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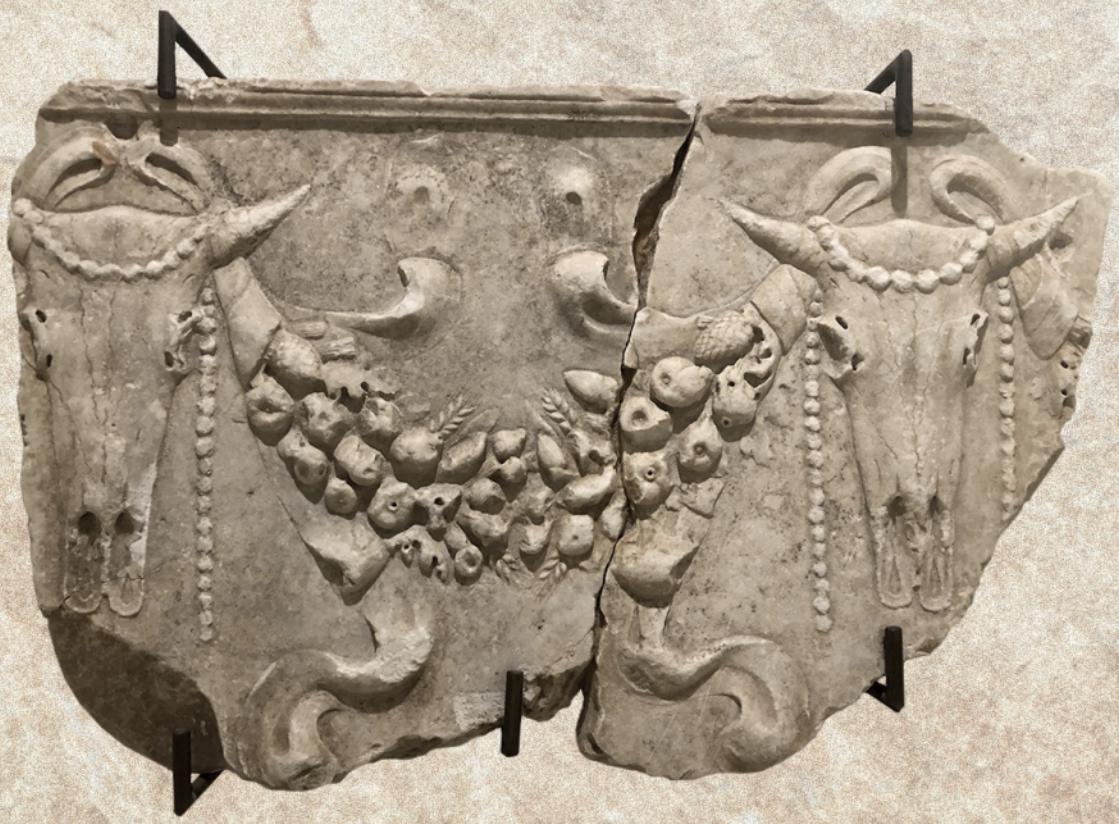

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The artistic nature in the 14th and 15th books of Galen's *On the Usefulness of the Parts of the Body*

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Joana FALCATO
Universidade Nova de Lisboa
joanafalcato@gmail.com
https://orcid.org/0000-0001-8383-4892

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Abstract

In the 14th and 15th books of the galenic work *On the Usefulness of the Parts of the Body*, dedicated to male and female reproductive organs and foetal development, the author presents nature (φύσις), the agent of the human body's formation, as artistic and admirable, because it used an art (τέχνη) to make immortality possible, which consists in replacing one living being by another in an admirable way. Such an art is also related to a divine purpose, once nature's action, possessing an intrinsic ability, is that of a demiurge. So, if, on the one hand, we have an artistic and practical nature, whose activity is proved by dissection and visible in the position and function of male and female reproductive organs, on the other, we have an abstract concept of the same nature, working to perpetuate humankind, but whose deepest and more abstract problems are not to be discovered nor solved in medical works such as *On the Usefulness of the Parts of the Body.* In this paper I will analyse how the concepts of φύσις and τέχνη relate to each other: I will develop and deepen the role of nature as an artisan regarding the formation and function of the reproductive system and foetal development and its limits as such, pointing also the different subtleties of the concept.

Keywords: nature; art; artisan; foetal development; reproductive system.

It is assumed that *On the Usefulness of the Parts of the Body* was written between 164 a.C and 175 a.C.[1]. Galen wrote the work with the purpose to show that each part of the body has a structure suitable to the role it plays in the body's organization, and that the whole body works in sympathy. Also, in this text, Galen proves how each of the bodily parts works in accordance with the soul, once the body is adapted to the soul's faculties.

In the 14th and 15th books of *On the Usefulness of the Parts of the Body*, the author focuses on explaining how the structure of male and female reproductive organs fits nature's purpose of perpetuating the species, how this structure is adapted to its function, and, in case of women, to foetal development. Such an explanation is in tune with the rest of the work, that presents every part of the body with a corresponding function and structure that manifests its cooperation with the entire body to serve nature. So, the structure and function of the sexual organs are proof of the nature's admirable art (θαυμαστήν τέχνην - 4.144.1K). As the author shows in different parts of *On the Usefulness of the Parts of the Body*, there is no better structure or bodily organization to the presented functions[2].

In this paper, I will explain the meaning of this artistic nature in the philosophical framing given to the anatomical and functional explanation of the reproductive organs. I will start by presenting a general definition of the concepts φύσις and τέχνη adapted to this context. After that, I will explain and illustrate the meaning of the expression «artistic nature» used in 14th and 15th books[3].

According to Chantraine's *Dictionnaire Etymologique de la langue grecque* (1999: 233-34), the word φύσις has the same root as the verb φύομαι, which means to grow and born, in the sense of some process that takes place in a spontaneous and natural way. From that, φύσις became a synonym for nature, as something that does not need any external intervention and develops and exists by itself, and an agent of creation *per se*. The aspect of being agent of creation justifies the identification, in the present work, of φύσις with the creator, δημιουργός, which also relates to the divine origin of the world's formation whose inspiration probably Galen took

1. *U.P.*, transl. Mercedes López Salvá, p. 7.

2. For example, at 3.46.14-16K, the author states that nature made the structure of the bones of the hand the more adequate possible as prehensile organs; at 3.83.19K, he affirms that nature does nothing «superfluous» (περίεργον), as she creates nothing by excess nor by default; at 3.114.4-5K, he says that nature placed each muscle in the most adequate place.

3. I will use the Kühn edition for the Greek text, and for its translation, the 1968 English version by Margaret Tallmadge May. I will indicate in the bibliography the chosen translations for the other works quoted in this article. In cases where I disagree with the translation, I will present my option aside the word chosen by the translator.

from Plato's *Timaeus*[4] and the stoics[5]. Besides, the fact that φύσις has its internal functioning makes the complete understanding of it inaccessible to human reason, once it is unreachable – and this was probably the meaning of Heraclitus' fragment 123 in which he affirms that «nature loves to hide itself»: φύσις κρύπτεσθαι φιλεῖ. The same idea is expressed in fragment 54, where Heraclitus holds that an invisible connection is better than a visible one: ἁρμονίη ἀφανὴς φανερῆς κρείττων. In Heraclitus' perspective, the internal process of things is more powerful than an external visible one: the strongest connection exists in the interior, something not visible neither reachable. It is possible to draw from this unreachable factor also the justification for its divine meaning, since at least part of the internal process of φύσις remains a mystery to human understanding, only accessible to a superior or omniscient force. And this is the connection with φύσις in Galen, in the aspect that is identifiable with a divine provenience[6].

Τέχνη appears in the same etymological dictionary (1999: 1112) as synonym of know-how in a profession, skill, technique, art, and derived from these meanings, sometimes with a negative connotation, τέχνη corresponds to trick, cunning or plot. As points out Schaerer (1930: 1-3), in the Homeric epics τέχνη was given to men by gods, so that the divine plan was perfectly aligned with that of the human actions, as it is possible to verify for example in Hom., *Od*.

4. In Plato's *Timaeus*, the God or demiurge is defined as being the «best of causes» (29a6), having desired that everything would be good (30a1), completed the best and most beautiful work according to nature (κατὰ φύσιν ἄριστόν τε ἔργον ἀπειργασμένος, 30b5-6) and created the world through providence (πρόνοια, 30c1). For a comparison between Plato's idea of the demiurge and the stoic's, *cf*. Powers 2013.

5. At Cic. *N.D*. 2.57, the author states that nature was defined by Zeno as an artificer (*artifex*) and the intelligence of the Universe named prudence or providence (*prudentia vel providentia*). Cicero tell us that the stoics established the Universe as being governed by Gods' providence and wisdom and also that everything is under the direction of an intelligent nature; this nature, however, is subjected to God, since there is nothing above the Deity. (Cic. *N.D*. 2.75); Aulus Gellius, clarifying Chrysippus' thought, also defended divine providence, by explaining how the existence of evil follows providence and nature and does not deny them (*SVF* 2.1169-70). Also, the identification between nature and providence was already present in Zeno (*SVF* 1.176), as nature with art in the same author (*SVF* 1.171).

6. Kovačič (2003: 3) identifies two meanings for the concept of «nature» in Galen: one is the dynamic principle of the human's being immanent activity; the other one is the transcendental divine principle in the human being or «Baumeister» *i.e*., the master of construction, to whom Galen calls «demiurge». The discussion about the concept in the Galenic *oeuvre* is complex. The general meaning of φύσις in it was developed by Kovačič (2001) and in the 14th chapter of the book *Greek Medicine from Hippocrates to Galen* entitled «Galen's Concept of Nature» – Jouanna 2012.

6.232-235, where Homer shows that it was Hephaestus and Athena who have taught all arts to a skilled man:

> ῾Ως δ'ὅτε τις χρυσὸν περιχεύεται ἀργύρῳ ἀνὴρ
> ἴδρις, ὃν ῞Ηφαιστος δέδαεν καὶ Παλλὰς Ἀθήνη
> τέχνην παντοίην, χαρίεντα δὲ ἔργα τελείει,
> ὣς ἄρα τῷ κατέχευε χάριν κεφαλῇ τε καὶ ὤμοις.
>
> As when a skilled man, one whom Hephaestus and Pallas
> Athena have taught all manner of crafts, overlays gold on silver,
> And graceful are the works of art he creates,
> So she poured grace down over his head and shoulders[7].

But after the *Iliad* and the *Odyssey*, in literature and philosophy, the gap between arts and the divine plan or the absolute is progressively more notorious, with different authors, such as Aeschylus (*Prometheus Bound*), Isocrates (*To Nicocles*) or Plato (*Hippias Minor*, *Charmides*, *Euthyphro*) trying to find a way by which arts (τέχναι) and knowledge (ἐπιστήμη) could eventually reflect and harmonize with the absolute truth, good or happiness.

So, we have these two different concepts – one (φύσις) representing the spontaneous, innate, out of humans' control process of creation, and the other, τέχνη, manifesting the reachable, wholly defined, and tangible way of creating something by human means. Humans can completely master a τέχνη but cannot master φύσις, because it is φύσις who regulates humans and not the opposite. The limits of τέχνη consist in the fact that no human art could ever access the hidden truth contained in φύσις. As such, τέχνη, even if is a way of creating something, and trying to imitate φύσις in this process, will always, as to say, stay behind it.

Plato, along with Aristotle, discussed the two concepts, mainly in *Laws* X, *Republic* X and in *The Sophist*. In *Laws* 889a, he discusses the relationship between art and nature, in order to prove that in the legislative process, human art has its model in the divine art and is not a deviation from nature. He asserts that all things come into being either by art, or nature or chance (τύχη), and that the greater and most beautiful things (τὰ μέγιστα αὐτῶν καὶ κάλλιστα) are done by nature and by chance, while the lesser things (σμικρότερα) by art, establishing this way a scale of importance between things made by nature and by art. Besides that, he establishes also a sort of a scale between τέχναι, as painting, poetry

7. The same idea is expressed in Hom. *Od*. 23.159-163.

and other arts of the sort have a little share in truth, while some others, such as medicine, agriculture and gymnastic participate in nature, and are more serious.

Also, in *The Sophist* (265e) Plato makes a universal division between two kinds of art, divine and human, and draws a line between the multiple subdivisions among the human arts. In the *Republic* 597a, he identifies three types of artificer, with the purpose of pointing the falsity of mimetic or representational art. At the top of this scale is God, the author of natural creation and the maker of the ideal bed existing «in nature». After him is the carpenter and in the third place of the scale, the painter who is three levels away from nature and consequently, from the truth[8].

As Plato, Aristotle considers φύσις superior when compared to τέχνη, as we can verify in *Nichomachean Ethics* 1106b15, where he says that virtue, like nature, is more accurate and better than any form of art (Ἡ δ' ἀρετὴ πάσης τέχνης ἀκριβεστέρα καὶ ἀμείνων ἐστὶν ὥσπερ καὶ ἡ φύσις, τοῦ μέσου ἂν εἴη στοχαστική). *Parts of Animals* 639b15 presents the same interpretation: the λόγος and the cause of things are present both in the products of nature and in those of art, and causality and beauty are more present in the works of nature than in those of art. In *Metaphysics* 1070a8, recalling Plato, Aristotle asserts that things are generated either by art, by chance or spontaneously, and that art has an external generative principle, while nature has an internal one. As analysed by Close (1971: 172) «While art is an external principle of change, nature is an internal one, giving substantial form and an autonomous power of evolution to the thing in which it is located. Further, nature is more powerful and serves its final end better than works of art. The metaphysical analysis of nature's characteristics is based on the assumption that nature and art are parallel creative processes, since one imitates the other».

We find a different idea in *Physics* 199a15, when the author affirms that art either imitates (μιμέομαι) or completes (ἐπιτελέω) things that nature was not capable of finishing (ἀπεργάζομαι). So, here, art surpasses nature in its creative power, what is also in conformity with the idea expressed in *Poetics* 1448a, where is stated that mimetic artists can represent people better than the normal level, worse than it, or much the same[9].

The given examples prove the importance of φύσις and τεχνή in philosophy and literature before Galen. He inherited the precedent intellectual dialogue regarding these concepts and adapted it to his ideas. But, as it is common and

8. Gonzalez (2018) presents a study about the idea of μίμησις in Plato's *Republic*. For the relationship between art and nature in Plato and Aristotle's works, *vide* also Bawden 1910.

9. The Aristotelian theory of the μίμησις is developed, for example, in the studies of Trench (1933) and Woodruff (2015).

natural in a lot of galenic writings dedicated to medical subjects, the concepts are not analysed with such depth as in philosophical works, as the author recognizes, for example, in *The formation of the embryo* 4.695.2-6K, where he states that the organs are a product of an intelligent creator, but refuses to go further into the analysis of the essence of this creator, leaving the inquiry about its identity to the philosophers, as we can understand by reading the following excerpt:

> Ἐγὼ μὲν, ὡς ἔφην, οὐκ ἄν ποτε πεισθείην ἄνευ σοφωτάτου τε καὶ δυνατωτάτου δημιουργοῦ γεγονέναι. Τίς δ'οὗτός ἐστιν, ἐλπίζομεν ἔμπροσθεν ἀκούσεσθαι παρὰ τῶν φιλοσόφων, οἵ γε καὶ περὶ τοῦ κόσμου καὶ τῆς ὅλης γενέσεως ἀποφαίνονται.
>
> As I have said, I could never be persuaded that these have come about without an extraordinarily intelligent and powerful craftsman. As to the identity of this craftsman, I had hoped to learn this from the philosophers who pronounce on the universe and on the generation of all things.

Likewise, in *On the Usefulness of the Parts of the Body*, there is not a profound reflection on what φύσις or τέχνη means. Through this work, the author shows how the observable functioning of the human body is proof of nature's art, which is admirable because it was responsible for making the perfect structure to the corresponding functions. He uses the concepts with philosophical meaning; however, he doesn't reflect much on them, mainly using them to frame and justify the medical knowledge he wants to communicate.

In the 14th and 15th books of this work, dedicated to male and female reproductive organs, he continues this line of thought by presenting the structure and function of the mentioned organs as proof of a perfect action from an external creator. The particularity of these books consists, on the one hand, in showing the reproductive organs as the main tools by which φύσις assure its purpose, the perpetuation of the species, and on the other hand, in presenting the τέχνη of replacing one living being with another as the specific art by which the perpetuation of the species is possible, something that does not occur with other parts of the body.

So, at the beginning of the 14th book, φύσις appears as a personified agent, who ideally would have done its creation immortal, but matter (namely arteries, veins, nerves, bones, and meat) prevented its work (δημιούργημα) from being immortal, due to its corruptibility. Therefore, φύσις found an alternative for making its creation immortal through an admirable art (θαυμαστήν τέχνην), which consists of replacing one living being with another, by giving reproductive organs to animals and uniting to these organs one particular function to the production of pleasure and to the soul, the desire to make use of them:

> Μάλιστα μὲν οὖν ἀθάνατον ἡ φύσις, εἴπερ οἷόν τ'ἦν, ἐσπούδασε τὸ ἑαυτῆς ἀπεργάσασθαι δημιούργημα· μὴ συγχωρούσης δὲ τῆς ὕλης – ἐξ ἀρτηριῶν γὰρ καὶ φλεβῶν καὶ νεύρων καὶ ὀστῶν καὶσαρκῶν οὐχ οἷόν τ' ἦν τὸ συγκείμενον ἄφθαρτον γενέσθαι - τὴν ἐνδεχομένην αὐτῷ βοήθειαν εἰς ἀθανασίαν (...) θαυμαστήν τινα τέχνην ἐξευρούσης αὐτῆς, ὡς ἀεὶ τῷ διαφθειρομένῳ ζῴῳ νέον ἕτερον ἀντικαθίσταιτο. Gal. *UP*, 4.143.5-4.144.3K.
>
> Certainly, nature would have been eager to make the work of her hands immortal if she could have done so. But when her material did not admit of this – for anything composed of arteries, veins, nerves, bones and fleshes could not be made incorruptible – she contrived what was possible to help it toward immortality (…) she has discovered a wonderful art whereby, when an animal dies, she may always put a new one in its place.
>
> Ἅπασι τοῖς ζῴοις ὄργανά τε κυήσεως ἡ φύσις ἔδωκε καί τινα συνῆψεν αὐτοῖς μὲν τοῖς ὀργάνοις ἐξαίρετον δύναμιν εἰς γένεσιν ἡδονῆς, τῇ χρησομένῃ δ'αὐτοῖς ψυχῇ θαυμαστήν τινα καὶ ἄρρητον ἐπιθυμίαν τῆς χρήσεως, ὑφ' ἧς ἐπεγειρόμενα καὶ κεντριζόμενα, κἂν ἄφρονα κἂν νέα κἂν ἄλογα παντάπασιν ᾖ, προνοεῖται τῆς τοῦ γένους διαμονῆς, ὥσπερ εἰ καὶ τελέως ἦν σοφά. Gal. *UP*, 4.144.7-14K.
>
> Nature has given to all humans/living beings instruments for conception, and to the instruments themselves she has joined a remarkable faculty to produce pleasure and to the soul that is to make use of them a marvellous, inexpressible longing to do so, which rouses and stings the animal so that even though it is foolish, young, and altogether without reason, it provides for the continuance of the race/species just as if it were perfectly wise.

The pleasure derived from desire is presented as an ingenious tactic (σόφισμα, 4.145.1K) nature uses due to a lack of wisdom both from living beings themselves and from the substance they are made of. We could think that the author presents φύσις with a fault because, in some way, it appears limited by the essence of the matter. But this limitation must be faced not as a fault but as part of the organization of things intrinsic to nature and as a characteristic that doesn't make it less powerful. Nature is even aware of the limitation derived from matter and has tools, through τέχνη, to overcome what eventually would be considered a constraint[10]. This τέχνη is subjected to φύσις and serves it, but we can say that without τέχνη, φύσις wouldn't be able to perform its function, that is, to ensure a way of making immortality possible to the species.

10. In this aspect, it is possible to conclude that τέχνη finishes what φύσις was not capable of, the Aristotelian idea expressed in *Physics* 199a15.

Galen takes φύσις as a superior entity who created living beings not by some irrational chance (τύχης τινὸς ἀλόγον), but by acting with a forethought or providence (πρόνοια, 4.152.17K). In many parts of the work, the author uses the word δημιουργός as a synonym for φύσις[11], a reminiscence, already mentioned, of Plato's God in *Timaeus*, which also works through providence, showing that everything that was made, was made as such according to the highest good. So, φύσις in the 14th and 15th books of *On the Usefulness of the Parts of the Body* has a divine agency, and another proof of that is the fact that the author used the word «gods» (θέους) in 4.180.5K to refer to the entity that created living beings. The providence through which nature acts is related to the fact that φύσις does not make anything in vain (μηδὲν μάτην ἡ φύσις ἐργαζομένη – 4.228.16-17K; οὐδὲν δ' ἡ φύσις ἐργάζεται μάτην - 4.240.19K), one idea that Galen also seems to have taken from Aristotle[12], who expresses it in several works as *Parts of Animals*[13]*, On the Soul*[14], *Progression of Animals*[15] or *Generation of Animals*[16]. This provident nature makes every part of the body suitable for its purpose, and that is why its art is admirable (θαυμαστήν).

The admirable art of nature is something evident, as the author shows in 4.186.6-7K, stating that it is impossible not to marvel at the art of nature (ἀδύνατον αὐτῷ μὴ θαυμάσαι τὴν τέχνην τῆς φύσεως) if one is familiar with the dissection of the parts of the body. In this sense, the wonder of the purpose of nature's art can be found in dissection, in the structure, place, and functioning of the reproductive organs.

11. *E.g.* 4.145.14K ; 4.156.13K ; 4.162.13K ; 4.164.14K. In the chapter «Galen's woman», Flemming (2000: 303-329) also develops the relationship between the two concepts in the galenic representation of women.

12. «Nature does nothing in vain» is the subject developed by Gottlieb & Sober (2017).

13. Arist. *PA*. 641b12-13: «Further, no abstraction can be studied by natural science, because whatever nature makes, she makes to serve some purpose» (Ἔτι δὲ τῶν ἐξ ἀφαιρέσεως οὐδενὸς οἷόν τ᾽ εἶναι τὴν φυσικὴν θεωρητικήν, ἐπειδὴ ἡ φύσις ἕνεκά του ποιεῖ πάντα).

14. Arist. *de An*. 434a30-3: «But an animal must have sensation, if it is a fact that nature does nothing in vain. For all provisions of nature are means to an end, or must be regarded as coincidental to such means» (Τὸ δὲ ζῷον ἀναγκαῖον αἴσθησιν ἔχειν, εἰ μηθὲν μάτην ποιεῖ ἡ φύσις. ἕνεκά του γὰρ πάντα ὑπάρχει τὰ φύσει, ἢ συμπτώματα ἔσται τῶν ἕνεκά τοῦ).

15. Arist. *IA*. 708a9-13. «The reason why snakes are footless is, first, that nature creates nothing without a purpose but always with a view to what is best for each thing within the bounds of possibility (...)» (Τοῖς δ᾽ὄφεσιν αἴτιον τῆς ἀποδίας τό τε τὴν φύσιν μηθὲν ποιεῖν μάτην· ἀλλὰ πάντα πρὸς τὸ ἄριστον ἀποβλέπουσαν ἑκάστῳ τῶν ἐνδεχομένων).

16. Arist. *GA*. 36-38. «Now, as nature does nothing that is superfluous or pointless, it is plain that she will not do anything too late or too soon, for in that case what was done would be either pointless or superfluous» (᾽Επεὶ δ᾽ οὐθὲν ποιεῖ περίεργον οὐδὲ μάτην ἡ φύσις, δῆλον ὡς οὐδ᾽ ὕστερον οὐδὲ πρότερον· ἔσται γὰρ τὸ γεγονὸς ἢ μάτην ἢ περίεργον).

So, in females, the uterus is placed below the stomach because it is the best place for sexual intercourse, the reception of the sperm, foetal growth, and birth (4.145.14-4.146.2K). Likewise, the cervix was made by nature full of nerves so that it can expand, contract and stiff in order to avoid that, in these transitions, it would suffer any damage and to remain straight in the semen's reception. Also, breasts are connected with the uterus because, like the uterus, they are small while women are developing but get bigger when the time to conceive arrives (4.154.7-4.154.15K). In men, the hollow structure of the penis is the best possible to allow the change of position for the sexual intercourse, and its placement further up or down would result in great discomfort or danger of wound (4.213K). Thus, in women, as in men, there is no better place to put the sexual organs, with the difference that what in men is outside, in women is inside (4.158.14K). Besides, male testicles are bigger, because the male is hotter than the female (4.164.9-11K).

But Galen tells us that it's not easy to explain nature's works (and the verbs he uses are ἐξηγέομαι 4.157.3K/ἑρμηνεύω 4.224.6-7K), and because of that, the observation of the parts (τῶν μορίων ἡ θέα) will add (προσθήσει) what lacks to the discourse (τῷ λόγῳ) – 4.158.12-14K. Due to the fact that he values the conclusions derived from observation over rational explanations, he says at 4.169.7-9K that he will show the cause of sexual differentiation not through persuasive words (λόγοις πιθανοῖς), but through clear proofs discovered in dissections (ἀλλ' ἐναργέσιν ἀποδείξεσιν ἐκ τῶν ἀνατομῶν εὑρισκομέναις). But, after that, he shows what seems a contradiction by stating that the wonderful art of nature is visible through the discourse (4.169.9-11K). So, he always needs words to explain dissection, and by criticizing the use of persuasive words, he is criticizing those who use words deprived of the evidence resulting from observation to explain the phenomena (mainly the sophists[17]), but he is not refusing the power of words to describe the experience.

Indeed, as many studies suggest, like Nutton (2021); Von Staden (1995; 1997) and Petit (2018), although Galen criticizes the sophists in the majority of his work, he has many similarities with them. These similarities occur in several aspects, as Von Staden (1997) develops in his article, proving that Galen used many words and procedures characteristic of the sophists' performances. Nutton (2021: 117) points out similarities between Galen's social background and that of the sophists'. In his article, Chiaradonna (2014) explains Galen's position concerning the use of persuasive and truthful words: he relates the use of persuasion

17. 3.801.13-3.804.7K.

with the sophists and criticizes it. However, Galen himself used a lot of sophistic schemes to create a persuasive speech, like self-appraisal. He also used terms that denote affection from the part of the public (such as θαυμάζεσθαι, θαῦμα, ἐκπλήσσω) or words that point to a spectacular performance (such as ὁρᾷν, ἰδεῖν, θεᾶσθαι, ἀκούειν) as points out Von Staden (1997: 51), who affirms that «both the anatomical and the sophistic performer thus deploy mutually reinforcing visual, verbal, and affective elements to attain the desired effects in their audiences».

But even if words are used to express the conclusions found in dissection, there will always be limits to discourse regarding the processes of φύσις, which are of the same order as the limits of human understanding compared to a superior action, continuing the idea already mentioned and developed by some philosophers of nature that in φύσις there is an unreachable part that is impossible to understand or replicate by human action. In that sense, the author believes that even if we are not capable of explaining all of nature's works, because they are hard to explain (δύσφραστα), we should at least try to observe and comprehend them all (νοῆσαι, 4.157.2-5K). Also, in some passages, he expresses the limits of human knowledge, as in 4.218.7-16K, when he affirms that we should not try to understand how the bodily parts arrived to be the way they are, being enough to acknowledge that every part has the suitable structure for its corresponding function; or in 4.198.12-14K, where he says that it is not easy to explain the wonder behind the organization of the bones; or even in 4.224.4-8K, where he affirms that it is difficult to explain clearly (χαλεπὸν μὲν ἑρμηνεῦσαι σαφῶς) how many art φύσις used to give shape to the living being who was being formed. It also arrives that, when Galen does not know the reason for the functioning of some part of the human body, he declares that it is a problem of nature itself to solve, as when he cannot explain the mechanism by which the nerve of the masculine sexual organ is full of πνεῦμα (4.220.16-18K). Besides expressing the intrinsic limitations of words and human understanding, these statements can also reflect a lack of medical knowledge and are a way of solving and justifying it.

But, even if he is aware of these limitations, Galen tries to put words to the service of knowledge. As explained Mercedes Salvá in the introduction to *On the Usefulness of the Parts of the Body*'s translation, Galen cares about the use of language and defines terms that may be not clear to all his readers, because he knows that precision in words is the key to understanding concepts and that without it, science does not exist. He creates a «rhetoric of science» that gives him credibility in the field of knowledge, once his truths, based on data collected from experience, offer verifiable certainties that give men the possibility to control their body's health and soul's virtue by regulating their way of life. (p.12).

To make clear his discourse, Galen even uses a lot of resources from imagination: when he says, for example, that the sexual «parts» of women are inside and the masculine outside, he invites us to «imagine» or project in our mind (νόησον) the opposite – what would happen if the masculine parts were inside (4.159.5K); he does the same for the possibility that the feminine sexual organs are outside (4.159.14K), inviting us to imagine how it would be. The personification of φύσις is also part of this imaginative way of presenting knowledge, softening the aridity of anatomical description and rendering its understanding easier. The use of analogies has also this purpose: at 4.160.7K Galen compares the effect of the lack of heat that prevented moles'eyes to come out to the same effect in women's genitalia.

The fact that the use of analogies facilitates the understanding of his explanations is also notorious, for example, in *Anatomical Procedures* 2.218-16-18K[18], when Galen compares bones to the walls of the houses, or when at *On the Usefulness of the parts of the body*, at 3.371.5K when he compares the veins at the intestine with the roots of the trees[19].

Besides, this kind of resource seems to be used by Galen also as a way to give credibility to his statements, which has a rhetorical effect[20]. The relationship between medicine and rhetoric was developed by Pender. In his article, he tells us that «Ancient medicine is a repository of metaphors and methods applicable to history and political theory, literary criticism and ethics» (2005: 43) and that «Rhetoric – as a practical, prudential interpretation of probable signs directed toward intervention in a given situation – is at the heart of medical practice. Sign-inference, exemplarity and analogy – and the shared attention to the probable, to "what might be otherwise" that lies at the heart of rhetoric – enable the physician to conjure, to grasp through "mental sight", the absent presence of disease» (2005: 62).

So, to explain how φύσις planned the immortality of the human beings, he used the analogy of a city's founder, who doesn't think only about the moment of its establishment but plans the polis' maintenance in the long-term. Likewise, through the art of replacing one living being with another, nature made its work last for a long time.

18. Ὁποῖόν τι ταῖς σκηναῖς οἱ καλούμενοι κάμακές εἰσιν, καὶ ταῖς οἰκίαις οἱ τοῖχοι, τοιοῦτον ἐν τοῖς ζώοις ἥ γε τῶν ὀστῶν οὐσία (As poles to tents and walls to houses, so are bones to living creatures).

19. Τὸ δὲ δὴ λοιπὸν ἔτι τῆς περὶ τὰ νῦν προκείμενα μόρια διηγήσεως ἔργον τε καὶ τέχνημα τῆς φύσεως ἤδη λεγέσθω. πάμπολλα μὲν εἰς ἕκαστον τῶν ἐντέρων ἐπεραιοῦτο στόματα φλεβῶν οἷον δένδρου τινὸς ἔσχατά τε καὶ λεπτὰ ῥιζῶν πέρατα.

20. For the use of rhetoric and second sophistic in the galenic work, *vide* Von Staden 1995.

Following that, nature's work is classified at the beginning of 14th book as δημιούργημα, also a manual work, linked with the analogy of the artisans (δημιουργοί) presented in book 15th, in which Galen compares houses and boat artisans to φύσις' action[21]. In other parts of the work, Galen also uses analogies from products of crafts/manual arts to explain bodily functions, namely those that involve construction: at 3.688.10-11K, he says that the head is placed above all body limbs as the roof of a warm house; at 4.91.1K, he compares the spine to a ship's keel or foundation (τρόπις), at 4.63.9K to vaults in architecture (ψαλίδας); the mechanism of assuring security to the vertebrae is compared to that of walls at 4.86.2-7K. So, through these examples, we can prove that Galen uses what is classified as a literary resource to explain objective phenomena, and by doing that, he also uses persuasive words to convince.

These last examples prove that φύσις works in a very similar way to what is observable in reality through the different τέχναι of building houses or ships. In that sense, φύσις can be compared to a δημιουργός, here not with the divine or extra-human meaning, but as a craftsman who knows the art of building or producing things. In book 3, we find the making of the human body compared to a sculpture made by Phidias[22]. We also find it in some extracts of the book *On Natural Faculties*, showing once again the connection between manual crafts and the formation of the body:

> Καθάπερ γὰρ ὁ Φειδίας εἶχε μὲν τὰς δυνάμεις τῆς τέχνης καὶ πρὶν ψαύειν τῆς ὕλης, ἐνήργει δ' αὐταῖς περὶ τὴν ὕλην – ἅπασα γὰρ δύναμις ἀργεῖ ἀποροῦσα τῆς οἰκείας ὕλης – οὕτω καὶ τὸ σπέρμα τὰς μὲν δυνάμεις οἴκοθεν ἐκέκτητο, τὰς δ' ἐνεργείας οὐκ ἐκ τῆς ὕλης ἔλαβεν, ἀλλὰ περὶ τὴν ὕλην ἐπεδείξατο τὰς μὲν δυνάμεις οἴκοθεν ἐκέκτητο, τὰς δ'ἐνεργείας οὐκ ἐκ τῆς ὕλης ἔλαβεν, ἀλλὰ περὶ τὴν ὕλην ἐπεδείξατο. Gal. *Nat. Fac*. 2.83.17-2.84.3K.
>
> For in the same way that Phidias possessed the faculties of his art even before touching his material, and then activated these in connection with this material (for every faculty remains inoperative in the absence of its proper material), so it is with the semen: its faculties it possessed from the beginning, while its activities it does not receive from its material, but it manifests them in connection therewith.

21. 4.241.15-4.242.3K
22. 3.238.13-18K.

> Τίνα ζητήσομεν ἐνταῦθα τρίτον ἐπιστάτην τοῦ ζῴου τῆς γενέσεως, ὃς χορηγήσει τῷ σπέρματι τὸ σύμμετρον αἷμα; (…) τὸ σπέρμα αὐτὸ δηλονότι· τοῦτο γάρ ἐστιν ὁ τεχνίτης ὁ ἀναλογῶν τῷ Φειδίᾳ, τὸ δ' αἷμα τῷ κηρῷ προσέοικεν. Gal. *Nat. Fac*. 2.84.11-15K.
>
> What is the third overseer of animal generation that we are to look for, which will furnish the semen with a due amount of blood? (…) Obviously, the semen itself. This, in fact, is the artificer analogous with Phidias, whilst the blood corresponds to the statuary's wax.

Phidias is the sculptor who, through a τέχνη, gives shape to matter. In the same way, the male sperm gives the foetus an artistic form (μορφὴν τεχνικήν), that is, change it from a shapeless and inert piece of flesh into the form of a living being. So, here τέχνη is also the principle of shaping the objective reality; without it, the matter would be shapeless. And this is the exact role τέχνη plays when it comes to φύσις – it gives plausible objectivity to the idea of immortality by organizing the sexual organs oriented to reproduction.

It is possible to conclude that in the 14th and 15th books of *On the Usefulness of the Parts of the Body*, nature is the agent responsible for the creation and functioning of the sexual organs, giving continuity to the idea of the previous books dedicated to other parts of the body. Nature possesses the τέχνη of replacing one living being with another and, by that, ensures immortality for the species. It is admirable because it made the bodily parts perfectly aligned with their functions, and this feature is related to the divine way through which φύσις makes everything with a purpose, being the reason why it is also identified with God or the creator.

The admirable art of φύσις is visible through dissection, a method that fills the gaps in knowledge and in the discourse. But is always through the discourse that Galen explains the observation of the body. He even makes use of literary resources, namely analogies that frequently compare the action of nature with that of the human crafts, and through them we verify that the artistic nature can also be compared to δημιουργοί, not with the divine or extra-human sense, but in the more practical reality of a craftsman. This parallel takes us also to book 3 and some extracts of *On Natural Faculties*, where we find the making of the human body compared to the process of making a sculpture. As the sculptor gives shape to matter, he is working on through a τέχνη; also the male sperm is crucial in the process of giving shape to the flesh. And we can compare it to the action of τέχνη, being the principle by which reality takes form. In the same way, in the 14th and 15th books of *On the Usefulness of the Parts of the Body*, τέχνη is the way by which the immortality (ἀθανασία, *UP* 4.143.10K) contained in the

divine or superior entity of φύσις is materialized in the objective reality, given the impossibility, from nature's part, to make her work (δημιούργημα) immortal (ἀθάνατον, *UP* 4.143.5K). In other parts of the work, Galen developed the sense that bodily features follow soul's purpose[23]. In the case of reproduction, it also serves an objective that is placed in the order of the extra-physical or divine. However, it is worthwhile to mention that the notion of «immortality», reflected by the words ἀθανασία and ἀθάνατον does not refer to the religious or metaphysical concept rooted in the idea of immortality of the soul inherited from Plato that arrived to Christianity[24], but to a more earth-rooted notion that humankind needs to survive in time.

And regarding the perpetuation of the species, the reproductive organs perform a different and more important role than all the other parts of the body because they serve as tools to make immortality possible, giving shape to the perpetuation of the species. And because of that, the connection between the abstract or superior world and the material one, in which the body exists, is in these books more present and developed.

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23. See the work of Devinant (2020) regarding this subject.

24. However, it is worthwhile to mention that the notion of «immortality», reflected by the words ἀθανασία and ἀθάνατον does not refer to the religious or metaphysical concept rooted in the idea of immortality of the soul inherited from Plato that arrived to Christianity, but to a more earth-rooted notion that humankind needs to survive in time. The meaning, in Greek thought, of the platonic notion of immortality of the soul and its correspondent relation with Christianity is developed by Jaeger (1959).

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