1669).¹⁹ In fact, as I am going to show, Geulincx’s *Medicina* testifies to his progressive adherence to certain Cartesian theses, which he might have appropriated while working, at the same time, on Descartes’s text.

As to the *terminus ante quem*, this is harder to ascertain, and we can merely identify it with Geulincx’s death (November 1669). No insights on dating, in any case, arise about the appointments and public lectures held by Geulincx at Leiden. He never had an authorization to teach medicine, either publicly or privately, even if the ambiguous character of medicine as a natural-philosophical discipline, and his not touching practical medical disciplines as hygiene or therapeutics (as the *Medicina* deals with physiology, pathology and semeiotics, parts of theoretical medicine, while hygiene and therapeutics constituted practical medicine) left him room to teach it in his private lectures in philosophy, which he was authorized to provide from March 1659, and which he continued until the end of his life. Ultimately, it is not clear whether the text is the result of an abridgement – as the title could suggest – of a larger one. As Geulincx was presiding over disputations in physiology in 1664–1666 (as I discuss in section 3.2), in those years he was probably already lecturing in this discipline, and preparing some texts as the basis of his *Medicina* (whether or not he used the latter for actual teaching, as it seems incomplete).

489; as to treatise 2 and disputation 2, cf. 389 with 496; as to treatise 3 and disputation 3, cf. 408 with 501; as to treatise 4 and disputation 5, cf. 423 with 511.

16 As to treatise 1 and disputation 4, cf. Geulincx, *Opera philosophica*, volume 2, 371 with 505.

17 As to treatise 5 and disputation 6, cf. Geulincx, *Opera philosophica*, volume 2, 428–429 with 515–516; as to treatise 6 and disputation 6, cf. 440 with 515.

18 Geulincx, *Opera philosophica*, volume 3, *Annotata latiora*, 436 and 440.

19 The *Disputatio physica de incendio Aetnae* is in Geulincx, *Annotata maiora in Principia*, 234–239. The reference to the disputation is omitted in Land’s edition, but it can be found in Universitaire Bibliotheken Leiden, BPL 1255, Arnold Geulincx, *Collegedictaten Geulinx*, 134v, 137r, and 141r, and in Geulincx, *Annotata maiora in Principia: Annotata maiora*, 133, 138, and 146.

3. The contents of the *Medicina contracta*

3.1 Life, health, disease, and the function of medicine

Geulincx's physiology reflects his dualism. First of all, for him life is the "the conjunction of mind with body or that usage whereby the mind uses the body," and conversely, death is their separation. (Ideas that rely in fact on a Platonic view, as the body is intended as the instrument of the mind: a position rejected by Descartes, who moreover reduced life phenomena to merely corporeal vegetative functions).²⁰ In turn, health is the "disposition of the human body to further life," while disease is twofold: (1) medically speaking, it is the "close disposition of the human body to death," being the main diseases affecting the heart, as the heart is the place of the production of spirits (which retain a central role in physiology, as for Descartes), or the main instrument by which the mind can use the body, as in *De microcosmo* (§ 7). (2) According to a common understanding of it, or vulgarly speaking, disease is the "affliction or sad perception of the soul," because "as soon as [...] the close disposition to death comes about in the human body, the mind is naturally disturbed." This idea recurs in the *Ethica* and the *Annotata* to it.²¹ Given Geulincx's overall idea of the body as the instrument of the soul, when the body "becomes an unsuitable instrument for the mind itself," a natural state of sadness arises, with the exception of those diseases directly affecting the brain. Such a use of the body by the mind, however, does not imply a communication between substances or even a real agency by the mind. It consists, nominally, in actions and passions: a theory for which Geulincx refers to his *De microcosmo*, where (§§ 1 and 5) passions are described as perceptions, and actions as the acts of will, though "we are ignorant of the way in which [bodily] movement happens," following them.²² Similarly, according to the *Medicina* "that gland hears in a certain way the command of the mind," as "in [...] the human mind there is just a will, as it can neither produce

20 As discussed in a number of studies, Descartes labelled as phenomena of life those traditionally ascribed to vegetative soul (growth, nourishment, procreation), in which mind (or rational soul) does not take part, and maintained that they can be explained, ultimately, by the idea of the innate heat of the heart and the production of spirits for which it is responsible: a kind of explanation which is extended by him also to locomotion and sensation (which in the case of man also involves mind). These ideas were expressed in works available to Geulincx: e.g. his *Discours de la méthode* (1637), the *Sextae responsiones* of his *Meditationes de prima philosophia* (1641), and *Traité de l'homme* (1662, 1664): René Descartes, *Oeuvres*, ed. Charles Adam and Paul Tannery (Paris: L. Cerf, 1897–1913), volume 6, 46–55; volume 7, 426; volume 11, 202. See Karen Detlefsen, "Descartes on the Theory of Life and Methodology in the Life Sciences," in *Early Modern Medicine and Natural Philosophy*, ed. Peter Distelzweig, Benjamin Goldberg, and Evan R. Ragland (Dordrecht: Springer, 2016), 141–172, https://doi.org/10.1007/978-94-017-7353-9_7; Barnaby R. Hutchins, "Everyone Knows What Life is': Life as an Irreducible in and outside of Descartes's Metaphysics and Biology," in *Life and Death in Early Modern Philosophy*, ed. Susan James (Oxford: Oxford University Press, 2021), 263–276, <https://doi.org/10.1093/oso/9780192843616.003.0014>. On Descartes's theory of soul with respect to Plato's, see Sarah Broadie, "Soul and Body in Plato and Descartes," *Proceedings of the Aristotelian Society* 101, no. 1 (2001): 295–308, <https://doi.org/10.1111/j.0066-7372.2003.00032.x>. On the idea of life in Plato (ζωε, for which a living being is a compound of soul and body), see Michael Naas, *Plato and the Invention of Life* (New York: Fordham University Press, 2018), 32–33 and 175–176.

21 See *infra*, n. 32.

22 Geulincx, *Opera philosophica*, volume 2, *Physica vera*, 440–441 and 443.

motion, nor even, properly, determine [it].²³

These positions have to be considered by taking into account Geulincx's medical background, especially the Cartesian one. The medical teaching and discussions at Leiden and in the Netherlands during the 1660s were dominated by the doctrines of a plethora of authors: as those of Jean Fernel (1497–1558) and Daniel Sennert (1572–1637), and those of systematizers like Johannes Heurnius (1543–1601), and Gilbert Jack (1578–1628), while from the 1630s–1640s Vopiscus Fortunatus Plempius (1601–1671) and Henricus Regius (1598–1679) provided influential textbooks, not to mention the lectures and disputations of Sylvius taking place at Leiden from 1658 onwards. Among Cartesian-inspired Dutch medical authors or sympathizers, it is worth mentioning, besides Regius (active at Utrecht) and Sylvius, Cornelis van Hogelande (c. 1590–1662, physician at Leiden), and the Leiden professors Adolph Vorstius (1597–1664) and Johannes Antonides van der Linden (1609–1664) (neither of whom, however, left Cartesian treatises), and Florentius Schuyl (1619–1669, editor of Descartes's *Traité de l'homme*, on which however Geulincx did not rely, as I discuss in section 3.2), while Johannes de Raey (c. 1620–1702) also lectured on medicine in 1659–1662 by commenting upon Sennert.²⁴

Accordingly, we can conclude that Cartesian-inspired physiologies were also widely taught and discussed before the publication of Descartes's *L'homme* in 1662 and 1664. Among them, the first were those of Regius and Van Hogelande: in Regius's *Fundamenta physices* (1646) and *Fundamenta medica* (1647), the ideas of vegetative and sensitive soul, life (intended, in a Cartesian fashion, as the distribution of the spirits nourishing the body),²⁵ and health and disease (consisting in the ability or inability of performing actions or functions, as in several other authors – making Geulincx's position on health quite original),²⁶ are rendered in corpuscular terms, and the classification of physiological functions is simplified.²⁷ The traditional tripartition of faculties and spirits endorsed by Fernel, between natural (procreation, nourishment, growth, primarily residing in the liver), vital (heart beat and pulse, residing in the heart), and animal (movement and sensation,

23 BPL 1255, 584r–v and 587v.

24 Andrea Strazzoni, "Some Unpublished Fragments on Descartes's Life and Works," *The Seventeenth Century* 37, no. 5 (2022): 801–839, <https://doi.org/10.1080/0268117X.2021.2021976>.

25 Vegetative soul is intended as (1) the very disposition of the parts of living bodies, by which they perform their vital functions (nourishment and procreation), and in particular (2) their innate heat, which allows for the distribution of the alimentary juice throughout the whole body – a (3) distribution in which both vegetative soul and life also consist; sensitive soul consists of the very sense and locomotion organs, as spirits, nerves, valves, muscles: Henricus Regius, *Fundamenta physices* (Amsterdam: Apud Lodovicum Elzevirium, 1646), 145–146 and 153. See *supra*, n. 20.

26 Health is intended as the good temperament of qualities (viz. traditional primary and secondary ones) and the apt conformation of organs, allowing the human body to perform actions, while disease is their opposite: Henricus Regius, *Fundamenta medica* (Utrecht: Apud Theodorum Ackersdycium, 1647), 3 and 11.

27 Andrea Strazzoni, "How Did Regius Become Regius? The Early Doctrinal Evolution of a Heterodox Cartesian," *Early Science and Medicine* 23, no. 4 (2018): 362–412, <https://doi.org/10.1163/15733823-00234P03>.

residing in the brain), for instance, is reduced to an Aristotelian bipartition of vital (viz. vegetative) and animal (viz. sense and movement) functions and spirits.²⁸ In his *Cogitationes quibus Dei existentia item animae spiritalitas et possibilis cum corpore unio demonstrantur nec non brevis historia oeconomiae corporis animalis proponitur* (1646), in turn, Van Hogelande differentiates between human and animal life (in the treatise *De existentia animae*), where the former is intended as the state of union between rational soul or mind and body, and the latter as the subtle matter or spirit present in the blood. In particular, mind itself can be compared to a subtle matter permeating the blood and its spirit, and at the same time residing primarily in the pineal gland, allowing it to have sense perceptions and thus being united to the body, in which it is, in Platonic terms, “incarcerated.” Accordingly, for Van Hogelande death consists in the separation of body and soul, determined by the cessation of the fermenting processes which characterize the subtle matter present in the blood. In the treatise on *Oeconomia animalis*, in turn, animal life is intended, in more restrictive terms, as the distribution of animal spirits from the brain into the nerves, allowing for sense perception and motion, so that the condition of its continuation is the continuous flow of blood into the brain, in order for the animal spirits to be generated.²⁹ Also, for De Raey life – medically speaking – is not human life, viz. characterizing the union of soul and body, but a process involving the body only, and consisting of the distribution of blood and spirits in each part of the body, while health is the disposition of these parts to perform their actions (rectifying Sennert, who adopted the same idea of health but differentiated between disposition and potency), which is different for each of them, but ultimately dependent on spirits and blood.³⁰ For Sylvius (*Disputationes medicae*, 1659–1661, and *Praxeos medicae liber primus*, 1663), ultimately, life is maintained by the innate heat of the heart, viz. the “source of life, possibly of the soul, and primary link of the body”: in particular, by the continuous, chemical process of effervescence (to which he devotes extensive consideration) taking place in it, while death is the ceasing of such heat and

28 Health, for Fernel, is the “absolute and excellent symmetry” of the parts of the body, allowing the performing of actions, while disease (which I discuss also in section 3.3) is an “affection against nature” which “averts functions by itself,” and whose extreme point is death. Life, eventually, is intended as the “ability and efficiency of actions,” and the “proper function of the living,” soul – intended in its three species: vegetative, sensitive, and rational – being the cause of such actions, and life its “companion and friend”: Jean Fernel, *Universa medicina* Fernel, *Universa medicina* (Utrecht: Typis Gilberti a Zyll et Theod. ab Ackersdijck, 1656, first edition 1567), 94, 95, 193, 195, 197, and 220.

29 Cornelis van Hogelande, *Cogitationes, quibus Dei existentia, item animae spiritalitas, et possibilis cum corpore unio, demonstrantur, nec non, brevis historia oeconomiae corporis animalis, proponitur, atque mechanice explicatur* (Amsterdam: Apud Ludovicum Elzevirium, 1646), 38–43 and 67–68. Van Hogelande does not define the idea of health.

30 British Library, London, Sloane 1733 Chartaceus, Johannes de Raey, *Clarissimi Domini De Raeij philosophiae et medicinae Professoris Dictata ad Sennerti Epitomen* (c. 1658–1662), ff. 225r–306r: 226v–227v; cf. Daniel Sennert, *Epitome Institutionum medicinae, cum Libro de febribus* (Amsterdam: Apud Iodocum Janssonium, 1653, first edition 1631), 5–6.

effervescence.³¹

Geulincx's positions on life reveal similarities especially with those of Van Hogelande, with whom he shares a Platonic-inspired idea of life as conjunction of soul and body, consisting in the actions and passions they reciprocally undergo thanks to the flow of animal spirits (though explained by Van Hogelande more in terms of a world-soul hypothesis, and by the idea of the incarceration of soul in the body), on which on the other hand Regius, Sylvius and De Raey put much less emphasis (although he was to rely on Sylvius's account of physiological functions, as I discuss below). Still, Geulincx goes further in developing the consequences of this approach, as for him the very idea of disease assumes a new significance, as he introduces (1) a 'vulgar' idea of disease (viz. the above-mentioned natural sadness), not so much a Scholastic one, but rather an imprecise one, as not all the conditions immediately leading to death – in which a disease, medically speaking, consists – can be perceived by a natural sadness, which does not arise from certain diseases directly affecting the brain. This idea represents a development with respect to what he stated in his *Ethica*, where disease is considered only in the state of sadness associated with it, and discussion of which was aimed at emphasizing the misery of man as he is affected by bodily troubles associated with such a feeling, and his being powerless with respect to the passions.³² In such a medical development also functional was (2) the associated, medical idea of disease, which Geulincx restricts to those factors posing an immediate danger of death: for him, indeed, not all the inconveniences (*incommoda*) affecting the body are, properly speaking, diseases, so that removing "inconveniences and deformities" is not the main task of physicians. In fact, the very condition of health can nonetheless be concomitant with inconveniences such as harsh pains, limping, or blindness, which however need not always be seen as diseases or their symptoms, as usually meant "in the vulgar school of medicine." In this reductionist perspective, for Geulincx medicine is the "art of removing diseases," not of preserving health (an idea for which he has in fact little use in his medicine): following, in this approach, Sylvius rather than Sennert or Regius (for whom the preservation of health is the primary task of medicine).³³ As for Sylvius (as he put it in his *Praxeos medicae idea nova*, viz. the complete form of the text published in 1663 as *Praxeos medicae liber primus*, and *De methodo medendi*, though published only after Geulincx's death), medicine focuses on restoring health, namely in healing the lesions – partially presented in the *Praxeos medicae liber*

31 Franciscus Sylvius, *Disputationum medicarum pars prima* (Amsterdam: Apud Johannem van de Bergh, 1663): *Disputationum medicarum prima, de alimentorum fermentatione in ventriculo*, 1 (theses 2–3); *Praxeos medicae liber primus*, 222–223. Sylvius considers health, basically, as the possibility of exerting bodily functions: Franciscus Sylvius, *Opera medica* (Amsterdam: Apud Danielelem Elsevirium, et Abrahamum Wolfgang, 1680): *Praxeos medicae appendix*, 737.

32 Geulincx, *Opera philosophica*, volume 3, *Ethica*, 55; *Annotata ad Ethicam*, 241 and 253.

33 BPL 1255, 584r–v; Regius, *Fundamenta medica*, 1; Sennert, *Epitome Institutionum medicinae*, 1.

primus – concerning natural functions (nourishment and respiration), animal (sense perception and motion) – both serving the conservation of the individual – and reproductive ones.³⁴ Animal and reproductive functions, nonetheless, were not considered by Geulincx, whose medicine assumes a narrower scope, focusing especially on nourishment and respiration (as I discuss in the next section and in section 3.4).

3.2 *Concoction and respiration*

The foremost process in Geulincx's physiology is, in fact, the account of concoction, i.e. the process of the transformation of food into nourishment for the fire of the heart (and in blood and spirits),³⁵ and its subservient process of respiration. He explains concoction by considering, first, the functioning of the stomach, viz. the 'last' among the main parts of the body (in his account: brain, heart, and stomach, to which he added, apparently during a re-working of the text, the organs of respiration as a fourth part), but the first one in maintaining the fire of the heart, or *biolychnium* (which, as for Descartes, is a key element in physiology).³⁶ It consists of: (1) the chewing of food in the mouth, its early fermentation by saliva, and its transformation into chyle in the stomach, thanks to the action of juices, heat, and the movement of respiratory organs (especially the muscles of the diaphragm and of the abdomen). (2) The detachment of aliment and excrement in the intestine, thanks to the conformation of the orifices of the chylous vessels (*venae lacteae*), the respiratory movement, and the chemical processes arising from the juices generated by the gallbladder (*vesicula fellis*) and the pancreas, allowing the separation of the most subtle part of the chyle: as maintained, according to Geulincx, by some scholars: these being the cases, respectively, of Jean Baptiste van Helmont (1579–1644) – and of his followers, like Sylvius – and of De Graaf (*élève* of Sylvius), who made public his discovery of the role of the pancreatic juice in concoction in 1664;³⁷ (3) the movement of the excrement to the anus, and of the chyle to the heart from the intestine through the chylous vessels, the cisterna chyli and the thoracic duct (*ductus chyliferus*), thanks, again, to the respiratory movement and to the peristaltic movement of the intestine.³⁸ A model of concoction which, thanks to the discovery of the thoracic duct by Jean Pecquet (1624–1674), who announced it in the *Experimenta nova anatomica* (1651) and to whom Geulincx explicitly refers,

34 Sylvius, *Disputationum medicarum pars prima: Praxeos medicae liber primus*, 1–2; Sylvius, *Opera medica: De methodo medendi*, 55; *Praxeos medicae idea nova*, 158.

35 See *supra*, n. 13.

36 See *supra*, n. 20.

37 Regnier de Graaf, *De succi pancreatici natura et usu exercitatio anatomico-medica* (Leiden: Ex officina Hackiana, 1664); for a discussion, see Evan Ragland, "Experimenting with Chymical Bodies: Reinier de Graaf's Investigations of the Pancreas," *Early Science and Medicine* 13, no. 6 (2008): 615–664, <https://doi.org/10.1163/157338208X362705>.

38 BPL 1255, 584v, 585v–586r, and 587v.

was rather simplified with respect, for instance, to that of Regius, who still assigned in the third edition (1661) of his *Fundamenta physices*, viz. his *Philosophia naturalis*, a concocting function to the liver, albeit acknowledging the discovery of the duct.³⁹ a function rejected both by Geulincx and Sylvius, for whom the duct allows the passage of chyle directly to the heart.⁴⁰

Notably, respiration plays a central place in Geulincx's physiology, having the task of moving aliments and excrements within the body, as maintained also in the *De microcosmo*, §§ 6 and 8. Besides, for Geulincx it has another, main role, as he points out that air is as necessary to the fire in the heart as to the fires in kitchens, viz. as ventilation.⁴¹ In this, Geulincx followed Sylvius; as seen above, for the latter respiration was a main function of the body, serving, in particular, to allow the effervescence of the blood and thus the maintenance of the innate heat: as shown, for instance, by a ventilated fire, which is more powerful than one burning in a barely opened furnace (i.e. similar to the example proposed by Geulincx), an effect which Sylvius attributes to the salt carried by air.⁴² This process is not explained by Geulincx, who just maintains that respiration, especially in the case of gasping (which ultimately serves sad persons to get the spirits necessary for them to come out of their state of sadness), increases the heat of the heart, even if the person gasping tries to cool it down with air, which happens, however, just in a moment, after which the heat increases even further, thanks to the increased quantity of air inhaled in gasping.⁴³

As to the mechanical effect of respiration as the 'engine' of digestion, on the other hand, Geulincx was largely original, as this function was not considered even in the influential *Tractatus [...] de respiratione usuque pulmonum* (1667) of Johannes Swammerdam (1637–1680), who had himself contributed to Sylvius's research on the topic, while in his *L'homme* Descartes explicitly restricted the function of respiration to the condensation of the vapours of blood.⁴⁴ In the mid-1660s, indeed, respiration was a vital topic, being also discussed by Geulincx in two disputations *De respiratione* he presided over in October 1666 (the second of which was with Paul Bontekoe as *respondens*, apparently the brother of Cornelis, 1647–1685, to whom I will return).⁴⁵ In the *De respiratione* he assumed pre-Cartesian positions, as he differentiated automatic and voluntary respiration (the functions of which are, however, not explored in the texts, it only being asserted

39 Henricus Regius, *Philosophia naturalis, in qua tota rerum universitas, per clara et facilia principia, explanantur* (Amsterdam: Apud Lodovicum et Danielem Elzevirios, 1661), 293.

40 Sylvius, *Disputationum medicarum pars prima: Disputationum medicarum sexta, de bilis ac hepatis usu*, 77–78 (theses 3–4).

41 See *supra*, n. 13.

42 Sylvius, *Disputationum medicarum pars prima: Disputationum medicarum septima, de respiratione usuque pulmonum*, 120–125 (theses 54–74).

43 BPL 1255, 592r and 595v–596r.

44 Descartes, *Oeuvres*, volume 11, 125.

45 C. Louise Thijssen-Schoute, *Nederlands cartesianisme, avec sommaire et table des matières en français* (Amsterdam: Noord-Hollandsche Uitg. Mij., 1954), 182–183.

that respiration is essential to life). He claims that automatic respiration is due, as for Aristotle, to the dilation of the lungs caused by the heat of the heart, and to their contraction by the colder, inspired air, whereas voluntary respiration is a muscular movement.⁴⁶ This differentiation is ignored in the *Physica vera* and *Medicina*, where respiration (both automatic and voluntary) is explained as the result of a muscular movement (of the diaphragm and abdomen, and the intercostal muscles), following a Cartesian model.⁴⁷

Notably, the series of disputations on respiration is incomplete: while disputation 1 establishes the difference between the two kinds, disputation 2 is aimed at rebutting criticisms of this thesis, including one based on the case of apoplexy (the cause of which is not specified by Geulincx) – in which respiration allegedly ceases, even if the heartbeat and thus the communication of blood and heat in the lungs continues – which Geulincx rebuts by considering that in apoplexy respiration does not in fact cease. Rather it is at most slowed or impaired, both the automatic and voluntary (or animal) kinds, though for him this is rather due to a wound or spasm in the diaphragm – evidently caused by the apoplexy itself, which somehow affects the nerves, since the wound or spasm occurring in apoplexy is compared to a cutting of the nerves of the muscles (to which I shall return in section 3.3). This was demonstrated by a vivisection performed by the *respondens*, in which a dog, whose diaphragm was cut, started to (1) breath in a ‘reversed’ manner, viz. by raising the diaphragm into the thorax while inspiring, and lowering it towards the abdomen while expiring, viz. the opposite of what usually happens, and, briefly, in an impaired way, before (2) starting to breathe again deeply. An explanation of these two phenomena is deferred to a third disputation – where he also would deal in full with a refutation of criticisms of his theory arising out of the case of apoplexy, and so apparently with the cause of apoplexy itself – but of which there is no trace.⁴⁸ We can suppose that it never occurred, as Geulincx himself refers to only two disputations on respiration in his *Annotata* to the *Ethica*.⁴⁹

These disputations, in any case, show that Geulincx, certainly before preparing his *Medicina*, conducted research and questioned standard, Cartesian explanations in physiology. This is the case also with another disputation in physiology he presided over, namely his *De conario sensus id est de principali organo sensus* (20 December 1664). Here he claims that anatomical

46 Geulincx, *Annotata maiora in Principia: Disputatio physica de respiratione prima*, 239–242 (theses 1–5).

47 Geulincx, *Opera philosophica*, volume 2, *Physica vera*, 445; BPL 1255, 586r. On Descartes’s model of respiration and on his theory of muscular movement, see Andrea Strazzoni, “The Use and Plagiarism of Descartes’s *Traité de l’homme* by Henricus Regius: A Reassessment,” *Perspectives on Science* 31, no. 5 (2023): 627–683, https://doi.org/10.1162/posc_a_00587.

48 Geulincx, *Annotata maiora in Principia: Disputatio physica de respiratione secunda*, 244–245 and 250–252 (theses 2 and 13–18).

49 See *infra*, n. 19.

observations are required to settle the question as to what part of the brain is the conarion itself, viz. the main organ of sense, to which he claims to be devoting a second disputation, of which, again, there is no other trace,⁵⁰ while in the *De microcosmo* (§ 3) and *Medicina* this is identified, in Cartesian fashion, in the pineal gland.⁵¹ Thus, Geulincx did not uncritically embrace Descartes's physiology: rather, he accepted it in its post-Cartesian developments, as by Van Hogelande and Sylvius, and after having questioned and discussed some of its tenets. Moreover, even in his *Medicina* he did not accept a central tenet of Descartes's physiology, namely the idea that the heart is passive with respect to the blood, whose dilatation causes that of the heart: instead, he claimed that it is the heart, as a muscle, that actively expels the blood.⁵² A thesis maintained, amongst others, by William Harvey (1578–1657) and by Regius in the third edition of his *Fundamenta physices*, which he might have endorsed since Descartes's original explanation (based on rarefaction of the blood only) came under attack (as by Plempius, as reconstructed by Lucian Petrescu), as Geulincx might have done.⁵³ Moreover, Geulincx proposed a Cartesian neurophysiology, though he did not embrace the peculiar account proposed by Descartes in his *L'homme*. There the pineal gland is conceived as a spring of spirits, which are directed by the soul into this or that opening in the cavities of the brain, connecting it with the nerves and the muscles, when a motion occurs, and whose widening – caused by the pulling of the filaments contained by the nerves – causes the spirits to flow into certain pores more than others, thereby moving the gland itself and causing sense perception.⁵⁴ Instead, in Geulincx's model the spirits enters the cavities of the brain from the choroid plexus (in a quite traditional way),⁵⁵ and are directed into this or that nerve by the gland, which acts as a rudder, in determining the movement of the body. In sense perception, on the other hand, the movement of the external body is communicated by a pushing transmitted from the nerves to the spirits surrounding the brain and then to the gland, in a 'linear model', such as maintained by Descartes in his *Dioptrique* (1637).⁵⁶ Notwithstanding these differences, Geulincx certainly saw in Descartes a model, as in 1669 he was commenting upon his *Principia* (viz. in his *Annotata maiora*), and largely used his physics and physiology to complete his own.

50 Geulincx, *Annotata maiora in Principia: Disputatio philosophica de conario sensus id est de principali organo sensus*, 254 and 257–258 (theses 6 and 16). In his *Annotata maiora* on Descartes Geulincx referred to a *Disputatio prima de conario sensus* only: the reference is omitted in Land's edition, but it can be found in BPL 1255, 144, and in Geulincx, *Annotata maiora in Principia: Annotata maiora*, 150.

51 BPL 1255, 584r.

52 BPL 1255, 589v.

53 Regius, *Philosophia naturalis*, 305–306; Lucian Petrescu, "Descartes on the Heartbeat: The Leuven Affair," *Perspectives on Science* 21, no. 4 (2013): 397–428, https://doi.org/10.1162/POSC_a_00110.

54 Descartes, *Oeuvres*, volume 11, 173, 179–180, and 188.

55 Christopher Upham Murray Smith, Eugenio Frixione, Stanley Finger, and William Clower, eds., *The Animal Spirit Doctrine and the Origins of Neurophysiology* (New York: Oxford University Press, 2012), <https://doi.org/10.1093/acprof:oso/9780199766499.001.0001>.

56 BPL 1255, 586v–587v; Descartes, *Oeuvres*, volume 6, 129.

3.3 *Fluids, pores, and apoplexy*

The last two parts of Geulincx's *Medicina* are devoted to pathology and semeiotics. As to the cause of diseases, for Geulincx this primarily consists in some affection of the fluid parts (humours and spirits) and only accidentally of solid ones: a differentiation which one can also find in Fernel, who identified the causes of diseases in the 'contained parts', viz. fluids, and the diseases themselves in the 'parts' viz. the solid ones. For Geulincx, however, diseases are no more caused by, for instance, any primary, secondary or occult quality of bodily parts,⁵⁷ but only by (1) the undue opening or closing of meatuses and vessels through which fluids run, and their (2) quantity, either (I) excessive or (II) defective, (III) degeneration (i.e. the mutation of one humour into another) and (IV) aberration and secession, viz. as one humour does not reach its destination or detaches from another one. Again, Geulincx stresses, in particular, how "the abundance of humours, in general, damages respiration" (as it can impede the movement of the diaphragm), and so do the redundancy of spirits, which move the respiratory muscles, while degeneration and aberration of fluids are explained mostly as caused by the obstruction and opening of meatuses and vessels.⁵⁸

Geulincx's *Medicina* thus embodies a specimen of iatromechanics – with references to chemical processes. Not surprisingly, we can find a similar approach in the *Oeconomia animalis* of Cornelis Bontekoe (posthumously published in 1688 together with Geulincx's *Physica vera*): Bontekoe studied at Leiden in 1665–1667, while what appears to be his brother Paul acted as *respondens* in one of Geulincx's disputations,⁵⁹ and his *Oeconomia animalis* is based on the Platonic idea of life as the state of conjunction of soul and body, on the relevance of respiration as the 'engine' making concoction possible, and more in general on the processes of the circulation of blood and of chyle as allowing the functioning of the human body.⁶⁰ Bontekoe relied on an iatrochemical approach as well: as for instance, like Sylvius (to whom he dedicated his inaugural disputation *De gangrena et sphacelo*, 1667), he explained the heating effect of respiration on blood (which is the first aim of respiration) as due to the salt carried by air itself,⁶¹ though the role of secretions and excretion (and related ideas such as that of insensible transpiration) of substances

57 Fernel, *Universa medicina* (1656), 195, 198 and 201.

58 BPL 1255, 593r–v.

59 See *supra*, n. 45.

60 Cornelis Bontekoe and Arnold Geulincx, *Metaphysica, et Liber singularis de motu nec non eiusdem Oeconomia animalis, opera posthuma, quibus accedit [...] Physica vera, opus posthumum* (Leiden: Apud Johannem de Vivié et Fredericum Haaring, 1688), *Oeconomia animalis*, 1–7. On Bontekoe, see Christoph Schweikardt, "More than Just a Propagandist for Tea: Religious Argument and Advice on a Healthy Life in the Work of the Dutch Physician Cornelis Bontekoe (1647–1685)," *Medical History* 47, no. 3 (2003): 357–368, <https://doi.org/10.1163/157338208X362705>.

61 Bontekoe and Geulincx, *Oeconomia animalis*, 30–32.

definitely had a more central part in his physiology, these being the main concepts by which he explains concoction and nourishment.⁶² Geulincx thus played a relevant role in making Leiden a centre of the development of iatromechanics, notably influencing Bontekoe, and paving the way to its teaching by Theodoor Craanen (1633–1688), who was appointed at Leiden after Geulincx’s death, in 1670.⁶³

Among diseases is worth noting, in particular, the already-mentioned case of apoplexy, to which Geulincx paid particular attention in his *Medicina* and in other writings, apparently striving to find an explanation for it. In fact, this case shows the potentialities but also some limits of his applications of the iatromechanical approach, especially in the light of the empirical evidence he dealt with. In his *Medicina*, notably, he carefully rejects an explanation of apoplexy according to which if the passage through which the carotids (carrying blood and spirits to the brain) and the jugular veins (through which blood refluxes) pass is obstructed by pituita or mucus, spirits cannot flow in enough quantity into the brain. Geulincx allows that apoplexy ultimately consists in a deficiency of spirits,⁶⁴ though he rejects the given explanation of this deficiency, as anatomical evidence shows that while veins can be compressed (e.g. by a tourniquet), arteries cannot. The veins’ compression and the lack of reflux would in fact cause the chamber of the ventricles of the brain (and of the pineal gland) to be wide open, as its blood vessels would be filled by blood and the ventricles would not subside, but would be kept dilated. This, coupled with the continuous flow of spirits (which, in a Cartesian model endorsed also by Regius, fill the space around the pineal gland, moving it),⁶⁵ would lead to delirium or insomnia (as the spirits keep a man awake) rather than to apoplexy. Moreover, in this condition the veins would burst, and so a copious haemorrhage would take place in the ventricles of the brain, causing the beginnings of the nerves to be occluded and with this an apoplexy, as no spirits would flow in them. Haemorrhages, however, could not be observed in the autopsies Geulincx read about, by which, moreover, respiration would be hindered, as the blood would come to fill the respiratory nerves (usually more open than the others, as maintained also by Descartes in *L’homme*, since they are continuously filled by spirits),⁶⁶ leading to

62 Bontekoe and Geulincx, *Oeconomia animalis*, 38–46.

63 On Craanen and iatromechanics, see Davide Cellamare, “Medicine and the Mind in the Teaching of Theodoor Craanen (1633–1688),” in *Descartes in the Classroom: Teaching Cartesian Philosophy in the Early Modern Age*, ed. Davide Cellamare and Mattia Mantovani (Leiden: Brill, 2022), 199–230, https://doi.org/10.1163/9789004524897_011.

64 BPL 1255, 589v and 591r.

65 Erik-Jan Bos, “Descartes and Regius on the Pineal Gland and Animal Spirits, and a Letter of Regius on the True Seat of the Soul,” in *Descartes and Cartesianism: Essays in Honour of Desmond Clarke*, ed. Stephen Gaukroger and Catherine Wilson (Oxford: Oxford University Press, 2017), 95–111, <https://doi.org/10.1093/acprof:oso/9780198779643.003.0006>; Strazzoni, “The Use and Plagiarism.”

66 For Descartes the wider opening allows spirits to enter more easily into the respiratory nerves; for Geulincx, they are more open because of the flow of the spirits; see Descartes, *Oeuvres*, volume 11, 139.

an immediate suffocation. Respiration, however, is not completely hindered in apoplexy, as is also claimed in the second disputation *De respiratione*, as seen in section 3.2. Accordingly, for Geulincx another cause of apoplexy is to be searched for.⁶⁷ In fact, in his *Medicina* Geulincx proposes other causes, as he maintains (in a quite generic way) that a lesion in the brain can cause apoplexy, as the latter affects what we may label as the nervous system as such. At a more detailed level, he claims that apoplexy can be caused by the fact that the substance of the brain does not properly filter the spirits (though it is not clarified when this happens),⁶⁸ so that: (1) the spirits flow in an insufficient quantity into the brain and nerves; or, alternatively, (2) they flow into the brain together with alien bodies, such as pituita and catarrh, which come to fill and occlude the nerves. This can cause apoplexy if they flow “in multiple nerves, or in almost all, or in the common source of nerves” (apparently the beginning of the spinal cord). This flowing of bodies into the brain, in fact, happens quite easily because such bodies have a liquid nature, and because arteries, in the brain, are enveloped by one membrane only.⁶⁹

Like respiration, in fact, apoplexy was also a vital topic at Geulincx’s time.⁷⁰ In his *De abditis rerum causis* (1548), Fernel criticized, on an experiential basis, the idea that apoplexy is caused by the obstruction by a humour of the ventricles of the brain, not allowing spirits to flow into the nerves (as in Geulincx’s explanation): rather, apoplexy is caused by a compression of the arteries of the *rete mirabile*, which they compose after having entered into the brain and before releasing the spirits from the choroid plexus, so that the brain receives no spirits. In the case he considered, this was caused by the blood flowing from the veins of the eye, after a blow, and obstructing the base of the brain.⁷¹ On the other hand, Sennert explained apoplexy as principally due to the obstruction of the meatuses of the nerves in the brain by a pituitary humour, not allowing the passage of spirits to the other parts of the body (as in the model attacked by Fernel).⁷² Further explanations came from Gregor Nymann (1594–1638), who in his *De apoplexia tractatus* (1629) proposed the idea that apoplexy is due to the occlusion by pituita of the *torcular Herophili* or

67 BPL 1255, 590v–591r.

68 BPL 1255, 586v (where he maintains that spirits flow into the ventricles of the brain from the choroid plexus) and 587v (where he maintains, after having stated that the spirits flow into the skull through arteries, that the brain is said – “dicatum volunt” – to be filtering the spirits).

69 BPL 1255, 587v, 589v, 591r, and 594v.

70 Henry S. Schutta and Herbert M. Howe, “Seventeenth Century Concepts of ‘Apoplexy’ as Reflected in Bonet’s *Sepulchretum*,” *Journal of the History of the Neurosciences* 15, no. 3 (2006): 250–268, <https://doi.org/10.1080/09647040500403312>.

71 Jean Fernel, *Jean Fernel’s On the Hidden Causes of Things. Forms, Souls and Occult Diseases in Renaissance Medicine*, ed. John M. Forrester (Leiden: Brill, 2005), 640; see also Jean Fernel, *Universa medicina* (s.l. (Geneva): Apud Petrum Chouët, 1638, first edition 1567), 503 and 505 (from book 5, not included in the 1656 edition, of Fernel’s *Pathologia*). On the role of spirits in pre-Cartesian physiologies, see Smith, Frixione, Finger, and Clower, *The Animal Spirit Doctrine*.

72 Sennert, *Epitome Institutionum medicinae*, 183–185.

confluence of sinuses, where carotids and the veins pass and which he considers as the source of blood and spirits in the brain (carried, in his pre-circulatory physiology, also by veins).⁷³ In fact, the kind of explanation attacked by Geulincx. In turn, in his influential *Observationes anatomicae ex cadaveribus eorum quos sustulit apoplexia* (1658) Johann Jakob Wepfer (1620–1695) explained apoplexy as caused by (1) the occlusion of carotids by ‘fibrous bodies’ present in them (so that the brain does not receive enough blood and spirits), and by (2) cerebral haemorrhages, impeding the spirits flow into the brain, as in the case mentioned by Fernel.⁷⁴ Regius, eventually, considered apoplexy, in the first edition of his *Fundamenta medica* (1647), as caused by the subsidence or narrowing of the ventricles of the brain and by the consequent compression (and occlusion) of the nerves which are under them: due, in turn, to the humours lying in the brain and ventricles and pushing these down, or to the humours and vapours obstructing the carotids, the choroid plexus, or their pores, from which spirits cannot flow and fill the ventricles.⁷⁵ An explanation using the idea that the ventricles of the brain are obstructed by humours – which however do not appear to directly occlude the nerves, but cause the ventricles to do so – and the one according to which the brain does not receive enough spirits because the arteries, the choroid plexus, and their pores are obstructed. From the second edition (1657), however, he changed his account, attributing apoplexy to a lack of reflux of blood from the brain through the jugular veins, which (1) can be closed by a swelling of the carotids – passing through the same holes of the skull as the jugulars – due to an abnormal quantity and force of blood (in turn due to a compression of the vessels external to the brain caused by humours, coldness, or other causes, which increases the flow of blood through the arteries, apparently by compressing them and causing the blood to move faster), or (2) can be obstructed by internal tumours or humours. This causes the choroid plexus to be blocked by an abnormal quantity of blood, and impedes the generation and flowing of animal spirits. Moreover, he points out that only the jugular veins can be blocked in this process, for the reason that the carotids carry more powerful blood, and are provided with more robust tunics.⁷⁶

As the argument criticized by Geulincx fits the account of Nymann, we can take it as having, as a more recent polemical objective, also that of Regius (1657), who developed upon Nymann’s account in seeing in the passages in the skulls a key point of occlusion of veins, and maintained the incompressibility of arteries and the weaker structure of veins, thus leaving room for the introduction of the idea of haemorrhage as cause of apoplexy. However, Geulincx claims not to

73 Gregor Nymann, *De apoplexia tractatus, in quo huius gravissimi morbi tum curatio, tum ab illo praeservatio perspicue proponitur, clareque demonstratur* (Wittenberg: Typis Jobi Wilhelmi Fincelii, 1629), 103.

74 Johann Jakob Wepfer, *Observationes anatomicae ex cadaveribus eorum quos sustulit apoplexia* (Schaffhausen: Typ. J. C. Suteri, 1658), 218 and 234–235.

75 Regius, *Fundamenta medica*, 62–63.

76 Henricus Regius, *Medicinae libri quatuor* (Utrecht: Typis Theodori ab Ackersdijck, et Gisberti a Zijll, 1657), 77.

have read about this in the literature, apparently ignoring Wepfer's book, where besides a case comparable to that of Fernel, there is also clearly described a cerebral haemorrhage copiously filling the brain and its ventricles.⁷⁷ Geulincx's main concern, in fact, is that of the compatibility of an explanation for apoplexy with the persistence of respiration, which is particularly endangered in the case of a haemorrhage. Such a persistence, in fact, had already been addressed by him in his second disputation *De respiratione*, as discussed above, where it is maintained that voluntary respiration, too, performed by muscles (and so through nerves and spirits) is possible in a case of apoplexy, which, logically, should not completely impair the nerve system. At which point he had claimed that respiration is made difficult by a wound in the diaphragm, causing the lungs not to move freely, as shown by the case of the vivisection of a dog. Geulincx postponed a further discussion of this topic to a probably not held third disputation, though it is noteworthy that he compares what was witnessed in the cutting of the diaphragm of the dog (who in fact did not suffer an apoplexy, but whose case is assumed as exemplifying it) to a convulsion: as when the diaphragm is cut, it undergoes convulsions and becomes rigid, explaining this as the effect of the cutting of the nerves, which causes their contraction, and so the convulsion and stiffening of the part of the body they are in. In particular, Geulincx claims that it is explained elsewhere why nerves which have been cut come to contract,⁷⁸ though such an explanation is missing in his extant texts, unless he refers to the obvious idea that nerves are swelled by spirits (as held in the *De microcosmo*, § 3, and also in the *Medicina*):⁷⁹ so that if they are cut, they are depleted of spirits, and contract viz. deflate or collapse (in accordance with a Cartesian model), impeding the passage of further spirits. This – I infer – might lead to a permanent stiffening of the part of the body in which nerves are inserted (such as a muscle), which remains filled with spirits, whose reflux (e.g. to the antagonist muscle) is impeded by the mutilated nerves.⁸⁰ Accordingly, in his *De respiratione* Geulincx implied that apoplexy (its cause is not clarified) affects nerves, but not so as to impede respiration.

In fact, in his *Medicina* Geulincx also maintains that (1) nerves can be “contracted” by excessive humidity or dryness (apparently, they lose their elasticity and cannot be properly filled or swelled by spirits): in this case, the part of the body (*membrum*) where they are inserted is “contracted” too, viz. one can observe a spasm: we can infer that this latter contraction is a continuous dilatation and swelling, which can in fact be seen as a shortening of the length (contracting) of such a part. Indeed, Geulincx does not clearly explain the reason for this, though he immediately compares this phenomenon to that of the (2) permanent swelling of one muscle – and

77 Wepfer, *Observationes*, 4–5.

78 Geulincx, *Annotata maiora in Principia: Disputatio physica de respiratione secunda*, 250 (thesis 15).

79 BPL 1255, 587r.

80 See *supra*, n. 47.

the consequent contraction (or shortening) of the part to which it is attached – due to some occlusion in the channels connecting this muscle to its antagonist, impeding the movement of the spirits into the antagonist and its own deflation (a mechanism introduced by Descartes in *L'homme* and widely discussed by Regius, who plagiarized Descartes on this in his *Fundamenta physices*, and from whom Geulincx seems to borrow the idea of the circulation of spirits).⁸¹ So that the muscle at stake is kept swelled and the part of the body to which it is attached is kept contracted or shortened (and so is, in fact, also the muscle itself, which contracts or shortens in length while swelling). Moreover, (3) Geulincx claims that such cases of spasms (or continuous swelling of one muscle, and contraction of the part of the body to which it is attached) are comparable to what can be observed when a muscle is damaged, either by cutting its fibres, or by a hit: it remains relaxed as its fibres (and itself) cannot contract (apparently, they cannot be in a tension), and this causes the antagonist to be continuously swelled. This, for Geulincx, happens automatically, even if he does not explain why: in any case, it is apparent that the antagonist muscle cannot fill the damaged one with its spirits, and no alternate motion of the two muscles takes place.⁸² This does not exactly match what is stated in the disputation, where there is mention only of the stiffening of the part the nerves of which have been severed (not mentioned in the case of muscular damage considered in the *Medicina*, where only the fibres of the muscle are considered). In fact, the case of spasm or continuous swelling is explained in a more detailed (albeit not entirely clear) manner in the *Medicina*, where a more overt Cartesian model, openly taking into account the reciprocating movement of spirits from a muscle to its antagonist, is followed. We can thus suppose that in 1666 Geulincx was lecturing in physiology (as in the meantime he was presiding over related disputations), and presenting a theory of nerves which then evolved into that provided in the *Medicina*, and that also in this case – as in those of the cause of respiration and of the pineal gland – he came to progressively embrace Cartesian views.

As to apoplexy itself, it is worth noting that in his *Medicina* Geulincx proposes a development of the account which he gave in his *Annotata* to the first treatise of the *Ethica* (most probably prepared before the *Medicina*). There he claims that the explanation of muscular movement as a communication of motion from the brain to the nerves is based on the experiences of apoplexy and paralysis, which are due to an occlusion of the meatuses connecting the cavities of the brain with the nerves. In which case the persistence of respiration is granted by the heat of the heart, which he refers to in his two disputations on respiration, where in any case it is admitted that

81 BPL 1255, 591r; see Edwin Clarke, “The Neural Circulation. The Use of Analogy in Medicine,” *Medical History* 22, no. 3 (1978): 291–307, <https://doi.org/10.1017/S0025727300032920>.

82 BPL 1255, 592r.

voluntary respiration, too, depending on muscles and not directly on the heat of the heart, does not cease in apoplexy.⁸³ The same kind of solution is proposed also in the *De microcosmo* (§ 3), where the symptoms of apoplexy are attributed to a “severed, harmed, or obstructed nerve”⁸⁴ (thus taking into account the case of the severance of a nerve, as in his *De respiratione*, and unlike in his *Medicina*), and in his *Annotata maiora* on Descartes’s *Principia* (roughly coeval with the *Medicina*), where it is maintained that apoplectics lose movement and sense perception as the “end of the channel, by which movement and species are transmitted from all the other parts [of the body] to the brain, is obstructed, or otherwise blocked.”⁸⁵ An explanation which is developed in the *Medicina* as Geulincx recognizes in catarrh that which occludes multiple nerves. With his solution, notably, Geulincx (roughly) aligned with the ones presented by Van Hogelande and Sylvius. As for Van Hogelande (*Oeconomia animalis*) in apoplexy the openings or beginnings of the nerves in the brain are blocked by an unspecified cause, and so few spirits can flow to the muscles – affecting in this way respiration, which is hindered but not stopped.⁸⁶ For Sylvius, in turn, apoplexy can have different causes: in particular, it is due to an insufficient quantity of animal spirits, either because (1) they are not generated when insufficient blood is carried to the brain (e.g. when arteries are blocked by a tumour or burst), or because (2) not enough spirits move to the muscles, since nerves can be compressed or broken at the beginning of the spinal cord (or *medulla spinalis*). So that for Sylvius, too, respiration is hindered but not stopped in apoplexy (with the exception of the most serious cases), and depends on the movement of the muscles of the diaphragm and abdomen.⁸⁷

In the hands of Geulincx, to sum up, the iatromechanical approach showed its potentialities but also some limits in providing explanations compatible with empirical evidence: in particular, the ideas of the occlusion of the veins and of cerebral haemorrhages implied by the explanations of Nymann and Regius (1657), are at odds with the persistence of respiration. At the same time, Geulincx ignored the empirical evidence brought forth by Fernel and Wepfer, and proposed a main solution – namely the idea that nerves are obstructed by catarrh – which was certainly not detailed by him as the one he criticized, and in fact not supported by him with empirical evidence. This kind of issue could be one of the possible causes of the apparent aborting of his medical project. His *Medicina*, indeed, seems to be incomplete, and in any case – unlike other unpublished texts of his –

83 Geulincx, *Opera philosophica*, volume 3, *Annotata ad Ethicam*, 207. The reference to the disputations is omitted in Land’s edition, but it can be found in BPL 1255, 502, and in Arnold Geulincx, *Γνώθη σεαυτὸν, sive Ethica* (Leiden: Apud Adrianum Severini, 1675, first edition 1665), 127.

84 Geulincx, *Opera philosophica*, volume 2, *Physica vera*, 441.

85 Geulincx, *Opera philosophica*, volume 3, *Annotata latiora*, 517.

86 Van Hogelande, *Cogitationes*, 264–266 and 271–272. As to respiration itself, Van Hogelande adhered to the so-called Cartesian circle, or to the idea that the movement of the thorax, due to muscles, causes the pushing of air into the lungs (which otherwise will contain a vacuum).

87 Sylvius, *Disputationum medicarum pars prima: Disputationum medicarum septima, de respiratione usuque pulmonum*, 109–110 (theses 19–23); Sylvius, *Opera medica: Praxeos medicae idea nova*, 429 and 431–432.

is not mentioned in his other writings.

3.4 Semeiotics

The main issues affecting Geulincx's medicine concerned semeiotics. As mentioned above, for Geulincx the foremost sign of disease is the state of sadness announcing death, whereas in the case of diseases affecting the brain these have to be acknowledged through "other evidence."⁸⁸ Regardless of the nature of such evidence (about which Geulincx is not entirely clear), the signs on which the physician has to focus are not those of the diseases themselves, but rather those of their causes. In this endeavour, even if for Geulincx there are four classes of diseases (which he deals with in the section on pathology), corresponding to the four main parts of the body, Geulincx focuses only on the causes of the diseases affecting the heart, for the reason that the main danger to life is the extinction of its fire, in which danger consists, properly speaking, disease. This approach was innovative with respect to traditional forms of classification of diseases: which one can recognize, for instance, in Sennert and Regius, whose classifications followed the differentiation between similar parts (or homeomeries, viz. the basic 'elements' composing the body) and organic parts (viz. the organs themselves). So that diseases affect the temperament of the former, and the conformation of the latter (further divided, according to the different approaches, as concerning the temperament of primary, secondary, or occult qualities, and the figure, size, or construction of the organic parts).⁸⁹ Sylvius, on the other hand, developed an approach more akin to the one assumed by Geulincx, the former being certainly the latter's source: as in his previously mentioned *Praxeos medicae liber primus* he focused on the ways of healing harmed natural functions, viz. nourishment and respiration only (which he also considered in his *Disputationes medicae*),⁹⁰ the other bodily functions being reserved to two further books, which appeared only in 1674. Like Sylvius, Geulincx, too, focused on two main causes of disease, namely (1) a "not correctly provided nourishment" and (2) a "removed air hole" (*spiraculum*), viz. a problem in respiration, both of which he had proposed, first, in his *Ethica*.⁹¹ As to their signs, however, Geulincx proceeds in a not entirely linear way, as (I) first he briefly presents some signs common to these kinds of causes (like weakness). (II) Hence, he briefly presents the different causes of the first kind (excessive, defective, and inconvenient nourishment), and some of their signs (as palpitations). (III) Then, he considers the different causes

88 BPL 1255, 595r.

89 See, for instance, Regius, *Fundamenta medica*, 10 and following; Sennert, *Epitome Institutionum medicinae*, 55 and following.

90 See *supra*, n. 34, and Sylvius, *Disputationum medicarum pars prima: Disputationum medicarum prima, de alimentorum fermentatione in ventriculo*, 1 (thesis 4).

91 Geulincx, *Opera philosophica*, volume 3, *Ethica*, 55.

of the second kind (namely excessive or defective respiration), as well as their signs, roughly divided in two classes: (1) some signs are derived from the causes themselves: bad respiration, for instance, is immediately noticed in a sick person. Moreover, Geulincx also introduces further, preceding causes, which are a source of signs as well (“the causes [...] provide the signs”):⁹² for instance, if a person is sad, anxious (viz. undergoes certain passions of the soul),⁹³ or takes excessive physical exercise, we can infer that his/her respiration can be excessive or defective. (2) Other signs, in turn, are derived by the effects (in fact, effects different from the very disease, viz. side-effects): as for instance by the qualities of the blood due to defects of respiration. The differentiation of signs into causes and effects is more systematically used in his (IV) separated presentation of the causes of disease concerning nourishment, which ends abruptly, and where the signs of each kind of cause of disease – viz. each kind of bad nourishment – are taken from their further causes, and from their effects.⁹⁴

With this categorization, Geulincx assumes a peculiar position in early modern medicine. Traditionally, theories of signs in medicine were based on three main notions, i.e. (1) disease, (2) its causes, and (3) its symptoms. Fernel, for instance, considered disease as (1) an affection against nature of the parts of the body, viz. a vice in its solid parts, (2) its cause as a vice in the ‘contained parts’, viz. humours and spirits, and (3) its symptoms as the vice in the functions performed by bodily parts. For him, disease, cause and symptom are distinct, though we can generally identify a disease and its cause only through its symptoms, as disease and cause are hidden to us – making medicine a conjectural discipline. Accordingly, only symptoms, in this triad, are signs, viz. a particular class of signs, as signs might also indicate affections of the body which are just beyond nature, not against it, or can be signs of a state of health. Symptoms, in turn, are of three kinds, namely (1) the harmed action or function immediately following from a disease (for instance, a defect in hearing), and (2) simple affections (like hearing ringings) and (3) vices in excrements (like losing blood from the ears) following from the harmed action or function.⁹⁵ For Sennert, on the other hand, signs (which are what makes known anything concerning restoring and preserving health) have three sources, as they can be acknowledged from (1) the very nature of a thing, like the very disease, which is manifested by itself, so that no other sign is necessary; (2) its effects, viz. anything following from health, disease, or the causes of disease, or (3) the causes themselves.⁹⁶ A tripartition discussed by Plempius, who reduced the first source of signs to effects.⁹⁷ Eventually, for

92 BPL 1255, 596v.

93 BPL 1255, 589v.

94 BPL 1255, 595r–599r.

95 Fernel, *Universa medicina* (1656), 193, 195, 220–221, and 225–226. See *supra*, n. 28.

96 Sennert, *Epitome Institutionum medicinae*, 193 and 196–197.

97 Vopiscus Fortunatus Plempius, *Fundamenta medicinae [...]. Editio tertia* (Leuven: Typis ac sumtibus Hieronymi

Regius a disease can be recognized (1) by itself, or (2) by its signs: which can be in turn (2.1) its causes, or (2.2) its effects i.e. symptoms.⁹⁸

In this framework, Geulincx focused on the causes of diseases and on their side-effects only, both in semeiotics and – in principle – in therapeutics, probably because of the little medical value of (1) his idea of disease, intended as a “close disposition of the human body to death”⁹⁹ or to the missing use of the soul by the body, and of (2) its immediate symptom, namely a state of sadness arising from it: both of which are hardly to be countered in themselves, not to mention the difficulties in making a diagnosis through such a symptom. So that for Geulincx the physician has to focus on causes only, not on diseases,¹⁰⁰ whereas in the medical tradition – including Fernel, Sennert, Regius, and Sylvius – therapeutics concerns the diseases themselves, along with their causes and symptoms. In the cases of Sennert and Sylvius’s *De methodo medendi*, for instance, addressing the causes of diseases pertains properly to the conservation of health (viz. to the so-called *indicatio praeservatoria*), while addressing the disease pertains to the *indicatio curatoria*,¹⁰¹ which in the case of Geulincx concerns causes themselves, while the preservation of health – and its very idea – is basically removed from medicine.

We need to mention, moreover, that Geulincx’s definition of disease excluded from its number all the *incommoda* not directly or immediately threatening life, forcing him to revise the traditional catalogues of pathologies, and thus to re-build a discipline. This might have been a reason for him to not mention his *Medicina* in his other texts, to leave it incomplete – unless only the extant copy, labelled as a *collegium* and thus likely the subject of actual teaching, is partial – and to provide a quite un-linear exposition of semeiotics.

4. Conclusions

As a conclusion, it is worth summarizing the foremost ideas dealt with in Geulincx’s *Medicina*. Geulincx attempted (quite originally) to develop a medical theory based on the idea of life as the mere conjunction of soul and body, in which the latter is intended, Platonically, as the instrument of the former, and where the soul can act on the body and undergo passions (the only kinds of ‘interaction’ between the two) through the animal spirits produced by the innate heat of the heart. This heat is the key element of Geulincx’s physiology, while spirits act, as in Descartes’s account,

Nempaei, 1654, first edition 1638), 278.

98 Regius, *Fundamenta medica*, 76.

99 BPL 1255, 584r.

100BPL 1255, 595r.

101Regius, *Fundamenta medica*, 134–135; Sennert, *Epitome Institutionum medicinae*, 513 and 516–517; Fernel, *Universa medicina* (1656), 275; Sylvius, *Opera medica: De methodo medendi*, 55.

in a hydraulic manner, and allow the interaction of the soul and the body through the pineal gland: an idea which Geulincx did not always embrace in his career, and which indicates, in his *Medicina*, the progressive adoption of a Cartesian-inspired standpoint, noticeable also in Geulincx's explanation of respiration and muscular movement.

On this ground, Geulincx intended death as the separation of soul and body as due to problems – viz. diseases – with the maintenance of the heat of the heart, namely conditions posing a direct danger to the production of spirits. Such dangers concern nourishment and respiration, the latter having the function – original to Geulincx – of mechanically helping digestion or concoction (underlying the maintenance of the heat of the heart), besides being crucial, in providing ventilation, to the chemical processes involved by concoction. For the explanation of the latter process Geulincx relied on up-to-date ideas such as those set forth by De Graaf, and was clearly influenced by an iatrochemical approach (Sylvius being a key source for him), which he integrated with an iatromechanical one, viz. he attempted to develop a physiology based on the ideas of fluids, particles, vessels, and pores: an approach which also showed some limit to his explanations, in particular, in the case of apoplexy and the ways to deal with it empirically.

As to the very idea of disease, moreover, Geulincx provided a novel conceptualization of it, distinguishing between (1) a vulgar (albeit not traditional) idea, consisting in the sadness that the danger of death provokes, and (2) a medical idea, viz. the previously mentioned dangers or conditions immediately leading to death. So that he endorsed the idea that medicine is not aimed at preserving health (as maintained, on the other hand, by Sennert or Regius) but at removing diseases (as for Sylvius) – and intended health, quite originally, as the disposition of the body to further life, with basically little use in medicine. Moreover, for Geulincx physicians must not focus on the signs of diseases (as indeed the actual sign of a disease is the sadness arising from it, with little practical value), but on their causes and pre-conditions, which are either self-revelatory, or can be ascertained by some side-effect. With this approach, Geulincx assumed a peculiar position in the medical theories of the seventeenth century, which usually also focused on diseases themselves. It was, however, his innovativeness in considering what disease is that most probably led him not to complete his physiology: this implied a substantial re-organization of both semeiotics and therapeutics around new categories, as well as the exclusion, from the domain of medicine, of a number of conditions not posing a direct danger of death, but nonetheless usually addressed by physicians.

[581r]¹⁰² Arnoldi Geulincx
Antverpiensis
In Illustri Acad. Lugd. Batt.
Philosoph. Profess.
Collegium
Medicum

[581v]

[582r] Medicinae contractae
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Medicinae contractae
finis

[582v–583r]

[584v] Arnoldi Geulincx
[584r] Medicina contracta¹⁰⁴

Medicina est ars pellendi morbos hoc e[*subscriptum*: ^][*superscriptum*: s]t principale officium medici; caetera quae medicus aliquando praestat v. g. quod praesentem sanitatem conservet, quod incommoda et deformitates a corpore tollat, non agit ex principali officio.

Morbus est propinqua corporis humani dispositio ad mortem: morbis a morte dici videtur: morbus proinde vel gravior vel levior est, prout ea dispositio a morte longius aut propius abest.

102

Conventions adopted in the transcription: text deleted has been put between brackets []; dubious text is put between brackets { } and, whenever possible, I have provided the deleted or dubious text, otherwise, I have used the ellipsis ... in place of each illegible word or part of word; marginal additions have been placed after their referencing symbols; interlinear additions have been placed after the word they are above of, if above a word. I have elsewhere kept the original spatial disposition of the text, and only slightly modernized it. Every column of text or page was originally numbered with 1–31 (at the top), and folios with A, A1–5, B, B1–5, C, C1–3 (as footers).

103Read, here and henceforth: ‘biolychnio’ (in accordance with its case and declension).

104Headers, henceforth repeated on every page (one per page).

Mors vero non est aliud quam separatio mentis a corpore, sicut autem coniunctio mentis cum corpore consistit in usu istius corporis quo mens utitur, atque hic usus duas habet partes, actionem et passionem (de quibus vide physicam nostram parte ultima sive de microcosmo)¹⁰⁵ sic mors seu separatio illa consistit in non usu istius corporis atque iste non usus pro causa semper habet aliquam ineptitudinem corporis ad hoc ut mens ipso utatur: quamdiu enim corpus est idoneum mentis instrumentum tamdiu mens illo utitur, cum vero ineptum esse coeperit et inidoneum hoc ipso mens eo non utitur iam, in quo non usus mors consistit, non autem quaevis ineptitudo corporis separationem illam seu mortem causat: non enim si brachium alicui resectum sit, crus fractum, oculis eruti, necessum est ideo ut moriatur.

Quamvis corpus eius quoad multos usus, quos mentis praesentare solebat fractum sit inidoneum, sed demum talis ineptitudo corporis inducit mortem, quae fontem et originem usus istius, quo mens corpore utitur evertit atque potissimum mens utitur corpore in cerebro et nominatim in glandula pineali: itaque si hic aliquid notabiliter corrumpatur, necessum est fieri mentis a corpore separationem; sed tametsi mens ibi potissimu[{... }][*superscritum*: m] utatur corpore; non potest tamen eo uti sine aliis instrumentis, praesertim indiget spirit[*superscritum*: ib]us (vide physicam loco citato)¹⁰⁶ qui ei suppeditari debent a corde, seu a foco illo qui in corde ardet. Cum autem ignis et per consequens focus cordis hic intra aerem et aetherem valde facile extinguitur, hinc omne periculum et omnis fere morbus ad cor pertinet: nam reliqua instrumenta corporea quibus mens utitur, velut glandula, nervi, ossa, carnes, sunt satis valida; solus ille focus tenerrimus est, ut hoc ipso perit, si non continuo foveatur, (ignis enim circa nos indiget continuo alimento vide Cartesium)¹⁰⁷ extinguitur idem facile si spiraculum ei occludatur. Hinc laeso notabiliter cerebro et per consequens nervis respirationi inservientibus, praefocatur ille focus: focus enim ille intra arcum pectoris conclusus, solo hoc artificio superdurat, quod per respirationem alius ei ac alius aer semper accedat, adeoque perinde ac si in patenti esset: unde etiam concitate concurrentibus mors aliquando accedit, quia tensis musculis rigidoque pectore, respiratio nulla aut minus parva peragitur, adeoque focus cordis praefocatur.

Quia vero focus ille intertineri debet sanguine [584v] qui utpote pabulum istius ignis, perpetuo absumitur hinc resarciri debet per alimentum a stomacho suppeditatum, ut videre est in physica¹⁰⁸ hinc etiam magna cura medici est circa stomachum: ideoque hae tres dici possunt partes principales, cerebrum, cor, et stomachus; addo instrumenta respirationis ut sic universim sunt quatuor partes principes: circa quas principaliter cura medici versari debet, [*subscriptum*: ^][*superscriptum*: et] quarum indispositiones periculosos morbos continent. Notandum autem morbum ab aegrotante primo fere cognosci, tristi aliqua anxia et calamitosa conscientia, seu experientia statim enim atque dispositio propinqua ad mortem ponitur in corpore humano, mens naturaliter turbatur, angitur, et miserum in modum affligitur: imo illam ipsam afflictionem seu tristem perceptionem animi vulgus morbum vocare videtur: ita ut morbus apud illos, non sit aliud quam afflictio mentis, quam patitur, ex intima conscientia, qua cognoscit corpus suum disponi ad mortem seu reddi ineptum instrumentum pro ipsa mente; medici autem illam dispositionem humani corporis ad mortem [{morbum}] morbum vocant, quia illam curare et emendare debent, et hac emendata facile tollitur morbus, prout vulgus eum capit: mens enim statim atque corpus restitutum est sanitati, pristino vigore et securitate sumitur: et quidem plerosque morbos sic sentit aegrotans; sed dantur aliqui morbi quos aegrotans non primo sentit sed alii qui circumstant: quales sunt plerique morbi qui cerebrum afficiunt: mens enim et suum corpus eiusque partes, et his mediantibus alia corpora sentit in cerebro: itaque ubi cerebrum ipsum affectum est, iam non rite senti[*subscriptum*: ^]

105Geulincx, *Opera philosophica*, volume 2, *Physica vera, De microcosmo*, 442–443 (§ 5).

106Geulincx, *Opera philosophica*, volume 2, *Physica vera, De microcosmo*, 441 (§ 3).

107This is implied by Descartes's physiology as such, but is clearly expressed in the letter of Descartes to Elisabeth of Bohemia (1618–1680) of May 1646, published for the first time by Claude Clerselier (1614–1684) in 1657: see Descartes, *Oeuvres*, volume 4, 407.

108Geulincx, *Opera philosophica*, volume 2, *Physica vera, De microcosmo*, 445–446 (§ 8).

[*superscriptum*: e]t nec suum corpus nec alia corpora; itaque abest tunc ab aegrotante morbus ille vulgartis¹⁰⁹ qui consistit [{... }] [*superscriptum*: in] afflictione mentis; sed non abest ille morbus de quo medici, qui consistit in dispositione ad mortem. Enimvero cerebrum non est laesum aut non minus laesum, mens semper sentit tristi [{ aliqua }] illa perceptione morbos corporis sui, et praesertim illum qui circa cor versatur, et tendit ad extinguendum focum. Ex his facile dicitur, quid sit sanitas, nempe absentia morbi in corpore, cui mens coniuncta est, aut posi[tive] dispositio humani corporis ad ulteriorem vitam; id est ulteriorem coniunctionem mentis cum corpore. Quae proinde sanitas cum multis incommodis potest esse coniuncta, quae passim in vulgari schola medicarum etiam morbi aut symptomata vocantur: quales sunt acres dolores, claudicatio, caecitas etc.

De stomachi officio

Pars inter principes ultima, seu ad quam ultimo ordine recensendo [e]deveneramus erat stomachus, oportet autem stomachum capere cum annexis, seu iis omnibus quae ad idem officium concurrunt, quod est foco cordis alimentum praeparare et suppeditare: quales proinde partes sunt os cum dentibus, lingua, glandulis ma[m][*superscriptum*: x]illaribus et reliquis [585r] salivaribus, deinde oesophagus, et post stomachum pylorus, et intestina tenuia pariter ac crassae, tum poder,¹¹⁰ tum venae lacteae, glandulae lumbares, galaxia seu ductus chiliferus a Pequeto inventus¹¹¹ et insertio eius in venam sinistram subeclaviam.¹¹²

Haec enim omnia concurrunt ad idem illud officium, quod stomacho principaliter incumbit, quod est foco cordis prospicere de pabulo: quia enim focus ille alimentum suum absomit in corpore, accersendum est extra corpus novum pabulum quo nutriatur; sed hoc pabulum certo modo parari debet: quod fit cum certum cibum eligimus (non enim quolibet vescimur) eundem iam electum certo modo parandum damus ori, ventriculo, intestinis, certam eius partem seligendam venis lacteis eamque deferendam certa portione ad focum cordis per ductum chyliiferum: nam si minima quantitate deferretur, obruerit focum sicuti in foco culinae videmus eum pabulo, quamvis bono et [*superscriptum*: ad] ardendum apto, nimis cumulatim ingesto, suffocari et extingui: hinc conveniens erat ductum illum chyliiferum non nimis amplum ponere, ut eum etiam natura non amplum posuit, nam calami scriptorii amplitudine cernitur secundum spinam dorsi ascendere.

Porro etiam respiratio quamvis principaliter alium finem respiciat, quamplurimum tamen confert ad hoc officium stomachi, imo totum fere praestat quantum ad distributionem alimenti: cum caetera sunt velut inanima instrumenta et velut mola quaedam; ventus autem, qui illam agit est respiratio: continuo enim motu diaphragmatis inter respirandum, ventriculus ei proxime subiectus comprimitur, adeoque alimentum quod sumit in intestina detruditur; ex his porro tum eiusdem diaphra[{ m }] [*superscriptum*: a]gmatis, tum musculorum abdominis motu et alterna compressione, quod tenuius est: in alimento per exiguo¹¹³ oscula venarum lactearum in intestinorum cavitates hiantica, intruditur. Eodem modu¹¹⁴ respirationis succus, qui lacteis venis influxit ad galax { i } [*subscriptum*: ^] [*superscriptum*: e]am deducitur, et per ipsam in altum subvehitur eadem ope respirationis: cum enim inspiramus pectus attollimus, thoracem dilatamus, adeoque locum damus chylo, per ductum suum assurgenti; inferne vero cum [in] inspiramus abdomen constringimus (diaphragma enim descendit [{... }], et muscul[{... }] [*superscriptum*: i] abdominis constringunt ipsum abdomen teste sensu) adeoque ista constrictione attollimus inferne et in altum subvehimus

109Read: 'vulgaris'.

110Read: 'podex'.

111Jean Pecquet, *Experimenta nova anatomica [...]. Eiusdem Dissertatio anatomica de circulatione sanguinis, et chyli motu* (Paris: Apud Sebastianum Cramoisy et Gabrielem Cramoisy, 1651).

112Read: 'subeclaviam'.

113Read: 'exigua'.

114Read: 'motu'.

eundem chylum.

Officium stomachi et partium ei sic annexarum, ut diximus, est alimentum et pabulum suppeditare intertinendo $\llbracket \{f\} \rrbracket$ cordis foco; sed hoc officium quatuor in se complectitur: 1° parare et coquere cibum 2° secernere, unde iam alimentum et excrementum. 3° alimentum deferendum est ad locum destinatum, 4° excrementum eiiciendum est tanquam inutile: haec enim quatuor [585v] rite perfici debent, ad hoc ut foco cordis idoneum pabulum subministretur.

Primo officio nempe praeparationi et coctioni ciborum potissimum destinatur os cum dentibus maxillis caeterisque instrumentis, et ventriculus: et in ore quidem prima fit cibi praeparatio, cum ille cibi dentibus comminuitur, et crudis quaedam concoctio cum illi multa saliva admiscetur, atque ita quasi subigitur et fermentatur: salivam enim tali vi praeditam esse, ut fermentet, multis experimentis docemur: secunda praeparatio cibi et accurati $\llbracket \{ \dots \} \rrbracket$ or concoctio fit in stomacho, qui cibum universum complexus, atque ad eius mensuram se dilatans vel constringens, convertit illum in lacteam pultriculam, quae chylus passim dicitur. Ad quam coctionem confert tum calor vicinarum partium, cordis, hepatis etc., tum succi quidam continuo, in stomachum influentes, et in primis saliva, quam copiose et fere semper etiam dum non comedimus, deglutimus, tum etiam motus a respiratione, quo diaphragma cum annexo hepate impingit in stomachum per $\llbracket \{ \dots \} \rrbracket$ vices, et rursum attollitur.

Secundo officio peragendo, secretioni nempe alimenti ab excremento potissimum inserviunt venae lacteae, cum instrumentis respirationis: per has enim inter respirandum, quod liquidius atque tenuius est, abigimus, reliqua in intestinis remanent, atque adeo fit secretio inter alimentum, quod per venas lacteas abripitur, et excrementum, quod per intestina, devolvitur excernendum per podicem. In hoc officium secretionis vocant etiam aliqui¹¹⁵ pancreas et vesiculam fellis, quatenus ambo succum aliquem in intestina exonerant, quo succo, cum chylo qui e ventriculo delabatur commixtio, oriatur quaedam velut effervescentia, qua partes chyli ab se invicem secedant sicut videmus aquae vitriolatae adiecto sale tartari, sulphur praecipitari: et p $\llbracket \{ \dots \} \rrbracket$ ^[superscriptum: o]sse quidem tales aliquas praeparationes, ad faciliorem chyli per venas lacteas transitum in intestinis fieri non est diffitendum: praesertim cum adsint ibi multa, a quibus tale aliquid sperari merito possit.

Tertio officio peragendo, nempe alimento deferendo, potissimum inserv $\llbracket \{ \dots \} \rrbracket$ ^[superscriptum: i]t ductus chyliferus, tum etiam venae lacteae, imo etiam intestina, quatenus haec motu suo peristaltico alimentum pariter cum excremento deorsum pellunt, adeoque alimentum diversis osculis venarum lactearum successive applicant, velut excibrandum: his omnibus inserviunt etiam instrumenta respirationis, eo modo quo supra explicavi. Tandem etiam $\llbracket \{ \dots \} \rrbracket$ oesophagus ad hoc officium facit, non quidem quod alimentum deferat, sed rudimentum aliquod, quod ulteriorem suam perfectionem exspectat a stomacho.

Quarto denique officio seu excretionis inserviunt intestina cum podice, simul annitenti^[586r]bus instrumentis respirationis.

De officio diaphragmatis

Secunda pars a fine inter principes, ad quam descendendo deveneramus, potest statui diaphragma; utpote quod praecipuum est inter eas partes quae foco cordis prospiciunt de spiraculo: sicuti stomachus praecipuus erat inter illas partes, quae eidem foco prospiciebant de pabulo: potissimum enim ope diaphragmatis respiratio peragitur, nam hoc laeso caeteris licet integris, respiratio pariter aut laeditur aut tollitur: hic videmus laesio pulmonibus apertoque thorace, quam diu diaphragma a mediastino nec dum separatum est, respirationem satis valide peragi.

Quamvis autem diaphragma praecipuum sit in officio hoc collegas tamen etiam habet, musculos abdominis, cum rectos, tum obliqu $\llbracket \{a\} \rrbracket$ os ascendentes, descendentes, et transversos, musculos

115De Graaf, *De succi pancreatici natura*.

intercostales, musculos pectorales, cum internos qui expirationi tum externos qui inspirationi potissimum dicati sunt: ad haec pulmones pleuram seu membranam succingentem costas, et ab ipsa productum mediastinum, et in hoc cum seroso liquore suo conclusum pericardium.

Licet enim pericardium non proprie faciat ad respirationem, habet tamen simile aliquod officium: cum enim focus sit in corde, hoc quasi eius balneum est, efficitque ne focus ille ipsum cor adurat: sicuti ignis vivus stannae patellae impositus, illa dissolvit, nisi forte patellas illa aquae balneo incumbat: tunc enim periculum abest.

Ad respirationem etiam concurrunt nervi et cerebrum (quamvis aliud principale officium his incumbat) cum enim musculus peragetur respiratio (nam et diaphragma musculus quidam est, et reliqua huc concurrentia instrumenta potissimum musculi sunt) musculi autem nervis aguntur, et nervi a cerebro pendent, indeque spiritus recipiunt quos in musculos transfundant: hinc igitur patet cerebrum ac nervos, et potissimum spiritus ad respirationem facere, et hos quidem maxime cum active se habeant, caetera tantum passive, et velut molae quaedam quae a vento isto spirituoso agitantur.

Ad respirationem etiam faciunt aspera arteria, item os et nares, velut viae, per quas aer inspiratus admittitur, et exspiratus abigitur.

Unde sub officio respirationis, plura officia continentur; primo quidem officium inspirationis, et hoc debetur musculus, praesertim diaphragmati, quod inter inspirandum subsidit, et intra abdomen quodammodo se recondit adeoque aeri per asperam arteriam in pulmones ingressuro cedit: deinde musculus pectorales externi qui thoracem attollunt, ac intercostales aliqui qui dilatant: et denique musculus abdominis, qui inter inspirandum abdomen in longum extendunt, et in latum contrahunt.

Secundum officium expirationis, quod potissimum iterum incumbit diaphragmati, inter exspirandum attollenti se in thoracem, adeoque angustanti thoracem, et aerem receptum excludenti: deinde musculus pectoralibus internis quibusdam intercostalibus, hi nempe thoracem deprimunt et constringunt: denique musculus abdominis, qui inter respirandum abdomen ipsum secundum latitudinem distendunt, et secundum longitudinem contrahunt.

Tertio officium viae quod incumbit ori, naribus et asperae arteriae: per has enim vias aer inspiratus admittitur, et respiratus demittitur.

Quarto officium retentionis: quod incumbit pulmonibus, qui aerem inspiratum imbibunt velut aquam spongia, et tamdiu retinent donec subsidente thorace iterum exprimatur.

His annectimus quintum officium propter analogiam suam, et similitudinem cum officio respirationis, quod est cor ipsum a foco suo tutum praestare: ad quid officii incumbit pericardio cum seroso suo humore, atque ipsum pericardium sustinenti mediastino.

De officio cordis

Huius officium est ut ante diximus, cerebro subministrare spiritus: quamvis enim negare non velimus aliquod aliud officium cordis, nempe nutriendi partes solidas per sanguinem, quem in illas continuo immittit et impellit; tam hoc officium non est primum, et veluti per accidens tantum facit ad vitam, eo quod sine illis partibus solidis, et eorum nutritione: non bene possint consistere illa instrumenta, a quibus vita id est coniunctio mentis cum corpore seu usus iste quo mens utitur corpore, proprie dependet.

Primum hoc officio cordis consistit in foco, qui in corde iugiter ardet: ab hoc enim partes sanguinis ad cor delatae, incenduntur, seu vehementer agitantur: quae vero inter illas magis agitantur magisque ad motum apta sunt, in aortam expulsas, magis etiam peragunt secundum lineas rectas; adeoque per truncum aortae ascendentem ac descendentem recta feruntur: quae vero per

truncum ascendente[m] in arterias carotides, atque inde in plexum choroidem subvectae, et in ventriculos cerebri transcolantur, hae inquam particulae propriae sunt spiritus, qui deinceps nervorum fistulis illapsi, musculos subeunt, et membranae nostri corporis agitant, motumque iis aliund[e] impressum, deferunt ad cona[587r]rium, adeoque sentiendi vim membris illis impertiunt.

Quamvis autem cor suo foco princeps sit in hoc munere; habet tamen etiam ministras alias partes ad id officium concurrentes: venas, arterias, vasa lymphatica, et emunctoria; hepar, lien, renes, pancreas, et quam plurimas glandulas: haec enim omnia commodioris sanguinis in corde inflammationi, seu spirituum generationi inserviunt: emunctoria enim mox enumerata id auferunt a sanguine, quod spirituum productionem ac faciliorem eorum generationem remorari poterat: ut renes serum, pancreas, et multae glandulae mucum, hepar bilum etc. Venae autem et arteriae sanguinem residuum post spirituum generationem, circulando deferunt ad ista emunctoria, ut expurgetur, et spiritibus suppeditandis aptior reddatur; vasa tandem lymphatica, sanguinem temperant, et admixtione suae lymphae efficiunt solidiorem aliquam inflammationem: sicuti videmus admixtione aquae cum materia combustibili, si idonea sit [*separation added*] et rite administrata, ignem fieri solidum et tenacem.

Igitur in hoc officio cordis plura officia complicantur: primum officium est sanguinem depurare, et spiritibus generandis idoneum reddere: et hoc officium incumbit emunctoriis: quae sunt veluti cribra quaedam ad quae sanguis appulsus, varie cribratur ac transcolatur, adeoque varias particulas deponit, pro varietate foraminum, quibus cribra ista pertusa sunt: adeoque alibi ac alibi alia atque alia recrementa exuit sanguis, bilem, mucum, serum, etc.

Secundum officium est deferre sanguinem ad sua emunctoria: et hoc officium incumbit venis ac arteriis: et his quidem tanquam instrumentis passivis, cordi vero tanquam principio activo: ho[...]
[*superscriptum*: c] enim alterna sui dilatatione ac contractione, sanguinem in arterias impellit et a venis recipit, adeoque circulationem facit in sanguine eumque successive totum ad omnia sua emunctoria applicat.

Tertium officium est ipsum spiritum cudere et formare; quod est officium cordis et foci in isto fu[...]
[*superscriptum*: m]o ardentis.

Quartum officium est ignem qui in corde ardet certo modo temperare: quod officium incumbit vasis lymphaticis: haec enim lympham suam pro maiori parte deponunt in cisternam lumbarem: ex qua deinceps per ductum chyloferum et cum chylo mixta defertur ad cor.

De officio conarii

Huius officium est, uti spiritibus, seu spiritus impendere, in officium sensus et motus: conarium enim pro diverso situ suo, spiritus in ventriculis cerebri discurrentes, in eos vel illos nervos fortis impellit: adeo musculos illos in quos illi nervi terminantur, inflat, ac distendit, et hoc pacto motum membrorum efficit: dum vero spiritus e ventriculis cerebri communiter in nervos influunt, non causant quidem modum¹¹⁶ membrorum, sed ipsos nervos distendentes, efficiunt ut motus externorum corporum, [587v] extremitatibus impressus, deferatur ad conarium, ibidem menti varias imaginationes exhibeat, colorum, saporum, caloris, soni etc.

Dixi autem quod conarium pro diverso situ suo, spiritus in h[...]
[*superscriptum*: i]ngentem navim, vento actam modo in hanc modo in illam partem deferri, aut sicuti videmus ventum ex certa parte mundi spirantem, obiecto domorum, etc. in varias partes reflecti subinde etiam in gyrum agi: sic facile possumus cogitare motum magnorum in corpore nostro membrorum ab exiguae istius glandulae diverso situ pendere; atque ab illo diverso situ, spiritus in cavitatibus cerebri inter se commotos, in diversas

¹¹⁶Read: 'motum'.

nervorum fistulas impelli vehementius.

Ex quo patet quod conarium tantum passive se habeat ad hoc officium: ipsum enim se diversimode ponere non potest, cum nihil a se ipso moveatur, sed sic ponitur a spiritibus, vel propria vi in cerebri cavitates irruentibus vel ab impulsu corporum externorum, mediantibus nervis ad $\{\dots\}$ spiritus qui conarium circundant delato: aque ita se res habet imbutis corporibus; sed in humano corpore mentis imperium quodammodo audit illa glandula, seu mens potest ita motum istius glandulae determinare, ut modo in hoc, modo in illo sit positus:¹¹⁷ quod in ipsa quidem mente humana non nisi velle aliquod est, cum ipsa motum efficere non possit, nec etiam propri $\{\dots\}$ e determinare: vide microcosmum nostrum.¹¹⁸

Corpora vero bruta dico, quae automaticè moventur, mere per spiritus et diversum conarii positum, independenter a mentis imperio, qualia etiam saepe sunt nostra corpora, moventur enim saepe partes eorum, manus inter gesticulandum, palpebrae oculi inter nictandum, imo pedes inter ambulandum, absque ullo mentis imperio.

Licet autem conarium sit pars princeps in hoc munere, collegas tamen ei damus alias partes arterias carotides et cervicales, cerebrum eiusque cavitates, nervos et musculos, atque exteriora organa sensuum: et quidem per arterias iam dictas intra calvariam ascendentes, spiritus transcolantur; quae ibi arteriae eum in finem simplici et satis tenui tunica donantur, ut nempe spiritus facile transcolari possit. Cerebrum depurandis spiri[t]ibus dicatum volunt: sicut nempe spiritus vini a phlegmate suo depuratur, quando per spongiam oleo imbutam traicitur. Cavitates cerebri retinendis spiritibus, et amplitudine sua, liberum positum linquendo conario. Nervi recipiendis spiritibus, iisque distendendo se, faciunt ad sensum: muscoli denique ad motum. Et sic etiam satis dictum est de officiis, quae sub generali officio conarii deprehenduntur.

Pathologia

Sic igitur dictum sit de partibus principalibus seu maxime facientibus ad vitam earumque functionibus, quae physiologica continentur.

[588r] Nunc si qua aberrarent, et functiones suas non rite obeant: istae partes quatenus ad vitam conservandam requiruntur, morbi oriuntur, nam hoc ipso corpus humanum disponitur ad mortem.

De

morbis stomachi et partium annexarum

In stomacho et partibus ei annexis unum quidem praecipuum officium notaveramus, nempe alimentum suppeditare foco cordis; sed hoc officium in quatuor alia divisimus, nempe in officium coquendi, separandi alimentum ab excremento, alimentum diffe[r]endi, excrementum eiiciendi. Et quantum quidem ad primum officium, quod ori ac praecipue ventriculo incumbit, non rite obitur, si quid in ore desit. V. g. dentes exciderint, aut male affecti sint; maxilla luxat $\{c\}$ a sit, muscoli resoluti, aut aliter male affecti, tunc enim masticatio in ore non bene peragitur: sic etiam coctio, quae fit in stomacho vitiabitur, si salivae, alique succi qui ad macerandum ac fermentandum in ventriculo cibum requiruntur, defuerint, aut etiam redundarint.

Quantum ad secundum officium, quod praecipue venis lacteis, ac instrumentis respirationis incumbit, illud turbabitur, si notabiliter multa oscula venarum lactearum occludantur et obstipentur: tunc enim succus per illas venas deferendus, subire non poterit: atque hinc syncope, virium prostratio, corporis [*subscriptum*: ^][*superscriptum*: m]acies, et foci cordis extinctio atque mors. Secundo idem officium turbabitur si aliquam multae venae lacteae abrumpantur aut pertendantur foraminulis. Tunc enim succus qui venis lacteis illis influxerat, intercipietur antequam ad locum sibi destinatum devehit possit, atque in mesenterium et abdominis capacitatem effundetur: atque inde

¹¹⁷Read: 'posita'.

¹¹⁸Geulincx, *Opera philosophica*, volume 2, *Physica vera, De microcosmo*, 440–441 (§ 1).

hydrops qui vel siccus vel humidus: siccus quidem fit paucis quibusdam venis lacteis ab intestinorum flatu, venas eas vehementer distendente, disruptis: atque adeo flatu magna copia ex intestinis, in quibus stagnaverat, in abdominis capacitatem simul et semel penetrante: humidus autem hydrops fit quamplurimis venis lacteis acri aliquod spiritu erosio aut aliter pertusis: atque adeo succo ipso et chilo per foramina illa intercurrente intra abdomen, nec ad focum cordis pertingente, in cuius pabulum destinatus erat: hinc in hydropicis sitis illa ingens, quia quod e potulento ad temperandum cordis focum deferri debuerat, intercipitur in via et in abdomen effunditur, hinc iis (quod multi mirati fuerunt) alve feces durae, et urinae etiam coloratae et rubrae.

Tertio potest etiam hoc officium interturbari per tumores mesenterii venas lacteas ita comprimentes, ut succus qui primis osculis illapsus erat vix aut ne vix quidem ulterius propelli possit: atque inde etiam similes effectus oriri debent, nempe foco cordis, solito pabulo destituto, syncope, atrophica, et mors: imo etiam ex hisce tumoribus facile hydrops nasci potest: stagnantibus enim succis in venis lacteis, et ulterius quidem impulsis, sed ob angustias viarum ulterius penetrare non valentibus, facile fit disruptio venarum lactearum, et inde hydrops, sicut eum paulo ante descripsimus.

Quarto interturbatur hoc officium vehementer a respiratione laesa, cum enim respiratio non est satis valida succus etiam ex intestinis in venas lacteas non satis impellitur: hinc otiosi, sedentarii, somniculosi, sentiunt sibi vires debiles esse: quia exigua respiratione qua utuntur, non multum chyli in venas lacteas adigunt, ideoque cordis focus pabulo suo destitutus debilis ardet, atque facit illis sensum illum debilitatis ac pigritiae.

Tertium officium nempe devehendi pabulum ad cordis focum quod praecipue oesophago et ductui chyliifero incumbit, interturbari potest ab iis, omnibus quae vias illas occludere, constipare aut arctare possunt: quo spectant tumores tum cavitatis horum organorum, tum partium adiacentium: hi enim arctant et illae obstipant praedictas cavitates: tum etiam luxatio spinae dorsi aut vertebrarum cervicis: haec enim etiam ductum chyliiferum imo et oesophagum ac fauces ita arctare potest, ut per oesophagum vel ductum chyliiferum vel nulla vel nimis parva delatio alimenti contingat proinde inter hos morbos est angina, qua fauces per tumorem iis incidentem aut luxationem vertebrarum cervicis, ita ita arctantur, ut deglutitio impediatur, vel tollatur. Hoc officium etiam impediri potest ex laesa respiratione: nam chylus non aliter quam ope respirationis aut saltem potissimum ista ope per ductum suum assurgit et ad cor defertur.

Quartum officium scilicet excretionis, quod intestinis et podici praecipue incumbit, interturbatur ex iis omnibus quae intestina ad hoc officium inidonea reddere possunt: ut sunt ulcera intestinorum quo spectat dysenteria, diarrhoea, lienteria etc. Similiter hoc officium interturbari potest ab iis qui podicem afficiunt quo spectat proclivitas ani, resolutio sphincteris, haemorrhoides.

Denique hoc officium magnopere etiam turbari potest, si instrumenta respirationis sint laesa, et praecipue si muscoli abdominis aut diaphragmatis quibus potissimum compressio illa fit quae digestionem est necessaria, affecta sint.

De morbis diaphragmatis et partium annexarum.

In diaphragmate ac partibus ei annexis, similiter unum officium praecipuum observatum fuit, nempe cordis foco de spiraculo prospicere; sed hoc officium in quatuor etiam alia distinxeramus, nempe inspirationis, expirationis, viae et retentionis.

[589r] Primum officium quod potissimum incumbit diaphragmati, musculis externis thoracis etc., interturbari potest, × *[in margine: × etiam a plethora hac enim vasa quae per musculos feruntur distendant, et illa distensione impediunt liberam contractionem et expansionem musculorum: atque*

hinc in schola nominatur plethora ad vires.]¹¹⁹ a tumoribus, inflammationibus, relaxationibus, convulsionibus et caeteris morbis quibus isti musculi obnoxii sunt: praecipue vero per inflammationem diaphragmatis quae hoc etiam sibi peculiare habet, quod in consensum trahat cerebrum, et delirium pariat: qua via? Non satis adhuc innotuit.¹²⁰

Potest etiam hoc officium interturbari a multis aliis partibus male affectis; quibus tamen aliud officium principaliter incumbit: v. g. a ventriculo quia diaphragmati proxime supponitur, itemque intestinis cibo aut nimio flatu distentis. Eo enim casu diaphragma deorsum agi, quod ad inspirandum requiritur, difficulter potest: adeoque inspiratio eo casu tenuis et, et praefocari sibi videntur, quibus stomachus onustus est cibus, aut intestina flatibus distenta: multo magis hydrops uterque eundem effectum, id est inspirandi difficultatem pariet.

Secundum officium, nempe exspirandi, similiter laedi potest, musculis ei inservientibus, per tumorem, inflammationem etc. male affectis: sed et aliae quaedam, quibus officium aliud principalis incumbit idem officium interturbare possunt: v. g. si empyema aut serum sit in thorace: tunc enim diaphragma, (quod ad exspirandum requiritur) non poterit se satis commode intrare thoracem attollere. Hic etiam revocari possunt illa quae utrumque illud officium (inspirandi ac respirandi) aequaliter turbant, ut angina, de qua supra diximus, quia illa etiam interturbat primum officium, nec tantum respirationi obest sed etiam pabulationi, seu pastui, secundo pleuritis, quando nempe pleura quae¹²¹ est membrana costalis succingens inflammatur, adeoque dilationi ac contractioni quae inter exspirandum et inspirando in illa alternatim fiunt, nimis apta redditur, quod et dolori coniunctum est, quia membranae omnes exquisitum habent sensum: tertio peripneumonia, quando pulmones ipsi qui inter inspirandum expanduntur, et velut spongia quaedam poris hiant, inter expirandum vero vult compressa spongia contrahuntur inflammati sunt: ex his enim malis tum inspiratio tum exspiratio ex aequo laeditur.

Atque sic explicati etiam sunt morbi qui circa duo postrema officia (viae et retentionis) versabantur.

Dum enim officium viae vel retentionis laeditur, statim etiam officium inspirationis et expirationis perturbatur, ad morbos huius generis per accidens etiam spectant morbi cerebri et partium annexarum. Nam laeso cerebro, spiritibus, aut nervis, non potest vitae peragi respiratio, eo quod illa penitus pendeat a musculis, motum illum quem respirationem dicimus experientibus; musculi autem motum suum habent a nervis qui in [589v] implantantur nervi vero dependent a cerebro, et cerebrum ac nervi, ad motum musculis impertiendum nihil valent sine spiritibus: hinc cerebro notabiliter laeso, respiratio etiam tollitur aut vitiatur, id contingit in apoplexia, epilepsia, lethargo, phrenitide, et similibus morbis cerebri, in quibus omnibus respiratio male se habet.

Quantum ad quintum officium quod his quatuor annexueramus et incumbit potissimum pericardio cum contento sero, illud interturbabitur vel sero, ibi desit quantitate iusta, adeoque cor aduratur, vel nimia copia adsit, adeoque focus cordis quasi obruatur.

De morbis cordis et partium annexarum.

Officium praecipuum huius partis erat spiritum cerebro suppeditare, quod item in quatuor officia distinctum nempe sanguinem depurandi, sanguinem deserendi¹²² ad sua purgatoria, spiritum cudendi, et focum cordis temperandi.

¹¹⁹The column of text has been divided in two, in order to host the addition, the insertion of which was therefore coeval to the copying of the main text. The hand is the same as that of the main text.

¹²⁰See, for instance, Sennert, *Epitome Institutionum medicinae*, 140.

¹²¹Read: 'quae'.

¹²²Read: 'deferendi'.

Quantum ad primum officium, quod incumbit renibus, hepatis, i]eni, pancreati, et glandulis, potest officium hoc perturba[[tu]]ri, ab inflammationibus, tumoribus, ulceribus, aliisque affectibus istarum partium ob quos contingat vias illas per quas inter depurandum sanguinem recrementa secernunt[[{...}]]^[subscriptum: ^]^[superscriptum: r], claudi, angustari, vel nimis dilatari, vel aliter male formari: tunc enim emunctoria inepta redduntur ad excernendum et auferendum id a sanguine, ad quod auferendum erant destinata. Inter hos morbos spectabilis est calculus in renibus aut ureteribus, quo subinde urinae generatio aut excretio tollitur aut impeditur.

Quantum ad secundum officium quod praecipue et velut active incumbit cordi; passive, vero venis et arteriis, per quas sanguis in emunctoria sua propellitur, potest hoc officium turbari, primo ab affectionibus ipsius cordis veluti si laesum sit, aut tumorem habeat, aut timor magnus adsit, vel dolor, similiaque animi pathemata, aut rigor febrilis etc.¹²³ His enim omnibus cor minus valide se contrahit, vicissim ac exserit, adeoque sanguinem languidius propellit per venas et arterias in sua emunctoria.

Secundo officium hoc laeditur iis laesis quae passive concurrunt: nempe venis et arteriis: laeduntur autem haec tum vulneribus, tum parva conformatione, velut nimia amplitudine vel angustia: inde enim fit ut sanguis vel confertim nimis, vel nimis parce in emunctoria sua propellatur. Quo etiam referri potest obstructio minimarum illarum viarum, quae passim anastomoses vocantur, quibus arteriae cum venis committuntur: hinc enim sanguis in ramo aliquo arteriae stagnat, et velut aqua palustris corrumpitur et uliginem con[590r]trahit, et non nisi regurgitando redire potest ad cor et emunctorium ut ibi repurgetur.

Atque hic fons quidam detegitur, unde sine dubio exitiales et foedi affectus, ac forte etiam ipsa pestis scaturit: sanguis enim ille in capillaribus arteriis restitans vel ob sui coagulationem ex contagio aut aeris vitio, vel ob malam conformationem meatus, necessario corrumpitur, et in cor regurgitans (circulando enim ad ipsum non potest devenire dum via sit interclusa) febres sensibiles facit et focum cordis facile extinguit, cum ei intertinendo, nimis crassum et compactum pabulum suppeditet.

Tertio potest hoc officium interturbari ab ipso sanguine qui per venas et arterias impellendus est in emunctoria: sicut secretio quae fit per cribrum, non tantum interturbari potest a cribro ipso et cribrante sed etiam a materia quae transcolenda est: nempe, si haec nimis crassa et compacta sit aut ramosa, non succedet bene trans^[subscriptum: ^]^[superscriptum: co]latio: sic etiam si sanguis non apte sit dispositus, fiet^[subscriptum: 2] mala^[subscriptum: I]¹²⁴ eius in emunctoriis repurgatio: sic videmus in iis qui longa febre innecti sunt, vix quidquam sanguinis in vasis remansisse:¹²⁵ sanguis enim in illis tenuior per cribr[[{...}]]a emunctoriorum, excrementi instar elapsus est, aut ipsa etiam emunctoria corrupta, sanguinem probum cum recrementis percolarunt: sic etiam videmus urinae suppressionem aliquando venae sectione dissolvi, ideo nempe quod sanguis nimia copia foramina renum, per quae serum transcolatur ut in urinam cedat, circumstans, obpleret illa: sibi que ipsa obsisteret: ut videmus etiam in cribro fieri cum nimis confertim recrementa cum polline mixta ipsi induntur.

Tertium officium quod praecipue incumbit isti foco qui ardet in corde, nempe officium spiritus cudendi, interturbari potest ab omnibus illis, quae focum illum extinguere, suppressere aut etiam nimis succendere possunt: ita enim habente se illo foco, vel nulli, vel nimis pauci, vel nimis multi et immoderati spiritus generantur: itaque si sanguis ipse vitio aliquo laboret, et multo magis si chy[u]s atque ea quae ex intestinis [[{...}]]per venas lacteas in corde feruntur vitiata sint, impediatur bona et legitima spirituum generatio: quo spectant febres intermittentes et remittentes: hae enim intestinis stabulantur, et materiam suam habent a chylo, ut lati[u]s videre potest in disputatione nostra de

123Geulincx, *De febribus*, thesis 8.

124Read: 'mala fiet'.

125Geulincx, *De febribus*, thesis 17.

febris.¹²⁶

Quartum officium quod potissimum incumbit lymphae interturbari potest, tum ab ipsa lymphā, male se habente, tum a glandulis in quibus male percolata fuerit, cum primum a sanguine discessit, tum denique ab ipsis vasis lymphaticis, quae vel pertusa vel clausa alicubi, vel aliter disposita[*subscriptum*: 2] male[*subscriptum*: I],¹²⁷ lympham foco cordis non rite subministrent.

De
morbis conarii et partium annexarum

Varia officia in hoc conarii officio continentur, quae licet seorsim non proposuerimus, ubi de officio conarii actum fuit, facile tamen ex iis quae ibi dicta sunt colligi possunt, et ad certa capita reduci.

Nam primo quidem spiritus ascendunt per arterias carotides intra cranium per commune foramen cum vasis iugularibus hoc autem officium interturbari potest a pituitae¹²⁸ et muco e cerebri ventriculis destillante et vasa illa intra foramen illud cranii comprimente unde contingat vel nullos vel nimis paucos spiritus per arterias carotides sublevari in ventriculo cerebri: et hanc communiter statuunt causam apoplexiae,¹²⁹ in qua ideo motus omnis et sensus¹³⁰ deficit, quia spiritus deficiunt ob interclusam iis viam qui ad motum ac sensum requirebantur.

Verumtamen non videtur haec legitima causa apoplexiae: etiamsi enim concedamus venas intra craniis foramina sic constringi posse et comprimi a circumfuso illis muco, difficile tamen est hoc credere etiam de arteriis: videmus enim vinculo satis arcto et valide in brachium iniecto, cum vena secunda est, comprimere quidem venas brachii, ut sanguinem in se contentum ad cor revellere nequeant; sed arterias non impediri hoc vinculo quo nimis sanguinem in se contentum a corde referant sub vinculo in ipsam manum: hinc enim manus et eius venae intumescunt sub vinculo: similiter si intra foramen cranii talis aliqua arctatio contingat arteriae quidem satis libere sanguinem deferent ad cerebrum; sed venae non revehent a cerebro: fiet igitur talis aliqua intumescencia in cerebro et meningibus eius, qualis sub vinculo in manu cum venae sectio[{... }]ne celebranda est: ex qua gravedo primum, torpor, deinde etiam inflammatio oriri potest, vena sc. aliqua sanguinem distillante in contentum cerebri aut meningium: adeoque fiet potius deliria, phreneses, perpetua vigilia, et similes affectus: distentis enim a sanguine vasis, camera ventriculorum cerebri obfirmatur, ut vel non concidat, vel aegre concidat, spiritusque continuo subministrantur per arterias: unde vigilia et delirium. Si tamen hoc casu ita distendantur venae a sanguine illas implente ut in plexu choro[hide][*subscriptum*: ^][*superscriptum*: idis] vel alibi vena aliqua notabilis dirumpatur, ac sanguinem suum ubertim in cerebri ventriculos effundat, potest inde aut mors proxime, aut mediante apoplexia, vel simili aliquo affectu oriri: sanguine enim illo [591r] in ventriculo cerebri effuso, quam primum orificia nervorum opplebuntur, adeoque spirituum influxus impediatur, sensus ac motus tolletur, adeo certa mors parata erit.

Difficile tamen esset in hac explicatione respirationem salvare, quae licet difficulter et cum stertore, non tamen nulla ad aliquod tempus in apoplexia peragitur. Cum si sanguis ubertim effusus sit in ventriculo cerebri, primo omnium videatur irruere debere in respiratorios nervos, ob continuum spirituum eos subeuntium motum magis patulos: itaque a tali affectu non nisi repentina suffocatio speranda videtur, et non apoplexia: nec nemini me legere usquam in ventriculis cerebri apoplexia extincti sanguinem inventum fuisse.¹³¹ Alia igitur apoplexiae causa quaerenda es[{... }]t.

Secundum officium est spiritus transcolare, quod incumbit substantiae cerebri in qua transcolatione spiritus etiam depurari putantur, ut pridem dicebam: si ergo hoc officium interturbentur, et non bene

126Geulincx, *De febris*, thesis 13.

127Read: 'male disposita'.

128Read: 'pituita'.

129Nymann, *De apoplexia tractatus*.

130Read: 'sensus'.

131See, however, Wepfer, *Observationes*.

percolentur, varii affectus induci poterunt: et primo quidem si nimis multi et continuo percolentur, fient vigiliae; si nimis paucis lethargi et apoplexiae, si peregrina quaequam cum illis percolentur poterunt inde oriri epilepsiae, spasmi, convulsiones etc. Si enim nimis multi et confertim percolentur, ventriculi et cavitates cerebri, iugiter expandentur, atque adeo conarium seu sensorium commune non ligabitur (in qua ligatione somnus consistit) sed libere inter spiritus circumfluentes appensum, eosque in nervos sensibus inservientes derivans, perpetuam vigiliam efficiet: ad quam vigiliam etiam facere potest, quod spiritus e cerebro in nervos influentes non satis reddantur sanguin[[{...}]][superscriptum: i]: consentaneum enim est existimare, plures spiritus affluentes [[{...}]][superscriptum: ad] organa sensus ac motus, quam ibidem dissipentur: eos vero in formam liquoris reductos per vasa lymphatica remeare in cor et rursus confundi cum sanguine: proinde si viae illae per quas spiritus isti residui in vasa lymphatica penetrare solebant, occludantur, manebunt in nervis et cerebro, et continuo per alios spiritus iis accedentes animati, agitationem suam retinebunt; et sic perpetuam vigiliam faci[[{...}]]ent. Viae autem istae quibus spiritus sub forma liquoris in vasa lymphatica penetrant, possunt statui glandulae conglobatae: ab his enim vasa lymphatica incipiunt, et in communem truncum, qui et chyli ductus est se exonera[*subscriptum*: ^] [*superscriptum*: an]t.

Cum vero nimis pauci spiritus percolantur, subsidentibus cerebri ventriculis (ut qui a spiritibus expandi debeant) compressoque conario perpetuus quidem somnus seu lethargus in[591v]ducetur, cui affinis est coma vigilans in quo per intervalla aegri vigilant rursus obdormiscunt; spiritibus nempe per intervalla subministratis et facile, quia alii mox non suppeditantur, dissipatis; affinis etiam est torpor et somniculositas, quae etiam provenit a paucitate spirituum, sed non tanta sicut praecedentes affectus: haec enim omnia tantum differunt secundum magis et minus ut loquantur scholae.

Si vero aliena quaedam cum ipsis spiritibus percolentur, siquidem haec pituita serum aut mucus fuerint in nimis magna copia, orientur catharri et defluxiones; ex quibus infinita mala scaturiunt. Si enim catharrus defluat in nervos paralyisin, faciet, qua motus tollitur in parte aliqua aut sensus aut uterque sc. tam motus quam sensus; si in plures nervos aut omnes fere aut communem nervorum originem apoplexiam facere potest, aut repentinam mortem quando nempe etiam in nervos respiratorios incumbit: si ex catharro saepe[*superscriptum*: 2] etiam[*superscriptum*: I]¹³² surdit[[{...}]][superscriptum: a]s, saepe caecitas, saepissime raucedo et tussis et et asthma etc. prout in hunc aut illum nervum hanc aut illam partem decumbet catharrus.

Facillima autem est illa percolatio pituitae ac se[[{...}]][superscriptum: r]i: aqua enim[[,]] (ad quam haec spectant) facile se insinuat per por[[{...}]][superscriptum: o]s corpo[[{...}]]rum: unde semper etiam aliquid saltem cum spiritibus percolatur in ventriculo cerebri, deceditque nobis in nares, in gulam, et palatum, et cum secretu excernitur. Quo etiam facit quod sanguis facile segregetur a sero et praesertim locis frigidioribus qualia sunt circa cerebrum et cranium. His catharris facile adiungunt se succi quidem salsis et acidi: nam salsa et acida facile se coniungunt aqueis: atque adeo efficiunt catharros. Acres et erodentes possunt vero (et id rarius est) alia quaedam admisceri spiri[*subscriptum*: ^][superscriptum: ti]bus dum percolantur, quae in illis et excitent effervescentiam, ebullitionem, et rapidiores motus, quam natura eorum servat: sicut aqua ab admixta calce viva effervescit et ebullit, aut sicut oleum terebinthinae cum ¹³³ vitrioli ebulliunt. Et siquidem motus hic impressus spiritibus, eos intra cerebri ventriculos in circulum agat, vertigo orietur, qua res omnes verti, et in gyrum torqueri videntur, eo quod species rerum per spiritus sic se vertentes offer[[{...}]][superscriptum: a]ntur conario; aegri autem prolabantur in terram, quia spiritus in musculos non debite determinant quibus corpus sustinere debeant eo quod illi in gyrum acti orificia nervorum transcurrant. Si vero immoderatus adhuc effervescant spiritus et ipsos nervos ac musculos inordinate subeant, orientur epilepsia: in qua proinde muscoli cum annexis artibus

132Read: 'etiam saepe'.

133Read: 'oleo'.

inordinate concutiuntur et agitantur.

[592r] Ultimum denique officium poni potest in nervis qui sp[...][*superscriptum*: iriti]bus deferre debent: hi cum contrahuntur, quod tum ex nimia humiditate, tum etiam siccitate feri posse statuunt spasmus oritur, quo membrum cui nervus inseritur contrahitur: potest etiam hic oriri ex eo quod spiritus aliqui inordinate et nimis vehementi impetu in musculum aliquem influentes, impediuntur a regressu in musculum antagonistam, ob viarum per quos de uno musculo in alium se volvere solebant, oclusionem: hinc enim musculus ille in quem spiritus sic influunt sine refluxu in oppositum musculum, vehementer dilatabitur, atque membrum cui affigitur, contrahet, et tamdiu contractum tenebit, donec spiritus illi qui musculum illum [*subscriptum*: ^][*superscriptum*: distendunt,] dissipati sunt, et per poros musculi evaserit. Proinde spasmo affinis est resolutio alicuius musculi: musculo enim aliquo per vulnus transversim fibris eius non possint se solitum in morem contrahere, [*superscriptum*, repeated above the period: 2] inflictum, aut per contusionem, erosionem etc. sic laeso, ut fibrae eius [*superscriptum*, repeated above the period: 1]¹³⁴ manet musculus ille laxus, adeoque musculus ei oppositus seu antagonista eius membrum affixum ad se perpetuo trahit: v. g. relaxato musculo qui oculum movet ad minorem canthum, oppositus musculus, nempe qui eundem oculum movet versus maiorem canthum, illum semper trahit, priori nempe musculo non obsistente isti tractioni, adeoque induce[n]te strabonismum: ex quo patet quod relaxatio alicuius musculi, accedente contractione musculi oppositi, quae semper ei coniungitur, quando musculus alius integer est, similis perpetui alicui spasmo.

Causa morbi

Ex dictis facile patet morbum proprie non spectare ad solidas partes, seu ad carneam et osseam compagem; proprie autem et per se morbum ad humores et spiritus pertinere: non nego tamen quin per accidens morbus etiam pertineat ad solidas partes; sed considero tantum quid hic per se obtineat: medicus enim supponit quasi compagem integram humani corporis, tum siquid in humoribus ac spiritibus vitium [...][sit, emendat.

Peccant autem hae partes fluidae (humores et spiritus) vel per se, vel ratione meatuum et canalium per quas moventur.

Et in meatibus quidem duae generales sunt causae morborum, clausura et apertura: quantum ad clausuram et obstructionem illa quam plurimos morbos generare potest: cum enim fauces obstruuntur, respiratio tollitur aut [*subscriptum*: ^][*superscriptum*: im]minuitur, item motus [...][alimenti ad vent[...][riculum tollitur vel impeditur: unde foco cordis deest pabulum aut debita ventilatio seu spiraculum: quae dispositio sine dubio morbus est, utpote propinque disponens ad mortem.

Si oesophagus obstruatur aut pilorus, item foco cordis pabulum surrupiatur, idem fit si obstructio sit in venis lacteis aut ductum chyliifero.

Si obstructio sit in intestinis v. g. ex faecibus induratis, imprimis etiam pabulatio cordis foci magnopere impeditur: nam quicquid venarum lactearum sub obstructione ad intestina pertinet, fer[*subscriptum*: ^][*superscriptum*: i]atur, et chylum nullum aut perexiguum defert. Tantum istae venae lacteae quae supra obstructionem ad intestina pertinent, hic officio suo fungi [592v] possunt et chyli aliquid ad cor devehere: ex quo etiam sequitur pabulationem tanto magis impediri quanto obstructio in intestinis fuerit altior, et ventriculo prior: sic in intestinis tenuibus obstructio magis officiet pabulationi quam in crassis. Sed hoc insuper annexum habet talis obstructio, quod corrupti inter ventriculum et obstructionem succi (nam ex qua ibi detinentur, vitium contrahunt) servantur per venas lacteas ad focum cordis, cui alendo inutiles sunt aut noxii, adeoque creant etiam morbum.

Obstructio in vasis, impedit sanguinis circulationem, efficitque ut sanguis diu alicubi haerens et

¹³⁴Read: 'inflictum, aut per contusionem, erosionem etc. sic laeso, ut fibrae eius non possint se solitum in morem contrahere'.

restitans, et in grumum vergens, regurgitando subinde veniat ad cor, adeoque focum eius etiam interturbat, tanquam insuetum et noxium pabulum.

Obstructio in emunctoriis impedit sanguinis depurationem adeoque ad focum cordis alluit etiam pabulum $\llbracket \{ \dots \} \rrbracket$ *[superscriptum: noxium]* et inidoneum, et nimis faciens ad generationem spirituum quae dispositio etiam propinqua est ad mortem, quandoquidem vitae consistat in usu spirituum.

Obstructio tandem in ventriculis cerebri aut nervis, saepe ipsam mortem proxime causat, seu non usum spirituum: cum mens penitus prohibetur spiritibus et per consequens corpore suo uti: saepe causat morbum tantum: cum nempe tollit aut impedit respirationem: haec enim dispositio est ad mortem quidem sed necdum mors; saepe cau $\llbracket \{ \dots \} \rrbracket$ sat tantum incommodum aliquod v. g. caecitatem, paralytin manus et pedis, quae tamen incommoda schola etiam inter morbos recenset, nos non item quia illa non propinque disponunt ad mortem.

Quantum ad aperturam, convenit ea cum clausura seu obstructione, quod fluores eo ferri impediunt, quo *[subscriptum: ^]* *[in margine: ^ mere detinet in via, apertura]* a natura destinabantur, sed obstructio eos *[subscriptum: ^]* *[in margine: ^ vero eos]*¹³⁵ e via sua expellit et in alium locum exonerat.

Unde si oesophagus pertusus sit, cibus et praesertim potus in cavitatem thoracis: si ventriculus aut intestina, chylus in cavitatem abdominis effunditur: quae ambae effusiones 1° quidem notabiliter sunt impedire diaphragmatis motum sursum deorsumque (nam quod in cavitatem thoracis effunditur, impe $\llbracket \{ \dots \} \rrbracket$ dit diaphragmatis sursum, et quod in cavitatem abdominis effunditur, impedit motum diaphragmatis deorsum) et per consequens afficiunt no $\llbracket b \rrbracket$ tabiliter respirationi, adeoque morbum causant; quatenus vero succi sic intra vias suas effusi corrumpuntur et putrescunt, putridosque suos vapores exhalant, et ad cor vel caput transmittunt, unde focus in corde interturbatur eatenus adhuc alium morbum causant, seu potius aliter morbum causant: tota enim morbi ratio (ut ante $\llbracket dix \rrbracket$ *[superscriptum: vi]*dimus) consistit in propinqua dispositione ad extinctionem foci in corde ardentis, quae dispositio eadem semper est, sed modo ab his modo ab aliis causis dependet.

Si vena lactea pertundatur, aut ductus chyliferus, aut maius aliquod vas, similia erunt incom $\llbracket 593r \rrbracket$ moda et similiter fere morbum causabunt. Sed cum exigua ac capillaria vascula aliqua leviter pertunduntur, sanguis effluens per exiguas stillas contextum partis adiacentis infarcit, et in tumorem attollit ac ista *[subscriptum: ^]* *[superscriptum: dis]*tensione ac distractione partis inf $\llbracket \{ \dots \} \rrbracket$ *[superscriptum: ec]*tae dolorem etiam causat: tumores hi subinde non aliud causant quam incommodum, dolorem, molestiam, et difficultatem aliquam in motu vel sensu: subinde vero etiam morbum causant 1° quidem obstruendo vel comprimendo meatum aliquem quem pabulum defertur ad cordis focum, vel spiritus defertur ad cerebrum vel a cerebro derivatur in instrumenta respirationis: 2° dolorem causando impedire potest respirationem, ut contingit in pleuritide, peripneumonia, inflammatione diaphragmatis etc.: in his enim affectibus aegri a sufficienti respiratione abstinent propter dolorem quem inter respirandum sentiunt: sicut propter similem dolorem in inflammatione faucium aut oesophagi abstinent subinde a sumptione sufficientis alimenti: 3° tumores illi dum suppurantur in ulcera degenerant, quibus et pertundi possunt meatus in quibus haerent, et lateribus coalescere, ac proinde alio modo morbus causare.

Denique apertura in nervis aut cavitatibus cerebri, potest subitam mortem causare, spirit $\llbracket subscriptum: ^ \rrbracket$ *[superscriptum: ib]*us scilicet omnibus effluentibus, nec ad opus animae, quae meatus hos clau $\llbracket \{ \dots \} \rrbracket$ sa $\llbracket \{ \dots \} \rrbracket$ s¹³⁶ desiderat, impendi aptis, subinde morbum causare potest ubi propter aperturam nervorum respirationi inservientium, imminet periculum prefocationis, eo quod respiratio nulla aut nimis parva fiat, spiritibus canales istos, qui in musculos respir $\llbracket superscriptum: \rrbracket$

135The hand of the additions is the same as that of the main text.

136Read: 'clausos'.

t]atorios¹³⁷ terminantur, non satis subeuntibus sed per rimas mobilitate sua elapsis.

Ex dictis satis patet quod hae duae causae (apertura et clausura) se mutuo subinde causent: nam ex apertura tumor, ex tumore saepe clausura: ex clausura etiam potest apertura oriri: nam succis ad obstructionem restagnantibus iugiterque impulsis, et penetrare tamen non valentibus, facile isto impetu pert[...][superscriptum: u]ndunt meatum inter obstructionem et initium impulsis sui interceptum, praesertim [sis] si is sit tenuior, et disruptioni magis obnoxius: sic pridem ex obstructione venarum lactearum hydrop[...][em deducebamus, eo quod chylus, perpetuo motu respirationis in obstructionem illam impulsus ac repulsus, isto impetu locum aliquem cis obstructionem in vena lactea pertundat, per quam in cavitatem abdominis effluat.

Haec de causis quas meatus suppeditant, nunc de iis quas humores ipsi suntque potissimum quatuor. Copiae, inopiae, degeneratio, et aberr[...][superscriptum: a]tio. Copia humorum generatim laedit respirationem: et I^o quidem si cibus redundet in ventriculo, impeditur, diaphragma in subsidentia sua a mole subiecti, unde difficilis inspiratio quam sentiunt omnes illi, qui plus satis ederunt aut biberunt: similem effectum etiam, producunt [593v] faeces [...][alvi redundantes: sanguis etiam in [...][v]asis abundans, vasa distendendo, quae musculos perreptant, musculos ipsos ineptiores facit ad contractionem et distentionem: unde plethoricis difficilis respiratio utpote quae musculorum ope peragatur, et a venae sectione magnum levamen sentiunt, ac liberius respirant.

Rendun[t]dantia spirituum in nervis musculos, nimium distendendo, qui inter se antagonistae sunt effici motum difficilem, membra lib[...][erando¹³⁸ inter musculos oppositos: adeoque impeditur respiratio, eodem aliquo pacto quo in vehementi cursu aut alio simili exercitio: hinc enim spiritibus magna co[g]pia influentibus in oppositos musculos (inspiratorios et expiratorios) pectus inter illos libratur et tensum rigidumque subsistit, adeoque respiratio ad tempus tollitur: et spirituosi illi, v. g. post haustum magna copia generosum vinum, post aromatum usum etc. similem aliquam in se sentiunt difficultatem a qua magnopere levantur, iis omnibus quae spirit:¹³⁹ potenter evacuant, stomacho et querelis et pugnis, clamoribus et cachinnis, venere.

Copia humorum chyli praesertim et sanguinis non tantum hoc pacto obsunt foco cordis, quod eius ventilationem impediunt, sed minantur etiam periculum suffocationis: sicut enim focus culinae a bono pabulo nimis cumulati ingesto obruitur et extinguitur: sic etiam focus cordis a nimio sanguine et chylo confertim in ipsum irruente, etiamsi probi sunt et multo vitio laborent; suffocari tamen potest et obrui: hinc evexia athletica periculosa censente Hippocrate.¹⁴⁰

Quantum ad inopiam humorum, siquidem cibus, chylus aut sanguis deficient, necessum est focum cordis destitui sufficienti pabulo; si vero spiritus deficient necessum est motum languidiorem esse, et per consequens respirationem invalidam, unde praefocationis periculum: et siquidem spiritus omnino deficient, mors erit, quia mens iam corpore suo uti non poterit: si vero magnopere deficient,¹⁴¹ morbus ex suppressa vel imbecilla respiratione; si vero ad respirationem sufficient spiritus aegre autem ad alios motus corporis, somnus, vel in somnum magna propensio, quamvis et somnus ex aliis causis oriri possit, quarum disquisitio non est huius loci.

Quantum ad degenerationem, cum humores e cavitatibus suis exciderunt (quod in apertura contingit, cuius supra mentio est) item cum sistunt in suis meatibus via illis oclusa (ut vidimus circa obstructionem) facile degenerant in alios humores, et focum cordis appellentes, seu inventa seu facta via, turbant, et ex[*subscriptum*: ^][*superscriptum*: s]timationem minantur: hinc in inflammationibus saepe febres, nam sanguis e capillaribus venis in contextum alicuius partis dilapsus degenerat, et per tenui[...][ssimas particulas suas vasa hiantia alicubi ingressus miscetur

137Read: 'respiratorios'.

138Read: 'librando'.

139Read: 'spiritus'.

140Hippocrates, *Aphorisms*, I.3.

141Read: 'deficient'.

reliquo sanguine, et cum illo in cor subvehitur, [594r] ibidemque minus ad ustionem aptus, et tamen a foco cordis superatus, maiorem ignem excitat, qui febris dicitur,¹⁴² sed inter caetera notabilis est degeneratio qua pituita degenerat inflatum;¹⁴³ haec in cerebri ventriculis potissimum colligitur, indeque per oesophagum delapsa, stomachum et intestina pervadit, et qua transit, parietes viarum oblitit: et habet hunc usum quod lentore suo efficiet, ut cibus et recrementa quae vias illas pertranseunt, duritie sua et asperitate non laedant, nec haereant etiam nimis ad viam, utpote quae lubrica sit. Pituita haec ubi lentior est, in ventriculum ac intestina devoluta, cum ibi calor satis magnus *[[sit]]* est cum aciditate coniunctus, attollitur in bullas, intra quas aer continetur, qui hoc ipso flatu vocatur.

Cum enim pituita lentorem habeat, necessum est partes eius annulorum modo inter se implexas esse, ut facile quidem deduci possit in longum, sed non tam facile frangi ut in caeteris videmus fieri: cum igitur pituita illa a calore agitur, concurrentibus particulis salsis aut acidis, quae ad motum aptiores sunt, necessum est illam diffundi et in amplius spatium attolli, adeoque *[[{...}]]* [*superscriptum*: non] totum spatium occupare, sed intra se cavitatem vacuum relinquere, quae aere per respirationem non nimis in pulmones quam ventriculum penetrante, repleatur: quo aere distenta nec subsidere iam valens, multas et amplas bullas faciat quae difficulter franguntur, propter lentorem et catenationem pituitae.

Hae bullae ibi sic existentes et ventriculum ac intestina occupantes, imprimis difficile faciunt respirationem: et sumto potu sursum per levitatem suam eructantes, ructus efficiunt, aliquando etiam ubi nimis viscida est pituita per oesophagum assurgentes ita comprimunt ad pauxillum temporis asperam arteriam, ut praefocationis periculum immineat, donec per ructum dirumpatur.

Quaedam ex his bullis in intestinis diruptae, flatum suum exonerant in vias lacteas, quae illum ad cor devehunt, qui ibidem repentinam mortem subinde facit, cum flatu ille nullo modo sit idoneus, ad alendum cordis focum: interdum palpitationem cordis quando sc. cum alia materia mixtus, ac cum sanguine ac chylo confusus, irritat focum idem flatu e corde cum spiritibus confusus, et in cerebrum delatus, melancholicas cogitationes et spectra facit.

Quantum ad aberrationem, duplicem eam facio, aberrationem in specie et secessionem: illam intelligo, quando integer aliquis humor aberrat, et ad locum sibi destinatum non pervenit, cum [*superscriptum*: 2] ut [*superscriptum*: I]¹⁴⁴ obstructis venis lacteis, chylus cum faecibus commixtus excernitur per podicem, aut ruptis venis lacteis effunditur in abdomen: et hanc quidem speciem aberrationis satis discussimus cum de clausura et apertura meatuum egimus, [594v] ab his enim plerumque et fere semper pendet ista aberratio, nisi quod forte propter lubricitatem, et nimiam humiditatem alvi, contingat nimis cita chyli in intestinis praetervectio, unde is abhorret a venis lacteis per quas colari debeat, et per podicem excernatur: hoc et similibus paucis casibus exceptis, videtur aberratio humorum in specie sic dicta potissimum pendere a vasorum et meatuum obstructione vel pertusione.

Secessio humorum est, cum humor aliquis qui integer et commixtis partibus aliquo deferri debeat, secedit, et in diversas partes abit: quod ipsum iterum ab obstructionibus et pertusionibus meatuum fieri potest: ut cum semi obstructis et oppletis venis lacteis, non nisi tenuis et serosa chyli pars pertingit ad focum cordi; caseosa et butyroza partes tanquam crassiore, ad foraminula obstructionum resistente:¹⁴⁵ a *[[{...}]]* ut subtiliter pertusis venis lacteis, serum effunditur in abdomen; crassiores vero chyli particulae quae foramina illa transire non possunt, ad focum cordis appellant: sed notabilis est illa secessio, qua sanguis secedit in serum suum et crassiores partes, quae secessio non pendet necessario ab obstructione aliqua vel pertusione meatuum, sed saepe admodum a frigore

142Geulincx, *De febribus*, thesis 2.

143Read: 'in flatum'.

144Read: 'ut cum'.

145Read: 'resistente'.

aeris, corpus et praesertim caput ambientis: cum enim calor partes sanguinis et agitet et commiscent, frigus mixturam illa solvit et partes inter se secedere sinit. Ut vel ex eo videas, cum sanguis vena[{...]]e sectione missus in patellam recipitur: secedunt enim statim partes eius ab ambiens frigus, et serum supernatat.

Simile quid contingit facile in capite utpote frigidae temperaturae, dum praesertim frigus externum negotium hoc valide promovet. Cum vero sanguis ibi sic secessit, facile perlabitur serum vasa sua (arteriae enim intra c[{...]][*superscriptum*: a]lvarium simplici tunica donantur cum alibi duplici gaudeant) adeoque plus solito pituitae in cerebri ventriculis colligitur: quae vel alio destillans quam quo consuevit, vel eo etiam quo consuevit uberius destillans catharrus vocatur: qui quidem multorum incommodorum causa est (nam in nares defluens coryzam facit, in fauces rauc[{...]]edi[{...]]nem, in oculos vel aures surditatem vel caecitatem creare potest, in articulos arthritidem etc.) sed et gravium morborum, ac ipsis subinde mortis proxime: si enim catharrus incidet confertim in asperam arteriam et pulmones, epiglottide per nimiam humiditatem resoluta, intercluso spiritu statim praefocabit: si paulatim magnopere impedit respirationem, et si acris sit catharrus, asperam arteriam et pulmones erodet et tabem inducet similimodo in alias partes destillans alios morbos vel aliter causabit.

[595r] Semeiotica.

Signum generale morbi ante diximus esse anxiam conscientiam aegrotantis, qua sibi mortis impendentis conscius est; nisi cum cerebrum morbus occupat: tunc enim aliis indiciis colligitur morbus. Sed non tam de signis morborum, quam de causarum signis, a quibus hi pendent, sollicitus esse debet medicus: quia eius non est morbum auferre, per se loquendo; sed causas morborum: quibus ablatis, at morbus ipse, et hoc signum eius quod statim commemorabamus, sponte et naturaliter desinunt ac evanescent.

Quamvis autem morbum praecedenti parte in 4 genera tribuerimus; possunt tamen omnes hi morbi (ut aliquoties inuimus) ad unum genus revocari, nempe ad morbum cordis; ita ut nobis morbus tantum unus sit, nempe periculum extinctionis istius foci qui ardet in corde: nam 2 ibi postremum recensiti morbi (nempe ventriculi et diaphragmatis) non alia de causa morbis sunt, quam quod in se complicent hunc morbum cordis, qui consistit in periculo extinctionis biolignei: quicquid enim in illis partibus [*superscriptum*: ac][[x]]cidat, morbus tamen non erit, quamdiu hoc periculum secum non adducit: et quamvis similiter morbus cordis, seu periculum extinctionis biolignei, non alia de causa morbus sit, quam quod secum importet, morbum cerebri, seu periculum mortis, et non usus quo mens spiritibus destituta utatur corpore; tamen si morbi ita inter se implexi sunt, ut alter semper alterum secum trahat: hoc ipso enim quo non suppeditantur spiritus a foco cordis cerebrum spiritibus non utitur, et hoc ipso quo cerebrum spiritibus non utitur, focus cordis extinguitur, spiraculo destitutus: adeo ut vita praecipue quidem consistat in cerebro, sed a medico maxime servanda sit in corde.

Cum igitur morbus sit periculum extensionis¹⁴⁶ biolignei, patet duas tantum eius causas esse, nempe pabulum non recte administratum aut spiraculum ademptum: ignis enim apud nos nunquam extinguetur, quamdiu ei de pabulo et spiraculo bene prospectum est, alterum horum deficere debet, si extinguendus sit ignis: nam cum forte affusa aqua focus extinguitur, tum et malum pabulum ei suppeditatur, et a iusto suo et probo pabulo abarctetur: quod in physica vide.¹⁴⁷

Harum duarum causarum haec sunt signa syncope, lypothymia, debilitas, (quae omnia idem in essentia sunt et tantum secundum magis et minus differunt) febris et eam subinde [{...]]comitantia frigora, horrores, ac rigores: et etiam palpatio cordis: quantum enim ad primam causam, quae est mala pabulatio, illa triplex est, vel enim nimis, vel minus, vel non decens [595v] pabulum suppeditatur; si minus vel nimis, oritur syncope, vel annexum; si vero inconueniens pabulum

¹⁴⁶Read: 'extinctionis'.

¹⁴⁷Geulincx, *Opera philosophica*, volume 2, *Physica vera, De microcosmo*, 445–446 (§ 8).

suppeditatur oritur febris vel palpitatio¹⁴⁸ cordis: et debilitas quidem quae oritur cum nimis pabulis suppeditantur, illa a vacuantibus levatur et adsunt simul alia signa plenitudinis de quibus infra; illa vero debilitas quae oritur cum minus [{... }] alimenti suppeditatur, illa vacuantibus augetur et adsunt alia signa defectus.

Cum vero inconueniens pabulum suppeditatur, quatenus hoc partim est non pabulum eatenus syncopen etiam causare potest, aut frigora et rigores, cum focus cordis primo eius ingressu quasi obruitur, et a iusto suo pabulo defraudatur, deinceps vero cum focus cordis superat, et illud minus aptum pabulum dissolvit et depascitur, maiores ardores seu febres excitantur.¹⁴⁹ Palpitatio autem plerumque fit a flatu pabuli loco in foco cordis immisso.

Quantum ad secundam causam, nempe malum spiraculum, respiratio potest esse nimia, potest etiam esse minus parua: non {accensio} parua, quia satis illa continetur sub altero praecedentium membrorum: quod enim dicant respirationem depravatam esse, quia convellendo ve[[t]]l pulpitando fit, aut illa non est mala respiratio, nec foco cordis afficit, sed tantum aliquod incommodum adiunctum habet, aut si mala est, officiatque cordis foco, ex eo mala est, quo nimia sit vel nimis parua: simile quid observabimus circa mala pabulationem eam nempe per [{... }] minus et nimis abunde dividi.

Nimia respiratio locum habet in tristibus, anxiis, melancholicis (si enim ex intervallo frequenter suspirant) item in diligenter attendentibus, quales sunt acriter studentes, multis curis et negotiis obruti, et denique phrenetici, qui ad phantasmata sua et imagines diligenter auscultant (si enim ex intervallo diminuta, quaedam suspiria ducunt) suspirium seu integrum seu diminutum in eo consistit, quod post aliquo, exiguas respirationes, ac subinde fer[{...]]e nullas, una magna inspiratio adhibeatur: cum succedens respiratio si cum sonitu fiat et audeatur suspirium dicitur; sin sonitus ille absit (quod magis fit in acriter studentibus et cura ac negotiis oppressis) eandem quidem naturam agnoscimus cum suspirio, et tantum penes nimis differentem, sed tamen suspirium vulgo non vocabitur.

Suspirium valide accendit focum cordis, idque duabus de causis. 1^o quia respiratio inter duo proxima suspiria, exigua et subinde fere nulla, adeoque focus cordis eo tempore intra arctum pectoris conclusus, exardescit, eo modo, quo videmus focum culinae poculo illi inditum, quem Belgae een smoorpot vocant, nondum opposito¹⁵⁰ operculo, [596r] altius longe assurgere et incandescere: 2^o quia post suppressas illas aut imminutas respirationes, cum iam illis debilitari inciperet focus, succedit una vehemens et magna, quae focum cordis plus irritat et succendit, eodem modo ac si in casu posito focum illum poculo inditum per intervalla amplo follium flatu instigaremus. Quae sic optime et sapientissime constitui opifex nostri corporis, cum enim tristibus opus sit consilio quo malum quod ipsis nege[*superscriptum*: a]t amoliantur; consilio autem illi inveniundo opus sit spiritibus, per suspiria ingens copia spirituum (velut scintillae quaedam ex foco, cuius iam meminimus, irrumpentes) paratur similiter anxius suppeditantur spiritus quibus malum immiscens, per audaciam depellant, vel per fugam declinent, idem aut simile quid obtinet in studentibus.

Cum interim suspiria sic auget focum cordis 1^o quidem generatur in suspirantibus in[{...]]clinatio et propensio saepe saepiusque suspirando quaerunt enim levamen contra ardorem foci a frigore inspirati aeris atque eo etiam ad momentum levantur: sicut focus eo momento quo follibus illum perflamus, demissus et tenuis ardet, etiam si postea altius insurgat: sic et focus in corde suspirantium continuo magis ac magis accensus, eo[*superscriptum*: [a]]s [*subscriptum*: ^] [*superscriptum*: ad] iterum iterumque suspirandum impellit, quibus tamen suspiriis ad momentum tantum levantur, deinceps vero focus cordis magis inardescit. 2^o suspirantes sitibundi sunt, ut in maestis et anxiis manifestum est, quod clarissimum est ab eadem illa causa procedere, nempe a

148Read: 'palpitatio'.

149Geulincx, *De febribus*, thesis 2.

150Read: 'apposito'.

nimio ardore cordis, 3° cont[...][*superscriptum*: a]bescunt, quia sanguis in foco cordis nimis in ardescens et adustus, minus utili iam est ad nutriendum partes solidas corporis, ideo partes illae deficiunt et absumitur: imo cor ipsum ustulatur, et partes vi[...][i]cinae, pericardium et pulmones: in quo consistit febris hectica et marasmus,¹⁵¹ cum alimentum omne in corde corrumpitur ob minimum eius ardorem, nec partibus nutriendis amplis idoneum est, degeneratque in limosum, atrum, et cinericeum quendam liquorem, qui cum sanguine melancholicorum mixtus reperitur cum forte vena illis secatur, ideoque ab imperitis putatur esse ipsa melancholia vel eius causa.¹⁵² Cum tantum sit effectus quid[...][em], et recrementum ex pabulo foci nimis ardentis residuum. 4° ingeniosi sunt et machinatores, et multa imaginantur, quod fit ex copia spirituum, ab eadem copiam effusi saepe sunt: in cachimios, iocos et eadem fere patiuntur, quae laeti ac hilares; sed vix cum pleno animi sensu, ac eorum hepar aliis magis gratus [sit] est quam ipsis.

[596v] Ex his constat tribus fere modis nimia respiratione morbum causari: 1° si coniuncta sit cum paucis pabulis illud totum subito incendens, hoc ipso minatur inter[...][itum] ignis et mortem: unde periculosa et maestitia cum inedia, in quam tamen maesti praeconi sunt. Tristes vero bene reficiendi sunt, et subinde etiam magis appetunt, quam laeti, etiamsi ex tristitia suo app[...][etitui] non satis faciant: 2° nimis multos spiritus suscitando, nimia respiratio inducit nimis parvam respirationem (vide supra de redundantia spirituum) hinc qui magnopere afflicti sunt videntur sibi strangulari, et e domo proripiunt se in loca ampla et aperta, quasi ibi melius respiraturi sint, in quo est error iudicii ipsorum; difficultas enim respirandi non venit illis ab angustia loci, in quo versantur, ut alias fieri solet, sed a copia spirituum eo modo quo hoc supra explicavimus: 3° nimia respiratio causat morbum inducendo malam pabulationem: sanguis enim aduritur, et in recrementa mutatur, quae non magis faciunt ad focum cordis alendum, quam cineres et phlegmata, quae titionibus exsudarunt faciunt ad alendum focum culinae: d[e]inde etiam nimia respiratio in [...][venas] lacteas erudi et inutiles succi protruduntur, qui appell[...][entes] ad cor focum turbant et febrim excitant.¹⁵³

Quantum ad defectum respirationis seu respirationem nimis parvam, illa clare morbum causat, hoc ipso quo periculum praefocationis inducit: 2° etiam per accidens morbum causat inducendo defectum pabuli: dum languet respiratio, pabulum per venas lacteas et ductum chyloferum minus feliciter assurgit: ut ex pathologia nostra satis patet. Duae ergo sunt respirationes malae: et nimiae quidem signa sunt satis manifesta nam in suspirantibus et vehementer exercentibus, intensior¹⁵⁴ respiratio ipsis auribus percipitur: signa etiam suppeditant causae: nam si maestitia, anxietas, curae, studium acre et diuturnum, vehemens corporis exercitium praecesserint, nimiam etiam fuisse respirationem coniecere poterimus: imo etiam ab effectis, veluti si gracile sit corpus habitus melancholicus, sanguis ater et adustus, simile quid suspicari licebit, quamvis si effectus alias etiam causas agnoscant subinde; sed ad syndromen signorum attendendum est, non vero ad unum aliquod signum seorsim.

Deficientis respirationis signa sunt. I° ipsamet respiratio deficiens aegro facile innotescit, 2° cognoscitur etiam ex debilitate virium, quae debilitas refectio, et iis quae [597r] spiritus suppeditare possunt levatur; a contrariis vero laeditur; sicut contra debilitas illa quae subinde a nimia respiratione oritur, iis levatur, quae spiritus evacuant; iis vero laeditur quae spiritus augent vel reficiunt: denique cognoscitur etiam ex causis suis, de quibus infra.

Signa pabuli bioligneo non rite administrati

Nimii pabuli signa, petuntur I° a causis: quae sunt aetas iuvenilis, tempus vernum, aut potius initium aestatis apud Belgas, victus plenus, exercitatio corporis nulla seria sed per lusum instituta, hilaritas

¹⁵¹Geulincx, *De febribus*, theses 24–25.

¹⁵²Sennert, *Epitome Institutionum medicinae*, 92–93.

¹⁵³Respiration is not taken into account in Geulincx's *De febribus*.

¹⁵⁴Read: 'intensior'.

et ioci, et absentia animi pathematum, quae ad maestitiam, timorem vel aliam molestiam vergunt, et denique omnis constitutio talis, quae seorsim considerata quam maxime facere videtur ad sanitatem: his enim causis concurrentibus suppeditatur foco cordis pabulum supra modum quo ei interitus et suffocatio paratur, atque adeo morbus ille generatur qui passim evexia athletica vocatur.

Sunt tamen quidam etiam qui gracili et maculento¹⁵⁵ corpore, et mente studiis ac curis dedita, foco cordis de nimio pabulo prospiciunt, et in vasis distentis distentis [*sic*] ac turgidis circumferunt ingentem copiam sanguinis, quae foco cordis suffocationem minetur: hi duris vasorum tunicis et ad osseam quasi substantiam accedentibus saepe sunt praediti (quod videre licet in quibusdam senibus) per quas sanguis parce admodum transsudet in contextum corporis ad nutritionem faciendam, ideoque corpus iis gracile et emanciatum, venae vero sanguine turgentes quia non expenditur: idem etiam usu venit in iis qui raro sunt corporis contextu (ut videre licet in quibusdam iuvenibus) in his enim etiamsi sanguis, quantum ad nutritionem satis est, e vasis in contextum corporis transsudet, parum tamen istius sanguinis corpori apponitur, sed exhalet e poris quod apponendum erat, tum propter focum cordis valide ardentem et expellentem, tum propter amplitudinem pororum expulsionem illas non remorantem! Unde quidem contingeret in venis minor copia sanguinis; nisi vitu pleno aliisque causis mox enumeratis, plus suppleretur, quem transsudando discederet.

Hisce causis accedit etiam suppressio solitae evacuationis sanguinis, per uterum, per haemorrhoides, haemorrhagiam narium, per exercitia, balnea etc. item resectio alicuius membri v. g. brachii aut cruris: haec enim per [597v] accidens etiam causant nimium pro foco cordis seu plethoram.

Signa quae ab effectis petuntur difficilis respiratio, debilitas cum sensu gravitatis et inclinatione in somnum, difficilis motus v. g. in claudenda manu cum sensu plenitudinis: denique levamen quod sentiunt aegri ab iis quae sanguinem minuunt. Signum autem quod hic maxime in oculum incurrit, est turgentia vasorum artubus ad focum vel post leve exercitium.

Signa deficientis pabuli I^o petuntur a c[...][*superscriptum*: a]usis, quarum prima est inedia, sive spontanea sive coacta, v. g. propter anginam, ulcus aut obstructionem oesophagi, nauseam, et prostratum appetitum aegri: 2^o obstructio inferioris orificii in ventriculo seu pylori: 3^o obstructio venarum lactearum ductus chyli aut insertionis eius in venam subclaviam, aut obstructio venae ca[...][*superscriptum*: v]ae in trunco ascendente vel descendente, unde impediatur ingressio sanguinis in cor. Et prima quidem harum causarum nota[*superscriptum*: 2] satis[*superscriptum*: I]¹⁵⁶ est, reliquae autem aliis indiciis indigent quibus innotescant: obstructio igitur inferioris orificii in ventriculo prodit se vomitu post sufficientem [u][*subscriptum*: ^][*superscriptum*: ci]bi coctionem in ventriculo: tunc eum chylus egeritur per superius orificium, qui alioqui distribuendus erat per in[s]testina: huic accedit magna virium debilitas, ardor cordis, vertigo, et similia symptomata, quae facile deducuntur ex eo quod focus cordis novo pabulo non temperetur.

Si obstructio sit in intestinis tenuibus, similis fere vomitus continget, sed aliquanto raris et copiosis: amplius enim est spatium infarciendum inter superius officium ventriculi et obstructionem intestini tenuis, quam inter superis et inferis orificium ventriculi: ideoque ciborum et chyli regestio continget quidem non tam saepe; sed continget maiori [copia] copia: aderit etiam debilitas virium; sed non tanta; ut in praecedenti casu; cum per venas lacteas illam intestini partem quae obstructionem antecedit pertundentes, aliquid pabuli ad focum cordis deferri possit: aderit etiam [pabulis] febribus a malo et corrupto pabuli ex diuturna mora qua circa obstructionem haesit.¹⁵⁷

Si vero obstructio sit in crassis intestinis, fiet etiam vomitus per intervalla, non ciborum tantum ex ventriculo, non chyli tantum ex intestinis tenuibus, sed et stercoris ex intestinis crassis qui affectus volvulus ducitur,¹⁵⁸ et crediderunt veteres eum fieri ab intorsione alicuius intestini crassioris; sed

155Read: 'macilento'.

156Read: 'satis nota'.

157See Geulincx, *De febribus*, thesis 10, where however no obstruction of the intestines is mentioned.

158Read: 'dicitur'.

connexio intestinorum cum mesenterio, quae in anatome oculis subiicitur, clare explodit illud commentum: [598r] recentiores proinde aliud quid commenti sunt, nempe inflexionem intestini intra se ipsum versus superna: hinc enim fieri putant ut motus peristalticus qui faeces alioque ad podicem detrudebat, iam inversus, eas sursum ageret ad ventriculum; sed et hoc commentum est: vix enim est [subscriptum: ^][superscriptum: ut] connexio intestinorum cum mesenterio patitur, talem inflexionem, nisi admodum parvam forte, et in uno alterove loco: quod si tunc in ipsa inflexione seu plica intestini faeces sursum agantur; ultra tamen citroque deor[subscriptum: ^][superscriptum: s]um ferentur.¹⁵⁹

Secundo motus peristalticus non multum facit ad eiectionem excrementi, nisi per modum determinantis: sicut motus gubernaculi in navi non movet navem, sed tantum motum eius determinat, quem ab undis et vento habet: sic etiam motus peristalticus intestinorum, tantum determinat motum contentorum in intestinis, ipse autem eorum motus est a respiratione: puto igitur hunc affectum fieri[,] a dura et pertinaci obstructione intestini crassioris, ubi recrementa stercorescunt: posita enim tali obstructione, faeces quidem continuo per respirationem pelluntur et motu peristaltico intestinorum ad inferna determinatur; sed ad obstructionem appulsae sursum repelluntur, et ea via pergunt quae liberior est, etiam contra determinationem motus peristaltici, sicut navis vento valido et undarum fluxu acta; dum gubernaculo obtemperare non potest, fertur quoquo modo et ut [{po}] po[{s}]test.

Si venae lacteae sint obstructae, chylus cum stercore per [{...}][superscriptum: a]num excernitur: saepe albicans, nisi subide affusa bile copiosore inficiatur: adest summa debilitas, et refectionis quidem desiderium sed ex refectione nullum levamen, ardor cordis, vertigo etc. similia symptomata sunt si ductus [{...}] chyliferus aut eius insertio in vasa obstruatur unde oportet hanc obstructionem aliis signis dignoscere: videndum est itaque an luxatio aliqua sit in vertebriis, aut tumor aliquis circa illas partes, aut circa claviculam. Si enim horum aliquid adsit, magis praesumendum est obstructionem ad ductum chyliferum quam ad venas lacteas pertinere: vasa enim illa chylifera, facile quidem comprimuntur ab aliquo extraneo; sed non ita obnoxia sunt tumoribus qui intra cavitates eorum generentur cum sint substantiae membranaceae.

Interim etiam facile opplentur, si materia quae per cavitates eorum fertur nimis apta sit ad motum: atque talis obstructio facili[{...}]s locum habebit in venis lacteis quam in ductu chylifero, utpote quarum meatus exiliores sunt: si itaque vehementi post cibum sumtum exercitio, velut cursu, lucta, aequita[598v]tione etc.: inciderit in obstructionem vasorum chyliferorum, quae praedictis symptomatis se prodat iudicarem eum obstructione venarum lactearum; non vero ductus chyliferi laborare: nam vehementi isto exercitio cibus crudus e ventriculo per nimiam respirationem pulsus, et secundum iusto crassiores particulas osculo venarum lactearum impactus, obstructionis causa fuisse videbitur quae obstructio initia potissimum istarum viarum comparare videbitur.

Si denique obstructio sit in vena cava vel cordis auriculis, aut circa eiusdem valvas, siquidem illa obstructio plena sit, subito necem extincto cordis foco inferet; si vero particulis tantum, ita sc. ut adhuc aliquid sanguinis in cor derivari possit, magnam inferet virium debilitatem: discernetur autem ab obstructione vasorum chyliferorum, eo quod chylus hic per anum non excernatur, et a refectione

¹⁵⁹The first explanation of faecal vomiting criticized by Geulincx, i.e. the idea that it is caused by a looping of the intestine, traces to Asclepiades, while Galen explained it in terms of an inflammation of it (Garth H. Ballantyne, "The Meaning of Ileus: Its Changing Definition over Three Millennia," *The American Journal of Surgery* 148, no. 2 (1984): 252–256, [https://doi.org/10.1016/0002-9610\(84\)90232-0](https://doi.org/10.1016/0002-9610(84)90232-0)). The second explanation, viz. the theory of the invagination of the intestine leading to an anti-peristaltic movement, was maintained by Plempius; he nonetheless criticized the first kind of explanation with the same evidence proposed by Geulincx, viz. the adherence of the intestine to the mesentery, which makes its looping impossible: Plempius 1654, 143; also Sennert endorsed a theory of invagination: Daniel Sennert, *Practicae medicinae liber tertius* (Wittenberg: Typis Michaelis Wendt, 1648, first edition 1631), 244–245. The explanation of faecal vomiting as a result of the obstruction of the intestines can on the other hand be found in the *Praxis medica* (1640) of Lazare Rivière (1589–1655): Lazare Rivière, *Praxis medica* (The Hague: Apud Adrianum Vlaq, 1664), 450–451.

etiam robur aliquid accedat; quod in aliis illis obstructionibus non habebat locum.

Non tam deficit pabulum propter obstructiones viarum quibus id ad focum cordis deferendum est; sed etiam ab aperturas viarum et in rimas per quas elabatur pabulum, antequam focum illum accedere possit: si igitur oesophagus sit [[spiritus]] pertusus, facile vitium id cognoscitur tum ex dolore magno, tum ex eo quod liquores per os assumti, manifeste in thoracem devolvantur vel pro parte, vel in totum: qui liquores ab aegris praesertim vario decubitu corporis, quo illi ab uno loco in alium feruntur facile percipi possunt: si ventriculus, intestina, aut venae lacteae sint pertusa, hydrops nascitur; qui satis manifestum signum est talis alicuius vitii: similiter si ductus chyli ferus aut vas aliquod maius intra ventres dirumpatur, humor contentus effunditur; sed forte difficile erit discernere unum vas sanguinis aut chyli sit perfractum: resp.: praesumendum est vas, chyli potius quam sanguinis diruptum esse quia tenuiora sunt vasa chyli (adde et lymphae) quam sanguinis: cui et hoc accedit, quod dirupto vase chyliifero, venter paulatim intumescat, dirupto autem vase sanguinis simul et semel, idque cum maxima virium prostratione, aut etiam repentina morte, quia pabulum (sanguis) foco cordis notabiliter surripitur.

Signa inconvenientis pabuli foco cordis subministrat peti etiam possunt a causis; et I^o quidem inconveniens pabulum est flatus, per venas lacteas in cor delatus: atque hoc vitium prodit se rugitu intestinorum et tensione abdominis a flatibus in eo genitis, antequam ad cor deferrentur, tum etiam [599r] subsequenter syncope, cum flatus iam cordis thalamum ingreditur, ac brevi restitutione, cum iam post flatum, rursus probum alimentum appellit ad cor: unde flatulenti illi momento pessime habent et moribundi videntur, et subito iterum bene iidem sint, melancholici et tristes, anxii, verecundi, cum flatus in hypochondriis moratur eo autem per cibum vel potum discusso alacres rursus et laeti et saepe etiam impudentes.

Secundo malum et inconveniens pabulum est serum, seu serosi et aquei humores nimia copia ad cor devecti.