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The Medico-*oikonomik* Model of Human Nature in Bryson's *Oikonomikos*

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Abstract

In this paper, I argue that Bryson's *Oikonomikos* is a fascinating example of the *oikonomia* genre in several different respects. Although the problematic transmission of this Neopythagorean text makes studying it a challenge, such effort is well-rewarded with an elaborate argument which paints the human bodily constitution, the central bodily functions and *oikonomic* activities as intrinsically linked. Focusing on Bryson's argument which roots *oikonomic* behaviour in human biology, I explore the underlying conceptualisation of human nature and contextualise it within relevant philosophical and scientific traditions.

Keywords

Bryson – *oikonomia* – Neopythagoreanism – medicine

1 Introduction

The *Oikonomikos* of Bryson, a Neopythagorean philosopher, is a text rarely discussed in the scholarship on ancient philosophy.¹ While the complicated transmission of the text is undoubtedly partly to blame, Bryson discusses topics that are, in general, rarely found together and are not readily associated with the Neopythagorean tradition in particular: household management and

¹ A major recent study is Swain 2013. See also Wilhelm 1915, 164–8; Natali 1995; Dutsch 2020, 148–52.

human physiology.² In general, the Neopythagoreans are known more for their theories of the soul than for those of the body.³ However, the interest in both physiology and *oikonomia*, household management,⁴ is certainly present in their texts too, with some significant precedents in the broader Pythagorean tradition. Bryson's *Oikonomikos* is an especially notable example of how the Neopythagoreans adopted this genre. The treatise not only has the standard title; it is also structured according to the standard preoccupations of the genre.

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- 2 It was perhaps this point that led to Swain's suggestion (2013, 34) that Bryson's use of pseudo-Doric is the only feature of the text identifying him as a Neopythagorean. In this paper, I explore the Neopythagorean interest in physiology and medicine, arguing that Bryson's preoccupations are not as unique as they might seem. For the purposes of this paper, I use the term 'physiology' neither in the modern sense of the clinical discipline nor in the ancient sense of philosophical *phusiologia* (for which see Nutton 2012, 28–31), but simply as a shorthand for denoting ancient theories and explanations of the vital functions of the body, especially nutrition, respiration, and reproduction, just as, for example, in Debru 2008, 263.
- 3 Holger Thesleff suggested separating the Neopythagoreans into two groups, depending on the topics of their writings. He distinguished between what he considered to be the Late Hellenistic Pythagorean tradition (emblematised by pseudonymous works) and the first-century BCE figures (who used their own names), as the difference between them 'can on the whole be noticed in the subjects dealt with, as well as in the manner of approach and the language and style' (Thesleff 1961, 8; see also pp. 51–7). It is certainly true that the members of the first group are renowned for metaphysics (see John Dillon's discussion of Moderatus of Gadara and Numenius of Apamea and others on the soul, emanation, and theology in 1977, 341–83; Bonazzi 2013 and 2013a on Eudorus; Trapp 2007; Horkey 2021). However, if we accept Swain's convincing argument that Bryson very likely belonged to the first century CE (2013, 32–4), then Thesleff's chronological distinction collapses. Furthermore, even among the pseudonymous Neopythagoreans, the extant evidence shows a dominant interest in cosmology and metaphysics. Thesleff's list of their works includes titles on *oikonomia*, ethics (Callicratidas, Bryson, Pythagorean women's letters (Pomeroy 2013; Dutsch 2020)), and the art of governing (most notably, Diotogenes' *On Kingship*; see Roskam 2020), but many of the titles indicate a connection to metaphysics: topics such as numbers, harmonic proportions, and various aspects of the nature of the soul occur often. See Thesleff 1961, 8–24. In this paper, I argue that Bryson's project is genuinely outstanding and shows a rarely noted interest in physiology among some of the pseudonymous Neopythagoreans. In this respect, Bryson has some affinities with the broader Pythagorean tradition, some of which are noted below. For more recent studies of the Pythagorean tradition overall, see Kahn 2001; Zhmud 2012; O'Meara 1989; Burkert 1972; the papers collected in Huffman 2014; Horkey 2013.
- 4 *Oikonomia* is quite different from economics. As Moses Finley 1973, 21 famously argued, the latter did not exist at all in the ancient Graeco-Roman world. The former is concerned not with market relations, but with the running of the household and a variety of ethical questions that this task entails. See Helmer 2020, 34–8 for a more detailed discussion of distinctions between the two. Although the genre of *oikonomia* is primarily associated with such writers as Xenophon, by the early imperial period it was well-incorporated into the philosophical curriculum. O'Meara 2020, 199; 201–2 points out that Platonists of this period adopted an Aristotelian-inspired division of practical sciences into ethics, *oikonomia* and political philosophy.

It presents a discussion of property (its acquisition, preservation and expenditure) and then moves on to the discussion of the proper treatment of one's servants, wife and (male) child, thus covering all the ground typical of *oikonomia*. Furthermore, one of the key arguments in the treatise is the account of inexorable co-dependence of all crafts, a notable contribution to the genre. A closer look at this *Oikonomikos* reveals that it is also strikingly unusual: the very beginning of the treatise contains an account of human physiology, while the *oikonomikos logos* is interwoven with extensive, and often quite technical, medical claims. This naturally leads to the question of motivation. Why was Bryson discussing physiology in a treatise dedicated to household management? How can medicine, a complex expert field of knowledge, be useful in explaining the principles of this seemingly familiar and even mundane area? In this paper, I analyse how Bryson combines the two knowledge domains and, situating the text in his most immediately scientific context, argue that he produces a genuinely unique medico-*oikonomic* account of human nature.

2 Transmission in Bryson Arabus

Stobaeus' doxographical collection preserves two fragments from Bryson's *Oikonomikos*: one describing the chain-like interdependence of crafts and another dealing with slavery in the household. Although these two fragments are not much to go on, the treatise also survives in full in Arabic translation, in the manuscript Cairo, MS Dār al-kutub, Akhlāq 290 Taymūr. Since we are dependent on the Arabic translation for the vast majority of the text preserved, the question of the reliability of this translation is key. Martin Plessner has argued that the translator into Arabic epitomised and reordered the work,⁵ but Simon Swain has shown that Plessner's evaluation of the text is not entirely accurate.⁶ In his recent translation and commentary on Bryson Arabus, Swain convincingly demonstrates that there is little need for concern about the translator's accuracy. He compares the extant Greek fragments with their Arabic translations and finds that, while the translation is not literal, minor glosses and some rephrasing are used only to render the translation into more idiomatic Arabic; in general, the translator took care to preserve Bryson's original ideas.⁷ Given Swain's thorough analysis, it seems safe to conclude that Bryson Arabus is, overall, a good source for understanding the treatise. It would, of course, be

⁵ Plessner 1928, 10.

⁶ Swain 2013, 113; see also pp. 95–104.

⁷ Swain 2013, 112; see also p. 32 and p. 96.

unreasonable to read it as a literal translation, but there is no reason to suppose that it is a problematic source in terms of studying the themes, emerging overarching structure of the argument, and concepts that it mentions.

3 Household Management in Pythagorean Traditions

The original Greek text was composed in the Late Hellenistic or, more likely, early Roman imperial period;⁸ the title of the treatise clearly indicates the association with the *oikonomia* tradition, exemplified by Xenophon's *Oikonomikos*, Aristotle's *Politics* Book 1, and others.⁹ Although housekeeping tips and financial management are not the first things that come to mind when thinking about the Neopythagoreans, both this tradition and Pythagoreanism at large have some associations with the *oikonomia* subgenre of philosophical ethics.¹⁰ The Pythagorean communities in Croton, although certainly not extant by the time this text was composed,¹¹ provide anyone identifying as a Pythagorean with a certain authoritative pedigree in these matters. Various practical teachings attributed to Pythagoras also provide his followers with an authoritative reputation in matters concerning household management. It is quite clear that the Neopythagoreans embraced this reputation. Stobaeus' collection alone cites from several treatises. It is also worth noting that the treatises whose main occupation is emphatically not *oikonomia* can yet contain pertinent elements. Most notably, Ps. Ocellus Lucanus' *On the Nature of the Universe*, a work that focuses on metaphysics, has a section on the management of personal affairs, including the claims that are typical of the *oikonomia* genre.¹²

8 Swain 2013, 32–4.

9 See Helmer 2020, 38–42 for a survey of the *oikonomic* corpus.

10 See Helmer 2020 for the argument that *oikonomia* does make up a distinct subgenre of philosophical thinking from the Classical period onwards.

11 Diogenes Laertius 8.45–6 reports that the community persisted for nine or ten generations and provides Aristoxenus' list of the last Pythagoreans. See also Iamblichus, *Life of Pythagoras* 251. See also Zhmud 2012, chap. 4.

12 Ps. Ocellus, *On the Nature of the Universe* 4.6 urges against choosing a wife for her riches and status. The same advice is in Bryson Arabus (Swain §85–7). Similarly, Ps. Ocellus mentions the necessity of proper diet and exercise for both boys and girls (4.10), although in a fairly laconic fashion: ὅθεν δεῖ τοὺς παιδᾶς καὶ τὰς παρθένους ἐν γυμνασίοις τε καὶ καρτερίαις ταῖς προσηκούσαις τρέφειν τροφήν προσφέροντας τὴν ἀρμόζουσαν φιλοπόνῳ τε καὶ σώφρονι καὶ καρτερικῷ βίῳ. The extensive discussion of regimen in Bryson is much longer (see the discussion in section 4 below), but it is quite clear that Ps. Ocellus only alludes to the kind of ideas that Bryson elaborates.

The number of these texts is large enough to raise the question of the common ground and shared assumptions/principles—in other words, the question of what is distinct about the Neopythagorean way of managing a household. If the only material we had to consider was Stobaeus, the answer would be ‘not much’. The Neopythagoreans are cited together with famous playwrights and philosophers, including Euripides, Theophrastus, and Plutarch, and, by and large, the Neopythagoreans blend in well.

The topics they address and the motifs they use are hallmarks of this genre. For example, in the fragment from the treatise *On Woman's Harmony*, attributed to a Neopythagorean Perictione, the wife is urged to think nothing of herself while preserving and protecting the marriage bed.¹³ The argument echoes Ischomachus' instruction to his young wife to be the guardian of the *oikos* in Xenophon's *Oikonomikos*.¹⁴ Callicratidas, another Neopythagorean philosopher whose work also survives only in excerpts preserved in Stobaeus' collection, engages with the Aristotelian tradition and argues for male dominance in the household as a guarantee of familial happiness.¹⁵ Bryson's fragment classifying slaves also has an Aristotelian predecessor.¹⁶ The impression of uniformity, however, could be the result of Stobaeus' editorial work, rather than an accurate reflection of Neopythagorean engagement with the genre.¹⁷ Bryson's *Oikonomikos*, especially if studied not only through the surviving Greek fragments but also through the translation of the whole treatise into Arabic, shows more multi-faceted interests.

4 Bryson's Argument

Bryson Arabus is, in some ways, a peculiar text. The overall structure of the work is quite typical of the genre. The *Oikonomikos* is divided into four parts: beginning with a discussion of the proper management of goods (which involves acquisition, preservation and expenditure of wealth), Bryson moves on to discuss the proper treatment of servants and slaves, the criteria for selecting a

13 Stobaeus 4.28.19 W=frg. 1.3 Dutsch, p. 229.

14 Xenophon, *Oikonomikos* 9.14.

15 The key background here is Aristotle, *Politics* 1252a26–31. See Dutsch 2020, 140; 145–8; Moraux 1984, 605–78.

16 Aristotle, *Politics* 1.1255b1–40. See also the Stoic claim about three types of slavery reported in Diogenes Laertius 7.121–2. For discussion of the originality of Bryson Arabus' account, see Swain 2013, 257–69.

17 Although Stobaeus' work is useful for studying Neoplatonist engagement with the genre. See O'Meara 2020, 201–2.

wife, the virtues the wife ought to possess and, finally, the treatment of the male child. But whereas authors writing in this genre prominently use the comparison between the *polis* and the *oikos* to describe the proper management of the latter, Bryson does so by comparing the *oikos* to human physiology. The comparison is also far from superficial: Bryson consistently uses medical motifs throughout the treatise as an *explanans*, often referring to fairly technical anatomical knowledge and complex medical concepts. To some extent, the elements of his project might seem familiar. For example, the fact that the term *oikonomia* can be used to refer to all kinds of management, including the order of the universe and the principles of nature, has been pointed out by Carlo Natali.¹⁸ Modern research into ancient language and literature has long recognised the use of the body as a model for discussing organisational principles.¹⁹ At the same time, the sum of these elements, along with the argument as a whole as transmitted in Bryson Arabus, are remarkably unusual. The text not only makes a fairly large number of sophisticated medical references but also seamlessly interweaves these references into an *oikonomic* argument. And, if the *oikonomic* aspects of Bryson's work received little attention, the references to physiology have hardly been explored at all.²⁰ In order to appreciate how wonderfully odd this multifaceted argument is, we need to start by unpacking the medical claims he makes and clarifying the concepts he uses.

5 Medical Claims in Bryson

In the section dedicated to the child, Bryson Arabus advises against giving alcohol to the boy, with the following explanation: '... if wine tends to alter the minds of men of experience in life and lead them to foolishness, irascibility, bad thoughts, insolence, and reckless behaviour, with a boy this is even more likely because the brain of a boy is in addition delicate and the vapour of the alcohol quickly corrupts it because of its power over it.'²¹

The fact that this passage names the brain specifically as the organ associated with mental functions is certainly significant, but it raises some questions

18 Natali 1995, 97–9.

19 See Sluiter 2010, 30–3; it is also noteworthy that the rest of the article looks at Galen's comparison of the two in particular. As shown below, there are some interesting similarities between Galen and Bryson Arabus, so Galen's conceptualisation of linguistics in medical terms is helpful for identifying the relevant tradition and contextualising Bryson Arabus appropriately.

20 Swain deals with them briefly (2013, 230–2).

21 Swain §131, tr. Swain.

too. On the one hand, this claim clearly has a strong affinity to the encephalocentric (as opposed to cardiocentric) position in the Hellenistic medical debate on the identity of the *hēgemonikon* in the body.²² On the other hand, there is some extant evidence suggesting that the Pythagoreans also assigned this role to the brain. However, as Heinrich von Staden has noted, the evidence is 'flimsy and problematic'.²³ While Bryson may have been invoking some older Pythagorean claims, it seems more likely that he was (possibly at the same time) referring to the discovery of the brain's anatomy in the Late Hellenistic period—which, after all, would have been a more immediate background to his work. The Alexandrian doctors, especially Herophilus, discovered by dissection that the brain is responsible for voluntary motion and perception, which had a profound effect on medicine.²⁴ The dissections of Herophilus were famous, and it is hard to believe that anyone writing about the brain as the seat of the soul in the early Roman empire would not be aware of them or their importance. In fact, Bryson might have been killing two birds with one stone: both invoking the authority of ancient Pythagoreanism and showing

²² See Rocca 2003, 31–42 and the extensive study in Gill 2010.

²³ von Staden 1989, 155, p. 48. von Staden seems to have a point: of the two fragments that he cites, one is Alexander Polyhistor (Diogenes Laertius 8.30) who was active in the first century BCE, around two hundred years after Herophilus. Another one is an alleged citation from Philolaus' *On Nature*, but from a late and problematic source, Ps. Iamblichus' *The Theology of Arithmetic* (Most and Laks D26). Huffman's thorough discussion in 1993, 307–14 shows that the passage does not show signs of being written after Plato or Aristotle and could be a genuine fragment of Philolaus. This discussion primarily concerns the broad conceptualisation of psychological models used in the fragment and does not address the possibility that the reference to the brain could be a post-Hellenistic interpretation. This kind of interpretation can be quite subtle and not a matter of anachronistic attribution, as in the case of Aëtius' (4.5.14 Mansfeld and Runia) claim that the ruling part is in the head according to Pythagoras. The view is in fact Platonic in origin. See Huffman 2014a, 275 for Aëtius' tendency to attribute Platonic views to Pythagoras; for the Pythagorean views in Plato, see Horky 2013, esp. chap. 5. In this case, a comparable case is Calcidius' report of the dissection of the eye by Alcmaeon, which makes use of the anatomical information made available by the Herophilean discoveries. See Lloyd 1975, 115; Mansfeld 1975; von Staden 1989, 238. Philolaus' fragment may have undergone similar treatment (see Rocca 2003, n. 38), but even if it did not, the precise knowledge of the nervous system provided by the Herophilean discoveries must have coloured the way in which the claim was read from the Hellenistic period onwards.

²⁴ See the seminal study of von Staden 1989, esp. 155–60; 247–58. This claim is consistent with Swain's argument that the text was most likely produced in the early Roman imperial period.

that this thought is in sync with (or even precedes) cutting-edge scientific discoveries, thus invoking the authority of both.²⁵

The claim about alcohol vapours having ‘power’ (*quwwa*, gr. *dunamis*) over the brain shows that Bryson Arabus is in conversation with more than just the Pythagorean tradition. The terminology and the phrasing are very similar to the language in Galen’s *That the Capacities of the Soul Follow the Mixtures of the Body*, in which he argues that food and drink affect the soul through bodily mixtures, that is, they have ‘capacity’ (or ‘power’) to affect the soul.²⁶ Galen postdates Bryson by at least a few decades,²⁷ but striking similarities in their terminology and theories indicate that the latter must have been aware of contemporary medical discourses.

Having said that, it is also important to acknowledge that Bryson Arabus does not go so far as to make his treatise medical. He does not, for example, discuss actual brain anatomy, as medical authors do.²⁸ While it is not unexpected for a work entitled *Oikonomikos* not to engage in actual anatomy, this is nonetheless an important clue about how medical knowledge is used in this text. The aim appears to be to imply complex medical knowledge without actually

25 See Sluiter 2010, esp. 49–50 for the argument that there is a change in how medical authors represent their discipline in relation to other fields of knowledge (especially, although not exclusively, to grammar) from the third century BCE to the Second Sophistic, and that, by the time of Galen, they show more awareness of their own prestige.

26 The similarity allows us to recognise the formulation in Bryson Arabus as distinctly medical. For the illnesses caused by the humoral vapours, see *Causes of Symptoms* 2.7.2 (7.202–4K); for the capacities of humours, see *The Distinct Types of Disease* 12.2 (6.875K). Furthermore, it offers a glimpse into how Bryson was positioning himself in contemporary debates. Galen’s treatise is highly polemical, discussing a variety of alternatives (as well as different formulations) of the view that the capacity follows the mixture, rejecting them all, except his own, which is allegedly in agreement with Hippocrates too (for Galen’s argument, see Havrda 2017; Singer 2013). Although Bryson is not explicitly polemical, a comparison with Galen reveals that the position Bryson espouses is a part of a heated debate and by adopting it, he was indirectly engaging in polemics.

27 The relationship between Galen and the Neopythagoreans in general is very underexplored; it is not immediately obvious whether a treatise like *Oikonomikos* could have been read by Galen or if (perhaps more likely) the two just belonged to the same medical cultural *milieu*.

28 See also Herophilus’ claim that the ruling part is in the *koilia* of the brain or Erasistratus’ claim that it is in the *epikranis* (Aëtius 4.5.4–5, Mansfeld and Runia). Such descriptions appear to be just a shade too technical for Bryson Arabus, unless we accept Plessner’s suggestion that Bryson Arabus is an epitome. However, Swain’s arguments against this interpretation (see n. 6) seem to be decisive. Furthermore, there is no reason to expect detailed anatomy in the work that explicitly presents itself as belonging to the genre of *oikonomia*.

burdening the readers with tedious details. It would be unfair, however, to conclude that Bryson Arabus engages with the medical tradition only sporadically. Apart from the specific references to the brain, this part of the treatise closely resembles certain medical texts. The extensive advice on how to raise the (male) child could easily be read as one of the treatises on regimen.²⁹ Every single aspect of the child's life is managed in Bryson Arabus: food, drink, activities, exercise, sleep schedule.³⁰ Many of the claims resemble Galen's discussion of the ideal regimen for a child with perfectly balanced bodily mixtures in his *On Hygiene* or Athenaeus' extensive advice on child-rearing preserved in Oribasius.³¹

Another extensive medically informed discussion section can be found at the beginning of the section on the wife, discussing embryology. Like the section on a young boy's regimen, this section also closely resembles medical discussions of the topic. The passage states that the divine creator made people mortal,³² thus causing them to procreate.³³ Bryson Arabus explains procreation in reference to the elemental theory. It is the result of the union of heat and moisture, and these two elements constitute a kind of self-sufficient system as follows: 'development, growth, and movement cannot occur without heat. Imprinting and formation in accordance with a variety of sizes and shapes cannot occur without moisture.'³⁴ In assigning the passive role to moisture and the active role to heat, Bryson Arabus follows a fairly standard

29 The claims that Bryson Arabus makes do not seem to fit any of the extant works in a way that would allow speculating about sources (in other words, there is no significant overlap with claims in other sources).

30 An interesting comparison is the pseudepigraphic letters of the Pythagorean women philosophers. Although much shorter in length, their writings on the regimen for children also adopt and adapt medical knowledge. As Dorota Dutsch has recently argued, the comparison with medical texts on nursing shows that the Pythagorean women's letters do not imitate the advice found in the extant contemporary medical texts (especially Soranus), but there are broad similarities in the main preoccupations and motifs. See Dutsch 2020, 185–93.

31 Galen, *Matters of Health* 1.6.4–6 Koch (6.29–30K); Oribasius, *Medical Collections* 39 (138, 18–141, 9 Raeder); the significant background is Hippocratic dietetics, for which see Bartoš 2015.

32 This is a reiteration from the opening of the treatise, where the Creator is said to have made humans mutable and ceasing. See Swain §2.

33 This is a relatively common claim, found both in Plato (*Symposium* 207c–208b) and Aristotle (*On the Soul* 2.4, 415a29).

34 Swain §77, tr. Swain.

treatment of the elemental theory, often associated with Aristotle,³⁵ although found in Stoic physics as well.³⁶

It is worth noting that such a position echoes some motifs from the early Pythagorean tradition too. A fragment of Philolaus preserved in Anonymus Londinensis describes a human fetus as being made of heat (the passage is cited and discussed in section 8 below). Unlike Bryson Arabus, however, this fragment does not mention the gender differentiation on the elemental basis. That claim in Bryson Arabus seems to be distinctly Aristotelian in origin. This is not to say that Bryson necessarily positioned himself against Philolaus. It is entirely possible for a Neopythagorean like Bryson to supply Aristotelian details to the originally Pythagorean account, ultimately reading both accounts as consistent.³⁷ The account of conception in Bryson Arabus could very well be indebted to both traditions.

While acknowledging the significant Aristotelian influence, it is also worth noting that there is a small but significant difference between these predecessors and Bryson's account. In the former accounts, the passive-active interaction is typically modelled on the craft analogy, with the active element corresponding to the role of the creator and the passive one to the inert matter.³⁸ According to Bryson Arabus, the heat causes 'dissolution and destruction' of moisture.³⁹ The active nature of heat is thus neutral: in some circumstances, it is generative, in others it is destructive.⁴⁰ For generative outcomes, the proper amount of moisture is needed, and this claim paves the way for explaining why two genders are needed for conception. Bryson Arabus goes on to explain that 'The strength of each of these two in a single body is insufficient for the child to come to be. For this reason, the child arises from male and female. For in the male heat is stronger, while in the female moisture is greater.'⁴¹ The account is very succinct, but little speculation is needed to fill

35 *On Generation and Corruption* 329b23–25; *Meteorology* 378b10–26.

36 Nemesius 164,15–18=SVF 2.418=LS47D; Plutarch, *Against the Stoics on Common Conceptions* 1085C–D=SVF 2.444=LS47G.

37 The Aristotelian views that Anonymus cites were likely from the medical work of Aristotle's pupil Meno mentioned in Galen, *Commentary on Hippocrates' Nature of the Human Being* 1.2.26 Mewaldt (15,25K). See Huffman 1993, 291–2. The Hellenistic influences, especially the Stoic ones, might also be pertinent; on the Stoics and the Neopythagoreans, see n. 58 below.

38 Broadie 1987.

39 Swain §78, tr. Swain.

40 The destructive aspect of heat is also discussed at the beginning of the treatise when explaining why humans need regular nourishment; this passage is discussed in section 6 below.

41 Swain §78, tr. Swain.

in all the relevant details. Both male and female contain heat and moisture, but heat is more prevalent in the male and moisture is more prevalent in the female; owing to this prevalence, neither can produce an embryo without the other. The heat in the male would 'dry up' the embryo, thus preventing it from growing, and the prevalence of passive moisture in the female would prevent the initiation of sufficient growth to begin with.⁴²

There is a recognisable influence of Aristotelian embryology;⁴³ at the same time, Bryson's emphasis on the co-dependence of the elements for the maintenance of vitality leads to a more nuanced conceptualisation of the gender roles in conception. In some respects, his claims here are closer to Galen, who, while also maintaining the passive-active distinction of the gender roles, also argues that female passivity has a distinct role without which conception would not be possible.⁴⁴ The fact that Bryson is closer to Galen than to Aristotle shows not only an interest in engaging with medical accounts but also awareness of the recent innovations and discoveries in medicine. Bryson Arabus refers to discoveries and theories that were innovative and fashionable in the Late Hellenistic and early Roman imperial periods.

So far, my discussion has concerned specific references, but Bryson Arabus does not merely sprinkle medical references in a few places in his exposition of household management. The medical claims in Bryson are numerous and well-integrated into the central *oikonomic* discussion. They often serve as a point of reference for explaining or illustrating some *oikonomic* phenomenon. Bryson Arabus draws several analogies between the *oikos* and the body, ranging from an almost tongue-in-cheek comparison between poor investment and indigestion (Swain §37) to an elaborate analogy between the economic growth/decline of the body and the *oikos* (Swain §33–4).⁴⁵ But the most

42 Swain §77–9.

43 For a major study, see Connell 2016.

44 Lo Presti 2014 argues that the key difference between Galen and Aristotle in embryology is their respective conceptualisations of *dunamis*, with the former offering more of a 'two active powers' model and the latter establishing the strong contrast between the active and the passive powers. The gender roles in Bryson Arabus are very close to the former, as feminine moisture and masculine heat procreate co-dependently.

45 See also Swain §61–2, where Bryson Arabus compares servants/slaves with different limbs and organs of the body. Those who manage the *oikos* are said to be like the senses, through which one knows what is harmful and beneficial (the formulation is very common in Galen, although he uses this phrase in reference to vegetative capacities rather than animal sense perception; see *My Own Doctrines* 15,7–9 Boudon-Pietrobelli, 189–90, and the discussion in Wilberding 2014). Those who serve are said to be like hands, fetching what is useful for the body, while those who labour are compared to legs, because the entire body rests on them. Bryson Arabus concludes that servants ought to be protected like limbs.

elaborate one can be found at the beginning of the treatise. This is perhaps not surprising, as the beginning is the programmatic part of many treatises.⁴⁶ Bryson Arabus starts his work with a discussion tying physiology and *oikonomia* into a single multifaceted but coherent account of human nature.

6 The Body as the *oikonomic explanans*

At the beginning of the treatise, having stated that estate consists of four elements (property, servants, the wife, and the child), Bryson Arabus expounds a theory of human physiological functions, focusing especially on nutrition. The theory posits the claim that the human is made ‘wanting, mutable, and ceasing’,⁴⁷ and, for this reason, the divine creator provides him with capacities (*quwwa*).⁴⁸ The capacities, located in body parts, are five in number: the one which attracts to each body part what is useful to it from food in proportion (*‘alā maqādīr*)⁴⁹ to what it needs; the one which changes the food into the body part; the one which retains, in the form of fluid, what is useful; and the one which expels the material which is foreign to the nature of the body part; and, finally, the one which allows a body part⁵⁰ to grow in height, breadth, and volume until it is in proportion (*‘alā maqādīr*) with the rest (Swain §3–4). This scheme also has a parallel in medical texts, and quite a close one: an almost identical theory can be found in Galen’s *On Natural Faculties*, except that the latter discusses the first four capacities, not mentioning the growth capacity at all.⁵¹

46 Although, of course, not universally. This is not a common feature in the fifth- and sixth-century CE medical writings, as van der Eijk’s survey shows (1997, 113–15).

47 Swain §2, tr. Swain.

48 Most likely a translation of Greek *dunameis*. Such a translation is supported by the close similarity between the formulation of this theory in Bryson Arabus and Greek medical texts, especially Galen, which talk about *dunameis* in such contexts. The similarity between Galen and Bryson is discussed later in this section.

49 Several Greek terms can be translated this way, but in Greek medical works the expected term would be *summetria* and its cognates. For example, Galen, *Matters of Health*. 1.2.13–15 Koch (6.6–7K).

50 On the basis of consultation with Elvira Wakelnig, I take it that the object in this case is the ‘body part’, rather than the ‘body’ (as in Swain’s translation). Such a choice seems preferable not only because it reflects the repeated formulation but also because ‘body part’ seems to be the more likely object.

51 See also n. 19 above. Although the *dunamis*-based account of bodily functions goes back ultimately to Aristotle (*On the Soul* 2.2, 413a20–b25), the formulation in Bryson Arabus closely resembles the Galenic formulation. This naturally invites the speculation that the beginning of Bryson’s treatise was rewritten in light of the influence of Galenic medicine.

Noting that these are just *some* of the capacities provided by the creator, Bryson Arabus moves on to explaining the constitution of humans which renders them ever-changing and ever-wanting. The human is constituted of two elements: heat and moisture. Invoking the descriptions which are fairly common among the advocates of the four-element theory, Bryson Arabus calls the heat active but destructive, and moisture passive but nourishing. The heat enables motion (which is, of course, the essential aspect of animate life), but owing to its destructive nature, the human body is constantly undergoing dissolution. The lost material has to be replaced by nourishment (Swain §6).⁵² These claims share most of the assumptions with the passage on embryology discussed above: there is a noticeable Aristotelian influence when it comes to the description of the elemental properties, but there is also a notable emphasis on the co-dependence of heat and moisture which ultimately creates a cycle of activity. In the next few sentences, this very recognisably medical theory turns into an *oikonomic* account of human nature.

Bryson Arabus goes on to say that the body is not homogeneous and different parts require different nourishment (Swain §7). Different types of nourishments come from various plants and animals, and these in turn require different types of crafts to raise them (Swain §8). And, although all humans have the capacity to discover the arts needed for animal and plant cultivation, an individual's life is too short to learn them all (Swain §10). These two premises lead to a conclusion that communal life, wherein a number of people practise different crafts, is a necessity for an individual's survival.

The need for communal existence is then reinforced with the argument that the crafts are intertwined and co-dependent, making people form communities and live together, exchanging the fruits of their labours (Swain §12–14). The argument moves on to the fairly standard topics of the *oikonomia* genre, that is, the need-driven exchange of produce and the invention of money,⁵³ followed by a detailed discussion of the three standard *oikonomic* processes: acquisition, preservation, and expenditure or use of wealth.⁵⁴ In this way, the

However, Swain 2013, 231 argues convincingly that Bryson's account must precede Galen. Bryson's original Greek treatise might have been an influence on Galen, but not vice versa; in any case, the examination of the exact relation between the two is outside the scope of this paper. For the purposes of the current work, the comparison between Bryson Arabus and Galen serves to demonstrate that the theorisation of human physiology we find in the former is a recognisably medical account, comparable to what we find in the works of actual doctors.

52 See Galen, *Matters of Health* 1.3.1–2 Koch (6.7K).

53 Aristotle, *Politics* 1.9, 1257a24–6.

54 These are the cornerstones of the genre. See the extensive discussion in Helmer 2020, 119–76.

biological exposition of the human body grounds the *oikonomic* exposition of the nature of communal living and exchange. This aspect of the argument is hardly ever discussed in the scholarship on the text, but is nonetheless a truly remarkable confluence of medical and *oikonomic* discourses.

The part of the argument concerning the co-dependence of the crafts also survives in a Greek fragment, and the terminology in this passage sheds some light on the kind of conceptual apparatus used in the original Greek version of the treatise. The interdependence of all the crafts is explained as follows:

Οὕτως ἔχει ποτ' ἄλλαλα τάνθρώπινα πράγματα καθάπερ καὶ τὰς ἀλύσιος τοὶ κρίκοι. τήνοί τε γὰρ ἐξ ἀλλάλων ἄρτηνται ἀλλάλους τ' ἀκολουθοῦντι, καὶ ἐνός ἐξ αὐτῶν ἔλκυσθέντος ὁποῖου δὴ ποκα τό τε ὅλον καὶ τὰ ἐξ ἀρχᾶς ἀκολουθεῖ· καὶ τῶν τοῦ βίου δὲ πραγμάτων ὅποια ἂν βούλη ἐλέσθαι, εὐρήσεις καὶ τὰ λοιπὰ ἐξ ἀνάγκας κατὰ τὸ ἐξῆς ἀλλάλοις ἐπόμενα. αὐτίκα γὰρ εἰ <τὰ> κατὰ γεωργίαν τις ἐπιτηδεύει, ἄρ' οὐ πρᾶτον εἶμεν δεῖ τεκτονικάν; εἰ τεκτονικάν, δεῖ δὴ χαλκευτικάν· <εἰ> χαλκευτικάν, δεῖ δὴ μεταλλευτικάν. ἀλλ' ἵνα ἀγραυλεῖν δυνατοὶ ὦντι, δεῖ σκέπαν ἡμεν τὰν περὶ τὸ σῶμα· τοιγαρῶν ὑφαντικᾶς καὶ οἰκοδομικᾶς ἐστὶ χρεία. καὶ τᾶλλα δὲ πάντα μαστεύμενος καὶ ἀνερευνῶν οὕτως εὐρήσεις ἔχοντα ποτ' ἄλλαλα.

People's pursuits relate to each other just like the links of a chain. For they both hang from each other and entail each other, and if any one of them is ever pulled up, then from that point the whole and each one of them follow in entailment from the beginning. And whichever pursuits of livelihood you wish to choose, you will find that the rest also necessarily follow each other in order. For example, if someone were to engage in pursuits related to farming, would it not be necessary for carpentry to exist first? If there is carpentry, metalworking must already exist. If there is metalworking, mining must already exist. But in order for people to be capable of living out in the open, there must be protection for the body. Accordingly, there is a need of weaving and building. And besides, if you seek out and examine all the pursuits, you will discover that they all relate to each other in this way.⁵⁵

The chain imagery is key in this passage, and it is not uncommon in philosophical texts from the same period. Typically, it is used for illustrating the claim that certain objects exist by combination (usually *synthesis* or its cognates) of parts which are discrete objects in their own right. For example, the

55 Thesleff's 1965, 56–7 edition of Stobaeus (4.28.15 W).

sceptic philosopher Sextus Empiricus uses very similar language. The context here is the sceptic refutation of various theories of generation. Before showing that all these theories are untenable, Sextus describes different ways in which philosophers define generation. Among them is the generation by means of combination (ἐπισύνθεσις) of several discrete objects, and as his first example, he mentions the rings of a chain as follows: ‘Generated from multiple things in virtue of a combination are, for example, a chain in virtue of a concatenation of links, a house in virtue of a coming together of stones, or a garment in virtue of a weaving together of wool and warp.’⁵⁶

Dio of Prusa also uses this phrase in his consolatory work *Charidemus*. In this work, an unnamed philosopher describes life as consisting of intertwining episodes of pain and pleasure that necessarily succeed one another, just like the links of the chain (καὶ τῷ ἑτέρῳ τὸ ἕτερον ἐξ ἀνάγκης αἰεὶ ἀκολουθεῖν, ὡσπερ οἶμαι τοὺς κρίκους τῆς ἀλύσεως).⁵⁷ It is worth noting that the passage mentions not only the links of the chain but also uses the verb ἀκολουθεῖν to describe the relationship between those links, and this term occurs in Bryson’s fragment as well. This term can have specific connotations depending on the context,⁵⁸ and if we take into consideration the broader context, supplied by Bryson Arabus, an interesting pattern emerges.

Given that Bryson’s argument moves seamlessly from a medical/physiological to an *oikonomic* account of human nature, showing that the principle of interdependent parts explains the functioning of both, it seems reasonable to assume that this terminology also featured at the beginning of the treatise. The use of ἀκολουθεῖν in reference to capacities would not be odd. The similarity between Bryson Arabus and Galen has already been noted, and in this case too it provides an illuminating analogy. The latter uses the verb and the cognate notion of consequence to explain that capacities are entailed in the continuous existence of the body. For example, when arguing for the existence of the retentive capacity, he states the following: ‘our argument has clearly shown the necessity for the genesis of such a capacity, and whoever has an appreciation

56 Sextus Empiricus, *Against Dogmatists* 10.330, tr. Bett: ἐκ πλείονων δὲ κατ’ ἐπισύνθεσιν ὡς ἄλλυσις μὲν κατ’ ἐπισύνθεσιν κρίκων, οἰκία δὲ κατὰ σύνδοδον λίθων, ἐσθῆς δὲ κατὰ κρόκης καὶ στημῶνων συμπλοκήν.

57 Dio of Prusa, *Discourse* 30.20–1.

58 As a logical term, it is especially associated with the Stoic Chrysippus who wrote a non-extant πρὸς τὸ περὶ ἀκολουθῶν α’ (Diogenes Laertius 7.191=S*VF* 2.13); it is also a grammatical term, and these two senses are not independent but grounded in Stoic metaphysics (see Sluiter 1990, 13–16). Swain 2013, 236 points out that Diogenes Laertius 7.125 reports the Stoic view that virtues all entail each other using the same term. It is also worth noting that Alexander of Aphrodisias (*On Fate* 193.5–7) describes the Stoic causal theory with the imagery of the chain.

of consequence (ἀκολουθίας) must be firmly persuaded from what we have said that, if it be laid down and proved by previous demonstration that Nature is artistic and solicitous for the animal's welfare, it necessarily follows that she must also possess a capacity of this kind.⁵⁹ Galen is using ἀκολουθεῖν as a logical term, but the argument only has the ἀκολουθία because it tracks 'the necessity' of the generation. Given that Nature is τεχνική, animal bodies are designed with benevolent intentions, and therefore necessarily entail useful capacities—in this case, the retentive one.

Thus, the extant Greek fragment suggests how the original treatise employed specific terminology that enabled the seamless transition from physiology to *oikonomia* which we find in Bryson Arabus. The term ἀκολουθεῖν or its cognates very likely featured in Bryson's description of the capacities and was then employed in the analogy between the chain and crafts, reinforcing the pattern of interdependence both within the body and in the community at large. First, the elements of which we are constituted co-depend on each other for the continuous existence of our body. This co-dependency/cooperation generates the flux of matter because the moisture consumed by the heat needs to be resupplied. The capacities which regulate this flux are also co-dependent, and they entail each other's existence. The most remarkable claim in Bryson's exposition, which was very likely underscored by repeating such terms, is that this interdependence does not end with the boundaries of the body. In order to provide matter for the flux, we also need a variety of foods, which means we need a number of people living together and cultivating different foods in order for a single person to survive (or have a healthy life). This is a strong claim: our constitution presupposes living in a community and exchanging goods, and the *oikonomic* aspect of life is dictated by human nature itself, just like physiology.⁶⁰

This conclusion sketches out the beginning of the answer to the question of what motivated the combination of two different domains of knowledge. A medical account of human nature as ever-waning and only replenished by the

59 Galen, *Natural Capacities* 3.1 (2.145K), tr. after Brock: Ὁ μὲν δὴ λόγος ἤδη σαφῶς ἐνεδειξατο τὴν ἀνάγκην τῆς γενέσεως τῆς τοιαύτης δυνάμεως καὶ ὅστις ἀκολουθίας σύνεσιν ἔχει, πέπειστα βεβαίως ἐξ ὧν εἵπομεν, ὡς ὑποκειμένου τε καὶ προαποδεδειγμένου τοῦ τεχνικῆν εἶναι τὴν φύσιν καὶ τοῦ ζῶου κηδεμονικὴν ἀναγκαῖον ὑπάρχειν αὐτῇ καὶ τὴν τοιαύτην δύναμιν.

60 The influence of Stoicism on Neopythagoreans has been widely debated even since Eduard Zeller 1919 argued that it was substantial. Generally, few agree completely with Zeller's view, and, for example, Centrone 2014 discusses elements of implied polemics with the Stoics. Nevertheless, when it comes to *oikonomic* ideas, Swain's 2013, 235–6 argument that Bryson has more in common with Stoic than Peripatetic thought is certainly convincing.

collaborative efforts of several capacities is a very apt model for modelling *oikonomic* activities, which also consists of inflow and outflow of goods. To a certain extent, Bryson's project can be compared with the so-called anthropological motivations of *oikonomia*, which are standard to the genre. A closer comparison between Bryson and the famous anthropology in Aristotle's *Politics* Book 1 shows that the former has a very distinct approach.

7 Bryson's *oikonomic* Anthropology in Context

Aristotle invites his audience to think of the first people and the first origins of the community. Whether he is inviting the consideration of a historic fact or just a conceptual paradigm does not matter much for current purposes. The key point is that the anthropology of humans as *oikonomic* agents is presented as a natural development, primarily motivated by their needs.⁶¹ In other words, Aristotle's account just tells his readers how things came to be the way they currently are, which then leads to the discussion of how we ought to act as *oikonomic* agents.⁶²

In Bryson Arabus, the language of needs also features prominently. Immediately following the passage about the interconnectedness of crafts, he writes that people 'have a *need* (ἡγά) of each other'.⁶³ However, his medical introduction into human nature suggests all that and something even stronger, namely, that humans are predisposed by their constitution for *oikonomic* behaviour. Life in a community and the roles that each member of the *oikos* plays are not due to some historic circumstances. They are profoundly tied to the underlying structure of living beings, especially humankind. Bryson Arabus shares this motif with other Neopythagoreans, although even in this case, Bryson's project has an unusual focus.

Together with the fragments of Bryson, Stobaeus records fairly long excerpts from the work of another Neopythagorean Callicratidas, entitled *On the Happiness of Household*.⁶⁴ In one of these fragments, Callicratidas posits a tripartite analogy between *oikos*, *polis*, and cosmos as a whole as follows: 'It is according to the same principle that the household and the city-state among humans, and the cosmos among the gods, are organised. Yet the household and the

61 *Politics* 1.9, 1257a20–40; see also Plato, *Republic* 369b–370a.

62 For an extensive discussion, see Meikle 1995, esp. chap. 3.

63 Swain §15, tr. Swain.

64 Callicratidas has generally received rather more attention than Bryson, starting with Armand Delatte's *Essai sur la politique pythagoricienne* 1922 and Moraux 1957, 82–6.

city-state are respective imitations of the management of cosmos.⁶⁵ Callicratidas establishes a structural equivalence between the universe, a well-run city and a well-run household, thus suggesting that the nature of the latter two is closely tied to the former. Just like Bryson, Callicratidas grounds the *oikonomia* in the natural world, but unlike Bryson, he focuses on the universe at large.

The same tripartite system is in the background of Ps. Ocellus Lucanus' *On the Nature of the Universe*. As the title suggests, this treatise focuses on natural philosophy, but its final section on ethics connects the harmonious functioning of the *kosmos* with harmonious behaviour in humans. The key message is the importance of chastity;⁶⁶ if people engage in intercourse not just for procreation, terrible consequences follow, affecting not just the household, but also entire city-states. The text argues that the *oikos*, the *polis*, and the *kosmos* are not simply analogous; they are causally linked. When households become *κακοδαίμονες*, entire cities become such too, because the former are parts of the latter, and whatever state the parts are in, the whole acquires as well. The analogy with crafts underscores this point: *oikos* to *polis* is as a foundation is to a whole house, and the consequences of a well-managed or mismanaged household are the same as those of a well-built or poorly built foundation. Thus, the ethics of the household are motivated by the well-being of the *polis* and, further down the line, the *kosmos* at large.⁶⁷ Ps. Ocellus' point appears to be very similar to Callicratidas, only in an elaborated form. Just like Callicratidas, he draws a parallel between the *oikos* and its larger equivalents (the city and the *kosmos*) rather than the smaller one (the physiological organisation of the body).⁶⁸

Contextualising Bryson Arabus reveals the ways in which this text is original and the ways in which it conforms to the existing tradition. Bryson Arabus shares the approach with other Neopythagoreans in the sense that they all aim to ground household ethics in the phenomena of the natural world. Presumably, in Bryson as in others, this approach can be understood as the

65 Stobaeus 4.28.17 W: κατὰ γὰρ ταύταν τὴν ἀρχὴν ἐν μὲν τοῖς ἀνθρωπίνοις ὁ τε οἶκος καὶ ἡ πόλις συνήρμοστοι, ἐν δὲ τοῖς θῆροις ὁ κόσμος. μίμῃμα δ' οἶκος καὶ πόλις καττὴν ἀναλογίαν τὰς τῷ κόσμῳ διοικήσεις.

66 This motif plays a fairly prominent role in the pseudepigraphic texts of the Pythagorean women. See Dutsch 2020, 167–9, although Dutsch also presents an argument that the sexual ethics in these texts is more nuanced than it might seem at first sight (2020, 84–114).

67 Ps. Ocellus 4.7–8 (Harder); as well as the house, the text also uses the example of the keel of the ship and musical modulation.

68 In this respect, Callicratidas and Ps. Ocellus are using the standard motifs from the *oikonomia* genre (see nn. 18 and 54 above). As far as the extant evidence can tell us, Bryson is genuinely original in his choice to compare the well-run household with a smaller equivalent, the physiological system of the human body.

standard method of investigating the *systema*.⁶⁹ The distinctive terminology does not feature in Bryson's extant fragments, but it might have been present in those sections of the treatise that do not survive in Greek. The parts of the natural world that these Neopythagoreans are interested in are, however, significantly different. Both Callicratidas and Ps. Ocellus are concerned with aligning the *oikos* with the cosmic order, and thus focus on comparing the *oikos* with its larger equivalents, that is, the *polis* and the world. This approach is fairly typical of the genre. Bryson Arabus shows that in Bryson's *Oikonomikos* the key preoccupation was the comparison of the *oikos* with the smaller equivalently organised entity: the body. This is not to say that Bryson shows no interest in political life at all, as the Greek fragment on the interconnectedness of crafts shows that he did. But it is human physiology that plays a significant explanatory role throughout the treatise: it provides a model for the proper management of goods not only by extensive analogies, but also by outlining how the intake and output of matter ought to take place.

8 The *oikonomic* Body in Pythagorean Traditions

Although Bryson stands out among his fellow Neopythagoreans in this respect, he is not entirely unique in the context of the broader Pythagorean tradition to which he might have looked for inspiration and authority.⁷⁰ Anonymus Londinensis preserves a fragment from Philolaus which also uses comparisons between *oikonomic* activity and human physiology as follows:

69 See Centrone 2014, 321 who notes the following: 'The whole universe may thus be viewed as a complete system articulated into different sub-systems: world, city, family, individual and individual soul', notably not mentioning the body. Centrone also argues that there is one golden rule for governing all different systems: 'the better ought to rule and direct, the worse ought to be governed and obey' (*Ibid.*). In this respect too, the opening of Bryson's treatise is somewhat original, because it posits co-dependence rather than hierarchical rule as the basis for harmonious co-existence. Swain 2013, 318–19 suggests that Bryson was a 'progressive' Neopythagorean, although see Dutsch 2020, 151, n. 45.

70 The doxographic sources show a substantial interest in human physiology too. For example, Aëtius cites numerous Pythagorean claims (some of them are Platonic in origin, however; see n. 23). Thesleff's lists of the pseudepigraphic Neopythagorean treatises (extant and otherwise) in 1961, 8–27 contains several medical titles, e.g. Metrodoros' writing on medicine (Iamblichus, *Life of Pythagoras* 241–3); Acron of Acragas *On Medicine* (Suda). The Pythagorean diet is one of the better-known aspects of this tradition, and Pythagoras himself is said to have invented regimens (Porphyry *Life of Pythagoras* 35; Iamblichus, *Life of Pythagoras* 196; see also Celsus, *On Medicine, Prooemium* 7, Diogenes Laertius 8.12), although this philosophical tradition and medicine are connected in other ways too. See Burkert 1972, 292–4.

Φιλόλαος δὲ ὁ Κρο[ο]τωνιάτης συνεστάναι φησὶν τὰ ἡμέτερα σώμ[ατα ἐκ] θερ-
μοῦ. ἀμέτ<οχ>α γὰρ αὐτὰ εἶναι ψυχροῦ[, ὑπομι]μνήσκων ἀπὸ τινων τοιούτων·
τὸ σπέρμ[α εἶναι θερ]μόν, κατασκευαστικὸν δὲ τοῦτο τ[οῦ ζώου]· καὶ ὁ τόπος
δέ, εἰς ὃν ἡ καταβολ[ή—μήτρα] δὲ αὐτῆ—(ἐστὶν) θερμότερα καὶ ἐο[ικυῖα
ἐκ]εῖναι:.... με[τὰ γὰρ] τὴν ἔκτεξιν εὐθέως [[το]] τὸ ζῶιον ἐπισπάται τὸ ἐκτὸς
πνεῦμα ψυχρὸν ὃν εἶτα πάλιν καθαπερεὶ χρέος ἐκπέμπει αὐτό.

Philolaus of Croton says that our bodies are constituted out of hot. For he says that they have no share of cold on the basis of something like the following considerations: Sperm is hot and this is what constructs the animal. Also the place into which it is sown, the womb itself, is even hotter and like to the seed ... Immediately after birth the animal breathes in the external air which is cold. Then it sends it out again like a debt.⁷¹

Philolaus is reported as stating that human bodies are primarily constituted of heat, with both the seed and the womb dominated by the hot element. Once born, an animal breathes in (presumably, for the first time) cold air and then exhales it 'like a debt'. The comparison is unusual but apt: presumably, the cold air is like debt because the coldness is not a constitutive part of the animal, given that embryos are made of heat.⁷² The newborns 'borrow' coldness when they take their first breath and then 'return' it by exhaling.

Bryson's argument could be grounded in the Pythagorean tradition with implied references to texts like Philolaus. There are, however, a couple of differences between the two. First, Bryson Arabus talks of two elements, moisture and heat, as being primary. But, as Carl Huffman has noted, Philolaus' claim is primarily concerned with describing the embryo as hot as opposed to cold, which does not rule out the presence of other elements, such as moisture, in the reproductive parts.⁷³ Second, the explanatory roles are assigned quite

71 Anonymus Londinensis 18.8–24, Greek from Huffman 1993, 289, after Diels; Manetti's edition 2011, 38–9 is not substantially different. The translation is by Huffman.

72 Seaford 2004, 283 argues that 'there is nothing in the *physical* process to suggest the metaphor' and the biology phenomenon is modelled on the ideas about the constancy of the monetary exchange, but the elemental theory underpinning this account of respiration explains the metaphor quite well, and it seems to be a simpler explanation. Philolaus' use of such language is not entirely unique among the Presocratics: one of Anaximander's fragments (Most and Laks D6) also describes coming into being and subsequent destruction using the same term. Regarding the cooling effect of the air, the scholarship has also noted the connection between *katapsuchousthai* and *psuchē* which has some bearing on the Pythagorean concept of the soul. See Huffman 2009, 30–1; Huffman 1993, 289–306; Sedley 1995, 24–5.

73 Huffman 1993, 295–6.

differently in these two texts. What is *explanans* in Philolaus is *explanandum* in Bryson and vice versa.

Moreover, it is worth considering how much work the *explanans* does in each case, and how much the comparison between *oikonomic* processes and physiology explains. In the case of Bryson, the comparison does far more work. Indeed, what Bryson says about human physiology and *oikonomia* goes beyond mere comparison: the interconnectedness of the parts which underlies human physiology is also the interconnectedness of the communal exchange of goods. The way we understand human physiology has consequences for how we understand economic exchange. The argument in Bryson Arabus describes the principles and processes according to which *oikonomia* functions on the basis of another knowledge domain. In other words, Bryson is modelling *oikonomic* knowledge on physiological knowledge, producing a medico-*oikonomic* model of human nature. Philolaus might have provided an authoritative precedent for such a project, but it does not seem to be sufficient motivation for such an extensive parallel between the two knowledge domains. Bryson's more immediate context, especially Hellenistic scientific discourses, is likely to play a paramount role.

9 Bryson in the Context of Hellenistic Scientific Discourses

In Bryson Arabus we find extensive modelling of one domain of knowledge onto another. The precise details of his project are fairly original, but the broad-stroke approach, his general methodology, has some parallels, especially among the mechanistic accounts of physiology. The most famous case is the philosophical/medical account of human physiology based on pneumatics (*pneumatikē tekhnē*). Pneumatics was a branch of mechanics which was focused on the building of air-pressure-powered devices. These devices were often shaped to look like animals and humans, and some of them were 'self-movers'—that is, they reacted to the environment by, for example, 'drinking' water when it is presented to them.⁷⁴ It is well-established in scholarship that the mechanisms powering the devices to act in a way that replicates animate creatures became a useful tool for modelling the understanding of the

74 For an extensive discussion of the self-movers in mechanics, see Berryman 2009, 201–5, especially the example of Hero's owl-and-birds. Illuminating illustrations of complex pneumatic devices, although dating from the Renaissance period, can be found in Greenwood and Woodcroft 1971.

physiology of those same animate creatures.⁷⁵ Thus, there are parallel cases of Hellenistic scientists/philosophers using one knowledge domain (especially if that knowledge domain is innovative) for modelling another. Although the contents of Bryson Arabus' project are certainly different, his overall approach is recognisable as the kind of approach taken by other innovative scientists/philosophers in the cultural vicinity.

Many of the Hellenistic writings on medicine are lost,⁷⁶ and it is therefore difficult to assess whether the contents of Bryson Arabus might be comparable to some other works from the period. There is some extant evidence suggesting this might be the case. One of the few well-preserved medical treatises from the early Roman imperial period is Anonymus Londinensis,⁷⁷ which contains a few instances of remarkably similar terminology to that found in Bryson Arabus. The key passages come from the beginning of the third part of the manuscript concerned with physiology. Having described the human body parts and their division, the author moves on to discuss what he calls the *oikonomia* of the body.⁷⁸ What follows is an unusual combination of atomistic style and four-element/vitalist style medical theory. The author posits that constant emanations come from bodies (*ἀποφοραί*), especially the living ones. They arise from the warmth of these bodies which causes constant evaporation of the moisture as steam, consisting of particles. The description of the different sizes of particles and their respective motions that follow leads to the conclusion that the bodies are constantly evaporating and would quickly perish if they were not resupplied. The matter which resupplies them is nourishment and *pneuma* (*ἀλλὰ γ(άρ) ὕλ[η]ν ὑπεβάλετο τροφήν τε καὶ πνεῦμα*).⁷⁹

This account shares some striking similarities with Bryson Arabus, but, for current purposes, the most pertinent similarity is the description of the vitality-maintaining processes as *oikonomia*. There is no equivalent use of the term to refer to physiology in either Hippocratic, Galenic, or Oribasius' corpora, so this commonality is striking. Bryson's parallel between the body and the *oikos* serves a purpose: it models the *oikonomic* domain on the authoritative medical

75 von Staden 1996, esp. 93–4, where he lists the notable similarities between Erasistratus' heart model and Ctesibius' water pump; see also von Staden 1997 and Berryman 2009, 197–215.

76 See Leith 2013.

77 Ever since Diels' 1893 edition, the work was thought to be a collection of notes, but see the decisive work of Manetti 1986, 1994 for the argument that it is an extraordinary example of an unfinished handbook.

78 Anonymus Londinensis 22.5–7; Diels' classic edition reads: [ιδ]ῆ[ι] [δ]ῆ π[ε]ρὶ τῆς οἰκονομίας αὐτῆ[ς] νῦν ἀναγκαῖον δοκεῖ εἰπεῖν. Manetti's new 2011 edition is more sparse, but the term *oikonomia* still features prominently: ἰδ[ί]αι δὲ [...]η[ς] οἰκονομίας αὐτῆ[ς] [...].[.].[εἰπεῖν.

79 Anonymus Londinensis (Manetti) 22.49–50.

domain. Arguably, in Anonymus, the term *oikonomia* serves a similar purpose of modelling knowledge, although not nearly as extensively as in Bryson. Anonymus' physiology is based on the notion of emanations (*ἀποφοραί*). The term can be used in natural philosophy,⁸⁰ but it is more commonly used in an *oikonomic* sense, as payment due.⁸¹ Anonymus' choice to describe human physiology as *oikonomia* seems apt: if the body, just like the *oikos*, has *ἀποφοραί*, one might as well use the term *oikonomia* to denote the principles that govern not only the former but also the latter. The parallelism is hardly developed further in Anonymus, and it might seem to be a witty turn of phrase more than anything else. However, when contextualised, this terminology could be a significant indication of the author's alignment in the debate, which provides some insights for contextualising Bryson's project too.

First, it is important to note that the physiology of Bryson and Anonymus, although not identical, do belong to the same 'camp'. Just like Bryson, Anonymus also subscribes to the view that the innate heat 'burns' the body; as a result, we need constant replenishment, and the capacities enable and manage this process. Furthermore, his account is vitalist in the sense that the body is shown as having innate capacities which enable the vital processes,⁸² just as in Bryson Arabus' account. This understanding of human nature is a polemical rival to the mechanistic understanding of the body from the Hellenistic period onwards. One of the best sources for the debate is Galen's *On Natural Capacities*,⁸³ and references to this polemic can also be found in Anonymus. The clearest is the report that Erasistratus was criticised for claiming that the body is maintained by respiration and nutrition,⁸⁴ rather than the innate capacities which are

80 Plutarch, *Table Talk* 2.647F.

81 Herodotus 2.109; Aristotle, *Politics* 2, 1264a33; Xenophon, *Constitution of the Athenians* 1.11.

82 The warmth of the living bodies is mentioned when the theory of emanation is expounded; the capacities are mentioned subsequently, at 22.45.

83 Himself a vitalist, Galen extensively attacks those who attempt to account for human physiology mechanistically, especially Erasistratus (on mechanistic analogies of various organs in Erasistratus, see Nutton 2004, 137). The attack on the latter starts at *Natural Capacities* 1.16 (2.60–3K) and then is elaborated throughout the second book of the treatise. The important section is *Natural Capacities* 2.4 (2.88–93K), in which Galen criticises followers of Erasistratus for giving him Peripatetic pedigree while, in fact, he denied that tradition's key teleological commitments. On Erasistratus and Peripatetic tradition, see von Staden 1997; on Galen's teleology, see Hankinson 1989.

84 Erasistratus is known for positing *horror vacui* as the principle of human physiology. In short, he argues that such processes as nutrition and respiration take place because there cannot be void (see respectively Galen, *Natural Capacities* 1.16 (2.60K); *U. Resp.* 2.1 Furley and Wilkie (4.473K)). When one piece of matter is moved, another one is drawn to its place. This creates a cycle of motion. The body is maintained by the processes that operate by means of the principles of physics, which makes mechanistic modelling appropriate.

responsible for maintaining these processes.⁸⁵ Bryson's account is not directly polemical, but he adopts a position that is a polemical rival to the mechanistic theories, and thus there is an implied opposition.

Therefore, Bryson and Anonymus exemplify a notable tendency to associate the vitalist, *dunamis*-based, accounts of the human body with *oikonomia*. The comparison works slightly differently in both texts. In Anonymus, the *oikos* is the *explanans* of the natural synergy of the vital physiological processes. In Bryson Arabus, it is physiology that grounds the explanation of how to run one's *oikos* properly. The latter's undertaking is also much more ambitious as the analogy is very detailed and elaborate, but the similarity in terminology and overall commitments are nonetheless striking. Although the evidence is admittedly scarce, as is always the case with Hellenistic medical sources, the similarity between these two texts suggests that at least some of those who advocated the idea that organic animate creatures have innate capacities also drew a comparison between the body and *oikonomia*.⁸⁶ The very concept of *oikonomia* thus gains vitalist associations. The comparison between the body and the *oikos* can be understood as an alternative to the comparison between the body and automata. Given that we have a little evidence associating *oikonomia* with the vitalist understanding of the body, it is possible that these efforts were rivals to the mechanistic modelling of the body, and they formed a significant background to Bryson's attempt to explain *oikonomia* as parallel to the natural functions of the body.

The critics of this stance object to the lack of differentiation between organic and inorganic, arguing that the organic tissues and parts are not just maintained, but perform the maintenance themselves in virtue of innate capacities. One of the best sources for this debate is Galen. See Adamson 2014; Berryman 2009, 197–200.

85 Anonymus Londinensis (Manetti) 22.51–23.10.

86 The connection between Bryson and Anonymus is a separate question. Unfortunately, there is too little extant evidence to determine the relationship between the two, as the vast majority of Hellenistic medical corpora are lost; and so we are left with a number of possibilities. It could be that we have here the evidence of a broader trend: the vitalist understanding of the body as *oikonomia* which was positioned against the mechanistic understanding of the body, as exemplified by Erasistratus. Alternatively, it could be that Anonymus and Bryson are connected (they represent a minor tradition) and one was the inspiration for another. I think this is probably unlikely because there are some fairly significant differences between their medical views. There is also no evidence for such a connection. Yet another alternative is that the similarity between Anonymus' description of physiology as *oikonomia* and Bryson's argument is just a coincidence. Maybe it seems a little odd that two texts that come from the same period use such distinctive language, but it is not impossible.

10 Advertisement?

A closer look at the tradition to which Bryson belongs, as well as the more immediate scientific context, helps us to understand this extraordinary undertaking as a product of its time. Modelling one domain of knowledge on another has parallels in Hellenistic science, and the association of human physiology with *oikonomia* might have been a known motif, even if Bryson developed this motif to a remarkable extent. There is one remaining puzzle. Bryson explains a relatively familiar domain of knowledge, that is, *oikonomia*, in reference to a highly technical domain of knowledge, that is, physiology. Generally, explanations are built by combining a simple and familiar *explanans* with a complex and unclear *explanandum*. In Bryson, technical and innovative scientific claims are used to explain that which is hardly more than mundane.

The solution to this puzzle must lie in the fact that Bryson is not simply drawing an analogy between the body and the *oikos*. The fact that he is particularly interested in modelling inflows and outflows of wealth on the inflows and outflows of nutriment and air suggests an underlying interest in a common principle. The proper understanding of this principle involves understanding the isometric structures of the simple and the complex. The explanation of the latter is integral to the explanation of the former. In other words, the explanation of the more complex is necessary for understanding the simpler.

Although interest in the unity of underlying structures is a familiar motif of the Neopythagorean tradition,⁸⁷ Bryson's extensive engagement with medicine is unusual, and, furthermore, provides his project with a certain rhetorical edge. Earlier in this article, I argued that Bryson Arabus used medical references without providing extensive discussions of anatomical details, which suggests the invocation of the authority of medical sciences. Thus, although the treatise does not explain something new or unfamiliar, it beckons the reader to see a familiar phenomenon in a new light, presumably, the Neopythagorean light.

In fact, the idea that the pseudonymous Neopythagorean treatises were meant as a kind of advertisement to attract students and patrons had already been suggested in older scholarship.⁸⁸ A closer examination of the medical references and conceptual tools that are used in Bryson Arabus not only lends support to this argument but also shows how such an argument could be made

87 Although these philosophers are not unique in such undertakings. For example, Apollonius Dyscolus discusses language in terms of hierarchical isomorphic structures. See Sluiter 1990, 43–9.

88 Thesleff 1961, 72 attributes the idea to Bickel 1924 as follows: 'I am inclined to think, with Bickel, that they were on the whole intended as philosophical propaganda for laymen, or as textbooks in philosophy.' Presumably, Thesleff's reading is based on Bickel 1924, 356–8.

and how it could be positioned in the broader debates. The latter is important because it contradicts Thesleff's suggestion that the advertising nature of such treatises meant that they were fairly simplistic and not polemical.⁸⁹ Both ancient philosophy and ancient medicine were highly polemical,⁹⁰ and any kind of promotion of certain specific views is implicitly polemic. By reproducing certain claims, Bryson Arabus inevitably aligned with a certain position. Bryson's project is therefore anything but simple. He is engaging with the *oikonomia* tradition, with the Pythagorean tradition (including its Aristotelianising interpretations), while at the same time positioning his argument in the more recent medical debates. But, more importantly, Bryson Arabus, combined with the extant Greek fragment, shows that the main argument was complex and ambitious, seamlessly weaving the physiological and the *oikonomic* aspects of human nature together, thus indicating that this way of approaching household management is consistent with human nature. This complicated approach produces a fairly straightforward result: the Neopythagorean way of running the household is, in fact, in line with innovative anatomical discoveries and physiological theories. The ancient pedigree and authority of the tradition is reinforced by its compatibility with the new and the innovative. The same is true of the *oikonomic* aspect of his thought: while engaging with familiar motifs, *Oikonomikos* also makes a significant advance over the preceding tradition. It seems likely that Bryson's approach could have worked as an advertisement for the Neopythagorean way of life, but not merely as a simple collection of prescriptions for moral behaviour; it was, rather, a sophisticated re-imagining of everyday household running that went hand-in-hand with the innovative and authoritative understanding of human nature in contemporary medicine.⁹¹

89 Thesleff 1961, 72: '... the absence of polemics and invective suggests that the authors expected their public to listen to them; this, I think, points to an environment where Pythagoreans were already held in esteem.' Thesleff's suggestion about the authority of the Pythagorean tradition must be true to some extent (see Diogenes Laertius, *Pr.* 12–13; see also the discussion in Dillon 1977, 341–83; Kahn 2001, 86–93 on Pythagorean influences in literary texts starting from the Roman Republican period); but the extensive discussion of the medical sources suggests a different angle: the authority needed to be reinforced by showing the continued relevance and importance of the philosophical system.

90 Lloyd 1979, 85–125; van der Eijk 1997; Rosen 2019; Salas 2020, 1–6.

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