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*Source / Izvornik:* **Rhizai: A Journal of Ancient Philosophy and Science, 2005, 2, 183 - 196**

**Journal article, Published version**

**Rad u časopisu, Objavljena verzija rada (izdavačev PDF)**

*Permanent link / Trajna poveznica:* <https://um.nsk.hr/um:nbn:hr:261:452252>

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*Download date / Datum preuzimanja:* **2025-02-23**



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## PLATO'S AND ARISTOTLE'S EXPLANATION OF HUMAN POSTURE

*Pavel Gregorić*

It is well known that the most distinctive physiological features of human beings are erect posture and large brain relative to body mass. The size and complexity of human brain are intimately connected with the distinctly human ability to think and use language. Such an advanced software, to put it in modern terms, requires a suitably large and complex hardware. To my knowledge, the ancients were not alert to the fact that humans have large brain relative to body mass, nor did they in any way correlate brain size with cognitive abilities. However, the ancients were aware that human beings are unique in having an erect posture and the ability to think.

Some anthropological theories, both ancient and modern, make no connection between erect posture and the ability to think. Xenophon reports a conversation in which Socrates tries to convince Aristodemus that gods take care for their creation.

In the first place, human being is the only living creature that they have made to stand erect, and the erect posture enables him to see more in front and to better observe things above (τὰ ὕπερθεν) and to suffer less distress. Secondly, to beasts they gave legs that enable them to move about only, whereas human being they equipped also with arms which achieve most of the things in virtue of which we are happier than them. (Xenophon, *Memorabilia* I.4.11)

In addition to erect posture and arms, gods' care for human beings in Xenophon's account is manifest in mobile tongues that enable us to converse, and a lack of prescribed mating season. Once these physiological tokens of divine care for human beings have been enumerated, Socrates passes on to the soul. Gods are said to have endowed humans with the best kind of soul with which we are uniquely capable of apprehending the existence of gods and their magnificent arrangement of things in the world. However, Socrates makes no attempt to link the enumerated bodily features of human beings with their unique soul and cognitive abilities.

Xenophon is not alone in this. The most recent and striking theory of human posture, advanced by Bramble and Lieberman, is that erect posture developed as a result of long-distance running which had great evolutionary value for our distant ancestors.<sup>1</sup> To put it simply, we have erect posture in order to run for miles and cover great distances in search for food. There is no direct correlation between this physiological feature of human beings and their relative brain size or cognitive abilities.<sup>2</sup>

On the other hand, there are anthropological theories, again both ancient and modern, which do establish some connection between erect posture of human beings and their cognitive abilities. Plato and Aristotle advanced such theories, and in this paper I want to analyse them in some detail and compare them. But before I do so, I should briefly mention a modern example of such a theory to illustrate that Plato's and Aristotle's efforts to connect erect posture of human beings with their unique cognitive abilities, although hopelessly antiquated in detail, were not at all peculiar to their time.

In 1876 Friedrich Engels wrote the essay 'The Part Played by Labour in the Transition from Ape to Man', published posthumously in 1896. In that piece, Engels claimed that erect posture was the first and most significant step in human evolution because it enabled our ancestors to use their hands to make tools and to engage in labour.<sup>3</sup> The development of labour created social behaviour and, with it, language and rational thought. A crucial part of Engels' theory was his insistence that our cognitive abilities were the last of our unique features to develop, and their development, according to Engels, was made possible by erect posture which made hands free. Engels' theory ran against the popular view at the time, advocated by Charles Darwin in *The Descent of Man*, according to which growth in brain size and cognitive abilities must have occurred before the transition to an erect posture. However, the discovery of a hominid with a small, ape-sized brain and an erect posture in 1974 (the now famous 'Lucy') proved Darwin wrong, although it is debatable whether, and to what extent, it proved Engels right.

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<sup>1</sup> Bramble, D. M. and Lieberman, D. E., 'Endurance Running and the Evolution of *Homo*', *Nature* 432 (2004), 345–352. Myles Burnyeat called my attention to the results of Bramble and Lieberman which were reported in the press.

<sup>2</sup> According to Bramble and Lieberman (*ibid.*, 351), though, erect posture enabled efficient long distance running, and long distance running in turn enabled efficient scavenging which provided our distant ancestors to have a diet rich in fat and protein necessary for having a large brain.

<sup>3</sup> Note that Xenophon in the quoted passage anticipates not only the connection between erect posture and free hands, but also the great value of free hands.

Unlike Engels, who thinks that it is labour that makes us what we are, Plato thinks that it is our ability to think. Here's an outline of the story from the *Timaeus*.<sup>4</sup> The rational part of our soul is made by the Demiurge himself of the same (only less pure) ingredients and in roughly the same way as the world-soul. Hence the kinship and likeness of our rational souls to the world-soul. The world-soul is made of two circles, that of the Same and that of the Different, and so are rational souls. The world-soul's circle of the Same accounts for the perfectly regular motion of the outer heaven with fixed stars, whereas the circle of the Different accounts for irregular yet not entirely disproportionate motions of the planets. The human rational soul's circle of the Same accounts for our ability to think, that is to apprehend things that are and never come into being (Forms). The circle of the Different accounts for our ability to apprehend things that come into being (sensible particulars). The former kind of apprehension is done by the intellect (νοῦς), the latter by opinion or belief (δόξα, πίστις).

The purpose of the human being is to live a happy and just life, which Plato understands as a life guided by the fully developed rational part of the soul. Our rational soul is fully developed when revolutions of the Same and the Different that constitute it are made as orderly and smooth as our nature permits, which enables us to grasp Forms and have true opinions. In that orderliness and smoothness, our rational soul imitates revolutions of the world-soul.

However, it is not easy to have one's rational soul fully developed, since the rational part of the soul is accompanied by the spirited and appetitive parts, and, together with these two parts, it is placed in a body. This was necessary because the world without all species of mortal animals would be incomplete and unlike the paradigm. However, the task of creating mortal animals with suitable bodies was delegated by the Demiurge to the immortal animals that he created, the lesser gods. Imitating the Demiurge who provided the world-soul with a spherical body, the lesser gods shaped a spherical part of the body to accommodate a rational soul with its circles of the Same and the Different, and that part is the head. The head consists of the cranium which surrounds and protects the brain conceived as a large chunk of marrow. And according to Plato, marrow is the substance which binds the soul to the body. Now the head consists of thin bones and very little flesh because their abundance would render the marrow inside insensitive, and thus it would impair also its memory and sharpness.<sup>5</sup>

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<sup>4</sup> Important details of this story are aptly fleshed out in Filip Karfik's contribution in this issue.

<sup>5</sup> 74A7–10.

The head needed a vehicle to enable it to move about with facility. For that purpose the lesser gods provided the head with a body furnished with limbs for locomotion. But this body now required principles of nourishment and preservation, so the lesser gods created two irrational parts of the soul, the spirited and the appetitive part. This whole body in which the soul is embodied at birth undergoes intensive growth and development. The process of digestion, which is particularly vehement in infancy, creates great fluctuation of matter through the body which disturbs revolutions of the rational soul. Also, encounters with external objects create physical shocks and violent sensations which also compromise revolutions of the rational soul. Revolution of the Same is thus entirely blocked in childhood, which explains why children cannot think, and revolution of the Different is so confounded that children have only feeble and confused opinions. In order to surmount these difficulties and restore the circles of the rational soul into their natural condition, what is required is right nurture or regimen (*τροφή*).

However, hardships of the rational soul do not cease after infancy. The rational part of the soul has to fight irrational impulses of the two mortal parts of the soul, such as pleasure, pain and desire coming from the appetitive part, or fears, angers and hopes coming from the spirited part. The lesser gods tried to minimise the effects of these by locating the spirited part of the soul in the chest and the appetitive part even farther away from the head, namely in the abdomen, but these effects are still significant. What is required for the subjection of the two irrational parts of the soul to the rational one is right upbringing and habituation (*παιδεία, ἐπιτηδεύματα*).

Finally, what is needed to bring revolutions of the rational soul into perfect order is right education (*μαθήματα*), notably mathematics and philosophy. It should be obvious by now that it is quite difficult and laborious to have one's rational soul fully developed and to live rationally. It requires proper regimen, upbringing and education.<sup>6</sup> And since we largely depend on our community to provide us with these, it clearly follows that if we want to be perfectly rational and live just and happy lives, we need a community committed to imparting such benefits to its members. I imagine this would be the community described in the central books of the *Republic* and briefly summarised in the opening of the *Timaeus*.<sup>7</sup>

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<sup>6</sup> 87B6–8.

<sup>7</sup> 17C1–19B2. The case of Socrates may be taken to illustrate two things in this connection: first, that a supremely rational individual can occasionally crop up in a predominantly irrational community, and second, what is likely to happen to such an individual in such a community.

If one succeeds to develop one's rational part of the soul to its fullest and to subjugate the irrational parts, one's life will be happy and just. And when it ends, one's rational soul will rejoin the star to which it has been allotted upon its creation, and there it will enjoy a blessed existence ever after. If one fails to develop one's rational soul fully, however, one will be reborn as a woman. If one fails again, one will be reborn as an animal of some variety. As we shall see, the species of one's reincarnation depends on the extent to which one failed to develop one's rational soul.

Now to Plato's explanation of erect posture. In 43D–45A Plato establishes that the rational part of the soul is located in the head and that the head is fixed on top of the body (*ἐπάνωθεν*, 45A1). In 70A6 he uses a striking and influential metaphor when he speaks of the head as the 'acropolis' of the body.<sup>8</sup> This metaphor conveys the following four intuitions: (i) that the head is at the summit of the body, (ii) that it affords a vantage point over the body and its surroundings, (iii) that it is the place from which commands to the rest of the body are issued, (iv) that it is the residence of something divine. However, none of this implies an erect posture. We could perfectly well imagine a head fixed on the back of a quadruped body. Think of a carriage mounted on the back of an elephant: surely it could be called an 'acropolis' for the same reasons that Plato calls the head in the human body an 'acropolis'.

To see why the head fixed on the back of a quadruped body would not work for Plato, we have to go beyond the metaphor of acropolis and remember that the lesser gods fashioned the human body in such a way as to minimise the influence of the irrational parts of the soul by locating them at a safe distance from the seat of the rational part of the soul. Had the head been attached to the back of a quadruped body, the rational part would be very near the spirited and the appetitive parts and thus too susceptible to their influence. So the metaphor of acropolis implies an erect posture *only* if we supply some premisses from other parts of the text.

Erect posture of the human being is explicitly mentioned only at the end of the dialogue. Here is the crucial passage.

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<sup>8</sup> The Anonymous Parisian of Fuchs' *Anecdota medica graeca* (fr. 1) says that Hippocrates taught that 'the intellect (*νοῦς*) is placed in the brain like some sacred image in the Acropolis of the body'. The metaphor is not found in the extant Hippocratic corpus, and it is likely that the Anonymous Parisian took it from this passage in Plato's *Timaeus*. Galen probably had the *Timaeus* passage in mind when he used the same metaphor in *De remediis parabilibus* XIV.313 (Kühn).

As regards the most sovereign kind of soul in us, we must conceive of it in this way: god has given to each of us, as his daemon, that which we say resides in the summit of our body (*ἐπ' ἄκρῳ τῷ σώματι*) and which raises us from earth towards its kin in the heaven, since we are not an earthly but a heavenly plant, as they say most truly. For it is there, whence the soul first sprang into birth, that the divine <part of us> suspends our head or root and thus erects the whole body. (Plato, *Timaeus* 90A2–B1)

What this passage tells us is that our rational soul, which resides in the head, raises us from the ground towards its kin in the heaven. The expression 'kin in the heaven' (*τῶν ἐν οὐρανῷ συγγένειαν*) can be interpreted in several ways. The word *συγγένεια* can be taken in the concrete sense, designating a single kinsman or the whole kinsfolk,<sup>9</sup> but it can also be taken in the abstract sense, designating the very relation one has to one's kinsmen, i.e. kinship. Cornford seems to take it in the latter sense when he renders it 'celestial affinity'.<sup>10</sup> I find this interpretation unsatisfactory. It seems to me that something cannot be spatially directed towards the *relation* of affinity or kinship, but only toward another *thing* to which something may stand in that relation. We have to suppose, therefore, that there is something in the heaven to which the rational soul stands in the relation of kinship. Now this may be either the particular star to which a rational soul is assigned at creation, or the world-soul's circles of the Same and the Different. The former seems unlikely, not least because many stars rise and set depending on one's geographic location. Plato could hardly say that one is *raised* from earth towards a star which, relative to one's location, periodically sinks below the horizon.<sup>11</sup> This and similar problems do not arise if we suppose that the thing to which rational soul stands in the relation of kinship are the world-soul's circles of the Same and the Different, since their workings are always and everywhere present above one's head. However, we would like to know how exactly this relation of kinship brings it about that the body is raised from the ground and kept upright.

The following sentences are not much more informative either. Plato gives us another metaphor, that of a heavenly plant. This is how I understand the metaphor. Every plant has a root which is fixed into the soil. The soil is the origin of the plant on which the plant feeds and from which it shoots forth.

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<sup>9</sup> Cf. LSJ s.v. II.

<sup>10</sup> Cornford, F. M., *Plato's Cosmology: The Timaeus of Plato translated with a running commentary*, Routledge & Kegan Paul, London, 1937, 353.

<sup>11</sup> I owe this point to István Bodnár.

Now the head of the human being is analogous to the root of a plant in that the head houses a rational soul which has its origin in the heaven. Moreover, there is a sense in which the rational soul 'feeds' on the heaven, but this sense is not apparent from the metaphor itself or from this passage. We shall come back to this point and spell out the required sense. Finally, as the root fixed into the soil enables the plant to grow vertically up and stand straight, so the head rooted in the heaven keeps the rest of the human body suspended vertically down, thus making the body upright.

The text which explicitly mentions erect posture of the human being, then, does not fully explain why it is that the human being is erect. We learn that the human being stands upright because the rational soul, which is located in the head, gravitates toward the heaven and thus straightens up the body. We also learn that the rational soul gravitates toward the heaven because of its kinship with something in the heaven, but we are not told in what sense it gravitates and how this gravitation actually erects the body. Although our passage does not contain an answer to this question, it can be found in an earlier passage.

In 45B2–46C6, Plato gives an account of the mechanism of seeing. After that he pauses and says that we need to distinguish between accessory and real causes, that is between necessity and intelligence, or roughly how things are structured and for what purpose they are so structured. In 47A1–C4 Plato illustrates the distinction by providing an account of the real cause of sight in human beings. The real cause of sight, its main purpose, is to enable us to observe the heaven. Observation of regular change of day and night, of months, seasons, and years, led to the invention of number, gave us the notion of time, and incited investigation into the nature of the world. All this enabled us to discover philosophy which is pronounced to be 'the greatest good bestowed upon the mortal race by gods' (47B1–2).

A few lines latter we find another account of the real cause which seems to be an elaboration of the one just mentioned.

The god invented sight and gave it to us so that we can observe the revolutions of the intellect in the heaven and apply them on the revolutions of our own thinking, since they are akin to those – our revolutions that can be disturbed to those that cannot. And so that, having studied them and having acquired correctness in calculations according to nature, by imitating the completely unfaltering revolutions of the god we can stabilise the faltering revolutions in us. (Plato, *Timaeus* 47B6–C4)

What we can see in the heaven are various motions of stars and planets. By observing these motions we grow intellectually and develop a conceptual apparatus by means of which we discover their cause, the perfectly regular revolutions of the world-soul's circles of the Same and the Different. These



revolutions are said to be akin (*συγγενεῖς*, 47B8) to the revolutions of our rational soul, which confirms our interpretation of the expression 'kin in the heaven' (*τὴν ἐν οὐρανῷ συγγένειαν*) in 90A5. Anyway, having discovered the perfectly regular revolutions of the world-soul's circles of the Same and the Different, we have something to imitate with our rational soul. Our rational soul becomes fully developed when its revolutions become as regular and unfaltering as those in the heaven. In effect, this means that our rational soul will be in full control of our life and will suffer no disturbance from the irrational parts of the soul. So, in essence, sight is conducive to thinking and living rationally.

Now to fulfil this purpose well, the sense organ of sight has to be located at a place in the body which affords easy gazing at the heaven. The head on top of an upright body is a suitable location. There the eyes are raised well above the ground so as not to be screened by objects lying on the ground. Granted that the head is the best place for the organs of sight, one might wonder why the lesser gods have not planted the eyes on the summit of the head, rather than on the frontal side of the head (face), if the real cause of sight is to enable us to observe the heaven. The reason, I take it, is the accessory cause of sight, and that is to allow us to see things in front of us which is necessary for survival.<sup>12</sup> That would be very difficult if the eyes were planted on the top of the head. With the eyes planted on the frontal side of the head which is itself sufficiently mobile, looking in front, around and up is easy, and that serves both causes of sight.

What I am getting at here is that we have an erect posture in order to gaze at the heaven. Note that this is anticipated by Xenophon in the passage quoted at the beginning. There Socrates says that the human being is the only living creature made to stand erect, among other things, in order 'to better observe things above'. One might be tempted to speculate whether the source of this view was the historical Socrates. However that may be, it is sufficiently clear by now that for Plato gazing at the heaven is not an aim in itself. Rather, it is a means of developing our rational soul. Hence, we must conclude that, according to Plato, we have erect posture ultimately in order to think and live rationally.

Now we are in a position to address the questions we left unanswered. Our rational soul 'feeds' on the heaven – to complete the metaphor of a heavenly plant – in the sense that observation of the heaven supplies our rational soul with concepts and models for its activity. In other words, the heaven provides our rational soul with the material for its growth and development. As to the

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<sup>12</sup> 45A2–B4.

question how the kinship of our rational soul with the world-soul in the heaven brings about our erect posture, the answer is obvious: by way of sight. Rational soul gravitates toward the heaven in the sense that observing the heaven makes the rational soul grow. And this gravitation makes the body stand upright because the organ of sight, to fulfil its purpose well, has to be located in the head mounted on top of an erect body.

My conclusion is confirmed by Plato's account of the chain of reincarnations in 91D6–92C3. Those men who fail to fully develop their rational part of the soul, so that they are overpowered by their irrational parts and thus forced to live irrationally and unjustly, are reborn as women. Those who are not vicious and who are interested in observing the heaven, but in their dullness believe that sight reveals all there is to the heaven, they are reborn as birds.<sup>13</sup> Those who had no use for philosophy and paid no attention to the heaven had degenerate rational souls, so they are reborn as beasts of various sorts. Their heads are located closer to the ground and their skulls come in all sorts of irregular shapes to house the distorted circles of their undeveloped rational souls. In order to support their bodies, beasts are equipped with four legs. There are further degrees of degeneration of rational souls, which demand suitable housings: polypods with heads even lower to the ground, needing more than four legs to support their bodies, reptiles with heads on the ground, needing no legs to support their bodies, and finally aquatic animals submerged into murky depths and deprived of air.<sup>14</sup> What is at work

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<sup>13</sup> Plato's choice of animal for reincarnation of this sort of soul seems obvious enough. However, we should keep in mind that Plato's order of reincarnation preserves the order of presumed dignity of animals. The Greeks attached special value to birds by connecting them with gods and observing their behaviour as one of the main forms of divination. Plato seems to have been fully alert to the fact that bird is the only bipedal animal in addition to human being. The notorious Academic definition of human being as a featherless biped with straight nails was clearly intended to distinguish human being from bird; cf. *Def.* 415A11 and *DL* VI.40. There is no evidence that Plato correlated bipedalism of birds with their cognitive abilities, although some passages seem to indicate that he considered birds quite intelligent; cf. *Laws* 814B, 840D.

<sup>14</sup> In stressing that fish are deprived of pure air (*ἀναπνοή καθαρά*, 92B2, 4), Plato may be invoking the theory of Diogenes of Apollonia who connected the quality of air an animal breathes with its cognitive abilities. Theophrastus reports Diogenes' view that other animals are less sensible than humans because they breathe impure air from the ground; cf. 64 A 19 (*DK* II.56.13–29). This allows us to infer that Diogenes probably thought that erect posture of humans contributes to their intelligence insofar as it enables them to breathe purer air above the ground.

here is a *scala naturae* which correlates an animal's posture and habitat with the degree of intellectual corruption and moral deformity of the soul that it houses. To put it very simply, the farther away from the heaven an animal's head is, the less rational and moral is the soul housed in that animal's body.<sup>15</sup>

Let us now turn to Aristotle. He also saw a correlation between an animal's posture and its cognitive abilities, especially between an erect posture and the ability to think. However, Aristotle could not accept Plato's explanation of this correlation because it was based on premisses that he did not share. Aristotle did not accept the idea that order in the world comes from a divine craftsman fashioning the world according to a pre-existent plan. He could not accept Plato's view of the nature and origin of rational souls, the view that rational souls transmigrate and that other animals provide appropriate housings for the rational souls which failed in previous lives. He could not embrace Plato's division of the soul into the rational, the spirited and the appetitive part, because he found it arbitrary and inadequate.<sup>16</sup> He rejected Plato's view that the soul is actually divided into separate places in the body, because he thought that this compromised the soul's unity.<sup>17</sup> He spurned the idea that the rational part of the soul is located in the head, because he could not see how the brain could be connected with some vital functions (e.g. with some senses or with locomotion).<sup>18</sup> These are only some of Plato's premisses that Aristotle found repugnant, and this is not a place to elaborate on them. However, the preceding remarks suffice to show that Aristotle had to produce a different explanation of the correlation between an animal's posture and its cognitive abilities, one that will be in harmony with his physics and biology.<sup>19</sup>

Aristotle finds this explanation in the notion of bodily proportion, that is the proportion between the upper parts of the body (the trunk with its external and internal parts) and the lower parts (lower extremities with their external

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<sup>15</sup> An interesting question was raised by Mladen Domazet in discussion: what would Plato make of the giraffe? It is extremely improbable that Plato had any knowledge of giraffes, and even if he had, I do not think it would force him to revise his scheme. However, it is amusing to speculate what sort of person would be reincarnated as a giraffe. The modern astrologer, perhaps?

<sup>16</sup> Cf. *De anima* III.9 432<sup>a</sup>22–<sup>b</sup>7.

<sup>17</sup> Cf. *DA* I.5 411<sup>b</sup>5–8.

<sup>18</sup> Cf. *De partibus animalium* II.10 656<sup>a</sup>14–<sup>b</sup>7.

<sup>19</sup> I assume that biology comprises psychology as the study of the form of living beings, and physiology, as the study of their matter.

and internal parts).<sup>20</sup> There are two main bodily proportions. On the one hand, there is a bodily proportion such that the upper parts are more massive than the lower parts. This sort of bodily proportion Aristotle calls 'dwarflike' (νανώδης), and it applies to all animals, most perspicuously to quadrupeds. On the other hand, there is a bodily proportion such that the upper parts of the body are commensurate with the lower parts. Aristotle does not have a special name for this sort of bodily proportion, but we can provisionally call it 'manlike', because it is fully realised in normal grown up human beings. Manlike bodily proportion enables erect posture of human beings, which is the most natural posture. It is the most natural posture, according to Aristotle, because in this posture the upper parts of the body correspond with the absolute 'up' of the universe, and the lower parts of the body with the absolute 'down' of the universe.<sup>21</sup>

The notion of bodily proportion plays a role in the explanation of various kinds of animal locomotion. In dwarflike beings the upper parts are too heavy to be sustained by the lower parts of the body. This is why quadrupeds use the front limbs to support their upper parts, and consequently why they walk on all four feet. As for human beings, 'in order to make their upper parts light and easy to carry, nature took away the corporeal <constituent> from their upper parts for the weight of the lower parts; that is why the buttocks, the thighs, and the calves of the legs are made fleshy'.<sup>22</sup> So the upper parts of grown up human beings are of such a size and weight that they are easily carried by the lower parts of the body.

More importantly, with the notion of bodily proportion Aristotle establishes a correlation between an animal's posture and its intelligence. The amount of the corporeal constituent in the upper parts of the body determines two things: the constitution of internal organs, notably the heart, and the

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<sup>20</sup> In some passages Aristotle explains different postures of living beings with reference to different amounts of vital heat inside their bodies; cf. *PA* III.6 669<sup>b</sup>2–7, IV.10 686<sup>b</sup>27–31 and Lennox, J. G., *Aristotle: On the Parts of Animals I–IV*, translated with an introduction and commentary, Clarendon Press, Oxford, 2001, 317–318. This sort of explanation seems to go back to Democritus; cf. 68 B 5 (*DK* II.137.19–22). The two explanations of posture in Aristotle, one with reference to vital heat and the other with reference to bodily proportion, are complementary.

<sup>21</sup> *PA* II.10 656<sup>a</sup>7–13; *De respiratione* 13 477<sup>a</sup>21–23; *Historia animalium* I.15 494<sup>a</sup>26–<sup>b</sup>1.

<sup>22</sup> *PA* IV.10 689<sup>b</sup>12–15.

pressure that the superincumbent parts exert on it. The more corporeal a heart is and the greater the pressure upon it, the poorer its performance as the seat of perception and imagination will be. The less corporeal a heart is and the lesser the pressure upon it, the better it will function as the seat of perception and imagination. And since imagination is necessary for thinking, according to Aristotle, only a lighter heart with a smaller pressure will enable an animal to think, and such a heart is found only in bodies of manlike proportion. I infer this from two closely related passages from *De Partibus Animalium* IV.10. One of the passages is this:

The human being is the only erect animal because its nature and essence is divine; the function of the most divine is thinking and being intelligent (νοεῖν καὶ φρονεῖν); and that is not easy when much of the body is pressing from above, for the weight makes thought and the common sense sluggish. (Aristotle, *De partibus animalium* IV.10 686<sup>a</sup>27–31)

I take it that Aristotle here wants to say that the weight of the superincumbent parts pressing from above makes the heart dysfunctional as the seat of perception and imagination, and this in turn renders thinking impossible.<sup>23</sup> The second passage explicitly refers to the first and calls the heart ‘the principle of the soul’.<sup>24</sup>

The bird and the fish kind, and every blooded kind are, as has been said, dwarflike. And because of this all animals are less intelligent than human beings. And even among human beings, children in comparison with adults, and among adults in their prime those that are naturally dwarflike <in comparison with those that are not>, even if they possess some other superior capacity, they are deficient in the possession of intellect. And the cause, as already stated, is that their principle of the soul is indeed very sluggish and corporeal. (Aristotle, *De partibus animalium* IV.10 686<sup>b</sup>20–28)

According to Aristotle, then, the human being is the only animal with manlike bodily proportion. And the human being has this particular bodily proportion because it makes the heart finer and puts it under lesser pressure from the superincumbent parts. This is necessary if the heart is to provide a material basis for sufficiently powerful perception and robust imagination

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<sup>23</sup> A detailed analysis of this passage, with an explanation of the precise reference of the terms ‘thought’ (διάνοια) and ‘common sense’ (κοινή αἴσθησις), can be found in my book *Aristotle on the Common Sense*, forthcoming from Oxford University Press.

<sup>24</sup> The heart is so described in *PA* III.3 665<sup>a</sup>12–17; see also *De somno et vigilia* 2 456<sup>a</sup>4–6, *De juventute* 3 469<sup>a</sup>5–7 and *De motu animalium* 10 703<sup>a</sup>11–15.

necessary for thinking. In other words, the manlike bodily proportion is hypothetically necessary for thinking: if an animal is to be able to think, it must have the manlike bodily proportion. Erect posture, on the other hand, is a necessary concomitant of manlike bodily proportion. To have a manlike bodily proportion is to have one's internal and external parts arranged in such a way that one ends up standing upright.

Another point discernible in the quoted passages is that variations in bodily proportion coincide with variations in their cognitive abilities and intelligence. The more dwarflike an animal is, the heavier its upper parts are, and hence the more it leans forward to sustain the upper parts by the front limbs, and at the same time the less intelligent it is. Non-human blooded terrestrial animals are extremely dwarflike in comparison with human beings, which is why they are quadruped and much less intelligent. Infant human beings are more dwarflike in comparison with grown up human beings, which is why human infants crawl and are unintelligent.<sup>25</sup> But as they grow, their upper parts gradually become commensurate with the lower parts, and they become erect because their lower parts come to be able to sustain the upper parts of the body. And as they become erect, they become gradually more intelligent. Pygmies and midgets are not as dwarflike as infants in comparison with ordinary grown ups, for they can sustain their upper parts by their lower parts, albeit not without some difficulty. Consequently, Aristotle claims, they do not have as developed intellects as normal human beings.<sup>26</sup>

Let us now briefly compare Plato's and Aristotle's views. Both philosophers see a correlation between posture and cognitive abilities across different species: a more vertical posture is accompanied by more powerful cognitive abilities, and a more horizontal posture is accompanied by weaker cognitive abilities. The advantage of Aristotle's explanation is that the very same principle is at work for the correlation not only across species, but within the same species, and even diachronically within the same individual. Recall that Plato, by contrast, does not explain the bent posture and lack of intelligence of human infants by the same principle by which he explains erect posture and intelligence of grown up humans. According to Plato, infants are not unintelligent because they cannot stand erect and observe the heavens, but because the violent process of digestion and reception of external stimuli obstruct revolutions of their rational souls. Besides, Plato would have considerable difficulties to

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<sup>25</sup> *De memoria* 2 453<sup>b</sup>6–7; *PA* IV.10 686<sup>b</sup>8–28; *De incessu animalium* 12 711<sup>b</sup>12–16.

<sup>26</sup> *PA* IV.10 686<sup>b</sup>23–26. Cf. *HA* VI.24 577<sup>b</sup>25–28; Ps.-Aristotle, *Problems* X.12 892<sup>a</sup>6–22.

explain his view that some members of human species, notably women, are equally erect but generally less intelligent than others.<sup>27</sup>

Moreover, for both philosophers the correlation between posture and cognitive abilities is causally determined, but each one of them construes this causal determination differently. For Plato, thinking and living rationally requires unimpeded observation of the heaven, and unimpeded observation of heaven in turn requires an erect posture. For Aristotle, thinking and living rationally requires manlike bodily proportion, but manlike bodily proportion does not *require* an erect posture; rather, an erect posture is a mere outcome of manlike bodily proportion. To put it differently, Plato maintains that erect posture is a necessary condition of unimpeded observation of the heaven, and unimpeded observation of the heaven is in turn a necessary condition of thinking. By contrast, Aristotle argues that manlike bodily proportion is a necessary condition of both thinking and erect posture. Note, however, that for Aristotle manlike bodily proportion is not a necessary condition of both things in the same way; it is a hypothetical necessity for thinking, and a simple necessity for erect posture.

In the end I would like to suggest why Aristotle did not follow Plato's lead in maintaining that erect posture is a necessary condition of thinking. The reason is that he rejected, among many others, Plato's premiss that unimpeded observation of the heaven is a necessary condition of thinking. According to Aristotle, we do not have to look up to find regularities. They are everywhere around us. As Aristotle argues in *De partibus animalium* I.5, we have much more and better information about natural things here on earth than about divine things in the heaven. Hence, a systematic study of natural things, notably plants and animals, is at least as promising a way to grasp forms and feed our intellects.<sup>28</sup>

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<sup>27</sup> It is fairly clear from *Resp.* V 455A-D that Plato considered women to be in average inferior to men both physically and intellectually.

<sup>28</sup> I would like to thank the participants at the conference in Dubrovnik for the questions and concerns that they raised. I have tried to address some of these concerns in the present text. I am very grateful to István Bodnár for subsequent discussions and written comments.