

Moving on the Latitude of Health and Disease. Some Remarks on the Galenic Concept of *Neutrum* from the 16th to the 18th Centuries



Simone Guidi and Luca Tonetti

Abstract This article examines how Italian physicians between the sixteenth and eighteenth centuries developed a logic of ‘intermediate states’ between health and disease. Moving from late Scholastic Galenism to early mechanistic medicine, it shows how a dynamic view of the body allowed physicians to describe overlapping configurations of healthy and morbid states. Particular attention is given to the concept of *neutrum*, which helps to frame processes such as falling ill and convalescence. In both qualitative and mechanistic paradigms, medical art emerges as primarily concerned with processes and transitions rather than fixed conditions: health appears as a contingent, time-bound relation (*ut nunc*), modulated by age, constitution, environment, and the biographical history of alternating episodes of illness and recovery.

1 Introduction: Galen’s *Neutrum* in its Context

Since 1948, the World Health Organization has defined health as ‘a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity’.¹ This notion seems to take health as a fixed and ideal status, which one

¹ World Health Organization (1946), p. 1

Although this work has been conceived and written by both authors in all its parts, sections 1–3 are to be attributed to Simone Guidi, section 4 to Luca Tonetti. We wrote the conclusion together.

S. Guidi (✉)

Institute for the European Intellectual Lexicon and History of Ideas (CNR-ILIESI), Italian National Research Council, Rome, Italy

e-mail: simone.guidi@cnr.it

L. Tonetti

Department of Historical and Geographic Sciences and the Ancient World (DiSSGeA), University of Padua, Padua, Italy

e-mail: luca.tonetti@unipd.it

can achieve completely and positively, acquiring the qualitative condition of health, and not via the decrease or negation of infirmity.

Such a definition would have probably captured the attention of the early modern physicians we address in this chapter, used to regarding health and disease in more dynamic and complex terms. It would suffice to recall that, still in the mid-eighteenth century, Diderot and d'Alembert's *Encyclopédie* defined *santé* in a much more complex manner; as 'the most perfect state of life', but especially as the

natural accord, the reasonable arrangement of the parts of the living body, from which it follows that the exercise of all its functions is done, or can be done in a sustainable manner, with ease, freedom, and to the extent which each of its organs is susceptible, according to its purpose, and relative to the actual situation, to the different needs, age, sex, temperament of the individual who is in this position, and to the climate in which he lives.²

Here, health is not conceived as a stable and 'complete' well-being, but rather as the relative state of well-being resulting from the mediation of a number of contrasting forces, which push and vibrate inside and outside the organic body and constantly carry it back and forth from health to illness and from illness to health. In this constant contrast, health ultimately results from the balance between these factors and so includes illness and its causes as components of health itself.

This dynamic definition of health and disease dates back a very long time in Western medical and philosophical culture. However, it took its modern shape mostly via some crucial debates generated by the practice to comment on Galen's works from the sixteenth to the seventeenth century, and then in the subsequent discussions aroused in eighteenth century medicine, which, still in the age of the Scientific Revolution, embodied substantial elements from Galenism.

In this paper, we aim to address some significant episodes in these debates, in order not only to revisit early modern medicine's dynamic conception of health, but also to point out some important shifts in the conceptions of health, illness, their co-presence in the body, and the processes that lead a living organism from one to another. We do so by analysing a number of case-studies in Italian early modern medicine, having chosen the specific context of Italy for its influential and long-standing medical tradition, which starts already in the Middle Ages and culminates in the seventeenth century.

In effect, via the notions of *oudéteron* (literally 'neither')³ and *ygeías platos* ('latitude of health'), then translated into Latin respectively as *neutrum* and *latitudo sanitatis*, for centuries Galenic medicine carried on a complex relative conception of health and disease which is very far from that presented by the WHO. The origins of this idea are found in Galen's *Ars medica* (*Techné Iatriké*), also known in the Middle Ages as *Tegni* or *Microtegni*, one of the most commented Galenic works, and a

² Jaucourt (1765/2013), p. 628.

³ As noted by van der Lugt (2011), p. 15, 'Galen did not invent this tripartite division of medicine *ex nihilo*. In the 3rd century BCE, the Alexandrian physician Herophilus had already proposed a similar classificatory scheme. However, Herophilus applied the categories healthy, unhealthy and neutral not to the objects of medicine (bodies, signs, causes), but to the main branches of the medical art.' See Von Staden (1989), pp. 89–114. On Galen's neutry see also Kaye (2014), pp. 141–144.

crucial one for the education of physicians throughout the medieval and early modern period.⁴ In particular, Galen presented his understanding of health and disease in the first section of *Tegni*, where he defined medicine as ‘the knowledge of what is healthy, what is morbid, and what is neither’,⁵ just before his treatment of semeiology and aetiology, two fundamental parts of medical reasoning.

Famously, Galen understood health in terms of *complexio*,⁶ the ‘proper balance of primary qualities’—a fundamental mixture of the Aristotelian four elements⁷—and conceived disease as ‘a disturbance of it’.⁸ Such a peculiar notion of health and disease led Galen to understand *complexio* as a ‘relative conception’,⁹ in the sense that *complexio* is a particular balance¹⁰ of elements, proper to each living species, and even to specific categories of individuals. Each was hence given an ideal *complexio*, the *eukraton haplōs*.¹¹ Importantly, for Galen, as with Aristotle, health and disease are opposite and contrary qualitative states.

A crucial element in our story is that, in this conceptual context, Galen introduced the—likely Stoic¹²—idea of *neutrum*: a third, intermediate, and neutral state placed halfway between health and disease. Famously, this notion is presented in *Tegni* by the following words, which identify three possible meanings of *oudéteron*:

The ‘neither,’ as cause, sign, and body, both generally and with application to the present, has three subdivisions in each case. The first is the sense of having no part in either of the opposites; the second that of participating in both; the third that of participating sometimes in one, sometimes in the other. And of these, too, the second admits of a distinction; for it may participate in both equally, or in one more than the other.¹³

Note that, for Galen, what is ‘neither’ is not only a body, but also a cause of either health or disease, and a sign of them. All these things can be ‘neither,’ healthy, or ill, in three senses:

- (a) Being neither of the two opposites, healthy and ill, and so being perfectly in the middle of these two states.

⁴ See Palmieri (2006), Pesenti (2000), and McVaugh (2019). See also Joutsivu (1999), pp. 18–42 and (2002), p. 290. On the circulation of Galenic texts in the Middle Ages see Green (2019). See also Agrimi and Crisciani (1988).

⁵ Galen (1821–1833), vol. 1, p. 307. English translation from Galen (1997), p. 345.

⁶ On this important notion see in particular the recent Beneduce (2023). See also Kaye (2014), pp. 141–144. For the medieval and Renaissance tradition see Siraisi (1990), pp. 101–106 and Chandelier and Robert (2013).

⁷ Ottosson (1984), pp. 129–136.

⁸ Ottosson (1984), p. 131. For Galen there are eight kinds of ‘imbalances’: four simple ones (hot, cold, wet, dry) and four composite (hot-dry, hot-wet, cold-dry, cold-wet).

⁹ Ottosson (1984), p. 133.

¹⁰ On the notion of balance, particularly in the scholastic medieval context, see Kaye (2014), pp. 128–240.

¹¹ Ottosson (1984), p. 134.

¹² Ottosson (1984), pp. 166–167; van der Lugt (2011), pp. 15–16. Galen’s primary source seem to be, however, Herophilus. See Von Staden (1989), pp. 82–83.

¹³ Galen (1821–1833), vol. 1, pp. 308–309. English translation from Galen (1997), p. 346.

- (b) Being at the same time healthy and ill, for instance, when one is healthy in some physiological aspects, but ill in others—this allows for different proportions of this status.
- (c) Participating partially in health and partially in illness.

As we shall see, this notion, and its definition in *Tegni*, theoretically challenged Galenic physicians, especially due to the fact that it can either be applied to the constitution of a body or to its current condition. However, in their respective ways, all these notions of *neutrum* could surely be interpreted in light of Galen's relative conception of health and disease. These are not fixed and univocal categories, but two poles, connected to each other by a gradient, through which they partially merge and converge. This gradient is the so-called 'latitude' of health (and illness), a notion that describes health and disease as the conditions of a dynamic subject, which *moves* over the entire magnitude of health and can draw any possible trajectory on it. Here, thus, the same body can be—and very often is—simultaneously healthy and ill, and health and disease are understood more in terms of direction than in terms of fixed statuses. Interpreting signs and reasoning of the causes, semeiology and aetiology help the physician to understand in real time where an individual living body is located on the map of health and illness, and what is happening in its physiology that causes certain motions, from health to disease, or from illness to health.

To understand the early modern reception of Galen's theory in particular, a further and important point lies then in a twofold distinction that Galen himself proposed for these three states—the health, the morbid, and the neutral state. Indeed, for Galen, these can be.

- (α) 'in the general sense' (*haplōs*, in Latin: *simpliciter*), or
- (β) 'with application to the present' (*en tō nūn*, in Latin: *ut nunc*).

We will see later how 16th and seventeenth century physicians in particular would interpret this distinction. For now, let us note that, for Galen, a sign, a cause, or a body taken *simpliciter* (α) can be considered—the expression is now obviously Aristotelian—either:

(α₁) 'always' (*diapantos*, in Latin: *semper*) healthy or morbid or neutral *simpliciter*; or.

(α₂) 'for the most part' (*os epi to polu*, in Latin: *ut multum*) healthy or morbid or neutral *simpliciter*.

2 Medieval Philosophical Problems and Solutions Related to the Latitude of Health

By these wide conceptual tools, Galen introduced a notion of health and disease that could hardly be framed within philosophical categories dominating ancient and medieval philosophy. In particular, the notion of *neutrum*¹⁴ raised three relevant and

¹⁴ On the notion of *neutrum* in medieval scholastic medicine see in particular Joutsivuo (1999) and van der Lugt (2011).

interdependent issues that would have worried physicians and philosophers from the thirteenth century up to the late Renaissance at least.

The first issue is that conceptions (B) and (C) of the ‘neither’, as participating simultaneously in health and disease, two qualitative contraries, were not compatible with Aristotle’s logical notion of contrariety, as presented in the *Categories*.¹⁵ Indeed, for Aristotle, if health and disease are contraries, they cannot persist in the same moment in the same subject, and hence there cannot be any neutral state that simultaneously takes both together.¹⁶ Vice versa, a neutral state represents an impossible (for Aristotelian logic) overlap of two contrary qualities. Hereafter, we shall call this the ‘transition problem’.

The second problem was about the true nature of neutral bodies—an aspect left ambiguous within the Galenic tradition. Physicians were particularly puzzled by the problem of whether neutral bodies tend towards health or disease, and how their nature conditions medical intervention. Moreover, they wondered whether they should be regarded as the object of preventive care or of therapeutic treatment.

The third problem—which we could not delve into sufficiently here—is that Galen’s understanding of health and disease required a dynamic conception of the form-matter relationship that dominated Aristotelian and scholastic theories of the living body and vital functions. In particular, it involved the consequence that qualitatively different forms constantly coexist or push each other away in the same substantial subject, and that—according to Galen’s conception—forms such as health and disease are structured by degrees. This point especially intersects the issue of the measurability of qualities and their degrees, launched by Arnaldus de Villa Nova in the fourteenth century and later developed by the so-called *Calculatores*.¹⁷

These issues connected with the notions of ‘neither’ and latitude of health were well-known by medieval and Renaissance physicians, who would have elaborated complex solutions in order to save the notion of *neutrum* from unavoidable critiques due to its inconsistency with Aristotle’s logic; above all Haly (Ali ibn Ridwan)¹⁸

¹⁵ Aristotle, (1991) *Categories*, 10, 11b38–12a2: ‘If contraries are such that it is necessary for one or the other of them to belong to the things they naturally occur in or are predicated of, there is nothing intermediate between them. For example, sickness and health naturally occur in animals’ bodies and it is indeed necessary for one or the other to belong to an animal’s body, either sickness or health’ (translation from Barnes’s edition).

¹⁶ Besides Ottosson, on this specific issue see Joutsivuo (1999), pp. 45–53 and Joutsivuo (2002).

¹⁷ See especially Sylla (1971–1972, 1973), Roudaut (2021, 2022). About the medical context see Bigotti (2019), pp. 233–248; Bigotti (2022) and Bigotti (2023).

¹⁸ See Joutsivuo (1999), p. 54 and van der Lugt (2011), pp. 23–24, who notes that ‘In order to bring Galen and Aristotle into accord, Haly reinterpreted the first sense of *neutrum* in his own way, by saying that Galen meant that in that state of the true medium, health and disease are not absent but mixed, as in the mixture of water and oil, in which both ingredients can still be distinguished’.

and Avicenna's¹⁹ critique or dismissal of this concept.²⁰ However, medieval and early modern physicians found in Galen a set of conceptual tools to engage with the 'transition problem', namely, to conceive individual movements on the latitude of health as logically consistent with a logic of contrary qualities.

In the first place, as said, they could count on a very dynamic conception of health and disease. In the specific case of medieval and Renaissance Galenism, the organism is a closed system, and life is a constant fight and opposition between health and disease. Health instantiates in particular in the notion of 'resistance to disease' (*resistentia*, or *potentia resistiva*, or *potentia resistendi*), a cardinal concept for medieval medicine since the fourteenth century at least,²¹ and still a pivotal notion among early modern philosophers²² and physicians. A healthy body is hence one which is structurally capable of resisting illness, and the latter is always the result of a deflection in this capacity, or the sign of a lack in it; or, finally, the effect of the victory of disease on resistance. This unavoidable interplay between opposite forces constantly moves the body over the latitude of health and disease, dynamically generating health and illness that are expressed by symptoms.

In the second place, they could use Galen's distinction between *simpliciter* (α) and *ut nunc* (β)²³ in order to create different conceptual levels for health, disease and the neutral state, in the main complexion of a body (what we might call a healthy, morbid or neutral constitution), or in its current condition (what we might call a health, morbid, or neutral current condition). By means of this distinction, one

¹⁹ See van der Lugt (2011), pp. 27–28, who notes how, in *Canon*, 'he claimed that it is futile to fight the *neutrum*, since the physician has no need for it. The categories of health and disease are sufficient'. On Avicenna's impact on the Italian Renaissance medical context, see especially Siraisi (1987). See also Strohmaier (2019).

²⁰ One popular solution to the 'transition problem', still topical in the sixteenth century, was that of Taddeo Alderotti (1215–1295), later followed by his pupil Pietro Torrigiano (d. $\approx$ 1320). Both Alderotti and Torrigiano accepted the *neutrum* as just a theoretical possibility without accepting that it could be physically and really possible. See Ottosson (1984), pp. 171–172. On Alderotti—a very major figure in these debates—see Siraisi (1981), Joutsivuo (2002), pp. 292–295, and van der Lugt (2011).

²¹ See Caroti (1989), Caroti (1995) and Roudaut (2025).

²² See Des Chene (1996), p. 46 ff.

²³ As aptly noted by Joutsivuo (1999), pp. 127–128, 'The terms *simpliciter* and *ut nunc* were used in scholastic logic as early as the thirteenth century, and can be traced, for example, in Albert the Great's confused theory of the distinction between 'simple assertoric statements (*de inesse simpliciter*) and assertoric statements as of now (*de inesse ut nunc*)'. Torrigiano, however, as well as other scholastic physicians, relied on Aristotle's logical works in interpreting the difference between *simpliciter* and *ut nunc* more directly'. Torrigiano drew on Aristotle's *Sophistical Refutations* where Aristotle distinguished between 'unqualified (*simpliciter*)' propositions or those which 'have some qualification of respect, place, time, or relation (*secundum quid*)'. This separation 'between 'something without qualification' and 'something with qualification' definitely had an impact on Pietro Torrigiano's formulations. *Simpliciter* was for him something without qualification, something in itself. It indicated lasting existence or existence without reference to any particular time. The term *ut nunc* referred to some qualification in relation to the present time'. Furthermore (p. 130), 'In Torrigiano's view, the term *simpliciter* principally denoted the ability to remain in a certain state. For example, a healthy body *simpliciter semper* was characterized by the ability to remain in good health always, not that a person with this kind of ability was necessarily in good health'.

could argue that, while a body remains *simpliciter* healthy, morbid, or neutral, as its steady natural status (and so its quality as health, morbid or neutral are fixed and not compatible with their opposites), it can also travel in different regions of the latitude of health, where it ‘accidentally’ (so to speak) participates in mixed forms of health and illness. So, the *simpliciter* and *ut nunc* distinction, opposing what is stable and structural in an organism from the in-time transition of the map of health and disease, provided important epistemological and logical elements to reconcile Aristotelian logic and Galenic methodology in medicine.²⁴

Finally, a connection between ‘resistance to disease’ and the *simpliciter/ut nunc* distinction could easily be obtained by understanding the latter in act-potency terms. As Ottosson aptly noted, especially in Italian medieval medicine, the *simpliciter/ut nunc* distinction ultimately came to be understood as the opposition between a *potential* capacity of the body and its *actual* condition. In this specific interpretation, a body is ‘structurally’ and *simpliciter* healthy when it has and maintains a constant potential for health, namely the natural capacity to remain healthy or to recover after a disease. The *ut nunc* condition regards the present moment and the way this potentiality persists or deflects in time. So, a healthy body *simpliciter* decreases this potentiality *ut nunc* during an illness and retrieves it in convalescence.²⁵ Exactly the same logic applies to the *simpliciter/ut nunc* morbid body, as well as to the *simpliciter/ut nunc* neutral state, creating a very complex ensemble of possible combinations. Furthermore, in the Italian medical environment, more than one version of this interpretation circulated. Taddeo Alderotti, for instance, interpreted the *simpliciter* state of health, morbid condition, and neutrality, as a steady feature received from birth (*ex generatione*), while the *ut nunc* condition developed in life.²⁶ Pietro Torrigiano, by contrast, considered *simpliciter* (healthy, morbid, or neutral) as what is true unconditionally, thus independently of any relation with external causes.²⁷ At the same time, he regarded *ut nunc* as the characteristic domain, which runs in time, of the variable state of alteration in the *simpliciter* state.²⁸

²⁴ In connection to this, it is worth pointing out an additional and less problematic epistemological point related to the latitude of health, one that would be particularly important for early modern philosophers. If health and disease are magnitudes that can increase or decrease, they metaphysically depend on Aristotle’s category of *poson*, namely quantity. Since they are not discrete statuses—that is, their parts are not separated from each other and are indeed organized in a continuity, in which one can go from health to disease and from disease to health, they are continuous quantities. As such, health and illness can be represented and understood in terms of space and time, two continuous quantities. For instance, they can be represented in spatial diagrams as things that qualitatively move not only in space, but also in time. On this point see Maclean (2001), in particular pp. 171–188.

²⁵ Ottosson (1984), p. 180.

²⁶ Ottosson (1984), p. 183.

²⁷ Ottosson (1984), pp. 182–183.

²⁸ Ottosson (1984), p. 183. On Torrigiano’s conception of *ut nunc* and *simpliciter*, see Joutsivuo (1999), pp. 127–133.

3 The Dynamics of *Neutrum* and *Latitudo Sanitatis* in the Sixteenth Century: Exploring the Cases of Sclano and Santorio

Before delving more in detail into the seventeenth- and eighteenth-century conceptions of latitude of health, neutral state and convalescence, in the present section we examine two significant moments in the debate on these notions in the sixteenth century, showcased in the views of Salvo Sclano and Santorio Santorio. Indeed, these two important physicians very clearly represent the main tendency of their age, which still remains within the conceptual predominance of Galenism, but is already embarking on the path of an experimental practice of medicine.²⁹

More in detail, by analysing these two case-studies, we wish to show how early modern physicians elaborated a complex conceptual framework in order to understand the constant interplay in the body of health and illness, their structural co-existence in the same complexion, and the expression over time of their effective opposition. What stems from this is a very dynamic and processual conception of health, which, as of the eighteenth century, would result in a re-understanding of the latter as a balance of different states of matter contrasting each other.

3.1 *Salvo Sclano*

In his commentary on *Tegni*, Sclano presents a very complex account of Galen's thesis, mainly realized by commenting the positions of Giovanni Manardo (1463–1536),³⁰ Giovanni Battista Monte (1489–1552),³¹ Giovanni Argenterio (1513–1572),³² and his preceptor Giovanni Filippo Ingrassia (1510–1580). The result is a full-fledged theory of health, disease, and the neutral state.

Like his medieval predecessors, and in an overt attempt to reconcile Galen and Aristotle, Sclano rejects an immediate equivalence of *simpliciter-ut nunc* with potentiality and actuality. More originally, reprising Ingrassia,³³ he also denies that health is immediately the same as *potentia resistendi*. Indeed, these are for Sclano two different features of the same healthy (*salubre*) body: on the one hand, we have health as a 'categorical' quality, and the healthy body is the one which benefits in act from it; on the other hand, we have *potentia resistendi*, which is the specific capacity to preserve or retrieve health against the causes of illness, a capacity that is however

²⁹ On Renaissance Galenism see in particular Ward (1981). For an overview on Galenism in early modern culture, specifically in connection with philosophy, see Favaretti Camposampiero and Scribano (2022). On *methodus medendi* in sixteenth and seventeenth centuries, see Boss (1979).

³⁰ On his position see Joutsivuo (1999), pp. 143–144.

³¹ On his view see Joutsivuo (1999), pp. 150–152.

³² On his position see Joutsivuo (1999), pp. 152–153.

³³ See Joutsivuo (1999), pp. 140–142.

structurally ‘included’ in actual health.³⁴ So, while a healthy body is actually such, it also has, in act, the capacity/potency to resist illness.

From this definition, it follows that the morbid condition is what is contrary to the healthy condition, namely what has no health in act (and so is ill in act) and/or what has no *potentia perseverandi* (capacity to persist) in health and so can easily be defeated by illnesses.³⁵ The neutral state is, for Sclano, equally twofold, but in an even more complex way. Indeed, it can be an intermediate state between a healthy and a morbid condition in two ways:

- between what is healthy, and the morbid condition taken as what has no *vis resistendi* (‘power to resist’) against illness;
- between what is healthy, and the morbid condition taken as what is ill in act.³⁶

These definitions are strongly related to Sclano’s understanding of the *simpliciter/ut nunc* distinction. Blending Alderotti and Torrigiano’s positions, to him, something is *simpliciter* healthy, morbid, or neutral, when it is such ‘absolutely and by nature’, and so in a ‘perfect’ way.³⁷ The expression ‘absolutely and by nature’ seems to mean here that something is healthy, morbid or neutral ‘in the general sense’ when such a condition is unconditional and structural, and so from birth. Instead, something is healthy, morbid, or neutral *ut nunc*, when it is such ‘with respect to the possessing subject’ (*respectu habentis*), and not ‘absolutely and by nature’. This means that in *ut nunc* health, illness, or neutrality, these states are taken only insofar as they are currently present in a specific body, and not insofar as they are structural features of it. They are rather the effect of other emergent causes which can be opposed and contrasted or increased and facilitated, by the *simpliciter* healthy, morbid, or neutral complexion of the body.

One important point that Sclano does not explicitly cover is whether *ut nunc* statuses should be considered natural or not. As mentioned, he defines *ut nunc* as not ‘absolutely and by nature’—does this mean that *ut nunc* situations are generated by Galen’s *res non naturales*³⁸ and never by nature? This interpretation—which marks an important point of departure from Santorio—might fit well with Sclano’s conception of health, illness, and the ‘neither’ as *actual* states determined *simpliciter* by nature, such that they could not convert into their opposite, not even *ut nunc*.

Hence, while healthy subjects *simpliciter* are those who are such absolutely/unconditionally and by nature, and have the capacity to resist illness, the *simpliciter* morbid organism is what is unconditionally morbid and has no resistance to disease. As a consequence, however, Sclano accepts that some morbid bodies can be *ut nunc* healthy (not showing any particular current symptom of illness), but remain *simpliciter* morbid insofar as they are disposed to illness by their lack of a capacity

³⁴ Sclano (1597), p. 58.

³⁵ Sclano (1597), pp. 58–59.

³⁶ Sclano (1597), p. 59.

³⁷ Sclano (1597), pp. 66 and 68.

³⁸ Namely, food and drink, exercise and rest, air, sleep, evacuation and repletion, and strong emotions.

to resist, and can be easily defeated by a disease.³⁹ In sum, health does not equate to being healthy at a given moment, but rather possessing in act health structurally and, with it, the capacity to remain in such a condition (which in the normal state is accompanied by health *ut nunc*). However, when speaking in absolute terms, that is *simpliciter*, all healthy bodies have this capacity. By contrast, a morbid complexion implies that an organism can easily be surmounted by the progression of an illness, thus being unable to resist it.

Another peculiar aspect of Sclano's position regards the distinction between Galen's (α_1) *diapantos* and (α_2) *os epi to polu*, formulated in *Tegni*. Unlike most of his colleagues, Sclano does not understand these terms as temporal expressions, so that *diapantos* would mean *semper* ('always'), and *os epi to polu* would mean *ut multum* ('for the most part [of time]'). For Sclano this translation is a blatant mistake,⁴⁰ since these two expressions indicate, instead, different degrees of health and disease or healthy and morbid constitution. It follows that *diapantos* should be translated into Latin as *omnino* ('altogether') and *os epi to polu* as *ex magna parte* ('mostly').⁴¹ This distinction adds to the *simpliciter/ut nunc* one and to the three states of causes, signs, and bodies, creating a very complex vocabulary and conceptual framework. However, Sclano maintains that *omnino* indicates a perfectly good or a perfectly bad natural constitution of the organism, and so coincides with the highest degree of the *simpliciter* healthy or morbid constitution; whereas, *ex magna parte* indicates an intermediate state between the healthy/ill condition and the neutral state, brought about by falling ill or by convalescence.⁴²

Let us now consider Sclano's understanding of the neutral state. It must be noted that he provides a quite tangled explanation of Galen's threefold 'neither' theory, mentioned above as (A), (B), and (C). The first 'meaning' of the neutral state (A)—which describes it as non-participation, either to health, or to morbid complexion or illness—concerns, for Sclano, both the *simpliciter* and *ut nunc* senses of 'neither'. Instead, the second and the third 'meaning' (B) and (C)—which describe the 'neither' as a simultaneous participation to both the extremes (in different proportions, or partially)—regard only the neutral state taken *simpliciter*.

Having established these premises, Sclano argues that *simpliciter* neutral subjects, according to the meaning (A), are those who are constituted in a middle state between these two: 'neither good', as healthy *simpliciter* bodies, 'nor bad' as morbid *simpliciter* ones, Sclano states.⁴³ Hence, the *simpliciter neutrum* organism is what is halfway between the 'altogether' (*omnino*) and 'perfectly' healthy organism and the 'altogether' (*omnino*) morbid one.⁴⁴ Accordingly, it coincides with the 'altogether' state of neutrality, characterized not by the simple 'neutral and intermediate disposition between health and disease', but by 'being constituted by nature in an

³⁹ Sclano (1597), p. 67.

⁴⁰ Sclano (1597), p. 138.

⁴¹ Sclano (1597), pp. 138–142.

⁴² Sclano (1597), pp. 140–142.

⁴³ Sclano (1597), p. 67.

⁴⁴ Sclano (1597), p. 149.

intermediate way'. This constitution bestows on the *neutrum* the 'act of health, and not that of neutrality', if we read Sclano's argument correctly, to a lesser extent than in *simpliciter* healthy bodies. So, the 'neither' in the sense of (A) (hence non-participation in both health and morbid complexion) has vital operations that are in-between perfect and imperfect operations, and just an intermediate capacity to resist the causes of illness.⁴⁵

As regards, instead, the *simpliciter* 'neither' in the sense (B), Sclano postulates its simultaneous participation in both healthy and morbid complexion, if we mean that certain parts of the *simpliciter* 'neither' organism are well-constituted and healthy, whereas other parts are not. This disparity is due to different mixtures of the four elements that form the human body.⁴⁶ Finally, Sclano considers the (C) meaning of *simpliciter* 'neither' as possible only in the sense that, by nature (and by nature only), certain bodies are constituted in such a way that they waver in time between healthy and morbid status, or change from one to another.⁴⁷ For instance, this is the case when a bad complexion (dominated by heat and humidity) in youth is replaced by a healthier constitution.⁴⁸ These bodies are *omnino* 'neither' *simpliciter* in the sense (C) if this oscillation is constant during their life or proportional between the permanence in the two states, and *ex magna parte* in the case it is not exactly proportional.⁴⁹

But what about the neutral status *ut nunc*, which explains the intermediate condition generated by the 'movement' over the latitude of health? For Sclano, unlike the *neutra simpliciter*, 'neither' organisms *ut nunc* are those that have an intermediate disposition in act—that is, currently (*actu*)—but which are not such by reason of their absolute or natural state.⁵⁰ Neutral state *ut nunc*, indeed, is due to acquired (*ascititijs*, from *ascisco*, 'to acquire') causes like illness; in particular, neutral bodies are those bodies which tend to health as the good of the organism itself, but do not have sufficient capacity to persist in the same state. So, if we read Sclano's tangled arguments correctly, while the neutral state *simpliciter* is an absolute condition determined by the nature of a given subject, the neutral state *ut nunc* comes always as an 'accidental' (so to speak) deviation from an absolute state of health or illness; this deviation is due to the (metaphorical) 'motion' on the latitude of health from one pole to another, generated by the progress of an illness or its remission.

The aforementioned points are, however, strictly connected with a further one, which is particularly important in the present reconstruction, namely the issue of falling ill (*decidentia*) and convalescence (*convalescentia*).⁵¹ Galenic physicians agree that both these processes belong to the *neutrum simpliciter*: but do they belong to the 'neither' *simpliciter* in the sense (A) or in the sense (B)? With respect to his

⁴⁵ Sclano (1597), p. 148.

⁴⁶ Sclano (1597), p. 152.

⁴⁷ Sclano (1597), p. 157.

⁴⁸ Sclano (1597), pp. 157–158.

⁴⁹ Sclano (1597), pp. 158–159.

⁵⁰ Sclano (1597), pp. 67 and 68.

⁵¹ For an overview on this problem see again Joutsivuo (1999).

interlocutors, Sclano takes an intermediate position and maintains that, while falling ill occurs within the sense (B) of the ‘neither’, convalescence brings about a neutral state in the sense (A). Indeed, in falling ill, a body participates in both extremes (health and morbid condition), since—as Galen himself noted—it simultaneously shows signs that could indicate both.⁵² Conversely, convalescence results from the mediation between health in act and ‘a very bad ongoing illness’. In this way, convalescence consists of the non-participation in health and morbid condition: on the one hand, indeed, the convalescing body is not morbid, but healthy; on the other hand, though, it is not actually a healthy body, but one in which a severe illness is still ongoing.⁵³

3.2 Santorio Santorio

In his corresponding treatment of the problem,⁵⁴ included in his commentary on *Tegni*, Santorio, the ancestor of the seventeenth century experimental revolution in medicine,⁵⁵ shapes his position in a constant dialogue with Sclano’s, besides many others—the aforementioned Manardi, Monte, Argenterio, and his mentor Bernardino Paterno (d. 1592).

In the first place, Santorio also clarifies the meaning of the *simpliciter/ut nunc* distinction. As with Sclano, to him, healthy, morbid, or neutral states of causes, signs, and body are called *simpliciter* to describe a structural and permanent state of the organism, and its capacity or incapacity to resist illness (*potentia resistendi*).⁵⁶ Significantly, Santorio qualifies the *simpliciter* state not only as ‘absolute’, but also as ‘exact’.⁵⁷ Instead, the *ut nunc* qualification indicates an equally natural feature,⁵⁸ albeit temporary; a movement on the latitude of health and disease that can be intensified or reversed, and which—being in transition—is never absolute nor exact.

However, unlike Sclano—who, as seen, conceived of healthy and morbid complexion *simpliciter* as having health in act, including the actual possession of the capacity to resist—Santorio follows Manardi and Paterno⁵⁹ in conceiving healthy status *simpliciter* as the pure ‘aptitude and potency to resist’,⁶⁰ and morbid

⁵² Sclano (1597), p. 155 ff.

⁵³ Sclano (1597), p. 156.

⁵⁴ On Santorio’s view of the *neutrum* see already Joutsivuo (1999) and Joutsivuo (2002), pp. 302–304. On his conception of the latitude of health and gradual intension/remission of health, see Hollerbach (2023), pp. 149–150.

⁵⁵ For a general overview on Santorio, see in particular the several essays in Barry and Bigotti (2022). See also Hollerbach (2023) and Wear (1981), pp. 250–256.

⁵⁶ Santorio (1612), p. 78.

⁵⁷ Santorio (1612), p. 79.

⁵⁸ Santorio (1612), p. 111.

⁵⁹ Santorio (1612), p. 72.

⁶⁰ Santorio (1612), p. 72.

status *simpliciter* as the absence thereof—what Santorio calls ‘non resisting potency’ (*potentia non resistens*).⁶¹ In sum, for Santorio, a healthy body *simpliciter* is one which by nature has the potency to resist illness, and not—as with Sclano—one which has health in act, and in addition, the potency to resist. As regards the *neutrum*, Santorio defines the neutral state *simpliciter* as what is halfway between the *simpliciter* healthy constitution and the *simpliciter* morbid one. Hence, the neutral is not what simultaneously (i.e., in time) participates in health and illness, but is ‘absolutely and exactly’ an intermediate between a healthy constitution, which possesses *potentia resistendi*, and the morbid one characterized by *potentia non resistens*.

In addressing the *ut nunc* problem, Santorio devotes the three states individual attention. As said, to him, the *ut nunc* is directly opposed to *simpliciter* as a potential state, so the former is understood here as the health or illness or neutrality in act in a certain body. For Santorio, every *ut nunc* status can be reversed or increased by *potentia resistendi* or *potentia non resistens*, which opposes it by being the body *simpliciter* healthy or morbid, or neutral.⁶² The healthy status of a body *ut nunc* is, however, a natural state (*ab ortu naturae*) caused by natural combinations of elements.⁶³ As such, it can be introduced in a morbid body *simpliciter*, or persist in a healthy body *simpliciter*, without contradicting this structural state, which, as said, is the cause of resistance or non-resistance to illness, and so it can be the cause of health *ut nunc* by rejecting the illness or by triggering healing.⁶⁴ Exactly the opposite applies for the ill status of a body *ut nunc*, which, according to Santorio, can be caused by the presence of a current disease in any form of *simpliciter* healthy, morbid, or neutral bodies, or by the aptitude or potency of the morbid body *simpliciter*.⁶⁵

Consequently, the neutral state *ut nunc* is a relevant concern. Santorio is particularly interested in the second Galenic sense of the ‘neither’ (B), meaning being at the same time healthy and ill, since he reckons that the neutral state *ut nunc* coincides with this second sense of the neutral state. In this sense, hence, the *neutrum* is what simultaneously has healthy and unhealthy dispositions in different parts of the body and so at the same time participates in health and illness *ut nunc*.⁶⁶ Not by accident, and unlike Sclano’s solution, the second sense (B) of the ‘neither’ state is also involved in convalescence and aging. In contradiction with Avicenna in particular, Santorio denies that convalescence and aging coincide with the neutral state in the first sense (A), as a non-participation in healthy and morbid statuses *simpliciter*. For him, convalescence is rather the simultaneous participation in health and illness *ut nunc*. Santorio, thus, conceives of convalescence as a neutral state deriving from movement process over the latitude of health and disease in time, in which the body participates at the same time and with its different parts, or in different proportions, in health and illness.

⁶¹ Santorio (1612), p. 128.

⁶² Santorio (1612), p. 129.

⁶³ Santorio (1612), p. 111.

⁶⁴ Santorio (1612), pp. 128–129.

⁶⁵ Santorio (1612), p. 131.

⁶⁶ Santorio (1612), p. 150.

Some important further remarks about the issue at stake here can be found, however, in a more famous work by Santorio, his *De statica medicina* (1614). Although the notion of *latitudo* is not explicitly addressed here, this concise yet influential collection of aphorisms, which achieved international renown, offers valuable insights to reflect on the continuous movement between health and illness. In this work, Santorio investigates the measurement of the body's *perspiratio insensibilis* (insensible perspiration) in relation to the six non-naturals: air, exercise, sleep, food, excretion, and the passions of the soul. *Insensible perspiration* refers to the imperceptible emission of matter (for example, through the pores of the skin), whose quantitative variations can affect the equilibrium between what the body takes in and what it expels. This balance, in turn, determines each individual's state of health or disease.⁶⁷

The Hippocratic concept of *additio et ablatio*—the restoration of humoral balance through the addition of what is lacking and the removal of what is excessive—was no longer sufficient to guarantee the recovery of health once the unnoticed losses of the body, through insensible perspiration, had been brought to light. According to Santorio, these excretions, though subtle, can indeed be measured and quantified. What was once, in Hippocratic medicine, a purely qualitative notion of balance is thus reinterpreted through a quantitative lens. Moreover, in Santorio's thought, the idea emerges that it is the body's solids and fluids themselves that must be held in proportion—an insight that would become increasingly central to medical theory in the centuries that followed, as we shall see in the following section.

4 The Quest for Equilibrium: The Dynamics of Health and Disease in Seventeenth-and Eighteenth-Century Medicine

As seen, until the sixteenth century, Galenic physicians understood health as the visible outcome of a complex process of contrast between illness and a healthy constitution. Accordingly, they interpreted in this sense the Hippocratic-Galenic idea of *krasis*, as well as the role of the physician in moving the body onto the latitude of health, constantly passing through the middle-land of the 'neither' in the (A) sense—the only meaning compatible with Aristotle's logic of contrariety. At the same time—and this is specifically the case with Santorio—they departed from a purely Hippocratic conception of health and paved the way for an influential conception of the body as a system of solids and fluids, and medicine as a quantitative and exact science.

But how does this notion further evolve after the mechanist turn of seventeenth century medicine? For sure, the rise of new medical approaches entailed the dismissal

⁶⁷ On the notion of insensible perspiration, see Renbourn (1960), Bylebyl (1977), several essays in Barry and Bigotti (2022), and Purnis (2023). On Santorio's legacy in eighteenth century medical practice and the development of 'systematic weighing', see Dacome (2001), and Dacome (2012).

of the logic of movement over the latitude of health, and in particular of the set of conceptual tools provided by *Tegni*: the distinction between *simpliciter* and *ut nunc* statuses, as well as that of the different forms of neutrality.⁶⁸ However, through the study of the specific cases of Giorgio Baglivi (1668–1707), Niccolò Graniti, and Giovan Battista Mazini (1677–1743), in this section we endeavour to weigh the persistence of the general idea of health as ‘balance’ within the new mechanical paradigm, and to point out the ‘translation’ into mechanical terms of the traditional ‘dynamic’ conception of health and disease, as resulting from the interplay between forces and resistances, here understood anew in terms of solids and fluids.

4.1 *Giorgio Baglivi*

It is no coincidence that Santorio’s *De statica medicina* achieved remarkable success, as evidenced by its many re-editions, translations, and commentaries between the 17th and 18th centuries—the text receiving comments from Giorgio Baglivi, Martin Lister, Denis Dodart, and James Keill, mostly from a mechanistic and ‘solidistic’ perspective.⁶⁹ Santorio’s theory of insensible perspiration fit seamlessly into the physiological framework of the time. The equilibrium pursued through Santorio’s ‘statics’ served as a key to predicting health and disease, as well as guiding our understanding of the transitions between these two states of the body, thus inviting a reinterpretation of the ancient notion of balance.⁷⁰

The Hippocratic concept of humoral equilibrium thus became just one aspect of a more complex interpretation of the living organism, in which the bodily fluids—with their forces and resistances—had to counterbalance the forces and resistances of the solids. Health and disease were seen as the result of ‘dynamic’ interactions between these opposing forces, with the heart acting as the body system’s driving mechanism. This view is aptly exemplified by Baglivi, who dedicated a commentary to Santorio’s work, titled *Canones de medicina solidorum*, adopting the same aphoristic style. His goal was to employ Santorio’s theory of statics—enriched by new physiological

⁶⁸ Considerable attention was given, especially between the 18th and 19th centuries, to the nature of *convalescence*. See, among others, Adolphi (1732), Struve (1735), Bidischini (1783) and De Vering (1816). Is it truly an intermediate state between health and illness? Does it tend more toward health or toward disease? Some authors, such as Friedrich Hoffmann, regarded it as belonging to the realm of illness; for others, it represented an ‘opportunity’ for health. For Struve (1735), the state of convalescence coincides with that of the decline of illness. A substantial body of literature reflects on how one might precisely determine the onset of convalescence, as well as the moment when health is fully restored. Some attempted—albeit unsuccessfully—to classify the various states of convalescence, even recognizing the existence of doubtful forms (*convalescentia lenta, vel difficilis, vel dubia*) and even false ones (*convalescentia spuria*): cf. Delius (1773). On recovery from illness in early modern medicine, see Newton (2018).

⁶⁹ On Santorio’s legacy, see Barry and Bigotti (2022). On the category of ‘iatromechanics’ and the role of quantification in early modern medicine, see the overview provided by Guidi (2023).

⁷⁰ See Bigotti (2019), pp. 226–233.

discoveries such as blood circulation—as a framework to reinterpret the Hippocratic legacy in a mechanistic light.⁷¹

Baglivi conceives of the body as a *fasciculum fibrarum*—a bundle of fibres interwoven and in continual correspondence, animated by a flow of oscillations and vibrations originating from the meninges of the brain.⁷² These cerebral coverings function as a kind of ‘second heart’, exerting a regulatory influence on the solid and fluid parts of the body. The fibres are thus not isolated entities but form a complex network. Moreover, they are not static but ‘elastic’, endowed with the capacity to contract and relax. Life itself, ultimately, depends on the continuous and balanced movement among these parts. ‘He who well understands the balance between the oscillating solids [i.e. the fibres and the parts composed of them] and the fluids that flow’, Baglivi writes in aphorism XI, ‘knows how to rightly treat many diseases’.⁷³ ‘And he who can compare the manner and quantity of insensible perspiration with the flow and amount of the other excretions, and rediscover the balance and proportion, will confidently prescribe remedies even for the most difficult illnesses’.⁷⁴ And again: ‘Whosoever knows the statics of the oscillating solids and the flowing fluids, because he learned it from others, or from us through our books *On the Medicine of Solids* or *On the Motor and Morbid Fiber*, masters Santorio’s very statics and thus the key to disclosing and removing the nature of many difficult diseases’.⁷⁵ Baglivi was referring to his own work on motor and morbid fibres, *De fibra motrice et morbosa* (1702), which was unfortunately only partially completed. In this earlier treatise, he sought to articulate his theory of fibres and to examine the connection between the brain’s meninges and the heart, exploring the principle that claims balance between the body’s solid and fluid components—a balance that he regarded as fundamental to distinguishing between states of health and disease. What, then, is this kind of equilibrium? Baglivi wrote:

In these matters, we shall not interpret equilibrium according to its strictest laws, as in mechanics or hydraulics. Rather, we shall define equilibrium as a certain proportion between the motion of the dura mater and that of the heart; between the oscillatory motion of the villi, or membranous solids, of one part and those of another; between the successive or oscillatory motion of the membranous villi and the motion of the fleshy villi; between the fibres that contract perpetually and the fluids that flow in contact with them; and, finally, between the fluids themselves, and those fluids – both homogeneous and heterogeneous – that flow through different channels with various inclinations of motion.⁷⁶

It is, therefore, a *proportion* among the parts of the body—one that cannot be the same for all, but necessarily varies from individual to individual according to

⁷¹ See Tonetti (2016), and Tonetti (2022). On Baglivi and the early modern reception of Hippocrates, see Maclean (2021). A general overview on Baglivi’s clinical methodology is provided by Andrault (2018).

⁷² See Vidal (1990), Tonetti (2016).

⁷³ Baglivi (1704a), pp. 168–169 (aph. XI). All translations of quotations are our own.

⁷⁴ Baglivi (1704a), pp. 168–169 (aph. XI).

⁷⁵ Baglivi (1704a), p. 183 (aph. XXXI).

⁷⁶ Baglivi (1704b), p. 297.

multiple factors. It is within this proportion, Baglivi claims, that our vital being resides, together with the diversity of temperaments, complexions, and natures.⁷⁷ ‘Perfect health’ is attained when all our operations—animal, vital, and natural—are performed with motion and resistance between the *dura mater* and the heart in proper proportion, both acting as regulators of the body’s solid and fluid components, and among the bodily parts themselves. This reinterpretation of the notion of equilibrium enables Baglivi to question earlier theories and remedies, including the long-standing belief that abstinence and moderation could ensure the body’s *resistance* against any diseases—a notion perpetuated by a long tradition of texts on the preservation and prolongation of life, beginning with Luigi Cornaro’s *Della vita sobria* (On a Sober Life)⁷⁸:

Many are astonished that sober and temperate men do not live longer than others, nor are they healthier; indeed, they often die suddenly. They are ignorant of Santorio’s statics, nor do they, by his sound precepts, rightly govern and steer the ship of health, constantly shaken by the six non-natural things; hence their premature death or sickly life. Physicians are less susceptible to this because they are skilled in statics.⁷⁹

However, proportion can only be discerned through direct experience with patients. It is a notion that resists precise definition, for it cannot easily be formalized or translated into a truly measurable quantity. In this sense, disease is not merely the malfunction of a machine, but rather the disturbance of a delicate, living balance—the ‘rhythm’ of life.⁸⁰

4.2 Niccolò Graniti and Giovan Battista Mazini

An attempt to visualize this notion of equilibrium comes from the lesser-known Salernitan physician Niccolò Graniti, author of a compilatory work titled *Dell’antica, e moderna medicina teorica, e pratica meccanicamente illustrata* (Of Ancient and Modern Theoretical and Practical Medicine, Mechanically Explained) (1739).⁸¹ He provides a ‘symbolic representation’ of the health-disease transition: an algebraic tool, the so-called ‘chiave logistico-medico-meccanica’, designed to express in formulas the relationship between the solid and fluid parts of the body. His goal is strictly practical—to establish rational therapeutics and formalize the choice of remedies to restore health.⁸²

Graniti shares many aspects of Baglivi’s theory (except for the role attributed to the cerebral meninges) as well as those of related authors such as Giovanni Alfonso Borelli and Lorenzo Bellini:

⁷⁷ Baglivi (1704b), p. 297.

⁷⁸ On Cornaro’s work, see Bellini (2018), and Madella (2023).

⁷⁹ Baglivi (1704a), pp. 166–167 (aph. 6).

⁸⁰ On Baglivi’s concept of disease, cf. Tonetti (2023).

⁸¹ On Graniti, see De Renzi (1852), pp. 410–411.

⁸² Graniti (1739), pp. 227–254.

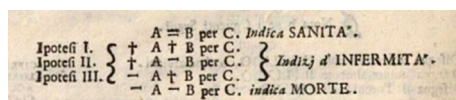


Fig. 1 Medical diagram by Graniti illustrating, through formulas, the balance between solids and fluids in the body as the basis for understanding health (*sanità*), illness (*infermità*), and death (*morte*). From Graniti (1739)

[...] in the human body, strictly speaking from a medical perspective, nothing is observed except solids and fluids; that is to say, the former *ratione potentiae* and the latter *ratione resistentiae* are reciprocally the cause of the systole and diastole of the heart (from Baglivi, Borelli, and Bellini's *De fibra motrice*).⁸³

Both solids and fluids, with their respective forces and resistances, thus work together to sustain the rhythm of the heart; taken together, the three constitute the variables that determine the state of health or disease. Echoing Baglivi's aphorisms almost *verbatim*, Graniti maintains that the physician's main task is to 'understand the equilibrium between the oscillating solids and the flowing fluids' (§103) and that 'the diseases of the human body cannot be properly treated without a precise knowledge of the statics of the solids, and especially without a full inspection of their equilibrium, forces, and reciprocal resistances' (§106).⁸⁴

On one hand, healthy life consists in the proper equilibrium between the force of the solids and the resistance of the fluids, maintained through the natural rhythm of the heart; on the other hand, all possible illnesses arise from the greater or lesser oscillatory motion of the solids and the greater or lesser flow of the fluids. Death occurs, however, when the movements of both solids and fluids come to a complete halt.⁸⁵ Using algebraic symbols, Graniti visualizes these relationships in five different formulas, where A stands for solids, B for fluids, and C for the rhythm of the heart, + or - indicates a greater or lesser quantity than necessary, and = signifies equilibrium (see Fig. 1)⁸⁶:

$$A = B \times C \text{ indicates health}$$

This represents perfect health, which occurs when the movement of the solids (A) is in balance with the movement of the fluids (B) through the well-ordered systoles and diastoles of the heart (C).

$$+A + B \times C$$

⁸³ Graniti (1739), p. 227.

⁸⁴ Graniti (1739), p. 239.

⁸⁵ Graniti (1739), p. 242.

⁸⁶ Graniti (1739), p. 244.

$$+A - B \times C$$

$$-A + B \times C$$

These three formulas represent the different states of illness that the body can experience when A and B are either above or below the necessary degree. In the order presented, they correspond to the most severe, acute and chronic diseases, reflecting the long-standing medical distinction between acute and chronic conditions.

$-A - B \times C$ indicates death

If both A and B fail, then the conditions necessary for the heart's natural rhythm—an essential requirement for life—will also fail.

The physician should therefore intervene by selecting remedies that can affect the individual variables, sometimes increasing and sometimes reducing the movement of solids or fluids, or both. In fact, as acknowledged by Graniti, this scheme is merely a formalization of the Hippocratic principle of *additio et ablatio*:

As you have already seen, A denotes the solid, B the fluid. These two lines = thus signify equality, or the balance between the two. This single line alone – denotes less. Likewise + denotes more, etc. [...] I have derived this diagram from Hippocrates, the Prince of Medicine, who described it succinctly: *Additio seu Adiectio eorum* (here is the 'more') *quae deficiunt* (here is the 'less') and *Subtractio eorum* (here is the 'less') *quae supersunt* (here is the 'more'). For who does not know that equality (=) is composed between the more and the less?⁸⁷

A similar approach is found in the work of the physician Giovan Battista Mazini, a pupil of Domenico Guglielmini and Antonio Vallisneri, who was among the leading interpreters of medical mechanism in Padua.⁸⁸ In the first two parts of his *Mechanices morborum* (Brescia, 1723–1725)—a work that earned him an appointment to the chair of *medicina practica* at the *Studium* of Padua—Mazini set out a mechanistic theory of disease based on the movement of fluids and solids (the third part, published in 1727, being devoted instead to the mechanics of fever). In the *Mechanica medicamentorum* (Brescia, 1734)—perhaps his most accomplished attempt to develop a pharmacology grounded in mechanical principles—Mazini not only seeks to explain the elastic and oscillatory motion of the fibres (drawing on the works of Borelli, Bernoulli, and Baglivi), but also reflects on the very definition of health and disease.

Since Nature is like a wise geometer (*sapientissima geometra*), arranging all things according to number, weight, mass, shape, motion, and time, one must assume that some form of proportion is necessarily required in all the physical operations of the animal body. Yet, as in Baglivi's case, Mazini admits to distancing himself from the strictness of geometrical proportion, viewing instead *proportion* as that balance among the parts which preserves—*aliqua latitudine*—the unity and cohesion

⁸⁷ Graniti (1739), p. 254.

⁸⁸ Ongaro (2008).

of the whole.⁸⁹ His aim is to show physicians how such connection, unity, order, or equilibrium (and, interestingly, a kind of *quasi-equilibrium*) can be achieved in both fluids and solids, so that an ‘appropriate health’ (*opportuna sanitas*) may be obtained and maintained within the living machine. Mazini begins by analysing the blood fluid—‘[starting] from which all the actions of the body, whether healthy or diseased, are chiefly to be understood’—and then turns to ‘the nutrition, forces, motions, and movements of all the solids’.⁹⁰

In this system, health can be easily altered or destroyed. When the components of the blood and other fluids have deviated considerably from their reciprocal proportion (*proportio reciproca*), owing to a defect in the number, mass, weight, or shape of the elements composing the fluids, or to a defect in their density, looseness, or roughness—or when the homologous proportion (*homologa proportio*) between fluids and solids has been notably disturbed—then diseases and disorders must necessarily follow; for in such a condition the elements of the blood fluid are no longer perfectly mixed with one another.⁹¹ The same applies to the solids.⁹²

Hence, Mazini offers two, in a sense, operative definitions of the states of health and disease, grounded in the body’s own sensations. A body in a full state of health—in which fluids and solids are in equilibrium (or nearly so) and proportional to one another—should feel in all its parts equally light, equally strong, equally steady, equally mobile, and so forth.⁹³ Conversely, a body in a state of illness, where everything is *sine aequilibrio*, should perceive, either in part or as a whole, something heavier, or unnaturally lighter, softer, harder, warmer, or colder.⁹⁴

Interestingly, none of these three perspectives makes an explicit reference to an intermediate state between health and illness. For instance, Baglivi never mentions convalescence or considers the condition of the body during this transition from illness to health. However, he acknowledges that relapses and transformations of one disease into another can occur during the recovery process, according to mechanisms that are yet to be explored.⁹⁵ Nevertheless, the notion of proportion enables them to provide a more nuanced representation of health and illness states, recognising a gradation in illness depending on the extent to which the balance between solids and fluids is disturbed. This also implies that there is no fixed definition of illness, as it is always situated within a variable *continuum* that is never identical from one person to another.

⁸⁹ Mazini (1743), pp. 278–279.

⁹⁰ Mazini (1743), p. 279.

⁹¹ Mazini (1743), pp. 284–285.

⁹² Mazini (1743), p. 285.

⁹³ Mazini (1743), p. 285.

⁹⁴ Mazini (1743), p. 285.

⁹⁵ See the section *De morborum successionibus* in Baglivi (1704b), pp. 367–376.

5 Conclusion

Summarizing its historical premises, we have followed a path through Italian medical tradition between the 16th and 18th centuries. It reveals, in early modern physicians, the need to shape a logic of intermediate states of health between healthy and unhealthy constitution, health and disease. Their attempts drew especially on the originally Galenic idea that these states are always and necessarily the result of dynamic processes.

In late sixteenth century Galenic medicine, still characterized by a qualitative view of nature, and therefore of physiology, the balance between these different dimensions is rendered through a network of conceptual and terminological distinctions, inherited from Medieval scholastic medicine. They allow one to think of the same organism as a closed system, simultaneously endowed with a healthy constitution and disease, as well as an unhealthy constitution and health. In particular, the concept of *neutrum* allows us to address the issue of the intermediate state and the processes of falling ill and convalescence.

Starting with the emergence of a mechanistic perspective, this dynamic conception remains essentially unchanged, despite undergoing a readjustment in the conception of the elements involved in the constitution of the body—now seen as composed of solids and fluids interacting with each other in a closed system. In this specific context, however, the notion of equilibrium involves a multiplicity of factors and a physical-chemical conception of forces and resistances that generate such states by counteracting each other.

Throughout this tradition spanning three centuries, there is a general focus in medical art on the process and transition rather than on the actual state, to the point that the physician's task is clearly defined as accompanying this transition. However, the possibility of recurrence and 'conversion' of the disease into other morbid states remains open and, in some ways, constitutive of the very nature of health. Medical action, therefore, takes place primarily in the dimension of time (*kairos oxys*, in Latin *occasio praeceps*) in the space between these moments. Although somehow measurable, and even if it depends on structural, absolute elements of a body's constitution, health—in the *ut nunc* sense—is therefore a contingent relationship. It is expressed in proportions and balances of an individual and relative nature, encompassing a wide range of elements such as age, constitution, and environment, including the *history* that has shaped and reshaped the individual body through alternating states of health and illness over time.

Acknowledgments We are grateful to Fabrizio Bigotti for his comments on an earlier version of this chapter. Any inaccuracies are ours alone.

References

- Adolphi M (praes.) (1732) *De statu convalescentiae*. Ex officina Langenhemiana, Leipzig
- Agrimi J, Crisciani C (1988) *Edocere medicos*. In: *Medicina scolastica nei secoli XIII–XV*. Guerini e associati, Milan
- Andraut R (2018) What does it mean to be an empiricist in medicine? Baglivi's *De praxi medica* (1696). In: Rey A-L, Bodenmann S (eds) *What does it mean to be an 18th century empiricist? Construction and circulation of a pluralistic concept*. Springer, Cham, pp 169–188
- Aristotle (1991) *Categories*. In: Barnes J (ed) *Selected works*. Princeton University Press, Princeton
- Baglivi G (1704a) *Canones de medicina solidorum ad rectum Statices usum*. In: Santorio S (ed) *De medicina statica libri octo*. Typis Berbabò, Sumpt. Haered. L'Hullière, Rome
- Baglivi G (1704b) *Opera omnia medico-practica et anatomica...*, 6th edn. Sumptibus Anisson & Joannis Posuel, Lyon
- Barry J, Bigotti F (2022) Santorio Santori and the emergence of quantified medicine, 1614–1790: Corpuscularianism, technology and experimentation. Palgrave Macmillan, Cham
- Bellini F (2018) Diet and hygiene between ethics and medicine: evidence and the reception of Alvise Cornaro's *La vita sobria* in early seventeenth-century England. In: Lancaster JAT, Raiswell R (eds) *Evidence in the age of the new sciences*. Springer, Cham, pp 251–268
- Beneduce C (2023) *Complexio*. Across disciplines. *Early Sci Med* 28(3–5):1
- Bidischini F (1783) *Dissertatio inauguralis medico-practica de reconvalescentia...*. Typis Mathiae Andreae Schmidt, Vienna
- Bigotti F (2019) Mind, body, and matter in the Galenic tradition of the late renaissance (1550–1630). Brepols, Turnhout
- Bigotti F (2022) *Gradius dimetiri: intensity and classification of complexions in 14th-century Italian medicine*. *Ann Sci* 79(4):419–441
- Bigotti F (2023) Intensity meters: new notes and discoveries on the invention of early modern precision instruments. *Early Sci Med* 28(6):597–630
- Boss J (1979) The *methodus medendi* as an index of change in the philosophy of medical science in the sixteenth and seventeenth centuries. *Hist Philos Life Sci* 1(1):13–42
- Bylebyl JJ (1977) Nutrition, quantification and circulation. *Bull Hist Med* 51(3):369–385
- Caroti S (1989) Da Buridano a Marsilio di Inghen: la tradizione parigina della discussione “*De reactione*”. *Medioevo* 15:173–233
- Caroti S (1995) Da Walter Burley al *Tractatus de sex inconvenientibus*. La tradizione inglese della discussione medievale “*De reactione*”. *Medioevo* 21:257–374
- Chandelier J, Robert A (2013) Nature humaine et complexion du corps chez les médecins italiens de la fin du Moyen Âge. *Rev Synth* 134(4):473–510
- Dacome L (2001) Living with the chair: private excreta, collective health and medical authority in the eighteenth century. *Hist Sci* 39(4):467–500
- Dacome L (2012) Balancing acts: picturing perspiration in the long eighteenth century. *Stud Hist Philos Sci Part C* 43(2):379–391
- De Renzi S (ed) (1852) *Collectio Salernitana, ossia documenti inediti, e trattati di medicina appartenente alla scuola medica salernitana*. Dalla tipografia del Filiatre-Sebezio, Naples
- De Vering JE (1816) *Dissertatio inauguralis medica de convalescentia eiusque cura*. Typis Caroli Gerold, Vienna
- Delius H F (praes.) (1773) *Dissertatio inauguralis medica de convalescentia vera et spuria*. Ex officina Viduae Camerariae, Erlangen
- Des Chene D (1996) *Physiologia: natural philosophy in late Aristotelian and Cartesian thought*. Cornell University Press, Ithaca–London
- Favaretti Camposampiero M, Scribano E (eds) (2022) *Galen and the early moderns*. Springer, Cham
- Galen (1821–1833) *Opera omnia Claudii Galeni*, edited by K. G. Kuhn. Cnobloch, Leipzig
- Galen (1997) *Selected works*, translated with an introduction and notes by P. N. Singer. Oxford University Press, Oxford

- Graniti N (1739) *Dell'antica, e moderna medicina teorica, e pratica meccanicamente illustrata*. Domenico Occhi, Venice
- Green MH (2019) *Gloriosissimus Galienus: Galen and Galenic writings in the eleventh-and twelfth-century Latin west*. In: Vallianatos PB, Zipser B (eds) *Brill's companion to the reception of Galen*. Brill, Leiden, pp 319–342
- Guidi S (2023) Data vs. mathesis. Contrasting epistemologies in some mechanizations and quantifications of medicine. In: Guidi S, Braga J (eds) *The quantification of life and health from the sixteenth to the nineteenth century: intersections of medicine and philosophy*. Palgrave Macmillan, Cham, pp 201–240
- Hollerbach T (2023) *Sanctorius Sanctorius and the origins of health measurement*. Springer, Cham
- Jaucourt L (1765/2013) *Santé*. In: *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers*, vol 14, p 628. Translated in: Meyer V (ed) *The encyclopedia of Diderot & d'Alembert*. Collaborative translation project. Michigan Publishing, University of Michigan Library, Ann Arbor
- Joutsivuo T (1999) Scholastic tradition and humanist innovation: the concept of neutrum in renaissance medicine. *The Finnish Academy of Science and Letters*, Helsinki
- Joutsivuo T (2002) Aristotle and Galen on neutral bodies: perspectives on Aristotle's and Galen's auctoritates in late medieval and renaissance medicine. In: Leijenhorst C, Lüthy C, Thijssen H (eds) *Dynamics of Aristotelian natural philosophy from antiquity to the seventeenth century*. Brill, Leiden, pp 289–306
- Kaye J (2014) *A history of balance, 1250–1375: the emergence of a new model of equilibrium and its impact on thought*. Cambridge University Press, New York
- Maclean I (2001) *Logic, signs and nature in the renaissance: the case of learned medicine*. Cambridge University Press, Cambridge
- Maclean I (2021) The reception of Hippocrates by physicians at the end of the seventeenth century: a comparative study. In: Levitin D, Maclean I (eds) *The worlds of knowledge and the classical tradition in the early modern age*. Brill, Leiden–Boston, pp 217–274
- Madella L (2023) The more the years the less the food: Alvisé Cornaro on the sober life (1558). In: Guidi S, Braga J (eds) *The quantification of life and health from the sixteenth to the nineteenth century: intersections of medicine and philosophy*. Palgrave Macmillan, Cham, pp 62–78
- Mazini GB (1743) *Opera omnia... tomus secundus Mechanicam tum Morborum, tum Medicamentorum continens*. Excudebat Joannes-Maria Rizzardi, Brescia
- McVaugh M (2019) Galen in the medieval universities, 1200–1400. In: Vallianatos PB, Zipser B (eds) *Brill's companion to the reception of Galen*. Brill, Leiden, pp 381–392
- Newton H (2018) *Misery to mirth: recovery from illness in early modern England*. Oxford University Press, Oxford
- Ottoson P-G (1984) *Scholastic medicine and philosophy: A study of commentaries on Galen's Tegni (ca. 1300–1450)*. Bibliopolis, Naples
- Palmieri N (2006) *L'Ars Medica (Tegni) de Galien: lectures antiques et médiévales: actes de la journée d'étude internationale, Saint-Étienne, 26 juin 2006*. Publications de l'Université de Saint-Étienne, Saint-Étienne
- Pesenti T (2000) The teachings of the Tegni in Italian universities in the second half of the fourteenth century. *Dynamis* 20:159–208
- Purnis J (2023) Sanctorius's weighing chair: measurement, metabolism, and mind. In: Guidi S, Braga J (eds) *The quantification of life and health from the sixteenth to the nineteenth century: intersections of medicine and philosophy*. Palgrave Macmillan, Cham, pp 111–132
- Renbourn ET (1960) The natural history of insensible perspiration: a forgotten doctrine of health and disease. *Med Hist* 4(2):135–152
- Roudaut S (2021) *La mesure de l'être. Le problème de la quantification des formes au Moyen Âge (ca. 1250–1370)*. Brill, Leiden–Boston
- Roudaut S (2022) Paul of Venice's theory of quantification and measurement of properties. *Noctua* 9(2):104–158
- Roudaut S (2025) Heat, coldness, and contrariety in late scholastic philosophy. *Aristotelica* 7:61–88

- Santorio S (1612) *Commentaria in Artem Medicinalem Galeni*. Apud Iacobum Antonium Somaschum, Venice
- Sclano S (1597) *Commentaria præclarissima in tres libros artis medicinalis Galeni*. Apud Ioannem Guerilium, Venice
- Siraisi N (1981) *Taddeo Alderotti and his pupils: two generations of Italian medical learning*. Princeton University Press, Princeton
- Siraisi N (1987) *Avicenna in renaissance Italy: the canon and medical teaching in Italian universities after 1500*. Princeton University Press, Princeton
- Siraisi N (1990) *Medieval and early renaissance medicine: an introduction to knowledge and practice*. University of Chicago Press, Chicago
- Strohmaier G (2019) Avicenna between Galen and Aristotle. In: Vallianatos PB, Zipser B (eds) *Brill's companion to the reception of Galen*. Brill, Leiden, pp 215–226
- Struve E G (1735) *Dissertatio inauguralis medica de convalescentiae statu eius impedimentis et praesidiis*. Typis Joh. Christiani Hilligeri, Halle in Magdeburg
- Sylla E D (1971–1972) Medieval quantifications of qualities: the 'Merton school'. *Arch Hist Exact Sci* 8:9–39
- Sylla ED (1973) Medieval concepts of the latitude of forms: the Oxford calculators. *Archives d'histoire doctrinale et littéraire du Moyen Âge* 40:223–283
- Tonetti L (2016) *Corpus fasciculus fibrarum: teoria della fibra e pratica medica nel De praxi medica di Giorgio Baglivi*. *Physis* 51(1–2):379–392
- Tonetti L (2022) Bodies in balance: Santorio's legacy in Baglivi's medicine. In: Barry J, Bigotti F (eds) *Santorio Santori and the emergence of quantified medicine, 1614–1790. Corpuscularianism, technology and experimentation*. Palgrave Macmillan, Cham, pp 289–315
- Tonetti L (2023) 'Nature is more subtle than any mathematician': Giorgio Baglivi on fluids in the human body. In: Guidi S, Braga J (eds) *The quantification of life and health from the sixteenth to the nineteenth century: intersections of medicine and philosophy*. Palgrave Macmillan, Cham, pp 157–174
- van der Lugt M (2011) Neither ill nor healthy: the intermediate state between health and disease in medieval medicine. *Quad Stor* 46(1):13–46
- Vidal M (1990) Giorgio Baglivi tra osservazione clinica e speculazioni iatromeccaniche. *Atti del centro ricerche storiche di Rovigno* 20:133–214
- Von Staden H (1989) *Herophilus. The art of medicine in early Alexandria*. Cambridge University Press, Cambridge
- Wear A (1981) Galen in the renaissance. In: Nutton V (ed) *Galen: problems and retrospects*. The Wellcome Institute for the History of Medicine, London, pp 229–262
- World Health Organization (1946) *Constitution of the WHO*. WHO, Geneva. <https://apps.who.int/gb/bd/PDF/bd47/EN/constitution-en.pdf?ua=1>

Simone Guidi is a Senior Researcher in the Institute for the European Intellectual Lexicon and History of Ideas (CNR-ILIESI) at the Italian National Research Council. He teaches History of Modern Philosophy at the Sapienza University in Italy. Previously, he was Assistant Professor of Philosophy in the University of Coimbra's Faculty of Arts and Humanities, Portugal. Simone's work focuses on the history of early modern philosophy, with special attention to the thought of Descartes, his sources and legacy.

Luca Tonetti is a Researcher in the History of Science at the Department of Historical and Geographic Sciences and the Ancient World (DiSSGeA), University of Padua. He also serves as Book Review Editor of *Nuncius: Journal of the Material and Visual History of Science* (Brill). His research delves into the history of early modern science and medicine, with a specific focus on Marcello Malpighi's unpublished manuscripts housed at the Bologna University Library and the Royal Society.

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