The Unpublished *Medicina contracta* of Arnold Geulincx

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**Abstract:** In this paper I provide a commentary on and edition of the unpublished and apparently incomplete *Medicina contracta* of the Flemish philosopher Arnold Geulincx (1624–1669).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;

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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In this paper I provide a commentary on and edition of the unpublished and apparently incomplete *Medicina contracta* of the Flemish philosopher Arnold Geulincx (1624–1669), lecturer and professor of philosophy at Leuven in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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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.

not know how to do, you do not do,” 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


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.


edition, and has been considered only very recently by scholars. Given its potential importance for a study of (1) the development of a Cartesian medicine at Leiden during the crucial decade of the 1660s, (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, 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 conarium 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), 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).

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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.
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, 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_). 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 _Latiora_) on Descartes’s _Principia_, finalized in 1669 (as it refers to the
disputation on cosmology of December 1668, and to a _Disputatio physica de incendio Aetnae_ held
in June 1669). 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).

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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). 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. 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. 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

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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 *Meditaciones 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.

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

These positions have to be considered by taking into account Geulinex’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.

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), 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), are rendered in corpuscular terms, and the classification of physiological functions is simplified. 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,

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23 BPL 1255, 584r–v and 587v.
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 Ackerseycium, 1647), 3 and 11.
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. In his *Cogitationes quibus Dei existentia item animae spiritalitas et possibilis cum corpore uno 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. 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. 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

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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 spiritualitas, et possibilis cum corpore uno, demonstrantur, nec non, brevis historia oeconomiae corporis animalis, proponitur, atque mecanice explicatur* (Amsterdam: Apud Ludovicum Elzevirium, 1646), 38–43 and 67–68. Van Hogelande does not define the idea of health.

effervescence.  

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.  

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). 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 Danielem Elsevirium, et Abrahandum 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.\textsuperscript{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),\textsuperscript{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).\textsuperscript{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 lactae), the respiratory movement, and the chemical processes arising from the juices generated by the gallbladder (vesicula felli) 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;\textsuperscript{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.\textsuperscript{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,
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: a function rejected both by Geulincx and Sylvius, for whom the duct allows the passage of chyle directly to the heart.

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. 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. 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.

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 respirazione 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. 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). 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

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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 respiratone usuque pulmonum, 120–125 (theses 54–74).
43 BPL 1255, 592r and 595v–596r.
44 Descartes, Œuvres, volume 11, 125.
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) breathe 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

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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, while in the De microcosmo (§ 3) and Medicina this is identified, in Cartesian fashion, in the pineal gland. 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. 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. 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. Instead, in Geulincx’s model the spirits enters the cavities of the brain from the choroid plexus (in a quite traditional way), 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). 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.


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


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

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58 BPL 1255, 593r–v.
59 See supra, n. 45.
definitely had a more central part in his physiology, these being the main concepts by which he explains concoction and nourishment. 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.

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, 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), 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), leading to

64 BPL 1255, 589v and 591r.
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 Herophilus or

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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.
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). In fact, the kind of explanation attacked by Geulincx. In turn, in his influential Observationes anatometricae 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. 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. 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.

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 praeervatio perspicue proponitur, clareque demonstratur (Wittenberg: Typis Jobi Wilhelmi Finceli, 1629), 103.
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. 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, 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): 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. 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). 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. 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 disputation), 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

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82 BPL 1255, 592r.
voluntary respiration, too, depending on muscles and not directly on the heat of the heart, does not cease in apoplexy.\textsuperscript{83} The same kind of solution is proposed also in the \textit{De microcosmo} (§ 3), where the symptoms of apoplexy are attributed to a “severed, harmed, or obstructed nerve”\textsuperscript{84} (thus taking into account the case of the severance of a nerve, as in his \textit{De respiratione}, and unlike in his \textit{Medicina}), and in his \textit{Annotata maiora} on Descartes’s \textit{Principia} (roughly coeval with the \textit{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.”\textsuperscript{85} An explanation which is developed in the \textit{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 (\textit{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.\textsuperscript{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 \textit{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.\textsuperscript{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 \textit{Medicina}, indeed, seems to be incomplete, and in any case – unlike other unpublished texts of his –

\begin{itemize}
  \item There is no reference to the \\
  \textit{Annotata ad Ethicam}, 207. The reference to the disputations is omitted in \textit{Land’s edition}, but it can be found in BPL 1255, 502, and in Arnold Geulincx, \textit{Ivōth oσαρίων, sive Ethica} (Leiden: Apud Adrianum Severini, 1675, first edition 1665), 127.
  \item Geulincx, \textit{Opera philosophica}, volume 3, \textit{Annotata latiora}, 517.
  \item Van Hogelande, \textit{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).
\end{itemize}
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 acknowledge through “other evidence.”

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).

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), 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. 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

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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”):\textsuperscript{92} for
instance, if a person is sad, anxious (viz. undergoes certain passions of the soul),\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{96} A
tripartition discussed by Plempius, who reduced the first source of signs to effects.\textsuperscript{97} Eventually, for

\textsuperscript{92} BPL 1255, 596v.
\textsuperscript{93} BPL 1255, 589v.
\textsuperscript{94} BPL 1255, 595r–599r.
\textsuperscript{95} Fernel, \textit{Universa medicina} (1656), 193, 195, 220-221, and 225-226. See supra, n. 28.
\textsuperscript{96} Sennert, \textit{Epitome Institutionum medicinae}, 193 and 196–197.
\textsuperscript{97} Vopiscus Fortunatus Plempius, \textit{Fundamenta medicinae} […]. \textit{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,

98 Regius, Fundamenta medica, 76.
99 BPL 1255, 584r.
100 BPL 1255, 595r.
101 Regius, Fundamenta medica, 134–135; Sennert, Epitome Institutionum medicinae, 513 and 516–517; Fernel, Universa medicina (1656), 275; Sylvius, Opera medica: De metodo 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.
Arnoldi Geulincx
Antverpiensis
In Illustri Acad. Lugd. Batt.
Philosoph. Profess.
Collegium
Medicum

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Medicinae contractae
finis

Medicina est ars pellendi morbos hoc e subscripturn: et principale officium medici; caetera quae medicus aliquando praestat vel praestem 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 { }; 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) 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 aliqui resектum sit, crus fractum, oculis erutis, necessum est ideo ut morturit.

Quamvis corpus eius quod multos usus, quos mentis praesentare solebat fractum sit inidoneum, sed demum talis ineptitudo corporis includit 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 potissimum[...] [superscritum: m] utatur corpore; non potest tamen eo uti sine aliis instrumentis, praesertim indigent spiritibus (vide physicam loco citato) qui ei suppliatur 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) extinguitur idem facile si spiriaculum ei occludatur. Hinc laeso notabiliter cerebro et per consequens nervis respirationi inservientibus, praefocatur ille focus: focus enim ille intra arctum 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 accedat, quia tensis musculis rigidoque pectore, respirationi nulla aut minus parva peragitur, adeoque focus cordis praefocatur.

Quia vero focus illae intterriti debet sanguine [584v] qui utpote pabulum istius ignis, perpetuo absumitur hinc resarciri debet per alimentum a stomacho suppletatum, ut videre est in physica hinc etiam magna cura medici est circa stomachum: adeoque hac tres dici possunt partes principales, cerebrum, cor, et stomachus; addo instrumenta respirationis ut sic universum sunt quatuor partes principales: circa quas principaliter cura medici versari debet, [subscription: ^][superscriptum: et] quorum indispositiones periculosos morbos continent. Notandum autem morbum ab aegrotante primo fere cognosci, tristi aliqua anxia et calamitosa conscientia, seu experientia statim 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 afflictionem 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 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 uti cerebrum ipsum affectum est, iam non rite senti[subscription: ^]

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, Œuvres, 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 vulgaris109 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 […] illa perceptione morbos corporis sui, et praesertim illum qui circa cor versatur, et tendit ad exinguendum focum. Ex his facile dicitur, quid sit sanitas, nempe absente morbia in corpore, cui mens coniuncta est, aut positi[ve] dispositione humani corporis ad ulteriorem vitam; id est ulteriorem conjunctionem 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 lactaeae, 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 stomaco principaliter incumbit, quod est foco cordis prospicere de pabulo: quia enim focus ille alimentum suum absumit 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 chyliferum: nam si minima quantitate deferretur, obruerit focum sicuti in foco culinae videmus eum pabulo, quamvis bono et [superscriptum: ad] arendum apto, nimis cumulatim ingesto, suffocari et extinguiri: hinc conveniens erat ductum illum chyliferum non nimiis 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 illum agit est respiratio: continuo enim motu diaphragmati inter respirandum, ventriculo ei proxime subjectus comprimitur, adeoque alimento quem sumit in intestina detruditur; ex his porro tum eiusdem diaphragma[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 respirations succus, qui lacteis venis influxit ad galax […] [superscriptum: ^] [superscriptum: e]am deducitur, et per ipsam in altum subvehitur eadem ope respirations: cum enim inspiramus pectus attollimus, thoracem dilatemus, adeoque locum damus chylo, per ductum suum assurgentii; inferne vero cum [in] inspiramus abdomem 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’.
112Read: ‘subeclaviam’.
113Read: ‘exigua’.
114Read: ‘motu’.
eundem chylum.

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

Primo officio nempe praeparatione 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 [\{\}or concoctio fit in stomacho, qui cibum universum complexus, atque ad eius mensuram se dilatans vel constringens, convertit illum in lacteam pulticulam, quae chylus passim dicetur. Ad quam concoctio momentum confer tur 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 respiracione, quo diaphragma cum annexo hepate impingit in stomachum per[\{\}] vices, et rursum attollitur.

Secundo officio peragendo, secretioni nempe alimenti ab excremento potissimum inserviunt venae lactae, cum instrumentis respirationis: per has enim inter respirandum, quod liquidius atque tenuius est, abigimus, reliqua in intestinis remanent, atque adeo fit secretio inter alimento, quod per venas lactae abripitut, et excrementum, quod per intestina, devolvitum excrendendum per podicem. In hoc officium secretionis vocant etiam aliqui \[115De Graaf, De succi pancreatici natura.\] pancreas et vesiculam fellis, quatenus ambo succum aliquem in intestina exonerant, quo succo, cum chylo qui e ventriculo delabitur commixtio, oriatur quaedam velut effervescentia, qua partes chyli ab se invicem secedant sicut videmus aquae vitriolatae adiecto sale tartari, sulphur praecepti: et p[\{\}] [\[superscriptum: o\]]esse quidem tales aliquas praeparationes, ad faciilem chyli per venas lactae transitum in intestinis fieri non est diffutendum: praesertim cum adsint ibi multa, a quibus tale aliquid sperari merito possit.

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

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

De officio diaphragmatis

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

Quamvis autem diaphragma praeclipsum sit in officio hoc collegas tamen etiam habet, musculos abdominis, cum rectos, tum obliquos ascendentes, descendentes, et transversos, musculos

\[115De Graaf, De succi pancreatici natura.\]
intercostales, musculos pectorales, cum internos quis 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 stanneae 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
incum{…}bat) cum enim musculis peragetur respiratio (nam et diaphragma musculus quidam est,
et reliqua hoc concurrentia instrumenta potissimum musculi sunt) musculi autem nervis aguntur, et
nervi a cerebro pendunt, 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 vel exspiratus abibitur.

Unde sub officio respirationis, plura officia continentur; primo quidem officium inspirationis, et hoc
debetur inter musculis praesertim diaphragmati, inter
debetur musculus, praesertim diaphragmati, quod inter
{…} inspirandum subsidit, et intrabdomen quodammodo se recondit adeoque aeri per asperam
{…} [superscriptum: a]teriam in
pulmones ingressuro cedit: deinde musculi pectorales [586v] externi qui thoracem attollunt, ac
intercostales aliqui qui dilatant: et denique musculi abdominis, qui inter inspirandum abdomen in
longum extendunt, et in latum contrahunt.

Secundum officium expirationis, quod potissimum iterum incumbit diaphragmati, inter
exspirandum atollenti se in thoracem, adeoque angustanti thoracem, et aerem receptum excludenti:
deinde musculis pectoralis interna et intercostalis, qui thoracem deprimunt et
constringunt: denique musculi abdominis, qui inter inspirandum 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 exspiratus abibitur.

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 aliquid aliquud {…} [superscriptum: d] officium cordis, nempe nutriendi partes solidas per
sanguinem, quem in illas continuo immittit et impellit; tam[subscription: ^][superscriptum: en] hoc
officium non est primarium, et veluti per accidens tantum facit ad vitam, co quod sine illis partibus
solidis, et eorum nutritione: non bene possint consistere illa instrumenta, a quiue vita id est
coniunctio mentis cum corpore seu usus iste quo mens utitur corpore, proprie dependet.

Primarium 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 ascendentem 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[587]rrium, 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 operatio ac faciiliorem eorum generacionem remorari poterat: ut
renes serum, pancreas, et multae glandulae mucum, hepar bilum etc. Venae autem et arteriae
sanguinem remorum post spirituum generationem, circulando deferunt ad ista emunctoria, ut
expurgetur, et spiritibus suppliedandis aptior reddatur; vasa tandem lymphatica, sanguinem
temperant, et admixtione suae lymphae efficiunt solidiorem aliquam inflammationem: sicti
videmus admistione 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 saege appulsus, varie cribratur et transcolatur, adeoque varias partulas
deponit, pro varietate foraminum, quibus cribra ista pertusa sunt: adeoque alibi ac alibi alia atque
alia recrimento 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 chyliferum 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 positu 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 efficat: dum vero spiritus e ventriculis cerebri communiter in nervos influunt, non
causant quidem modum[116] membro, sed ipsos nervos distendentes, faciunt ut motus
externorum corporum, [587v] et sanguinis impressus, deferatur ad conarium, ibidem menti varias
imaginationes exibit, colorum, saporum, caloris, soni etc.

Dixi autem quod conarium pro diverso positu suo, spiritus in h[…]os vel illos nervos, eos vel illos
musculos, vehementius impellit: quia alius ibi non apparet necessarium: sic enim videmus pro
diverso positu gubernaculis[…] [superscriptum: i] ingentem navim, vento actam modo in hanc
modo in illam partem deferri, aut sicuti videmus ventum e certa parte mundi spirantem, objecto
domorum, etc. in varias partes reflecti subinde etiam in gyrum agi: sic facile possimus cogitare
motum magnorum in corpore nostro membrorum ab exiguae istius glandulae diverso positu
pendere; atque ab illo diverso positu, spiritus in cavitatibus cerebri inter se commotis, in diversas

116Read: ‘motum’.

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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 impulsi corporum exterorum, mediantibus nervis ad \[\{\ldots\}\]spiritus qui conarium circundant delato: aqua 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 positum.\[117\] quod in ipsa quidem mente humana nonnisi velle aliquod est, cum ipsa motum efficere non possit, nec etiam propri\[\{\ldots\}\]e determinare: vide microcosmum nostrum.\[118\]

Corpora vero bruta dico, quae automatice 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 cerebrales, cerebrum eiusque cavidades, nervos et musculos, atque exteriores organa sensuum: et quidem per arterias iam dictas intra calvariam ascendentes, spiritus transcoluntur, quae ibi arteriae eum in finem simplici et satis tenue donantur, ut nempe spiritus facile transcolari possit. Cerebrum depurandis spiritibus dicat voluntas: sic nempe spiritus vini a phlegmate suo depurator, quando per spongiam oleo imbutam traicitur. Cavitates cerebri retinendis spiritibus, et amplitudinee sua, liberum positum linquendo conario. Nervi recipiendis spiritibus, iisque distendendo se, faciunt ad sensum: musculi denique ad motum. Et sic etiam satis dictum est de officiis, quae sub generali officio conarii reprehenduntur.

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 humamin 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 diviseramus, nempe in officium coquendi, separandi alimentum ab excremento, alimentum differendi, excrementum eicendi. 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, musculi resoluti, aut aliter male affecti, tunc enim masticatio in ore non bene peragitur: sic etiam coctio, quae fit in stomacho vitiabitur, si saliva, aliqua 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 \[\{\textit{subscriptum:} \}][\textit{superscriptum:} m]acies, et foci cordis extinctio atque mors. Secundo idem officium turbabitur si aliquam multae venae lactae abrumpsantur aut perturbantur foraminulis. Tunc enim succus qui venis lacteis illis influxerat, intercipietur ante quam ad locum sibi destinatum devehi possit, atque in mesenterium et abdominis capacitatem effundetur: atque inde

\[117\]Read: ‘posita’.

hydrops qui vel siccus vel humidus: siccus quidem fit paucis quibusdam venis lacteis ab intestinorum flatu, venas eas vehementer distendente, disrup[tis]: 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 erosis aut aliter pertusis: atque adeo succo ipso et chilo per foramina illa [inte] recidente intra ad[d]bdomen, 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 ipsis (quod multi mirati fuerunt) aliofe feces durae, et urinae etiam coloratae et rubrae.


Quarto inturbatur hoc officium vehementer a respiratio laesa, cum enim respiratio non est satis valida succus etiam ex intestinis in ve[subscriptum: ^][superscriptum: nas] lacteas non satis impellitur: hinc otiosi, sedentarii, somniculosi, sentienti sibi vires debiles esse: quia exigua respiratio qua utuntur, non multum chyli in venas lacteas adigunt, ideoque cordis focus pabulo suo destitutus debilis ardet, atque facit illis sensum ilium debilitatis ac pigritiae.


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

Denique hoc officium magnopere etiam turbare potest, si instrumenta respiratio sint laesa, et praecipue si musculi abdominis aut diaphragmatici quibus potissimum compressio illa fit quae [di]gestioni est necessaria, affecta sint.

De morbis diaphragmaticis et partium annexarum.

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

[589v] Primum officium quod potissimum incumbit diaphragmati, musculis externis thoraci etc., inturbatur potest, × [in margine:] × etiam a plethora haec enim vasa quae per musculos feruntur distendunt, et illa distensione impedient liberam contractionem et expansionem musculorum: atque
hinc in schola nominatur plethora ad virest\textsuperscript{119} a tumouribus, inflammationibus, relaxationibus, convulsionibus et caeteris morbis quibus isti musculi obnoxii sunt: praeipue vero per inflammationem diaphragmatis quae hoc etiam sibi peculiare habet, quod in consensum trahat cerebrum, et delirium pariat: qua via? Non satis adhuc innotuit.\textsuperscript{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 agit, qua via? Non satis adhuc innotuit.\textsuperscript{121}

Secundum officium, nempe exspirandi, similiter laedi potest, musculis ei inserv\textsuperscript{ [...] jentibus, per tumorem, inflammationem etc. male affectis: sed et alia quaedam, quibus officium aliud principalis incumbit idem officium interturbare possunt: v. g. si empyma aut serum sit in thorace: tunc enim diaphragma, (quod exspirandum requiritur) non poterit se satis commode intr\textsuperscript{ [...] a thoracem atollere. 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 peristeli, secundo pleuritis, quando nempe pleura quae\textsuperscript{122} est membrana cost\textsuperscript{ [...] supscriptum: a]s succingens inflammatur, adeoque dilationi et contractione quae inter exspirandum et inspirando in illa alternatim fiunt, nimirum apta reddur, quod et doloris cause est, quia membranae omnes exquisitum habent sensum: tertio peripneumonia, quando pulmones ipsi qui inter inspirandum expanduntur, et velut spongia quaedam poris hiant, inter exspirandum vero vult compressa spongia contrahuntur inflammati sunt: ex his enim malis tum\textsuperscript{[superscriptum: ^]\textsuperscript{[superscriptum: in]}spiratio tum exspiratio ex aequo laeditur.

A[t]que sic explicati etiam sunt morbi qui circa duo postrema officia (viae et retentionis) versabantur.

Dum enim officium viae vel retentionis laeditur, statim etiam officium inspirandi et exspirandi perturbatur, ad morbos huius generis per accidens etiam specta\textsuperscript{ [...] supscriptum: nt] morbi cerebri et partium annexarum. Nam laeso cerebro, spiritibus, aut nervis, non potest vitae peragri respiratio, eo quod illa penitus pendet a musculis, motum illum quem respirationem dicimus experientibus; musculi autem motum suum habent a nervis qui iis\textsuperscript{[589v]} implantantur nervi vero dependent a cerebro, et cerebro ac nervi, ad motum musculis impertiendum nihil valent sine spiritibus: hinc cerebro notabiliter laeso, respiratio etiam tollitur aut vitiatur, id contingit in apoplexia, epilep\textsuperscript{ [...] }ia, lethargo, phrenitide, et\textsuperscript{ [...] }similibus morbis cerebri, in quibus omnibus respiratio male se habet.

Quantum ad quintum officium quod his quaque\textsuperscript{ [...] uor annexueramus et incumbit potissimum pericardio cum contento sero, illud interturbabitur si\textsuperscript{ [...] supscriptum: i] vel serum, ibi\textsuperscript{ [...] ] desit quantitate iusta, adeoque cor adaturur, 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 deserendi\textsuperscript{122} ad sua purgatoria, spiritum cudendi, et focum cordis temperandi.

\textsuperscript{119}The 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.

\textsuperscript{120}See, for instance, Sennert, \textit{Epitome Institutionum medicinae}, 140.

\textsuperscript{121}Read: ‘quaes’.

\textsuperscript{122}Read: ‘deferendi’.

33
Quantum ad primum officium, quod incumbit renibus, hepati, ipi, pancreati, et glandulis, potest officium hoc perturbari, ab inflammationibus, tumoribus, ulceribus, alisque affectibus istarum partium ob quos contingat vias illas per quas inter depurandum sanguinem recrumenta secernuntur. Claudi, angustari, vel nimi dilatari, vel aliter male formari: tunc enim emunctoria inepta redduntur ad excrementum et aufuerendum id a sanguine, ad quod aufuerendum 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, similique animi pathemata, aut rigor febrilis etc. 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 nimirum, 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 corrupitur et uliginem con[...].

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 corrupitur, et in cor regurgitans (circulando enim ad ipsum non potest devenire dum via sit interclusa) febres sensibles 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 nimirum cessa et compacta sit aut ramosa, non succedet bene trans: sic etiam si sanguis non apte sit dispositus, fiet mala. Eius in emunctoriis repurgatio: sic videmus in iis qui longa febri inanieti sunt, vix quidquam sanguinis in vasis remanisse; sanguis enim in illis tenuior per cribra [ ... ] a emunctoriorum, excrementi instar elapsus est, aut ipsa etiam emunctoria corrupta, sanguinem probum cum recrumentis percolarunt: sic etiam videmus urinae suppressionem aliq[u]ando venae sectione dissolvit, ideo nempe quod sanguis nimia copia foramina renum, per quae serum transcolatur ut in urinam cedat, circumstans, obpleret illa: sibique ipsa obsisteret: ut videmus etiam in cribro fieri cum nimirum centi recrumenta 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, supprimere aut etiam nimirum succedere possunt: ita enim habente se illo foco, vel nulli, vel nimirum pauci, vel nimirum multi et inmoderati spiritus generantur: itaque si sanguis ipse vitio aliiq[u]o laboret, et multo magis si chyl[u]s atque ea quae ex intestinis [ ... ] per venas lacteas in corde feruntur vittata sint, impedietur bona et legitima spiritu[m] generatio: quo spectant febres intermittentes et remittentes: hae enim intestinis stabulantur, et materiam suam habent a chylo, ut lat[u]s vide re potest in disputacione nostra de

123 Geulincx, De febribus, thesis 8.
124 Read: ‘mala fiet’.
125 Geulincx, De febribus, thesis 17.
Quartum officium quod potissimum incumbit lymphae interturbari potest, tum ab ipsa lympha, male
se habente, tum a glandulis in quibus male percolata fuerit, cum primum a sanguine discessit, tum
denique ab ipsis vasis lymphae[590v]tias, quae vel pertusa vel clausa alicubi, vel aliter
disposita[subscriptum: 2] male[subscriptum: I],

lypham foco cordis non rite subministrent.

De

morbis conarii et partium annexarum

Varia officia in hoc conarii officio continentur, quae licet scorsim 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 pituitae et muco e cerebri
ventricularis distillante et vas a 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, in qua ideo motus omnis et senis 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
cranii foramina sic constrinigi 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
secanda 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 manus: hinc enim manus et eius venae intumescent sub vinculo:
similiter si intra foramen cranii talis aliqua arctatio contingat arteriae quidem satis libere sanguinem
deffert ad cerebrum: sed venae non revehent a cerebro: fiet igitur talis aliqua intumescentia
in cerebro et meningibus eius, qualis sub vinculo in manu cum venae sectio ne celebranda est:
ex qua gravedo primum, torpor, deinde etiam interdum potest, vena sa. aliqua sanguinem
distillante in contentum cerebri aut meningium: adeoque fient potius deliria, phreneses, perpetua
vigilia, et similis affectus: distantis 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: ^] vel alibi venae aliqua notable

disruptur, ac sanguinem suum ubertim in cerebri ventriculis effundat, potest inde aut mors
proxime, aut mediante apoplexia, vel simili aliqua affectu oriri: sanguine enim illo [591r] in
ventriculo cerebri effuso, quam primum orificial nervorum opplebuntur, adeoque spirituum influxus
impedietur, 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 irrure debere in respiratorios nervos, ob continuum
spirituum eos subeuntium motum magis patulos: itaque a tali affectu nonnisi repentina suffocatio
spanda videtur, et non apoplexia: nec nemini me legere usquam in ventriculis cerebri apoplexia
extincti sanguinem inventum fuisse. Alia igitur apoplexiae causa quaerenda es ne celebranda est:
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 quaepiam 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, esque in nervos sensibis inservientes derivas, perpetuam vigiliam efficiet: ad quam vigiliam etiam facere potest, quod spiritus e cerebro in nervos influentes non satis reddantur sanguine\[ {…} \][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 remear in cor et rursum confundii cum sanguine: proinde si viae illae per quas spiritus isti residui in vasa lymphatica penetrare soleat, excludantur, maneunt in nervis et cerebro, et continuo per alios spiritus iis accedentes animati, aggregationem suam retinuunt; 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 incipient, et in communem truncum, qui et chyli ductus est ex sanguina\[ subscriptum: ^{a} \][superscriptum: an]t. Cum vero nimis pauci spiritus percolantur, subsidetibus cerebri ventriculis (ut qui a spiritibus expandi debeant) compressoque conario perpetuos quidem somnus seu lethargus in\[591v\]ducetur, cui affinis est coma vigilans in quo per intervalla aegri vigilant rursum 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 loquuntur scholae.

Si vero alia quaedem cum ipsis spiritibus percolantur, siquidem haec pituita serum aut mucus fuerint in nimis magna copia, orientur catharii 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 omnibus fere aut communem nervorum originem apoplexi facere potest, aut repentinam mortem quando nempe etiam in nervos respiratorios incumbit: si ex catharros saepe\[ superscriptum: r\]i: aqua enim\[ , \]ad aquam facile se insinuat per por\[ {…} \][superscriptum: o]s corp\[ {…} \]orum: unde semper etiam aliquid saltum cum spiritibus percolatur in ventriculo cerebri, deciditque nobis in nares, in gula, et palatum, et cum secreto excernitur. Quo etiam facit quod sanguis facile segregetur a sanguine et praesertim locis frigidioribus quaerantur in cerebro et cranium. His catharris facile adiungunt se succi quidem salts et acidid: nam salsa et acida facile se coniungunt aqueis: atque adeo efficiunt catharros. Acres et erodentes possunt vero (et id rarius est) alia quaedam admisseri spirit\[ superscriptum: ^{a}\][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 oleo terebinthinae cum vitrioli ebullit. Et siqoidem motus hic impressus spiritibus, eos intra cerebro ventriculos in circulum agat, vertigo orietur, qua res omnes verti, et in gyro torqueri videntur, eo quod species rerum per spiritus sic se vertentes offer\[ {…} \][superscriptum: a]ntur conario; aegri autem prolambuntur in terram, quia spiritus in musculos non debite determinament quibus corpus sustinere debeant eo quod illi in gyro acti orificialis nervorum transcurrant. Si vero immoderatus adhuc effervescent spiritus et ipsos nervos ac musculos inordinat subeant, orientur epilepsy: in qua proinde musculi cum annexis artubus

132Read: 'etiam saepe'.
133Read: 'oleo'.

36
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 possent statuunt spasmus oritur, quo membrum cui nervus inseritur contrahitur: potest etiam hic oriri ex eo quod spiritus aliique inordinate et nimis vehementi impetu in musculum aliquem influentes, impediantur a regressu in musculum antagonistam, ob viarum per quos de uno musculo in alium se volvere solebant, occlusionem: hinc enim musculus ille in quem spiritus sic influunt sine refluxu in oppositum musculum, vehementer dilatatur, atque membrum cui affigitur, contrahet, et tamdium contractum tenebit, donec spiritus illi qui musculum illum [subscriptum: ^][superscriptum: distendunt,] dissipati sunt, et per poros muscoli evaserit. Proinde spasma affinis est resoluto aliqui musculi: musculo enim aliquo per vulnus transversim fibris eius non possint se solitum in morem contrahere.[superscriptum: repeated above the period: 2] inflicturn, 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 muscolo qui oculum movet ad minorem canthum, oppositus musculus, nempe qui eundem oculum movet versus maiorem canthum, illum semper trahit, priori nempe musculo non obstante isti tractione, adeoque induc[n]te strabonismum: ex quo patet quod relaxatio alicuius musculi, accedente contradictione 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 canaliurn 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]inuitur, 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 chylifero.


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

134Read: ‘inflicturn, 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 fucum eius etiam interturbat, tanquam insuetum et noxium pabulum.

Obstructio in emunctoriis impedit sanguinis depurationem adeoque ad focum cordis alluit etiam pabulum ⟦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⟦…⟧sat tantum incommodus aliquid v. g. caecitatem, paralysin 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, quo fluentes eos ferris impediant, quo [superscriptum: ^] [in margine: ^ mere detinet in via, apertura] a natura destinabantur, sed obstructio eos [superscriptum: ^] [in margine: ^ vero eos]135 e via sua expellit et in alium locum exonerat.

Unde si oesophagus pertusus sit, cibus et præsertim potus in cavitatem thoracis: si ventriculus aut intestina, chylus in cavitatem abdominis effundetur: quae ambæ effusiones 1º quidem notabiliter sunt impediti diaphragmatici motum sursum deorsumque (nam quod in cavitatem thoracis effunditur, impe[…]dit diaphragmaticus sursum, et quod in cavitatem abdominis effunditur, impedit motum diaphragmaticus deorsum) et per consequens afficiunt respirationem, adeoque morbum causant: quatenus vero succi sic intra vias suas effusi corrumpuntur et putrescunt, putridosque suos vapore exhalant, et ad cor vel caput transmittunt, unde focus in corde interturbatur et eadem alium morbum causant, seu potius aliter morbum causant: tota enim morbi ratio (ut ante [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[593r]moda et similiter fere morbum causabunt. Sed cum exigua ac capillaria vascula aliqua leviter pertunduntur, sanguis effluens per exigvas illas contextum partis adiacentis infarcit, et in tumorem attollit ac ista [superscriptum: ^] [superscriptum: dis]tensione ac distractione partis inf[…] [superscriptum: ec]tae dolorem etiam causat: tumores hi subinde non aliud causant quam incommodium, dolorem, molestiam, et difficultatem aliquam in motu vel sensu: subinde vero etiam morbum causant 1º quidem obstruendo vel comprimendo meatum aliquem quem pabulum defertur ad cordis focum, vel spiritus defertur ad cerebrum vel a cerebro derivatur in instrumenta respirationis: 2º dolorem causando impedire potest respirationem, ut contingit in pleuritide, peripneumonia, inflammatione diaphragmatici etc.: in his enim affectibus aegritudinis agri a sufficienti respiratione abstinent propter dolorem quem inter respirandum sentiunt: sic propter similem dolorem in inflammatione faucium aut oesophagi abstinent subinde a sumptione sufficientis alimentis: 3º tumores illi dum suppurans in ulcerum degenerant, quibus et pertundis possunt meatus in quibus haerent, et lateribus coalescre, ac proinde alio modo morbus causare.

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

135The hand of the additions is the same as that of the main text.
136Read: ‘clausos’.
t]atorios
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 restantantibus igiterque impulsis, et penetrare tamen non valentibus, facile isto impetu pert[\ldots]\[superscriptum: u\]ndunt meatum inter obstructionem et initium impulsus sui interceptum, praesertim \[\{sis\}\] si is sit tenuior, et disruptioni magis obnoxius: sic pridem ex obstructione variarum lactearum hydrop\[\{\ldots\}\]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 cavitate abdominis effluat.

Hae de causis quas meatus suppeditant, nunc de isis quas humores ipsi suntque potissimum quatuor. Copiae, inopiae, degeneratio, et aberr\[\ldots]\[superscriptum: a\]tio. Copia humorum generatim laedit respirationem: et l’ 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 \[\{\ldots\}\] alvi redundantes: sanguis etiam in \[\{\ldots\}\]vasis abundans, vasa distendendo, quaeramus musculos perreptant, musculos ipsos inespitos facit ad contractionem et distentionem: unde plethoricis difficilis respiratio utpote quae musculorum ope peragatur, et a venae sectione magna levamen sentiunt, ac liberius respirant.

Rendunt\[\ldots\]dantia spirituum in nervis musculos, niumim distendendo, qui inter se antagonistae sunt efficici motum difficilem, membrr\[\ldots\]erando\[138\] inter musculos oppositos: adeoque impeditor respiratio, eodem aliero pacto quo in vehementi cursu aut alio similim exercitio: hinc enim spiritibus magna co\[\ldots\]pia influentibus in oppositos musculos (inspiratorios et exspiratorios) 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 præsertim et sanguinis non tantum hoc pacto obsunt foco cordis, quod eius ventilationem impeditur, 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 chyllo confertim in ipsum irruente, etiamsi probi sunt et multo vitio laborent; suffocari tamen potest et obrui: hinc evexia athletica periculosae censentur Hippocrate.\[140\]

Quantum ad inopiam humorum, siquidem cibus, chylus aut sanguis deficit, necessum est focum cordis destitui sufficienti pabulo; si vero spiritus deficient necessum est motum languidorem esse, et per consequens respirationem invalidam, unde praefocationis periculum: et siquidem spiritus omnino deficient, mors erit, quia mensiam iam corpore suo uti non poterit: si vero magnopere deficit, morbus ex supressa 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 alii causis oriri possit, quaram 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 meatus via illis occlusa (ut vidimus circa obstructionem) facile degenrarant in alios humores, et focum cordis appellantes, seu inventa seu facta via, turbant, et ex\[subscription: ^]\[superscriptum: s]\[\ldots\]timationem minantur: hinc in inflammationibus saepe febres, nam sanguis e capillaribus venis in contextum aliquius partis dilapsus degenerat, et per tenuif\[\ldots\]s\[\ldots\]\[\ldots\]ssimas particulas suas vasa hiantia alicubi ingressus miscetur

137Read: ‘respiratorios’.
138Read: ‘librando’.
139Read: ‘spiritus’.
140Hippocrates, Aphorisms, I.3.
141Read: ‘deficirent’.

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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 oblimit: et habet hunc usum quod lentore suo efficiet, ut cibus et recramenta 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 caloricus tensis magnus [sit] est cum aciditate coniunctus, attollitur in bullas, intra quas aer renatur, qui hoc ipso flatus 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 agitatur, concurrentibus particulis salis aut acidiis, quae ad motum aptiores sunt, necessum est illum diffundere et in amplius spatium attollere, adeoque […] superscricptum: non] totum spatium occupare, sed intra se cavitate vacuum relinquere, quae aere per respirationem non nisi in pulmones quam ventriculum penetrante, repleatur: quo aere distenta nec subsidere iam valens, multas et amplas bullas faciat quae difficulter franguntur, propter lentorem et curationem pituitae.

Hae bullae ibi sic existentes et ventriculum ac intestina occupantes, imprimis difficilic faciunt respirationem: et sumto potu sursum per levitatem suam eructantes, ructus efficac, aliquando etiam ubi nimis viscida perdita per oesophagum assurgit, aere per respirationem non nisi in pulmones quam ventriculum penetrante, repleatur: quo aere distenta nec subsidere iam valens, multas et amplas bullas faciat quae difficulter franguntur, propter lentorem et curationem pituitae.

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 flatus 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 flatus e corde cum spiritibus confusus, et in cerebrum delatus, melancholicas cogitationes et specta facit.

Quantum ad aberrationem, duplicem eam facio, aberrationem in specie et secesionem: illam intelligo, quando integer aliquis humor aberraret, et ad locum sibi destinatum non pervenit, cum[ superscriptum: 2] ut superscriptum: 1] obstruunt venas lacteae, chylus cum faecibus commixtus exccernitur per podicem, aut ruptis venas lacteae 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 lubricitem, et nimiam humiditatem alvi, contingat nimis cita chylus in intestinis praetervsentio, unde abhorret a venis lacteis per quas colari debeat, et per podicem exccernatur: hoc et similibus paucis casibus excerptus, videtur aberratio humorum in specie sic dicta potissimum pendere a vasorum et meatum obstructione vel pertusione.

Seccesio 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 obstruunt et opoleitis venas lacteae, non nisi tenuis et serosa chyli pars pertinget ad focum cordis; caseosa et butyrosa partes tanquam crassiores, ad foraminula obstructionum resistente:145 ad […] ut subtiliter pertusus venas lacteae, serum effunditur in abdomen; crassiores vero chylus particulae qua foramina illa transire non possunt, ad focum cordis appellunt: sed notabiles est illa seccesio, qua sanguis secedit in serum suum et crassiores partes, quae seccesio non pendet necessario ab obstructione aliqua vel pertusione meatuum, sed saepe admodum a frigore.

142 Geulincx, De febribus, thesis 2.
143 Read: ‘in flatum’.
144 Read: ‘ut cum’.
145 Read: ‘resistente’.
aeris, corpus et praesertim caput ambientis: cum enim calor partes sanguinis et agitet et commiscet, frigus mixturam illa solvit et partes inter se secedere sinit. Ut vel ex eo vides, cum sanguis vena[…]e secedunt statim partes ab ambiens frigus, et serum supernatat.

Simile quid contingat 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[…]ed[…]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 conferunt in asperam arteriam et pulmones, epiglottide per nimiam humiditatem resoluta, intercluso spirito statim praefocabit: si paulatim magnopere impediet respirationem, et si acris sit catharrus, asperam arteriam et pulmones erodet et tabem inducet simili modo in alias partes destillans alios morbos vel aliter causabit.

[595r] Semeiotica.

Signum generale morbi ante diximus esse anxiam conscientiam aegrotantis, qua sibi mortis impendit et conscius est; nisi cum cerebrum morbus occupat: tunc enim aliis indicis 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 evanescunt.

Quamvis autem morbus praecedenti parte in 4 genera tribuerimus; possunt tamen omnes hi morbi (ut aliquoties innuimus) ad unum genus revocari, nempe ad morbum cordis; ita ut nobis morbus tantum unus sit, nempe periculum extensionis istius foci qui ardet in corde: nam 2 ibi postremum recensibit morbi (nempe ventriculi et diaphragmatis) non alia de causa morbis sunt, quam quod in se complicit hunc morbum cordis, qui consistit in periculo extensionis biolignei: quicquid enim in illis partibus [superscriptum: ac][x]idat, morbus tamen non erit, quamduo hoc periculum secum non adducit: et quamvis similiter morbus cordis, seu periculum extensionis biolignei, non alia de causa morbus sit, quam securum importet, morbum cerebrum, 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 extensionis biolignei, patet duas tantum eius causas esse, nempe pabulum non recte administratum aut spiraculum ademptum: ignis enim apud nos nunquam extinguitur, quamduo ei de pabulo et spiraculo bene prospectum est, alterum horum deficiere debet, si extingueduntus sit ignis: nam cum forte affusa aqua focus extinguitur, tum et malum pabulum ei suppeditatur, et a iusto suo et probo pablo abarctetur: quod in physica vide. 

Harum duarum causarum haec sunt signa syncope, lypothymia, debilitas, (quae omnia idem in essentia sunt et tantum secundum magis et minus differunt) febris et cem 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 inconveniens pabulum

146Read: ‘extinctionis’.
147Geulincx, Opera philosophica, volume 2, Physica vera, De microcosmo, 445–446 (§ 8).
suppeditatur oritur febris vel palbitatio 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 inconveniens 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. Palpitatio autem plerumque fit a flatu pabulo loco in foco cordis immisso.

Quantum ad secundam causam, nempe malum spiraculum, respiratio potest esse nimia, potest etiam esse minus parva: non accensio parvam, quia satis illa continetur sub altero praecedentium membrorum: quod enim dictam respirationem depravatam esse, quia convellendo ve[t]l pulpitando fit, aut illa non est mala respiratio, nec foco cordis afficit, sed tantum aliquod incommodium adiunctum habet, aut si mala est, officiature cordis foco, ex eo mala est, quo nimia sit vel nimis parva: 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 imaginem diligenter auscultant (si enim ex interommu cho diminuta, quaedam suspicio ducent) suspicio seu integrum seu diminutum in eo consistit, quod post aliquo, exigus suspinitiones, ac subinde fer[...]e nullas, una magna inspiratio adhibeat: cum succedens respiratio si cum sonitu fiat et audeatur suspicio dicitur; sin sonitus ille absit (quod magis fit in acriter studentibus et cura ac negotiis oppressis) eandem quidem naturam agnoscamus cum suspicio, et tantum penes nimis differentem, sed tamen suspicio vulgo non vocabitur.

Suspenditium valide ascendit focus cordis, idque duabus de causis. 1o quia respiratio inter duo proxima suspiria, exigua et subinde fere nulla, adeoque focus cordis eo tempore infra arctum pectoris conclusus, exardescit, eo modo, quo videmus focus culinae poculo illi inditum, quem Belgae een smoorpot vocant, nondum opposito opercillo, altius longe assurgere et incandescere: 2o quia post suppressas illas aut imminutas respirationes, cum iam illis debilitari inciperet focus, succedit una vehemens et magna, quae focus cordis plus irritat et succendit, eodem modo ac si in casu posito focus illum poculo inditum per interommu ample fallum etiam instigaremus. Quae sic optime et sapientissime constitui opifex nostri corporis, cum enim tristibus opus sit consilio quo malum quod ipsis superscrat amoliantur; consilio autem illi inveniendo opus sit spiritibus, per suspicio ingeniosa spirituum (velut scintillae quaedam ex foco, cuius iam momenta, irrumpentes) paratur similiter anxius supplendatur spiritus quibus malum immiscens, per audaciam depellant, vel per fugam declinant, ideam aut simile quid obtinet in studentibus.

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

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148 Read: ‘palpitatio’.
149 Geulincx, De febribus, thesis 2.
150 Read: ‘apposito’.
nimio ardore cordis, 3° conf[...][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[...]einae, pericardium et pulmones: in quo consistit febris hectaric et marasmus,\textsuperscript{151} cum alimentum omne in corde corruptur ob minimum eiusmod ardomem, nec partibus nutriendis amplis idoneum est, degeneratque in limosum, atrum, et cinericeum quendam liquorem, qui cum sanguine melancholicorum mixtus reperitur cum forte vener illis secatur, ideoque ab imperitis putatur esse ipsa melancholia vel eius causa.\textsuperscript{152} Cum tantum sit effectus quid[...]eet, et recreementum ex pabulo foci nimiris ardentis residuum. 4\textsuperscript{e} ingeniosi sunt et machinatorum, et multa imaginantur, quod fit ex copia spirituum, ab eandem copiam effusi saepe sunt: in cachimios, iocos et eadem fere patiuntur, quae laeti ac hilares; sed vix cum pleno animi sensu, ac eorum hepar alii magis gratus[sit] est quam ipsis.

[596v] Ex his constat tribus fere modis nimia respiratione morbum causari: 1\textsuperscript{o} si coniuncta sit cum pauco pabulo illud totum subito incendens, hoc ipso minatur inter[...]itum ignis et mortem: unde periculosae et maestitia cum inedia, in quam tamen maestii proni sunt. Tristes vero bene reficiendi sunt, et subinde etiam magis apperunt, quam laeti, etiamsi ex tristitia su[...]o app[...]ituit non satis faciant: 2\textsuperscript{o} nimiris multos spiritus suscitando, nimia respiratione inducit nimir parvam respirationem (vide supra de redundantia spirituum) hinc qui magnopere afflictii sunt videntur sibi stranguanari, et e domo proripiant se in loca ampla et aperta, quasi ibi melius respiraturi sint, in quo est error iudicii ipsorum; difficutas enim respirandi non venit illis ab angustia loci, in quo versusuntur, ut alias fieri solet, sed a copia spirituum eo modo quo hoc supra explicavimus: 3\textsuperscript{o} nimia respiratione causat morbum inducendo laetam pabulationem: sanguis enim aduritur, et in incremente mutatur, quae non magis faciunt ad focum cordis alendum, quam cineres et phlegmata, quae titionibus exsudarunt faciunt ad alendum focum culinae: de[...]inde etiam nimia respiratione in[...] venas lacteas erudi et inutiles succi protruduntur, qui appell[...]entes ad cor focum turbant et febrim excitant.\textsuperscript{153}

Quantum ad defectum respirationis seu respirationem nimis parvam, illa clare morbum causat, hoc ipso quo periculum praefocationis inducit: 2\textsuperscript{o} etiam per accidens morbum causat inducendo defectum pabuli: dum languet respiratione, pabulum per venas lacteas et ductum chyliferum minus feliciter assurgit: ut ex pathology nostra satis patet. Duae ergo sunt respirationes malae: et nimiae quidem signa sunt satis manifesta nam in suspirantibus et vehementer exercentibus, intentior\textsuperscript{154} 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 comicer 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\textsuperscript{o} ipsamet respiratio deficiens aegro facile innotescit, 2\textsuperscript{o} cognoscit etiam ex debilitate virium, quae debilitas refectione, et ipsis quae [597r] spiritus suppeditare possunt levatur; a contrariis vero laeditur; sicut contra debilitas ipsis quae subinde a nimia respiratione oritur, iis levatur, quae spiritus evacuant; iis vero laeditur quae spiritus augent vel reficiunt: denique cognoscit etiam ex causis suis, de quibus infra.

Signa pabuli bioligneo non rite administrati

Nimii pabuli signa, petuntur I\textsuperscript{o} 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

\textsuperscript{151}Geulincx, \textit{De febris}, theses 24–25.
\textsuperscript{152}Sennert, \textit{Epitome Institutionum medicinae}, 92–93.
\textsuperscript{153}Respiration is not taken into account in Geulincx’s \textit{De febris}.
\textsuperscript{154}Read: ‘intensior’.
et loci, et absentia animi pathematum, quae ad maestitiam, timorem vel aliam molestiam vergunt, et denique omnibus constitutio talis, quae seorsim considerata quam maxime facere videtur ad sanitatem: his enim causis concurrentibus suppeditur foco cordis pabulum supra modum quo ei interitus et suffocatio partatur, atque adeo morbus ille generatur qui passim evexia athletica vocatur.

Sunt tamen quidam etiam qui gracili et maculento 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 ossa quasi substantiam accedunt (quod videre licet in quibusdam iuvenibus) per quas sanguis parce admodum transserit in contextum corporis ad nutritionem faciendam, ideoque corpus iis gracile et emaciatum, venae vero sanguine turgentes quia non expenditur: idem etiam usu venit in ipsis qui raro sunt corporis contextu (ut videre licet in quibusdam iuvibus) in his tem etiam sanguis, quantum ad nutritionem satis est, e vasis in contextum corporis transserat, parum tamen istius sanguinis corporis apportitur, sed exhalet e poris quod apponendum erat, tum propter focum cordis valde ardentem et expellentem, tum propter amplitudinem pororum expulsiones illas non remorantem! Unde quidem contingere in venis minor copia sanguinis; nisi vitu pleno aliisque causis mox enumeratis, plus suppleretur, quem transssuendo discерeret.

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

Signa quae ab effectis petuntur difficilis respiratio, debilitas cum sensu gravitatis et inclinacione in somnum, difficiis motus v. g. in clauenda manu cum sensu plenitudinis: denique levanem quod sentiunt aegri ab ipsis quae sanguinem minuunt. Signum autem quod hic maxime in occulto incurrerit, est turgentia vasorum artubus ad focum vel post leve exercitium.

Signa deficientis pabuli I petuntur a c\[\ldots\]\[superscriptum: a\]usis, quarum prima est inedia, sive spontanea sive coacta, v. g. propter anginam, ulcus aut obstructionem oesophagi, nauseam, et prostratum appetitum aegri: 2o obstructio inferioris orificii in ventriculo seu pylori: 3o obstructio venarum lactearum ductus chyliferi aut insertionis eius in venam subclaviam, aut obstructio venae ca\[\ldots\]iae in trunco ascendente vel descendente, unde impediat ingresso sanguinis in cor. Et prima quidem harum causarum nota[superscriptum: 2] satis[superscriptum: 1] est, reliquae autem alii indiciis indigent quibus innotescant: obstructio igitur inferioris orificii in ventriculo prodit se vomitu post sufficientem \[{u}][superscriptum: ^{c}]\[superscriptum: ^{s}][superscriptum: ^{p}][superscriptum: c]ibi coctionem in ventriculo: tum 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 deductur in 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 inarciendum inter superius officium ventriculi et obstructionem intestini tenuis, quam inter superius et inferioris officium ventriculi: ideoque ciborum et chyli regestio continget quidem non tam saepe; sed continget maiori \[{\ldots}\] 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] febris a malo et corrupto pabuli ex diuturna mora qua circa obstructionem haesit.157

Si vero obstructio sit in crassis intestinis, fiat 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 alciuis intestini crassioris; sed

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155Read: ‘macilento’.
156Read: ‘satis nota’.
157See Geulincx, De febribus, thesis 10, where however no obstruction of the intestines is mentioned.
158Read: ‘dicitur’.

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

Si venae lacteae sint obstructae, chylus cum stercore per [[{…}]] 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: videmus enim quod luxatio aliqua in vertebris, aut tumor aliqua 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 chyliferis, facile quidem comprimuntur ab aliquo extraneo; sed non ita obnoxia sunt tumoribus qui intra cavitates eorum generentur sed in sympathiae membranaceae.

Interim etiam facile opplentur, si materia quae per cavitates eorum furtur nimis apta sit ad motum: atque talis obstructio facilis locum habebit in venis lacteis quam in ductu chyliferro, utpote quaran meatus exitiores sunt: si itaque vehementi post cibum sursum exercitio, velut cursu, lacta, aequival[598v]ione etc.: inciderit in obstructionem vasorum chyliferorum, quae praedictis symptomatis se prodaret udicarem eum obstructione varum lacteum; non vero ductus chyliferi laborare: nam vehementi isto exercitio cibus crudus et ventriculo per nimiam respirationem pulser, et securum iusto crassiores particulae oscula venarum lacteum impactus, obstructionis causa fusse videbitur quae obstructio initiat potissimum varum via comparare videbitur.

Si denique obstructio sit in vena cava vel cordis auriculis, aut circa eiusdem valvulas, siquidem illa obstructio plene sit, subito necem extincto cordis foco inferit; si vero partculis 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 reflectione

159The first explanation of faecal vomiting criticized by Geulinx, 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 Millenia,” The American Journal of Surgery 148, no. 2 (1984): 252–256, 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 Geulinx, 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 lactaeae sint pertusa, hydrops nascitur; qui satis manifestum signum est talis alicuius vitii: similiter si ductus chyliferus aut vas aliquod maius intra ventres disrupatur, 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 vaso chylifero, venter paulatim intumescat, dirupto autem vaso 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 l° quidem inconvenientis 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 idem sint, melancholicci et tristes, anxii, verecundi, cum flatus in hypochondriis moratur eo autem per cibum vel potum discussion alacer rursum et laeti et saepe etiam impudentes.

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