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BODY MANIFOLD

Mathematics (mis)performed by Vitruvian and Acephalic bodies

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Introduction

This article explores two very different geometries and two geometricalised bodies, derived from two distinct conditions of cultural possibility. The two cases presented here- the Vitruvian Man and the Acéphale- are significant for one simple reason: they are canonical images of these two affine bodily geometries. But instead of arguing for a historical difference, I will defend a cultural theoretical and extra-mathematical appropriation of Georg Bernhard Riemann's complex manifold theory to discuss tangential notions of bodily n -dimensionality. I explain: the body is relative to the local culture and site-specific notions of space (or place) within which it is actualised. One could speak of different bodily geometries here- one rectilinear and the other curvilinear- which effect multiple ways of corporalisation. On the one hand, Euclidean-space bodies are agents of a local geometry. As we zoom out of this vicinity of embodiment, another type of body, which inhabits general space, comes into view. The body manifold argues for an interdependence between these vicinities (a connection, not a division, between a body geometry and a body topology).

Riemann's move away from singular magnitudes to multiply extended magnitudes is my cue to argue for a passage from singularised notions of Body to bodies that extend multiply in the continuum cultural spaces of bodily representation. What do I mean by this? Quite simply, that if the manifold refers to space as something translocal and n -dimensional, equally the body-in-space reflects the spatial behaviour within which it is contained. I mean, the notion of the body as a physical whole, something singular, complete and discrete, reflects a geometry founded on these same principles. By the same token, an incomplete, folded, ongoing, processual body may well be the product or misperformance of a geometry of the non-Euclidean or Riemannian type. The body thus becomes a relative object in the culture continuum, largely defined by the space and geometry that contains it and within which certain conditions of possibility are laid. Riemannian geometry supplants the rule of the rectilinear and coordinated

space with an idea of line, angle, and metrics that is relative and multiple, and where spatiality can only be understood partially.

Inasmuch as the straight line never closes on itself, it never folds- it does not actualise the infinite. The straight line ruling Classical logic is endless temporal potentiality. In a rectilinear world we are dependent upon the disembodiment of the infinite toward which that straight line tends. We depend on God. But when the line misperforms and closes on itself, as all lines do in elliptic geometry, infinity is dispensed with and space becomes closed, spherical, multidimensional, changing, like a living and expanding quasi-shape. If Classical mathematics is disembodied, the bringing back of the body into modern mathematics affects not only mathematics, but also our deepest notions of what a body is in cultural discourse.

This passage from Euclidean to non-Euclidean bodiliness means that the body, like space, cannot be understood as a singularity, a One, a whole. Body is an agency that on the small enough scale of a particular culture resembles one thing. If we zoom out, however, the body becomes something else, something that escapes a singular cultural mooring. Think of a circle: if you zoom in around a point- the circle looks like a line. But as we move out from the local the circle assumes itself. This argument can be applied to the continuum of culture, as opposed to the continuum of space. In Classical terms, bodiliness is Euclidean and straight-lined. In the generalistic and relativising context of postmodernism, however, the rationality of the body begins to behave curvilinearly, erratically, and misperformatively. This dislocation weaves a topological relation between different models of embodiment, caught in a state of flux. Bodiliness is never quite arrived at when looked at from outside the physical thing we call body. At this general level, the body is always in a state of indeterminacy- the body is organless and virtual.

The Vitruvian Model

Marcus Vitruvius Pollio, or Vitruvius for short, sometimes loosely referred to as the first architect, described in his book *De Architectura* a design for what he called the 'well-shaped man' (*hominis bene figurati*). The well-shaped man, like the well-made play derived from Aristotle's *Poetics*, is dependent upon a rational arrangement of parts, a geometricalisation that gives credence and

confers the ideal embodiment a sense of beauty and truth. In other words, the well-shaped man is a focused notion of the body manifold, zoomed in to such a point of specificity that it seems unchanging and absolute.

Active in the first century BC, at the end of the Republican era, Vitruvius became one of the first Western thinkers to turn the human body into a model for the construction of well-shaped buildings. The building Vitruvius had in mind was the ideal Roman temple, which he saw as an organic space where physical and metaphysical, concrete and mathematical, somehow met. The standardised notion of the body described by Vitruvius suits the Roman tendency for universalism and political integration; it is part of the condition of possibility that led to the ordering of the known world in relation to a single geographic point and universal standard: Rome. Thus, a local or culture-specific notion was allowed to become universal, by virtue of a system of power-knowledge grounded on geometry. This standard body made the description of fairly complex forms more feasible on the basis of the visible resemblances between buildings and bodies, the latter being a sort of reservoir for models of visibility and universal reference in the Roman world.

Well-shaped man, Vitruvius reasoned, possessed a perfect architectural design, whose ideal physique hinted at the natural correlation between human proportion and ideal geometric form. In Book III of *De Architectura*, dedicated specifically to the sacred architecture of temples, Vitruvius explained that his design depended on two things: symmetry (*symmetria*) and proportion (*proportio*), and that the beauty of these principles was applicable as much to temples as to the human body. Vitruvius goes on to make a number of famous claims, two of which are worth noting here. Firstly, he argued that it is possible to speak of a bodily centre, inasmuch as the body possesses a navel (*umbilicus*). The reason why the body-centre is crucial to the realisation of an ideal and universal bodily geometry is because with a centre the body is also capable of describing perfect geometrical shapes. Vitruvius went on to suggest that if a man be placed flat on his back with his hands and feet extended, and a pair of compasses centred at his navel, the fingers and toes of his two hands and feet would touch the circumference of a circle. And just as the human body yields a circular outline, Vitruvius argued, so too a square figure may be found from it. Vitruvius found that in measuring the distance from the soles of the feet to the top of the head,

and then by applying that measure to the outstretched arms, the breadth of this outstretched human body would be found to be the same as the height, as in the case of plane surfaces which are perfectly square (Vitruvius 2005).

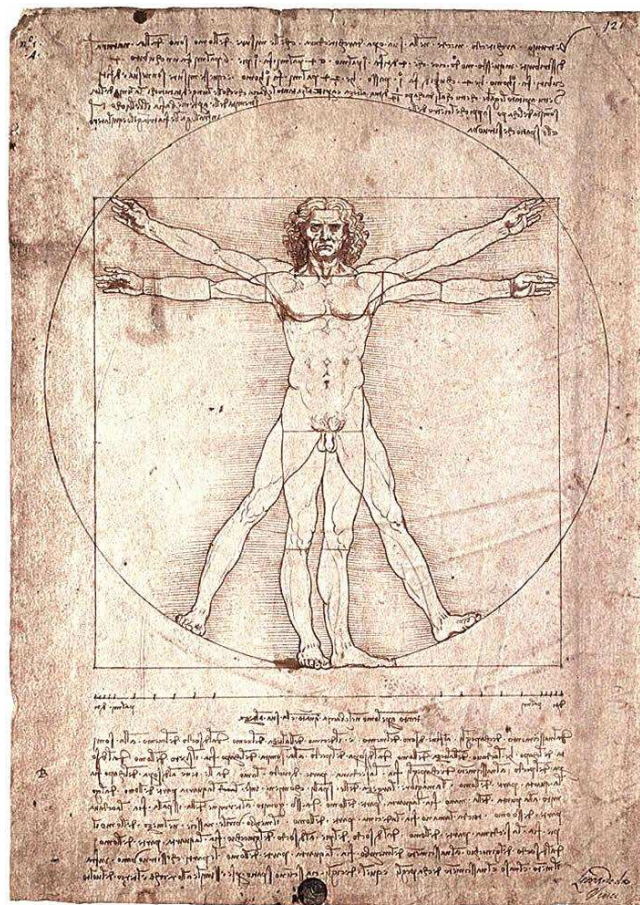
Secondly, Vitruvius argued that the units of measurement used in architecture are derived from the human body. In other words, according to Vitruvius the body was not only geometrical; furthermore, it was also a universal metric system. The world could be standardised and a single metrical reality could be fashioned by relating things to any part into which the body can be broken down and numericalised. In short, Vitruvius' sense of unity is achieved by stating a relationship between part and whole. Comparison effected according to measurement is reducible, in every case, to the arithmetic relations of equality and inequality derived from standardised bodily parts. Vitruvius concludes: 'there is a symmetrical correspondence between the members separately and the entire form of the body, in accordance with a certain part selected as standard' (2005: 75). In other words, the totality is governed by the arbitrary selection of one body part as the governing unit of measurement. This logic situates one particular body-part and one body-type (a young, male Roman) at the centre of the measurable and knowable universe. Thus, the world can be standardised according to cubits, feet, palms, and so on.

Although Vitruvius left no graphic interpretations of his 'well-shaped man', various artist-mathematicians of the 15th century and 16th century seized upon his theory¹. The most familiar version is undoubtedly Leonardo da Vinci's sketch, produced circa 1487. It depicts a male figure in two superimposed positions with arms and legs apart, simultaneously inscribed within a circle and a square. Indeed, da Vinci's Vitruvian Man remains one of the most referenced and reproduced images in popular culture, to the point of banality. The drawing and accompanying text, sometimes called the Canon of Proportions, is based on the correlations between ideal human proportion and geometry described by Vitruvius. Not unlike Vitruvius, da Vinci saw the body as a cosmography of the microcosm (*cosmografia del minor mondo*), which means that the supposedly

¹ Some of the artists that attempted to render Vitruvius' description in graphic manner include: Cesare Cesariano (1521), Albrecht Dürer (1528), Pietro di Giacomo Cataneo (1554), Heinrich Lautensack (1618), William Blake (1795), and Susan Dorothea White, whose version *Sex Change for Vitruvian Man* (2005) raised questions regarding the gender specific nature of existing studies on human proportion and bodily geometry in Western art.

natural proportion of the body was an analogy of the proportion and the general geometrical laws governing the entire universe.

But da Vinci departed from Vitruvius in many ways, not least because he decided to *draw* the ideal Man. By drawing the circle and square he correctly observed that the square could have the same centre as the circle, but that it was somewhat lower in the male anatomy. In fact, his discovery seems to suggest that the body's geometry is divided into two very distinct centres and two very different kinds of geometrical behaviour: one being curved, whose centre is the navel, and one straight-lined, whose centre is the phallus. This adjustment, which is the innovative part of da Vinci's drawing, departed from Vitruvius by positing a geometry that is to some extent dialectical, and which can be interpreted artistically and philosophically, as well as mathematically. Furthermore, da Vinci was not content with drawing a body inside a square and a circle. The detail of the man's face, the wavy hair, the details of the muscles, reinforce a contrast between the objectivity of pure mathematics, and the subjectivity of the concrete body as an interpretation of the artist's sensibility.



The Vitruvian Man, as sketched by Leonardo da Vinci (c. 1487)

It is important to note that da Vinci does not place the geometrical man on the ground, as Vitruvius does. Instead, he pictures the man standing. Rather than a passive given- *conlocatus*- da Vinci sees the body, not mathematics, as the principal agent. Vitruvius, on the other hand, relates the physical and the metaphysical by subordinating the former to the latter, so that the body, passively placed on the ground, is circumscribed and squared by an external agent that pins the body to the ground and imposes itself divinely upon it. Da Vinci's geometrical man can stand up- Dürer would go one step further, as he would allow this body to move by providing a stereometric version of the Vitruvian Man. The Vitruvian Man can henceforth be used in a performative context, as an illustration of motion and expression in Classical body praxis. The body acts: its aim, in its quest to represent beauty, is to reproduce geometrical form, and to draw forth the pure essence contained within body matter. All things considered, this universal Body is gazed upon as the beautiful and true reflection of some Divine mover, some God. But with the demise of theological mathematics, and owing to the rise of a non-essential, non-refereed, and secular notions of mathematics, the body was no longer capable of standing discrete, complete, and universalising, as da Vinci pictures it; instead, the body lost its navel and its head, it became a body-in-the making.

The Acephalic Model

In the mid 1930's Georges Bataille set out to create a secret community known as the *Acéphale*. It is said that Bataille wanted the community to be consecrated through the performance of a ritual human sacrifice, and that one of the members even volunteered to be the victim. One of the paradigmatic sacrifices that inspired the Acéphale confraternity was the regicide of Louis XVI, which hailed the beginning of the Republican era in France. This emblematic moment determined not only the end of a royal and divine sovereignty, however, but also the end of unity and completeness at a much broader level. It could be argued that the sacrificial nature of Bataille's religious community refers also to 'the sacrifice of form' (Biles 2007), and to the realisation that in a post-regal and post-theological era matter cannot be the complete iteration of *a priori*, true form. In an essay published in December 1929 entitled *L'informe*, Bataille writes

that the status of something is dependent upon our understanding of it, and our identification of things by the way in which we extract them from meaninglessness in order to transform them into objects of knowledge. To be formless is therefore to be unfit for the universal categories of division and distinction that make up meaning. Formlessness is endless continuity which, according to Bataille, declassifies form and matter, making distinctions worthless. ‘Philosophy has no other goal’ explains Bataille: ‘it is a matter of giving a frock coat to what is- a mathematical frock coat’ (1985: 31).

The kind of mathematics Bataille speaks of here is discrete mathematics: mathematics of round figures and once-for-all answers. In many ways, the notion of *l’informe* is part of a critique of a certain type of historical mathematics, what Deleuze and Guattari call ‘Royal or State science’ (2004: 402)². The formless negates meaning, which is why Bataille conceives it as non-mathematical. But Bataille’s reading founders, because modern mathematics is not necessarily free of contradiction. Modern mathematics is not Royal, but secular or ‘nomadic’. Whilst Bataille refuses to dissolve mathematical knowledge into the variable, modern mathematics is a plurality of contrasting and self-contradicting claims. Nonetheless, the formless is a profoundly mathematical concept despite Bataille’s refusal to accept so. The formless announces the need for another rationality of numbers and shapes: one which does not focus on limits, borders, and final answers, but the ongoing change and indeterminacy of formal logic.

Now then, the public face of the Acéphale community was a literary journal also entitled *Acéphale*, which was first published in 1936, and which run until 1939 (it only counted a total of five issues). In 1936 the surrealist painter André Masson came up with the image of the Acéphale, a post-Vitruvian figure that would serve as the journal’s striking front cover. Masson’s drawing of the Acéphale openly takes its inspiration from da Vinci’s Vitruvian Man; furthermore, the Acéphale is a contestation of the geometrical ontology found in the Classical body politic, where reason, seated in the head, rules the lower spirited and appetitive forces of the body (Weiss 1989). By expressing the impossibility of reaching a complete notion of the body-shape, the Acéphale is irreducible to an a

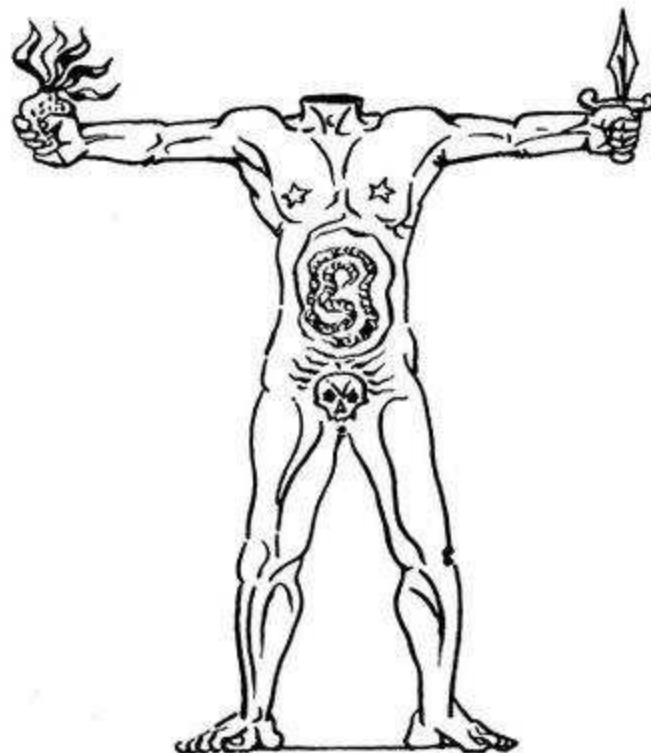
² Deleuze and Guattari further explain that ‘Royal, or State science only tolerates and appropriates stone cutting by means of templates... under conditions that restore the primacy of the fixed model of form, mathematical figures, and measurement’ (2004: 402). This explanation seems fitting as a description of the geometry of the Vitruvian Man, and its conception within a condition of possibility defined by the royal or theological nature of Classical logic.

priori ideal- it is just a body. Its formlessness and headlessness negate identity and universality by imposing an irremediable sense of lack or void.

Bataille does not acknowledge the loss of reason in the post-monarchic, post-theological age as combining developments within the sphere of modern mathematics. However, Bataille does question the break-up of mathematics into a dialectic domain in an essay from 1932 entitled *The Critique of the Foundations of the Hegelian Dialectic* (1985). According to Bataille, mathematics underwent a process during the nineteenth century that in every sense was *contrary* to fragmentation and the dialectical programme (1985: 111 *my emphasis*). Bataille is referring here to the formalist trend in mathematics during the early 20th century, which sought to find a definite axiomatic programme for the whole of mathematics. As a consequence of a schism in the world of mathematics that began possibly with the division of the Calculus in the 17th century, and which peaked in the 19th century with the invention of non-Euclidean geometry, mathematicians felt forced to search for more accomplished foundational theories. But although Bataille is quick to mention the influence of modern mathematicians who participated in the general axiomatisation and rigourisation of modern mathematics, he forgets or ignores that this project failed due to a number of groundbreaking ‘after-maths’, not least the postulation made by Kurt Gödel that all formal mathematical languages are by nature incomplete. Like the Acéphale, Gödelian mathematical logic is incomplete.

Bataille is intent on denying Engels’ suggestion that Calculus opened a sense of dialecticism in the mathematical field by claiming that ‘mathematical symbols, translated into every language, can lead to contradictions, but that these are contradictions without reality, they are pseudo-contradictions’ (1985: 111). By ignoring the possibility that mathematics may be either a dialectical or indeed multiplicitous knowledge, Bataille is unfortunately unable to bring his philosophy of formlessness into play with post-theological mathematics. Bataille argues: ‘it is necessary to recognise that this contradiction finally not only troubled mathematicians, but even scandalised them, that they applied all their efforts to the task of eliminating and-it would be vain to deny it-they succeeded’ (1985: 110). But they didn’t. Bataille rejects the idea of an irrational mathematics outright by insisting on the successful formalisation of modern mathematical knowledge.

The (un)living head is transposed to the genitals, and further depicted as a skeleton, confounding life, death, and eroticism as that which exceeds the limits of human reason. To read the Acéphale as a non-Euclidean body is to equate modern geometry with the drunken space of the Acephalic Man, who is now found floating in endless change and continuity, like an intoxicating man-woman in a world that has become a swirling vortex around him-her, where the prudishness of division is discarded in lieu of a confusion and imprecision from where the Acéphale cannot sober up. Utterly unsure of himself, the drunken Acéphale disposes of his timidity and relishes the freedom of being lost, delighted by the fact that he has not arrived and will not arrive at a sense of true identity. Becoming-the-body is thus the becoming-sober of a new type of modern rationality. Having experienced the drunken space, it becomes apparent that everything that seemed so fixed and natural in the Vitruvian world is de facto a fragment, a local version of a much more complex body manifold.



Andre Masson's cover illustration for the first issue of Georges Bataille's *Acéphale* (1936)

Conclusion

The differences and borderlines hailed in the Vitruvian sense of the bodyworld, and supported by a Euclidean ontology, cuts through and organise bodies decisively. By contrast, the non-Euclidean body is disorganised and uncoordinated. This notion of incompleteness and interminability reverses the zoomed-in worldview of Vitruvian corporeality, which as we know relied on the clear-cut, rectilinear and segmented distinction between body and mind, matter and form, identity and alterity. Instead of negating the body, Formlessness indexes the end of God's *imitatio*, thus 'bringing the body back in' (Rotman 1993), not as a reflection of pure Form, or Godly form, but as a reflection of a reflection, a misperformance, a paradox. This body is an erratic process of becoming or mis-becoming. In other words, whilst Classical conditions of possibility deny the actuality of the body in order to emphasise a godly and disembodied mathematics, modern conditions of possibility do the opposite, by denying the God in mathematics, and affirming a changing and unstable sense of bodiliness. Whilst the Euclidean body encounters itself in the reflection of beauty and truth, the non-Vitruvian body loses itself as a quasi-body, a body that has lost its certainty and completeness, its relation to the singular and the total. The body manifold zooms out, from the particularity and cultural-specific of the Vitruvian Man, to a notion of the Acéphale, the body-to-be. The body manifold argues for the interdependence of these vicinities of cultural discourse- it argues for a non-historical, non-rectilinear, foliated understanding of Body in the uncountable affine dimensions that make up cultural continua.

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