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MEASURING UP: THE GREEK ANALOGIES BEHIND VITRUVIUS' GEOMETRY OF THE BODY

Daniel Anderson

Introduction: Body Images

Vitruvius' book is chock full of bodies. It is by means of his oiled body that Dinocrates gains an audience with Alexander (2.praef.1), and by means of his naked one, and the equivalent body of water that it displaces, that Archimedes solves his well-known quandary (9.praef.9f.).[1] The body is a living, vital thing (7.praef.2f.), even as it is a book, a body of work (7.praef.10), arising from a body of education (1.1.12). Most important of all, Vitruvius outlines a 'body of architecture' (*corpus architecturae*, 6.praef.7) to propagate and extend the reach of the deified Augustus, commander-in-chief (1.praef.1), and this idea arguably gives rise to that of the 'body politic' (*corpus imperii*).[2] Vitruvius' text has been interpreted in terms of these bodies in important studies by Indra Kagis McEwen and John Oksanish;[3] both authors treat the body as replete with meaning, the site of contact between architecture and the political, between text and author. This chapter adds to our understanding of the repertoire of bodies in Vitruvius by looking at those earlier incarnations of circular and square bodies which Vitruvius inherits, and in terms of which he construes the human body as a site of ideal proportions.

Reading Vitruvius' model body in terms of its predecessors is a genealogical exercise, but unlike the genealogical arguments of a Rousseau, Nietzsche, or Williams, it does not aim to subvert or assert a presumed universal content by locating it historically in terms of an originary moment or psychological response; rather, as in Foucault, the goal is to defamiliarize that content by framing it in terms of its earlier instantiations.[4] In the case of Vitruvius, it can

1. See Tom Geue in this special issue.
2. Cf. McEwen (2003), 10f.
3. McEwen (2003) and John Oksanish (2019).
4. This distinction between Foucault and his predecessors loosely follows Koopman (2013), ch. 2, although Koopman's dissociation of Foucault's genealogies from normative positioning may ultimately be problematic (May [2014], 423–6). Some critics have similarly attempted to save Nietzschean genealogy from the birdlime of the genetic fallacy (Guess [1994], 285–8; Kail [2011]). Foucault linked his own genealogical approach to that of Nietzsche (Foucault [1971], cf. Bernasconi [2017], 157–60, 173f.), and while the 'genealogy of genealogy' can and has been traced through various other figures, from Boulainvilliers (Levy [1998]) to Overbeck (Sommer [2003], 100f.), or at a more fundamental level, d'Alembert and Diderot in the *Encyclopédie* (Hellström [2019], 228–36), Rousseau is arguably the next most important predecessor for the specific Nietzschean manoeuvre (Neuhouser [2012], comparing also Fichte, Feuerbach, Hegel, Marx, and Heidegger at p.372). Bernard Williams (2002), ch. 2, differs in his use of genealogy to affirm a position.

be shown that various elements of the normative geometrical and proportional body he describes relate to previously distinct Greek traditions of perfected bodies from Classical sculpture and pre-Socratic philosophy with contrasting ethical and metaphysical connotations apparently abandoned in their combination. These Greek precedents reveal a set of tensions in the Vitruvian representation of geometrical man to do with scale and relations of centre, part, and whole—that is to say, how best to account for protruding limbs, genitalia, navel, and organs.

Vitruvius himself implicitly contrasts his geometrical body, standing for good proportions in temple construction, against a strikingly different type of architectural embodiment inherited from the Greeks, in the immediately preceding section of the same book. This is the image of a body fused with a window opening onto the heart:

> is autem memoratur prudenter doctissimeque dixisse, oportuisse hominum pectora fenestrata et aperta esse, uti non occultos haberent sensus sed patentes ad considerandum. utinam uero rerum natura sententiam eius secuta explicata et apparentia ea constituisset!
>
> (Vitr. 3.praef.1)

> He (sc. Socrates) is remembered to have said wisely and knowingly that human hearts should have been furnished with windows and set ajar, so that their feelings would not be hidden but open to investigation. If only nature had actually followed his advice, it would have made them clear and open to view.

This Daliesque conceit grafts an architectural element, the window (cf. Vitr. 6.6.6f.), into human flesh, reconfiguring the body; this is not merely a figurative usage of *fenestratus*,[5] but the stuff of myths, of dreams.[6] Only in a contrary-to-fact protasis does nature follow the Socratic image, an unreality marked by the exclamation 'indeed!' (*utinam*) and the emphatic 'truly' (*uero*). The qualification of this image as unnatural, repeated again only a few lines later,[7] makes for a clear contrast between this body and the embodiment of nature in the self-consistent proportions of the well-formed, circular, and square human body that Vitruvius goes on to describe:

> natura conposuit corpus hominis, uti proportionibus membra ad summam figurationem eius respondeant.
>
> (3.1.4, cf. 3.1.2)

5. As per LSJ s.v. *fenestro* II.
6. On this image, see especially Rigoni (1974) and Laterza (2018).
7. *haec non ita sed uti natura rerum uoluit sunt constituta* ('things are not constituted in this way, but rather how nature intends', 3.praef.1).

> Nature has composed the human body so that in its proportions the separate individual elements answer to the total form.

Vitruvius offers two competing images of the intersection of body and building, distinguishing an artificial from a natural one, and offering contrasting views of how the human and the architectural might become one.

The unreality of the fenestrated body is further marked by its historical locatedness, which is implicitly opposed to the real existence of correct proportions in nature. Yet in spite of what Vitruvius himself says about its Greek origins (*is … memoratur … dixisse*, 3.praef.1 quoted above), the image does not perfectly square with any earlier model, nor is the conceit otherwise known to have been used by Socrates.[8] Our best parallel is found in the Babrian version of a much older fable (59 Perry).[9] Three gods have each produced something: Zeus a human, Athena a house, and Poseidon a bull; they ask Momus, or personified Envy, to act as judge. He criticizes all three, saying that 'as for the human, its chest was not fitted with a window, nor could it be opened up'.[10] This differs substantially from the Aesopic original (100 Perry), in which Momus criticizes the invention of man for not having been made with 'his heart hung outside the body' (τὰς φρένας … ἔξωθεν ἀπεκρέμασεν). The Babrian window replaces the earlier image of a pendant heart, and this anachronism appears to have had some currency already by the first century CE, since the fable is referred to in this way also by Plutarch and Lucian.[11] It is possible that Plutarch, Lucian, and Babrius are influenced by Vitruvius, rather than the other way around. This would make the most intuitive sense, since the Vitruvian image is decidedly more architectural than the Aesopian original,[12] and marks the opening gambit of the chapter as the negative of the well-formed body.

8. Rigoni (1974), 452f., drawing on a note in the edition of Ferri (1960), 160f., has suggested that Vitruvius is in fact misremembering Alcibiades' comparison of Socrates to a type of carved wooden receptacle like a matryoshka doll, commonly found in the herm-makers' shops, depicting the ugly Silenus on the outside, opened in two to reveal the image of a god within (Pl. *Symp.* 215b). Rigoni's main argument is that Vitruvius' interpretation of the image of the window onto the heart matches Alcibiades' of the wooden Silenus figurine, namely that wisdom is not perceptible in the exterior form or appearance of a person.

9. Eustathius (*ad Od.* 7.125) relates the image to the Aesopan version. Laterza (2018), 194, notes the presence of the image of an open breast in an Attic scolion: εἰ θ' ἐξῆν ὁποῖος τις ἦν ἕκαστος | τὸ στῆθος διελόντ', ἔπειτα τὸν νοῦν | ἐσιδόντα, κελείσαντα πάλιν, | ἄνδρα φίλον νομίζειν ἀδόλῳ φρενί ('If only it were possible [to learn] what each person is like by opening his breast, then peering at his mind, and closing it back up again, so as to to recognize a man as a friend by means of his authentic heart', Athen. 15.694e). While this suggests the specific image of the open chest is earlier than Babrius, the image lacks the specifically architectural reference to a window found in Vitruvius.

10. τοῦ δέ γ' ἀνθρώπου, | μὴ σχεῖν θυρωτὰ μηδ' ἀνοικτὰ τὰ στήθη (Babrius 59.10–12 Perry).

11. Plut. *Quaest. conv.* 3.1, 645a–c; Luc. *Herm.* 20, cf. Rigoni (1974), 448–52.

12. Also noted by Laterza (2018), 195, 'nella rivisitazione di Vitruvio si configura come uno spazio costruito tecnicamente e architettonicamente'.

Both of Vitruvius' versions of the body as building are novel reworkings of Greek ideas. They each play on one side of the notion of ἀναλογία, the Greek word with which Vitruvius opens his description of the proportions of an ideal body: *ea autem paritur a proportione, quae graece* ἀναλογία *dicitur* ('this [sc. symmetry] however is born of proportion, which the Greeks call analogy', 3.1.1). The word, like its Latin equivalent *proportio*, can mean 'proportion', which is to say 'mathematical proportion', but these words can also both refer to 'analogy', and both senses are apposite: comparison of the proportions of the human body to those of architectural structures draws the body into relation with the building. Where in the case of the window onto the heart, the body is conflated with the building, in the case of the body as a set of proportional relations, we have not a mere analogy (a : b), but an analogy of proportion (a : b :: c : d),[13] about literal proportions. This proportionality between the well-formed body and the well-constructed temple is understood in terms of symmetry and proportion:

> namque non potest aedis ulla sine symmetria atque proportione rationem habere compositionis, nisi uti ad hominis bene figurati membrorum habuerit exactam rationem.
>
> (Vitr. 3.1.1)

> For no temple can have a principle of composition without symmetry and proportion, unless it should have an exact correspondence to the parts of a well-formed person.

The principle of composition (*rationem*) based merely on symmetry and proportion is replaced by a correspondence (*rationem*) to the human body, with its own internal symmetries and proportions. The relative proportions of one thing correspond to those of the other, but this leaves open and unspecified how the body and the house intersect. Thus while the analogy of the proportional body at first glance appears distinct from the compound image of the fenestrated body with which the chapter opens, there is a tension between the more abstract claim that a temple should be constructed using the proportions of a well-formed human body, and the fact that body and building are physically commensurable, in that a building is a space in which a body moves about and lives.[14] The body of ideal proportions, which later images visually excerpt from its associated temple, not only offers a set of proportions for temple structure, but is the body in a state

13. Cf. Vesely (2002), 36.

14. Riggsby (2016), 296, 'In one sense, a Doric temple could really be the product of dimensionless proportionality. A souvenir model of the Parthenon could follow the proportions of the real one exactly. But that would be a toy, not a temple. The difference is that while columns, capitals, and triglyphs can all scale together, there is a mostly unspoken element that fixes the rest fairly narrowly: the human users of the structure. Most of them are around the same size and interact with it in broadly similar ways.' See also Oksanish (2019), 96f.

of composition or assemblage with that temple,[15] whose proportional relationship to the bodies that enter it is as important as the more abstract proportional relationships between its parts. If a window is only rarely in a body, a body is very regularly in a house.

Hip to Be Square: Doryphoros among the Herms

Vitruvius himself explicitly takes note of one prominent model for the body of good proportions, originating in Greek painting and sculpture:

> reliqua quoque membra suas habent commensus proportiones, quibus etiam antiqui pictores et statuarii nobiles usi magnas et infinitas laudes sunt adsecuti.
>
> (Vitr. 3.1.2)

> The other body parts also have their own corresponding proportions, which the famous painters and sculptors of antiquity likewise used to achieve great and boundless praise.

The standard interpretation of this line and the itemization of bodily proportions it concludes is that Vitruvius is referring to the *Canon* of Polykleitos,[16] an artwork that includes both the classical contrapposto male nude known as the Doryphoros or 'spear-bearer' and its accompanying manifesto.[17] The Polykleitan *Canon* was not only the original modular body,[18] a body in which the smallest members are

15. This notion of assemblage, or better *agencement*, is taken from Deleuze and Guattari's *Mille Plateaux*; see Nail (2017).

16. The sculptural basis of the whole passage is standard fare in the scholarship, e.g. Steuben (1973), 68–71; Berger (1990), 162f.

17. … καθάπερ ἐν τῷ Πολυκλείτου Κανόνι γέγραπται. πάσας γὰρ ἐκδιδάξας ἡμᾶς ἐν ἐκείνῳ τῷ συγγράμματι τὰς συμμετρίας τοῦ σώματος ὁ Πολύκλειτος ἔργῳ τὸν λόγον ἐβεβαίωσε δημιουργήσας ἀνδριάντα κατὰ τὰ τοῦ λόγου προστάγματα καὶ καλέσας δὴ καὶ αὐτὸν τὸν ἀνδριάντα καθάπερ καὶ τὸ σύγγραμμα Κανόνα ('… just as in the *Canon* written by Polykleitos. For having elaborated all the proportions of the body for us in this book, Polykleitos confirmed his account in a work, by fashioning a sculpture according to the prescriptions of his theory, and calling the sculpture itself *Canon* just like his book', Galen, *De placitis Hippocratis et Platonis* 5.3.16 de Lacy = 5.448 Kühn). The equivalence of this sculpture with the Doryphoros is suggested by Pliny's description of it, once Jahn's supplement is adopted: *Polyclitus … et doryphorum uiriliter puerum fecit [et] quem canona artifices uocant liniamenta artis ex eo petentes ueluti a lege quadam* ('Polykleitos … also made the Doryphoros, a virile-looking boy, which artists [also] called the "Canon", since they draw the outlines of their art from it as if from a rule', *HN* 34.55). Recent work using 3D laser modelling of extant copies of the Doryphoros and related sculptures by Polykleitos and others suggests that the Doryphoros was in fact used as a model for other sculptures (Sengoku-Haga *et al.* [2017] with further references). Our limited ancient references of the content of Polykleitos' treatise are usefully collected and translated by Stewart (1978), 124f.

18. Modularity of the Vitruvian proportional body is similarly reflected in Vitruvius' definition of 'proportion' as 'the correspondence of a measured share of the parts in the whole work, and of the whole' (*proportio est ratae partis membrorum in omni opere totiusque commodulatio*, 3.1.1), cf. Neumeister (1990), 433.

understood in relation to the size of the whole,[19] but it arguably also represents the first conceptual artwork, existing somewhere between the sculptural example and the text that explains it.[20] The word 'canon' refers to a measuring stick, implying that the sculpture embodied the measurements detailed in the treatise with such precision that it in turn could be used as a measure for other sculptural bodies.[21] One of these is Vitruvius' proportional man, who has a 'sculpted' body (*homo bene figuratus*, 3.1.2) in both figurative and literal senses.

Vitruvius' description of his perfected, natural body as 'square' (*item quadrata designatio in eo inuenietur*, 3.1.3, cf. below) recalls this sculptural tradition of bodily perfection,[22] a connection reinforced by Vitruvius' regular invocation of classical sculpture in this chapter (3.praef.2, 3.1.2, cited above). Although Vitruvius again obscures the precise lineage of the ideas he deploys, we know from Varro, via Pliny, that the ideal proportionality of sculptural squareness was associated in particular with Polykleitos' *Canon*. Varro calls the Doryphoros 'square' (*quadratus*), apparently redeploying a term traditionally associated with this sculpture to refer pejoratively to what he considered its rigidity of form.[23] That sculptural squareness had a long history as a marker of bodily and by extension moral perfectibility is nevertheless clear from a fragment of Simonides' *Ode to Scopas*:[24]

> ἄνδρ' ἀγαθὸν μὲν ἀλαθέως γενέσθαι
> χαλεπὸν χερσίν τε καὶ ποσὶ καὶ νόῳ
> τετράγωνον ἄνευ ψόγου τετυγμένον.
>
> (Pl. *Prt.* 339b = Simon. fr. 542.1–3)

19. Tobin (1975).

20. This idea is already reflected in Plin. *HN* 34.55 (immediately following the quotation in n.17): *solusque hominum artem ipsam fecisse artis opere iudicatur* ('He [Polykleitos] was the only man to have formally critiqued an artwork he himself had made, using a work of art'). The position of Borbein (2019), 32, reaffirmed by Papadopoulos (2019), 61 in the same volume, namely that the *Canon* referred only to the treatise and not to the sculpture, fails to convince; the word 'measuring-rule' was certainly already part of the semantic field of sculpture in the fifth century (or it would not have been used of the treatise), and the view that Galen's unambiguous testimony is too late to matter is excessively sceptical; more generally, it is circular to suggest that innovations do not occur because they are not regular occurrences.

21. καὶ πού τις ἀνδριὰς ἐπαινεῖται Πολυκλείτου Κανὼν ὀνομαζόμενος, ἐκ τοῦ πάντων τῶν μορίων ἀκριβῆ τὴν πρὸς ἄλληλα συμμετρίαν ἔχειν ὀνόματος τοιούτου τυχών ('There is a highly regarded statue by Polykleitos called the *Canon*, which has this name because of the precision with which all of its parts are in proportion to the others', Galen, *De temperamentis* 1.566 Kühn).

22. Another important (and related) connection is to the conceit of the city of Rome as 'squared' but also 'perfected' and 'sanctified' (*quadrata*), on which see McEwen (2003), 162–7, with earlier references. The 'squaring' in question here may be that of a circle divided into four quadrants via two intersecting lines, rather than enclosure in a square (Szabó [1938] and [1956]).

23. *quadrata* ***tamen*** *esse ea ait Varro et paene ad exemplum* ('However Varro called them [sc. Polykleitos' sculptures] square and almost copied from a blueprint', Plin. *HN* 34.55f). See discussion in Steuben (1973), 35f., 55f.; Pollitt (1974), 267; Hurwit (1995), 12; Steiner (2003), 42f.; McEwen (2003), 268f.

24. Scholarship on the fragments to this poem is extensive; key bibliography is found in Budelmann (2018), 216f.

> It is difficult for a man to be truly good,
> although fashioned foursquare
> in hand, foot, and mind without flaw.

The square shape of sculptured bodies is a marker of perfection, analogically similar to the idea of moral rectitude. Aristotle confirms this reading when he explicitly interprets the line from Simonides' poem: 'to say that a good man is square is a metaphor, for both are perfected' (οἷον τὸν ἀγαθὸν ἄνδρα φάναι εἶναι τετράγωνον μεταφορά, ἄμφω γὰρ τέλεια, *Rh*. 3.11.1411b25). Yet Aristotle's interpretation elides the clear sculptural overtones of Simonides' poem. If being 'four-cornered' (τετράγωνον) is a moral quality, reflective of the 'good man' (ἄνδρ' ἀγαθόν), it is also an aesthetic one, indicative of a 'crafted' (τετυγμένον) and 'flawless' (ἄνευ ψόγου) body. Indeed, the idea of correct proportion 'in hand and foot' (χερσίν τε καὶ ποσί) suggests that the 'squareness' of Simonides' man is not only figurative of an equable 'mind' (καὶ νόῳ), but literally refers to the orthogonal positioning of limbs. Although the geometrical conceit is new, this close correspondence of physical appearance and moral character is conventional in ancient Greek thought.[25] It is hard not to read this seeming allusion to Polykleitos, reinforced by the apparently unrelated mention of the sculptor twice elsewhere in the dialogue,[26] as an indirect response to the Protagorean notion of man as the measure. While Polykleitan sculpture might appear to embody the notion of man as measure, this sculptural representation, in at least Simonides' telling, is a next-to-impossible physical condition representing a next-to-impossible morality. Protagoras and Socrates' apparently textual-critical debate over whether Simonides' poem contradicts itself is thus at a deeper level about whether to follow Simonides in reading Polykleitan sculpture not as a representation of Protagorean relativism, but of an independent because unachievable physical and ethical ideal. Indeed, is the perfectly geometrical man really a man at all, or merely a sculptural ideation, something between a body, a building, and bodybuilding?

This question becomes even more pressing once it is recognized that the sculptural model to which Simonides refers is ambiguous, where the qualification 'foursquare' (τετράγωνον) was also used of a very different sculptural type, the herm.[27] If historians of classical art have long associated Simonides' poem with Polykleitos, there has been an equally strong tendency among literary

25. e.g., Archil. fr. 114, cf. Steiner (2003), 42. That τετράγωνον has a strong positive moral connotation is clear from its appearance in the Pythagorean table of opposites alongside other positively connotative terms (Arist. *Met*. A.5.986a22–6). The elements listed together on each side of this table were regularly associated in early Greek thought, for which see Lloyd (1966), 48–65.

26. *Prt*. 311c–d, 328c–d, cf. Onians (1999), 41.

27. ἡ τετράγωνος ἐργασία ('they [sc. herms] are square in construction', Thuc. 6.27.1).

scholars to read the term 'foursquare' in terms of Pythagorean thought.[28] It is against this latter tradition that Richard Johnston and David Mulroy have plausibly suggested that Simonides refers not to Polykleitos at all but to the block-like appearance of a herm.[29] Their best supporting evidence, in addition to the early use of this participle of a herm in Thucydides,[30] is Simonides' biographical connection to Hipparchus, a tyrant in Athens who was closely associated with the proliferation of herms in the Attic countryside, which were set up as road markers and inscribed with Hipparchan epigrams.[31] The herm is a curious reconfiguration of the human body: a bust set atop a pillar or *stele*, with stumps for arms and an erect phallus, unexpected and obscene, placed where it would have been if this rectangular stone had been carved into a torso. This appendage provides a continual reminder that this *stele* is a body, much more vividly than other related uses of the *stele* base as a stand-in for the body, such as tombstones.[32] Where the bare *stele* risks becoming purely symbolic, the herm's mixture of aniconic and figural elements is dynamic and keeps us in limbo between two contrasting modes of representation, the naturalistic body and abstract geometry. Just as herms marked thresholds, they are on the border of two contrasting types of representation.

Commentators who have recognized the sculptural references in Simonides' ode have tended to argue for one specific sculptural model over another, and the vivacity of the sculptural references seems to imply a specific image. Nevertheless, there may be good reason to think that Simonides' use of the word 'four-cornered' (τετράγωνον) is purposefully ambiguous, recalling both the Polykleitan *Canon* and a herm at once. The moralizing tone of the poem points to Polykleitos. The idea of flawless craftsmanship (ἄνευ ψόγου τετυγμένον) might refer to sculptural naturalism or to the literal squareness of a herm's trunk. The pointed reference to 'hand and foot and mind' could also go either way: these words are usually understood with the participial phrase, in which case they refer to how the sculptural ideal is constructed (τετράγωνον); yet they might equally be read as part of the main clause and indicate the ways in which it is hard for a man to become good. This ambiguity is encouraged by the reference to both the physical (hands and feet) and the intangible (the mind); the former works well of sculpture, the latter of character. It may be difficult to achieve the proportions (and implied moral quality) of a Polykleitan sculpture; yet there is equal difficulty in achieving the degree of 'goodness' (and widespread

28. This dichotomy is by no means absolute, and indeed the more convincing examples of the latter approach suggest that a primary metaphor drawn from sculpture refers to the embodiment of Pythagorean ideas, for example Fraenkel (1973) [orig. 1962], 307–11; Svenbro (1976), 144–61; Steiner (2003), 43. Among these authors, Svenbro (1976), 156, notably understands τετράγωνος in reference to Archaic *kouroi*.

29. Johnston and Mulroy (2004).

30. See n.27 above.

31. Ps.-Pl. *Hipp.* 228–9b, cf., e.g., Quinn (2007), 93–5.

32. For the use of unadorned *stelae* in cult worship, see Gaifman (2012), 181–241; for the use of *stelae* as grave-markers, see Sourvinou-Inwood (1995), 108–40.

Figure 1.1. Bronze herm of Polykleitos' Doryphoros found in the Villa of the Papyri, Herculaneum. By permission of the Ministero della Cultura—Museo Archeologico Nazionale di Napoli, inv. 4885. © Luigi Spina.

recognition) that might lead to one's representation and commemoration as a perfectly square and limbless herm.[33] In other words, both sculptural models apply. It is suggestive that this same conflation is found in a herm portrait depicting the Doryphoros found at the Villa of the Papyri (fig. 1.1, cf. the marble replica Naples inv. 6412).[34] Notable is the sculptor Apollonius' signature conspicuously positioned on the front of the Herm base. Apollonius' particular innovation here, justifying his bold claim to authorship of a reproduction, appears to have been a visual pun, which conflated two different modes of sculptural 'squareness', the perfected squareness of the ideal body and the abstracted squareness of the *stele* base. For the ancients at least, square bodies came in at least two different shapes and sizes (fig. 1.1).

Full Circle: Plato Parodies Celestial Bodies

If the square is a sculptural ideal, the circle is a cosmological one. Like the square, the circle and its near-relative the sphere are even more emphatically

33. For individual characteristics in early herms (hair and facial expressions), which suggest they may be representative of specific individuals, see Quinn (2007), 96.

34. I thank Megan Goldman-Petri for bringing these sculptures to my attention.

representative for the ancients of that which is complete.[35] Vitruvius' reference to a 'figure of circularity' (*schema rotundationis*, 3.1.3) suggests a conception of perfected roundness refracted through Stoic thought, where rotundity is first and foremost that of the cosmos.[36] Such terminology was well-enough established to be subjected to parody (Sen. *Ep*. 113.22), even as the underlying conception of circular bodies was understood to be part of a much longer and more distinguished history, going back to Plato's *Timaeus* in the first instance (Cic. *Nat. D.* 1.18, 2.45–9). In a substantial account of the universe's sphericity in Manilius (1.202–14), for example, we find a wealth of allusions to our earliest accounts of these ideas in pre-Socratic thought.[37] Manilius notes how a circle 'has neither beginning nor end' (1.212), recalling a famous dictum of Heraclitus,[38] and, in locating the earth at a point equidistant from everything (*e toto pariter sublata profundo*, 'suspended equally from every depth', 1.203), he similarly invokes Parmenides' justification of the sphericity of 'what is' (τὸ ὄν), a kind of immanent absolute:

> αὐτὰρ ἐπεὶ πεῖρας πύματον, τετελεσμένον ἐστί
> πάντοθεν, εὐκύκλου σφαίρης ἐναλίγκιον ὄγκῳ,
> μεσσόθεν ἰσοπαλὲς πάντῃ.
>
> (DK 28B8.42–4 = D8.47–9 Laks–Most)

> Since there is a distant limit, it is complete
> on every side, resembling the mass of a round ball,
> everywhere balanced equally from its centre.

While Parmenides' comparison of the cosmos to a ball appears abstract and inhuman, the Stoicism in which it was received in the early Principate saw a link between the nature of the cosmos and the individual human actor. Thus we find figurative use of *rotundus* in the slave Davus' idealized version of a Stoic, akin to a god, in a parodic work from this same period:

> et in se ipso totus, teres atque rotundus,
> externi ne quid ualeat per leue morari.
>
> (Hor. *Sat*. 2.7.86f.)

35. This section has been strongly influenced by David Sedley's valedictory lecture 'Godlikeness', delivered on 30 May 2014 at the Faculty of Classics in Cambridge, cf. Sedley (1997) and Sedley (1999). The roundness of perfected bodies among the pre-Socratics is also surveyed in Guthrie (1975), 47, cf. Ballew (1974), 189.

36. σφαιροειδὴς γὰρ ὁ κόσμος ('the cosmos is spherical', *SVF* 2.1009); *solisque orbem lunaeque rotundum* ('the disk of both sun and moon is circular', Manil. 1.208); cf. McEwen (2003), 160–2.

37. On Manilius' rounded cosmos, see Henderson (2011).

38. ξυνὸν γὰρ ἀρχὴ καὶ πέρας ἐπὶ κύκλου περιφερείας ('beginning and end are the same at the perimeter of a circle', Heracl. DK 22B103 = D54 Laks-Most). This is also the basis for the association of circularity with the eternal (Manil. 1.211); since change always has a beginning, locomotion in a circle escapes generation itself (Arist. *Cael*. 1.3 and 4).

> [The wise man] is a whole in himself, smoothed and rounded,
> so that nothing from outside can rest on the polished surface.

These lines suggest how an originally pre-Socratic cosmic notion of circularity could be casually applied, in Vitruvius, to an individual human body.

The notion of a body as a sphere was itself also widespread in pre-Socratic cosmological thought. It is largely under the influence of Xenophanes' rejection of anthropomorphic divinity in Homer that non-figural representations of the divine or absolute as a circular or spherical body double as conceptualizations of the cosmos.[39] Empedocles most clearly understands this spherical conception of the cosmos as a kind of body:

> οὐ γὰρ ἀπὸ νώτοιο δύο κλάδοι ἀίσσονται,
> οὐ πόδες, οὐ θοὰ γοῦν', οὐ μήδεα γεννήεντα,
> ἀλλὰ φαῖρος ἔην καὶ <πάντοθεν> ἶσος ἑαυτῷ.
> (DK 31B29 = D92 Laks-Most)

> Twin branches do not project from its back,
> nor feet, nor swift knees, nor reproductive organs,
> but it was Sphere and <everywhere> equal to itself.

The idea of rounded perfection is here contrasted against the awkwardness of having limbs or organs, just as, at the opposite moment of the Empedoclean cosmo-zoogony, the dissolution caused by Strife involves the grotesque and horrifying conceit of limbs existing independently of bodies:

> ᾗ πολλαὶ μὲν κόρσαι ἀναύχενες ἐβλάστησαν,
> γυμνοὶ δ' ἐπλάζοντο βραχίονες εὔνιδες ὤμων,
> ὄμματά τ' οἶ' ἐπλανᾶτο πενητεύοντα μετώπων.
> (DK 31B57 = D154 Laks-Most)

> Here blossomed many faces without necks,
> arms wandered around unattached to shoulders,
> and eyes drifted about alone, in need of foreheads.

While Empedocles does not picture the human body as spherical, he connects sphericity not merely with unity as such, but with perfected, completely unified bodies, unperturbed by limbs, organs, or other individual parts.

Empedocles' association of spherical form with bodily perfection is picked up and parodied by Plato on two occasions; these parodies are particularly

39. φησὶ δέ … οὐσίαν θεοῦ σφαιροειδῆ, μηδὲν ὅμοιον ἔχουσαν ἀνθρώπῳ ('He [sc. Xenophanes] said that the nature of divinity was spherical, and not like that of a human being', Diog. 9.19 = Xenoph. DK 21A1).

significant in that they use the conceit of a perfected, spherical body to address how something of godhead might adhere in the human. In the *Timaeus*, Plato conceptualizes the body as a means of transporting and protecting the head, which was the original, globular shape of human beings, but was incapable of maneuvering by itself on the earth's uneven terrain:

> τὰς μὲν δὴ θείας περιόδους δύο οὔσας, τὸ τοῦ παντὸς σχῆμα ἀπομιμησάμενοι περιφερὲς ὄν, εἰς σφαιροειδὲς σῶμα ἐνέδησαν, τοῦτο ὃ νῦν κεφαλὴν ἐπονομάζομεν, ὃ θειότατόν τέ ἐστιν καὶ τῶν ἐν ἡμῖν πάντων δεσποτοῦν. ᾧ καὶ πᾶν τὸ σῶμα παρέδοσαν ὑπηρεσίαν αὐτῷ ξυναθροίσαντες θεοί, κατανοήσαντες ὅτι πασῶν ὅσαι κινήσεις ἔσοιντο μετέχοι· ἵν' οὖν μὴ κυλινδούμενον ἐπὶ γῆς ὕψη τε καὶ βάθη παντοδαπὰ ἐχούσης ἀποροῖ τὰ μὲν ὑπερβαίνειν, ἔνθεν δὲ ἐκβαίνειν, ὄχημ' αὐτῷ τοῦτο καὶ εὐπορίαν ἔδοσαν.
>
> (Pl. *Ti.* 44d–e)

> The divine revolutions, of which there are two, they bound within a spherical body, imitating the form of the universe, which is rounded. This we now call the 'head', which is the most divine of all the parts in us, and rules over them. To it the gods gave over the whole body they had assembled as a servant, having considered that it should take part in all the motions which were to be. For in order that it not go rolling over the earth, which has all kinds of heights and depths, and be at a loss how to climb over some and climb out of others, they gave it this thing as a vehicle and means of transport.

Plato is parodying the notion that the spherical shape of celestial bodies represents any sort of body akin to that of a human being. 'The whole body' (πᾶν τὸ σῶμα) is reduced to a mere appendage of the 'spherical' head, which is also a 'body' of its own (σφαιροειδὲς σῶμα), where in pre-Socratic thought the sphere is always a totality, never a mere part. The spherical head that rolls to the lowest possible point comically exposes the imperfect sphericity of the earth, which is meant to mirror cosmic roundness (*Ti.* 33b). If the spherical human head reflects a more general cosmic circularity, the imperfectly spherical earth and the unspherical bodily appendage appear by contrast to indicate an imperfect cosmic circularity or indeed its absence altogether.

In Plato's other Empedoclean zoogony,[40] we come closer to a view of the entire body as symmetrical. Aristophanes' aetiological myth of love in Plato's *Symposium* is a story which begins after Aristophanes has recovered from a bout of hiccups, disrupting 'the proper order of his own body' (τὸ κόσμιον τοῦ

40. Guthrie (1975), 383, notes the Empedoclean origin in the description of androgynous beings at an early stage of development under the influence of Love (Emped. DK 31B61). These beings have 'double faces' (ἀμφιπρόσωπα, Emped. DK 31B61.1 ~ πρόσωπα δύ[ο], Pl. *Symp.* 189e).

σώματος, 189a). In a mythological past, Aristophanes describes humans as the double of what they are today, four arms, two faces, and so on, 'spherical in shape' (τὸ εἶδος στρογγύλιον, 189e), and without libidinal desire, being, instead, intent on warring with the gods. These beings are obscene: not quite perfectly spherical, but with bits sticking out, including genitalia; spherical, but only perfectly so when they move about at speed, doing cartwheels with limbs outstretched:

> ἐπορεύετο δὲ καὶ ὀρθὸν ὥσπερ νῦν, ὁποτέρωσε βουληθείη· καὶ ὁπότε ταχὺ ὁρμήσειε θεῖν, ὥσπερ οἱ κυβιστῶντες καὶ εἰς ὀρθὸν τὰ σκέλη περιφερόμενοι, κυβιστῶσι κύκλῳ, ὀκτὼ τότε οὖσι τοῖς μέλεσιν ἀπερειδόμενοι ταχὺ ἐφέροντο κύκλῳ.
>
> (Pl. *Symp.* 190a)

> It also moved around upright, as [we do] now, whichever of the two directions it wanted; and whenever it set out running at speed, just like acrobats perform a cartwheel by wheeling themselves around with limbs outstretched, so too were they [*sic*] swiftly borne along in a circle, except they supported themselves with the eight limbs then available.

Plato plays with the idea of anthropogenic geometry here in ways that have gone unnoticed. These beings move in multiple dimensions, both 'upright' or with 'straight' movement (ὀρθόν), but also by 'tumbling with a cartwheel' (κυβιστῶσι κύκλῳ). The word κύκλος of course literally means 'circle', and the word for 'acrobat' (κυβιστῶν) is remarkably close to κύβος or 'cube'. If one allows for an auditory pun, there is a squaring of the circle in the expression κυβιστῶσι κύκλῳ, which describes a cartwheel. These early beings adopt poses of pure geometry. In Aristophanes' interpretation of the story, this geometry is applied *mutatis mutandis* to mankind. These beings' shapes are spherical in imitation of heavenly bodies (190b): the males are originally born from the sun, the females from the earth, hermaphrodites from the moon, and their circularity, Aristophanes says, reflects that lineage. Yet the geometry of these predecessors adheres in us,[41] as is clear from Zeus' threat to 'cut [humans] in half once again, so that they move by hopscotching around on one leg' (πάλιν αὖ, ἔφη [sc. Zeus], τεμῶ δίχα, ὥστ' ἐφ' ἑνὸς πορεύσονται σκέλους ἀσκωλιάζοντες, 190d), should humankind ever again threaten the Olympian regime. The implication is that human bodies retain part of their original spherical symmetry even once divided. Yet this new geometrical perfection is a foil: humankind's former sphericity is framed as the impossible goal, if not the very form, of erotic desire.

41. Note how reference to humans as κόσμιοι ('orderly') in this passage (e.g., *Symp.* 193a) may also recall their descent from heavenly bodies, where κόσμος means 'universe'.

Conclusion: Square Pegs in Round Holes

Squaring of circles was a favourite intellectual pastime in antiquity; yet Vitruvius appears to have been unique in combining the sculptural square with the cosmological circular body:

> item corporis centrum medium naturaliter est umbilicus. namque si homo conlocatus fuerit supinus manibus et pedibus pansis circinique conlocatum centrum in umbilico eius, circumagendo rotundationem utrarumque manuum et pedum digiti linea tangentur. non minus quemadmodum schema rotundationis in corpore efficitur, item quadrata designatio in eo inuenietur. nam si a pedibus imis ad summum caput mensum erit eaque mensura relata fuerit ad manus pansas, inuenietur eadem latitudo uti altitudo, quemadmodum areae quae ad normam sunt quadratae.
>
> (Vitr. 3.1.3)

> The very centre of the body is naturally the bellybutton. For if a man were arranged on his back with hands and feet outstretched, and the pivot of a compass were placed in his bellybutton, the tips of both his hands and feet would be touched by the tracing of a circle. No less than the model of circularity is a square arrangement also to be found in the body. For if the measurement from the bottom of his feet to the top of his head is taken, and if this measurement were applied to the outstretched hands, it would be discovered that the width was the same as the height, just like areas made using set squares.

The references to geometer's tools in this version of the ideal body helps flatten the inherited associations of the body as geometrical shape. When Vitruvius calls his body of ideal proportions 'square' (*quadrata*, 3.1.3), he invokes this whole tradition of ideal sculptured bodies, but he then ignores the moral associations of this tradition by making bodily squareness literal through the reference to the geometer's 'set squares' (*ad normam*, cf. 9.praef.6f.). Any associations of the 'circular model' (*schema rotundationis*) are similarly undercut in tracing out this shape with a 'pair of compasses' (*circini*, cf. *centrum*). As Kathrin Winter discusses in this issue, there is a correspondence between the outstretched limbs and the 'arms' of the compass. Indeed, the vagueness of the gerundive *circumagendo* leaves open the possibility that the body as a whole might be understood to rotate in a circle around the navel, so that the arms and feet literally act as the compass, tracing the imagined line. The Vitruvian proportional body not only respects specific proportions, but its limbs provide a means of measuring its own circularity and orthogonality.

Limbs are awkward for the perfected body. This is because of an implicit equivalence between the ideas of geometrical form and unity. The Vitruvian body traces perfect shapes with its limbs, but does not constitute an abstract

shape, nor fill out the space it has thus marked. Indeed, it is often noted that the placement of the arms and legs of Vitruvius' reclined figure must take different positions in the circular and square paradigms, as if he were to be imagined tracing a snow-angel.[42] Yet where the body's trunk becomes shapely, as in the case of the herm, the presence of the phallus is perverse, an element which breaks the pure geometry of the square. With Simonides' square man, it is the limbs, the 'hands and feet' (χερσίν τε καὶ ποσί), which it is desirable, if difficult, to bring into line. Vitruvius, like Polykleitos, measures the body using forearm, finger, and foot, reconstructing up from the smallest piece. Where Polykleitos thus integrates the part with the whole, Vitruvius finds the body's measures everywhere beyond the body itself:

> nec minus mensurarum rationes, quae in omnibus operibus uidentur necessariae esse, ex corporis membris collegerunt, uti digitum, palmum, pedem, cubitum.
>
> (3.1.9)

> They (sc. the ancients) collected from the parts of the human body the proportionate dimensions which appear necessary in all building operations; the finger (inch), the palm, the foot, the forearm (cubit).

In something of an Empedoclean moment, the architect strews the proportions of disarticulated body parts throughout the buildings he designs. As a set of measurements, the body is dismembered, and this grotesque disassociation of body parts stands over against the idealizations of bodily form in Vitruvius' predecessors. The disarticulation of this body's parts suggests how it functions not as an organism, but, to borrow again from Deleuze and Guattari, something closer to a body without organs. This term refers to the full set of a body's capacities before these are given over to the correct operations of its organs, a state imperfectly approached by experimentation with drugs, masochism, or ascetic restrictions.[43] Vitruvius' proportional man lacks organs not only because he lacks animation; the diffusion of his limbs trace lines of extension for the human body out into the world.

Limbs imply movement. Empedocles' body-parts wander; the Plato-Aristophanic spheres run and perform acrobatics; even the herms, ever vigilant, do not lie flat but stand erect, marking boundaries, and guarding against intruders, like the phallus they have as an appendage.[44] The Vitruvian man, by contrast, is 'reclined' (*supinus*), its limbs outstretched, measured in two dimensions but existing in three, like an insect mounted for display. Yet it is more difficult than it at first appears to pin the Vitruvian man down by his navel. The idea of

42. Gros (1990), 66; Howe in Rowland, Howe, and Dewar (1999), 189; Gros (2001).
43. For a description of the concept of a body without organs, see Smith (2018).
44. Faraone (2018), 132–6, esp. 134 with references in the notes at 351.

a whole unified by a centre is Aristotelean, and the reaching 'hands' and pointed 'feet' are literally 'extended' away from the body's central point (*manibus et pedibus pansis*). Yet the umbilical cord is a problematic centre, in that it is also a connection to a larger whole, a series of bodies, a genealogy. If the navel is 'naturally' (*naturaliter*) the centre and mid-point of a body, it is also another appendage, a cord connecting multiple bodies. The idea of genealogy invoked by the navel recalls the earlier conceptions of circular and square bodies to which Vitruvius' geometrical man is heir.

Coventry University
ac8883@coventry.ac.uk