

# Introduction

## 1 Aristotle

According to the Oxford English Dictionary (online version), in contemporary English usage the word ‘nutrition’ carries four meanings:

1. The action or process of supplying, or of receiving, nourishment or food.
2. That which nourishes; food, nourishment.
3. The state or condition of being (well or badly) nourished; a person’s state of health considered as a result or indicator of (good or bad) nourishment.
4. The branch of science that deals with nutrition (*sense 1*) and nutrients, esp. in humans; the study of food and diet.

In light of the above definitions, ‘nutrition’ seems an appropriate English rendering for the Greek words τροφή or τὸ τρέφειν/τρέφεσθαι, which are used by authors of the 5<sup>th</sup> and 4<sup>th</sup> centuries BCE to refer to processes, activities or functions related to nourishment, or even to kinds of food or nutriment that are able to nourish or procure sustenance. The term θρέψις is not attested before the 2<sup>nd</sup> century CE. In Galen θρέψις is acknowledged as one of the three main activities (ἐνέργεια) of nature – the other two being growth and generation (*De facultibus naturalibus* I,5, K. II,10).

Specifically, rendering 4 resonates with what in Hippocratic texts is sometimes referred to as dietetics, that is, that part of the medical art (and not science) which deals with diet (δίαιτα). The gradual development of dietetics into a cornerstone of medicine was set off by medical ideas of that time which are closely akin to rendering 3, most notably the belief that a person’s state of health depends heavily on the food (s)he consumes. In one of its two main meanings (the other being ‘rearing’, ‘bringing up’), τὸ τρέφειν, apart from the act of nourishing, refers to the substances that are able to nourish (so, rendering 2). Now concerning nutrition as a bodily function related to a set of individual physiological activities of certain body parts, Aristotle seems to deserve, at least to a certain degree, credit for being the first to explicitly make such a progress (cf. *de Partibus Animalium* II,3, 650a9; III,14, 674b10, 19). Of course the ancients did not talk about metabolism, in the strict biochemical sense of the word, nor did they reflect on matters related to the energy value of food. They did nonetheless speak of assimilation of food as a sort of change taking place due to mutual interaction, in some cases of opposite, while in others of like qualities or powers.

In the place of the brain, some of whose networks are nowadays considered to be associated with the control of feeding, the ancients put the soul.

Aristotle was the first to systematically describe a particular part of the soul as responsible for the physiological process of nutrition. This is the nutritive part, which is acknowledged as the necessary and sufficient condition for life, and is therefore held to be shared by all living beings, plants, animals and humans. Nevertheless, as will become clear from the contributions to this volume, nutrition is far from being the only act in which the nutritive soul, biologically speaking, manifests itself. Breathing, cooling, growth, reproduction and, to a certain degree, sleep and vigilance are directly connected to nourishment from food, which explains why they all fall within the nutritive soul's realm of responsibility. Aristotle did not, thus, single out, say, a 'breathing/cooling' or a 'formative' psychic part, but rather subsumed the respective functions, along with a variety of other functions, under the umbrella of the nutritive faculty. And he did so not only because these functions are common, as he repeatedly insists, to all living things, but also because, in order to be performed, there must be some form of direct interaction between them and phenomena occurring during the nutritive process.

Overarchingly, addressing the fundamental problems concerning the nutritive part of the soul as well as the variety of physical manifestations it directs lies at the core of this volume. Its principal aim is to highlight the much-neglected multifacetedness of the 'lowest' part of the soul and its physiological aspects, thus opening the way for further investigation of Aristotle's and his successors' views on the subject. Divided into two sections, 'Aristotle' and 'Aristotelianism', each made up of 8 fresh contributions, this volume lays no claim to an exhaustive coverage. The variety of digestive residues, the contribution of evaporation to the nutritive process as a whole, or even the role of heat and cooling in animals that do not respire are only a few examples of the many topics that are directly related to nutrition and nutritive soul and need further clarification.

The contributions to this volume centre around two crucial research topics which have greatly troubled thinkers since antiquity, and over which floods of ink have been poured: the relationship between body and soul, and the partition of the soul. It is true that the nutritive soul and its physical manifestations have not been discussed in the relevant literature as adequately as the other two parts of the soul, the perceptive and the rational, although it has been almost two decades since Richard King established the breadth of the subject area and highlighted its importance. In his monograph *Aristotle on Life and Death*, King explores the last part of Aristotle's *Parva Naturalia*, namely the part that deals with topics such as the length of life, youth, old age, life, death and respiration, which he sees as a continuation and completion of the discussion of the nutritive

soul and its activities that began in *De Anima*. King analyses Aristotle's conception of life-cycle, stressing the indispensability of nutrition in passing through each stage of a living body's life-cycle, and the role of the nutritive soul as the efficient cause for growth and decay.

Nevertheless, reports of empirical observations about a wide variety of physical manifestations and states such as Aristotle's reasonably give rise to ontological questions regarding the 'identity' of the nutritive soul and its relation to the soul as a whole: What kind of entity is this nutritive soul? By means of what criteria did the ancients (or, perhaps *we* as interpreters?) distinguish this psychic part from other psychic parts, and why should this part be thought of as 'the lowest'? Should we speak of a part-whole relationship between the nutritive part and the rest of the *psychê* (cf. Perler 2015, p. 11–14)? Published in 2012, Thomas Johansen's *The Powers of Aristotle's Soul* offers a systematic analysis of *de An.* in which a chapter is devoted to nutrition and its importance in Aristotle's theory of the soul. In Johansen's own words, "Aristotle gives priority to nutritive soul in his account of the soul because nutrition serves as a paradigm of how the soul works as the nature of living beings. The nutritive soul thus has a special status among the capacities of the soul by illustrating how the soul works so as to bring about life" (p. 119). If indeed for Aristotle the nutritive soul holds a prominent place among the other psychic capacities, ought we not to reformulate our understanding of what it means for it to be 'the lowest' part of the soul? In any case, we hope that the collective effort undertaken for the present volume, oriented as it is towards investigating the subjects of nutrition and nutritive soul in Aristotle and Aristotelianism, will help readers explore more fully Aristotle's and his heirs' conception of the 'nature' of living things, and will give a new impetus to the study of Aristotelian psychology.

## 2 Philosophers and Physicians on Soul, Life and Nutrition

While the fact that the soul exists and somehow distinguishes a living thing from a non-living one has almost never been truly disputed, what the soul really is and how it activates the body have been hotly debated since antiquity. In the Homeric poems, a person's soul is often described as being the last breath that leaves his body at the moment of death. In Presocratic thought the soul, either immortal or mortal, is usually held to be of a material nature, being associated for example with air by Anaximenes and Diogenes of Apollonia, and with fire by Heraclitus and Democritus. Later, in Plato we find the view that the soul, though incorporeal, is imprisoned in and can be affected by the body as long as the latter is physically alive, whereas in Aristotle we learn that *nous* comes "from out-

side” (θύραθεν), even though the soul is a unified entity. Aristotle frequently attacks his predecessors for their materialistic accounts of the soul. If we also bear in mind that for Plato (a) the soul runs the danger of being affected by one’s struggle to gratify bodily desires, which explains why one should rather abstain from the so-called pleasures connected with food and drink, from sexual pleasures, and from the pleasures of ornament (*Phaedo* 64d); and (b) the third part of the soul, the appetitive part, is better depicted as a wild beast that must remain tied up and be located far away at least from the rational part of the soul (*Timaeus* 70d–71a), then we can draw a quite clear picture of the intellectual obstacles confronting Aristotle as he undertook to rework and argue in favour of the ‘lowest’ part of the soul.

While putting to the test Plato’s tripartite division of the soul (*Res publica* IV 434d–441c), Aristotle does not focus exclusively on reason, but introduces the nutritive capacity with a view to accounting for a variety of life activities (*de An.* III,9, 432b3–8; III,10, 433a21–6). For Aristotle, both ‘being’ and ‘living’ are better than ‘not being’ and ‘non-living’ respectively (*de Generatione Animalium* II,1, 731b29–30), but in order for a being to be alive it needs nourishment. In purging nourishment of its previous negative associations (see also Heraclitus’ DK 22 B 117 and DK 22 B 118; Euripides *Ion* 1170; Claus 1981, p. 73–74) and highlighting it as a prerequisite of life, Aristotle initiates a shifting of philosophical interest towards knowledge of the body and its physiology. Nutrition, thus, comes to be regarded as a complex process with distinct stages, affected by a variety of both bodily (body heat, moisture and cavities, stage of growth) and extra-bodily (environment, external air) factors – as a function, above all, that affects and supports the performance of other functions, such as cooling of the body, growth of individual body parts, and reproduction.

The above issues are addressed by many of Aristotle’s predecessors in natural philosophy, but only sporadically, not systematically. Anaxagoras, for example, is said to have wondered how hair can come from what is not hair and flesh from what is not flesh, concluding that everything is pre-existent in nourishment (DK 59 A 46; Longrigg 1993, p. 65). Empedocles often becomes the target of Aristotle’s criticism, mainly due to his false or incomplete accounts on matters which Aristotle eventually associated with the nutritive soul. Specifically, according to *de An.* II,4, Empedocles failed to refer to the soul as the formal agent of growth. Regarding plants, he claimed that growth takes place in two directions, downwards when they spread their roots in the ground because of the natural tendency of the earth contained in them; and upwards when they shoot in this direction due to the natural movement of the fire in them (*de An.* II,4, 415b29–416a2). Empedocles appears to have reflected on digestion as well. For him, we learn from Simplicius, food, after entering the mouth and being

ground up by the teeth, is digested in the stomach by a process of ‘putrefaction’ (σῆψις); it is then carried to the liver, where it is turned into blood and is distributed throughout the entire body via the blood vessels (Simplicius, in *Aristotelis Physica commentaria* 371,33 = DK 31 B 61; Aetius, V,27,1 = DK 31 A 77; Longrigg 1993, p. 73). Another hot topic of debate was respiration. Empedocles’ clepsydra analogy receives severe criticism in *de Juventute et Senectute, de Vita et Morte, de Respiratione* 13(7), 473a15–17 for lacking, in Aristotle’s view, a clear reference to the purpose of respiration and the question of whether all animals perform that function or not. In fact, in his rather sweeping critique in *Juv.* 7(1), 470b6–13, Aristotle reproves all his predecessors for offering no or incomplete accounts on the subject (Althoff 1999, p. 78–85). Lastly, Empedocles was also interested in matters related to reproduction. Besides his ideas on sexual reproduction and embryological development, he seems to have attempted to establish a connection between nutrition and reproduction in his description of maternal milk as decomposed blood (*GA* IV,8, 777a7 = DK 31 B 68; Longrigg 1993, p. 74).

On the other hand, the various views propounded by medical authors of the 5<sup>th</sup> and 4<sup>th</sup> centuries BCE contributed significantly to the formulation of fundamental questions about nutrition, which they viewed as being inextricably linked to human health and well-being. According to *De Vetere Medicina* 3,4 (L. I,576) the medical art has long been rooted in, and closely associated with, dietetics, ever since human beings understood that, in order for them to benefit from their nourishment, they must consume foods that are in keeping with their nature; for consuming initially, like the rest of the animal kingdom, foods that were raw and uncompounded, they endured many, terrible sufferings because of their strong and brutish regimen. Two central themes to which both natural philosophers and doctors will repeatedly recur from now on are already found here: first, the importance assigned to cooking as a means of producing qualitative change in the food – as we have seen earlier, Empedocles spoke of some sort of putrefaction of food in digestion, a term which was gradually replaced by the term πέψις (DK 31 A 77); and second the use of metaphors of dominance to describe the way in which the forceful properties of food interact with the human body – a kind of struggle between two opposite forces trying to overcome each other; besides the depiction in Plato’s *Timaeus* already referred to, cf. also *De Morbis* IV,2 (L. VII,544), Democritus DK 68 B 149, Galen *De fac. nat.* III,8 (K. II,173–174). This notion of dominance of one principle or force over the others and its association with matters of health and disease, appear in both the Pythagorean approach to health and disease in the language of opposites and harmony, and in the philosopher-physician Alcmaeon of Croton (5<sup>th</sup> c. BCE), who is said to have thought of health as the equilibrium of opposite forces in the body, and of disease as the result of the prevalence (μοναρχία) of one of them (DK 24 B 4).

As a consequence, the proportionate blending (σύμμετρος κρᾶσις) of opposite forces/qualities is now to be regarded as constituting health, internal balance and well-being in humans.

The elements or qualities contained in food were often associated with the material elements out of which the body is made up. In *De Morbis* IV,1 (L. VII,542), for example, we read that it is thanks to consumption of food and drink that the four types of fluid (ιδέας ὑγροῦ) by which the human body is constituted, blood, bile, phlegm and water (ὔδρωψ), manage to maintain their presence in the body and eventually to continue to keep it alive. *De diaeta* I,3 (L. VI,472), to cite another example, gives us an important clue: fire (which is hot and dry) and water (which is cold and wet) are pointed out as the constituent elements not only of man, but also of all creatures (including e.g. plants, seeds) – fire being understood as the principle of movement and water as the principle of nutrition. If fire and water constantly interact and mingle with each other harmoniously, then movement and nutrition should also be thought of as mutually dependent and somewhat complementary processes in the living body, allowing it to continue to grow and maintain its healthy condition. In *De Carnibus* 6 we are told that the *pneuma* associated with inhalation nourishes the heat of the heart – an idea with which Aristotle explicitly disagrees in *Juv.* (12)6 – while in *De Carn.* 13 food is said to effect growth by irrigating the body, according to the like-to-like principle.

To take stock, the key issues that receive much attention from Hippocratic writers of the 5<sup>th</sup> and 4<sup>th</sup> centuries BCE and are subsequently addressed by Aristotle in his discussion of nutrition could be summarised as follows: In these medical texts a clear distinction is drawn between the body parts involved in the multifaceted process of assimilation of food and the other parts. In several cases, the ingested food is treated as opposing or ‘attacking’ the human body; so one is often advised to exercise great caution in consuming food, if the ability of the body, in particular of the abdominal area, to overcome it is not to be impaired. Digestion brings some sort of harmonisation of food with the body by weakening its forces; only once this has been done can the nutrients be distributed (usually via the veins) to the rest of the body and be eventually assimilated. Air is sometimes discussed in light of its ability to contribute significantly to the process of digestion. The importance of excretions is also recognised, as it is generally accepted that the ingested food will not be useful (i.e. nourishing) in its entirety, and that the body possesses inherent ‘mechanisms’ responsible for clearing it of the by-products of digestion.

### 3 Aristotelianism

If an inquiry into nutrition and the nutritive soul in Aristotle's biological and psychological works necessarily requires to broaden the scope of the investigation and to consider the way in which Aristotle's own natural philosophy reacts to and interacts with other philosophical and medical theories, this is even more so when it comes to look at the Late Antique, Medieval and Early Modern reception, explanation, rethinking, and further development of Aristotle's views. For these views often leave room enough for divergent and/or conflicting interpretations and raise a number of questions that in Aristotle's works remain unanswered and therefore engender and pave the way for forms and strategies of reception, assimilation, rethinking and/or criticism that are often characterised by a high degree of originality and heterogeneity.

For this very reason it would have been impossible to offer in this volume an exhaustive picture of how the centuries-long philosophical tradition that takes its defining inspiration and reference point from the work of Aristotle and goes under the name of Aristotelianism (re)thought nutrition and all the processes that pertain to it and (re)defined the nature, properties and functions of the nutritive soul. We therefore aimed for exemplariness rather than comprehensiveness and tried to collect in the second part of this volume contributions that shed light and some fresh insights into particularly meaningful, or controversial, or until now mostly neglected accounts of the nutritive soul offered by philosophers, theologians and doctors belonging to different times as well as cultural and linguistic milieus and being part of, or being tightly intertwined with, what we define as Aristotelian tradition.

What to our eyes these accounts have in common and make them meaningful could be summed up with the key-words 'contamination' and 'theoretical challenge'. Let us start with the first key-word: contamination. The history of Aristotelianism in its different declinations – Greek (Antique and Late Antique), Medieval (Arabic and Latin), Early Modern – is first of all a history of contaminations: between different philosophical traditions (e.g. between Plato's and Aristotle's philosophy in the Neoplatonic Greek commentators on Aristotle); between different disciplines (e.g., natural philosophy and the 'medical science' as shaped by Galen); between different approaches to the very act of thinking and inquiring truth (e.g., the 'philosophical' and the 'theological'). The reception of Aristotle's account of nutrition and the nutritive soul and all the further attempts to go beyond this account while (allegedly) staying faithful to a broadly conceived 'Aristotelian' theoretical framework offer a perfect case study to better appreciate the internal dynamics of these processes of contamination for reasons that should be clear to the reader of this introduction from what has been until

now sketched. For, if Aristotle's account of the nutritive soul and, more generally, his notion of 'tripartite soul' had been developed by reacting, on the one hand, to the materialism of the Presocratic and medical Hippocratic accounts of nature, soul, body and bodily functions, and, on the other hand, to Plato's dualistic approach to the soul/body relationship and somewhat devaluating account of the appetitive soul, many Aristotelians had to face a somehow opposite challenge in dealing with questions concerning the nutritive soul. For, in rethinking Aristotle's views on nutrition and the nutritive soul, they mostly aimed (in a more or less programmatic way) to provide answers and offer accounts capable to bring these views to a higher level of coherence, perspicuity and theoretical cogency by 'contaminating' them with doctrinal elements stemming from other bodies of thought: from the Platonic and Neoplatonic theory of soul, from the Galenic theory of the 'natural faculties', from the Scholastic conception of the individual soul as substantial form.

This very process of contamination often results in a momentous theoretical challenge, and here we come to our second key-word. For reshaping Aristotle's account of the soul within a theoretical framework that integrates elements, for example, of the Platonic conception of the soul necessarily means to make an hylomorphic approach and a dualistic one interact and mingle with one another. This process of harmonisation is in some cases, and especially when it comes to accounts of the rational soul, produced by stressing some (actually or potentially) dualistic aspects of the Aristotelian theory of soul. But, when it comes to provide an account of the nutritive soul, which in Aristotle is in many respects the part of the soul in which the material and the formal aspects of the psycho-physiological processes are most tightly intermingled, this process of contamination and harmonisation turns into an actual challenge that requires theoretical solutions that in some cases prove to be highly original.

## 4 Synopsis of the Contributions

In his paper ("‘Most Natural Among the Functions of Living Things’: Puzzles about Reproduction as a Nutritive Function") **James G. Lennox** examines Aristotle's frequent claim that the nutritive and generative capacities of the soul are one and the same. This view, along with Aristotle's claim that to produce another like itself is the most natural of functions for a living thing, has been intensively debated since antiquity and has given rise to different interpretations. Lennox offers an explanation of how it is possible for the nutritive capacity, as a single capacity of the soul, to have two different functions, nutrition and repro-

duction, by paying special attention to their common goal, the continuation of being.

Besides reproduction, the nutritive soul, as efficient cause, is also responsible for growth and self-maintenance. Key questions related to this latter state, the state of being preserved as the sort of living thing one is, are seen in their proper light in **Mary Louise Gill's** contribution ("Method and Nutritive Soul in Aristotle's *De Anima* II,4"). According to Aristotle's methodological plan in *de An.* II,4, one must first investigate the objects involved in the nutritive activity in order to be able to understand the activity itself. Understanding the activity would then enable the determination of the relevant psychic capacity. Hence, Gill devotes considerable space in her paper to examining the status of food in Aristotle's theory of nutrition and discussing the notions of blood and heat at work there, while drawing at the same time on important passages from Aristotle's other works, such as *PA* and *Metaphysica* Θ.

Talking about nutritive and generative 'materials' presupposes a reference to forms, since living matter cannot occur without form. Although it is admittedly difficult to dissociate form from matter in living things, in his study ("Nutrition and Hylomorphism in Aristotle") **Richard A. H. King** uses the example of nutrition to illustrate the 'distinctness' of a living thing's form and matter, or in other words 'the work of the soul physically', a concept which he deems necessary in order to understand the basis of the hylomorphism of *Metaph.* With *de Generatione et Corruptione* I,5 as a key-text for his discussion, in which Aristotle admits that (a) matter flows and (b) form grows, King explains why the current account of growth is a promissory note for an account of nutrition, and how the growing form serves at the same time as the agent of stability for the living body.

In the light of its reproductive capacity, the nutritive soul effects the production of both the male and female generative residues, semen and menstrual fluid respectively. In her essay ("The Female Contribution to Generation and Nutritive Soul in Aristotle's Embryology"), **Sophia M. Connell** decodes those factors that render the female's contribution a 'useful' residue of nutriment different from that of the male, and elucidates the significance of the former's contribution using the example of wind eggs. Connell finally solves an ontological problem related to the female's generative capacity: how is it possible for the female nutritive soul to be at the same time the generative soul, seeing that it cannot actually generate on its own?

According to one peculiar passage in *GA* II,6 (744b27–745a10), which is put at the centre of **Andrea Libero Carbone's** investigation ("Why do not Animals Grow on Without End? Aristotle on Nutrition and Form"), nutrition and growth make use of two different 'kinds' of nutriment, one being the 'nutritive', the other being the 'growth-promoting'. What kind of food does the growth-pro-

moting nutriment constitute, and why does it stop, from some point onwards, enabling growth in certain bodily parts? What role do bones play in delimiting the growth of the entire body? In providing answers to these important questions, Carbone gives us a clear picture of the way in which Aristotle understood and described one of the most common biological functions of living beings.

Staying on the issue of growth, **David Lefebvre** (“Looking for the Formative Power in Aristotle’s Nutritive Soul”) throws the spotlight on embryonic development. Lefebvre sets out to explore the issue whether in Aristotle’s texts we can speak of a formative power in the nutritive soul, one that is responsible for the first constitution of the embryo. After investigating *de An.*, Lefebvre remarks that Aristotle makes no reference to such a power, precisely because he understands the formation of the embryo as a kind of growth. The same also holds for *GA*, in which, however, we are offered plenty of occasions, as Lefebvre stresses, to discuss issues such as matter at the beginning and at later stages of embryonic life, or the motions which initially ‘constitute’ the living being and promote growth at a later stage. Lefebvre concludes that even the evidence emerging from the study of *GA* eventually confirm the idea that in his embryologic account Aristotle remains faithful to the unity of the functions of the nutritive soul as presented in *de An.*

To what extent can Aristotle’s views on digestion and nutrition be considered as original contributions, and what concepts did he adopt from the medical tradition? These are the central questions that motivate **Hynek Bartoš**’ study (“Aristotle and his Medical Precursors on Digestion and Nutrition”), who discusses the relevant passages from the Hippocratic treatises *De Carn.* and *De diaeta* and highlights the significance of vital heat for the successful performance of the process of nutrition – a notion which Bartoš takes to be a Hippocratic relic in Aristotle’s thought. Bartoš prepares the ground for the main body of his contribution by bringing forward the correspondences between the views presented in the above-mentioned Hippocratic texts regarding the status of the brain and Aristotle’s relevant account in *PA* II,7.

Aristotle’s concept of heat occupies also the most prominent place in **Giouli Korobili**’s contribution (“Aristotle on the Role of Heat in Plant Life”), which directs the spotlight on the much-neglected subject of the role heat plays in the life of plants. While there is scholarly consensus around the idea that for Aristotle all living things, in order to maintain their lives, need, among other factors, a principle of soul and natural heat, and that plants are ensouled beings endowed with nutritive soul, one crucial question still remains obscure: What does this heat actually do inside a plant, especially considering that plants present far less complexity of structure than animals and humans? Korobili attempts to

give an answer to this question by offering an interpretation of the role of heat in the internal processes taking place throughout a plant's life cycle.

**Robert Mayhew's** contribution ("Reading and Sleep in pseudo-Aristotle, *Problemata* XVIII,7: On the Nutritive Soul's Influence on the Intellect, and *vice versa*") focuses on a key question that started very early to be debated in the Peripatetic milieu and that concerns the interaction of the nutritive part of the soul and the two other parts, especially the appetitive or perceptual part. In his essay Mayhew provides a commentary on pseudo-Aristotle, *Pr.* XVIII,7, which is especially concerned with the interaction between the nutritive part of the soul and the rational part and attempts to answer the question: "Why is it that some people, if they begin to read, sleep overtakes them even though they don't want to sleep, whereas others who want to sleep, are kept awake when they take up a book?" The complex explanations involve the effect of pneumatic movements and temperature on thought – which is somewhat surprising for Peripatetic texts, given Aristotle's account of sleep in his *De Somno et Vigilia*.

Issues concerning the relation between the nutritive soul and the other parts of the soul are also central to **Gweltaz Guyomarc'h's** essay ("Dividing an Apple. Nutritive Soul and Soul Parts in Alexander of Aphrodisias"). At first sight Alexander does not seem to draw a distinction between parts of the soul and its powers or faculties. And yet, when approaching the nutritive soul in his *De anima*, Alexander claims the powers for growing and for reproducing are both linked or "yoked" (συνέζευκται) to the power for nourishing. The question is to understand how those capacities relate to each other: are they essentially one and the same? Is the difference between them only a conceptual one? And finally and more generally: if a soul is a kind of bundle of different powers, what makes the bond between them? Guyomarc'h argues that soul-powers are not just explanations of a fundamentally unique reality. The processes at stake (nutrition, growth, reproduction) are physically different, and the related soul-powers differ in essence, but also in their activities. Additionally, there is no mysterious bond, no additional 'yoke' behind a cluster of soul-powers that would bind them: a given soul is immediately identical with its powers and it is not a power of various powers. The main criterion by which one can account for the organisation and the unification of soul parts is the teleological criterion.

With **Tommaso Alpina's** paper ("Is Nutrition a Sufficient Condition for Life? Avicenna's Position between Natural Philosophy and Medicine") we move into the field of Arabic Aristotelianism. Alpina deals with the nutritive soul by analysing the epistemological status of medicine as defined by Avicenna in his *Canon of Medicine* and the relation between medicine and natural philosophy. In providing the theoretical setting of the medical investigation in the first part of the first book of the *Qānūn*, Avicenna lists the things that the physician

must accept on authority, because their existence has been already ascertained elsewhere (i.e. in natural philosophy). Nutrition, and the nutritive soul seem not to escape this paradigm: Avicenna provides a formal account of nutrition in the *Kitāb al-nafs* (Book of the Soul, i.e. the psychology of the *Kitāb al-Šifā'* [Book of the Cure]), and a mechanical account of it in the first book of the *Qānūn*. Alpina's paper raises the questions, whether it is really indisputable that the mechanical account of nutrition provided in medicine is subordinated to its formal account in natural philosophy and whether the treatment of the psychic faculties in the *Kitāb al-nafs* is the theoretical ground for the medical investigation devoted to them in the *Qānūn*.

A key-thinker of Latin Aristotelianism is object of investigation of **Martin Klein**, whose contribution focuses on "Digestive Problems: John Buridan on Human Nutrition". Medieval thinkers agreed that the human soul, being the substantial form of the body, is immaterial and yet the principle of fairly material operations. But how to make this plausible was particularly problematic in case of nutrition. For, how can food be substantially converted into the body as composite of matter and immaterial form? And how can an immaterial soul process such a material operation? These questions are particularly pressing for John Buridan, who identifies nutritive powers with the soul. In his paper Klein argues that Buridan conceives of nutrition as a merely material change, a view which is in line with his broader conception of substantial generation and the relation between a substantial form and its coming to existence in suitably disposed matter. Ultimately, the way in which Buridan accounts for nutrition turns out to be another example of a rising dualism between body and soul, pointing to developments some centuries later which will render substantial forms superfluous.

**Christoph Sander's** paper ("Magnetism and Nutrition. An Ancient Idea Fleshed out in Early Modern Natural Philosophy, Medicine and Alchemy") aims to trace the complicated history of two intertwined concepts, 'nutrition' and 'magnetism', which were closely related to each other in pre-modern times but appear to be unrelated from a modern perspective. Then, the concepts of 'specific attraction' and 'dispositional self-movement' were regarded as crucial to understanding the powers of a magnet and a living body. By uncovering the historical origin(s) of the relation between nutrition and magnetism, its rationale, its subsequent transformation and its dissolution, the historical concept of 'nutrition' will come into sharper view from the perspective of the history of ideas. At the same time, from the perspective of the philosophy of science, Sander's study presents a test case scenario for discussing the importance of analogies in the formation of scientific theory.

In her contribution (“From Food to Elements and Humors. Digestion in Late Renaissance Galenism” **Elisabeth Moreau** aims to explore the early modern reception of the Galenic theory of digestion in a major treatise on theoretical medicine: the *Physiologia* of the French physician Jean Fernel (c. 1497–1558). In his works, Fernel aimed to concile Galenic medicine and Aristotelian natural philosophy with the Platonic account of Marsilio Ficino in order to enhance the divine origin of life and the soul. Moreau’s essay examines Fernel’s explanation of digestion from both angles. First, she looks at his application of the Aristotelian theory of elements and mixture to digestion as a transformation of nutrimental matter. Second, she appraises the influence of Platonic philosophy on Fernel’s interpretation of nutrition as a vital function directed by the soul, particularly its relation to occult qualities and the total substance. Special attention is also paid on food ‘concoction’ as a process of fermentation and coagulation. As argued by Moreau, Fernel explored these themes by synthesising the philosophy of Galen, Aristotle, and Avicenna and, just like other Renaissance Humanists did, by appraising medieval Latin-Arabic texts in light of ancient sources.

A very interesting perspective from which one can get new insights into the Medieval and Early Modern Aristotelian views on the nutritive soul is that investigated in **Bernd Roling**’s paper (“Standstill or Death. Early Modern Debates on the Hibernation of Animals”). Albertus Magnus in his commentary on the *Parva Naturalia* was maybe the first philosopher and naturalist to deal with the question of the hibernation of animals: How is it possible that nutrition of many creatures seems to be interrupted, but animals like bears or martens nevertheless continue to live and regain completely their vital energies in spring? Albert developed a model, with a kind of closed nutritive system in its centre, that became quite attractive for later natural philosophers. In Italy *physici* like Fortunio Liceti were debating Alberts ideas, later on especially the famous Danish polyhistor Ole Borch wrote a large treatise on the problem. Roling gives a survey of the debate, summarised by the encyclopaedical work of Karl von Bergen in 1752, taking the continuity of Aristotle and Galen in early modern medicine and zoology as starting point.

With **Andreas Blank**’s contribution (“Antonio Ponce de Santacruz on Nutrition and the Question of Emergence”) we get into the field of Late Aristotelianism and get a look at how medical and philosophical traditions interact in a thinker like Ponce de Santacruz in dealing with questions concerning emergence and emergentism. Some scholars have argued that emergentism was clearly articulated in some ancient thinkers, including Aristotle, Galen and the Aristotelian commentators Alexander of Aphrodisias and John Philoponus. There is also a consensus that this view left some traces in medieval and Renaissance thought, often complicated by theories of celestial causation, only to fall into oblivion

after the Pomponazzi affair up until the advent of the nineteenth-century British emergentists. The paper argues that this narrative can be challenged, and that emergentism remained a viable option in early seventeenth century. In particular, Blank argues that emergentist intuitions play a role in the discussion of nutrition in the natural philosophy of Antonio Ponce de Santacruz, royal physician to the Spanish king Philip IV.

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