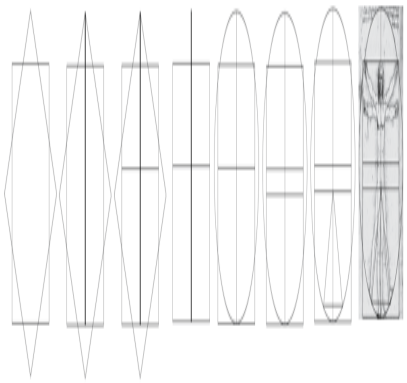


Circles and how to get out of them

Description

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â??There are weeks when it can sound as if the European sovereign debt crisis is going around in T article on problems with the Euro.



Problems that canâ??t easily be solved lead you in **circles**, even a vicious **circle**. Resolving the Euro crisis is also like â??trying to square the **circle**,â?• a reference to the impossible task of using only a compass and straight edge to draw a circle and a square that enclose exactly the same area.

Karl Marx wrote about the **circulation** of capital. Like most coins, Euros are round, and one side of the Italian Euro depicts Leonardo da Vinciâ??s Vitruvian man positioned within a **circle** and a square enclosing (roughly) the same area.

As any amateur geometer knows, circles enclose the greatest area within the least perimeter, and so make for efficient structures. They are the shape that cells, planets and atoms want to be â?? in section. Circles of course relate to ellipses (circles seen from an oblique angle), spheres (circles in 3D) and sine waves (a graph over time of the *y* value of a point travelling round a circle).

Circles are easy to create and draw, but are easy to get trapped in, and the perimeter is so undifferentiated that itâ??s hard to know where to jump off if thatâ??s your trajectory of travel. You just go round and round.

The circle is such a universal symbol of commerce and of life that it would be an intellectual triumph to identify phenomena that have absolutely no association with circles. It seems the human body and psychology are so inscribed in circles that the best hope of escape (if we want to escape) is *tangentiality* and *eccentricity*, or at least to expose the paradoxes within circularity (circular philosophy, rotary logic) itself.

For Plato (c. 428-347 BC) God made the â??the universe a circle moving within a circleâ?• (*Timaeus*). The so-called Platonic solids can be drawn by using a compass to scribe arcs and circles. Plato also observed that no one has ever seen a perfect circle and yet we know they exist.

The most â??eccentricâ?• circle story is an account in Platoâ??s *Symposium* that humans were originally spherical in shape. They then got split in two, with each half destined to search for itâ??s other â??soul mateâ?• to complete the circle.

Vitruvius (c. 80-15 BC) relates another more abiding creation story, where man emerges from the forest, exhibiting advantage over the other creatures:

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> finding themselves naturally gifted beyond the other animals in not being obliged to walk with faces to the ground, but upright and gazing upon the splendour of the starry firmament (38).

The human bodyâ??s position between ground and sky is crucial in antique thought and is often represented geometrically. The ground is a flat plane and the sky is a dome. The passage of the sun is an arc across the sky. Itâ??s symmetrical rising and setting defines the cardinal points: east, west, and by simple derivation south and north. So the plane of the ground is a square defined by the four compass directions, and the cosmos above is a circle. The human body is somehow at the centre of this: the body as vertical gnomon (as in a sundial) suspended between the ground and the sky.

The bodyâ??s place in the cosmos is well represented by Vitruviusâ?? famous description of ideal proportioning, derived from a male body stretched out on his back with the centre of a circle at the navel. The extremities of the body define the edge of a circle, and similarly of a square (73).

Vitruvius seems mostly interested in the relative proportions of body parts as a guide to dimensioning the structural elements of a temple. Vitruvius left no diagram to show us the precise geometry of the arrangement of the body. Architects are less interested now in the minutiae of such proportioning systems (for which there were many rival systems in any case), but the symbolism of the spatial pattern involving the heavens (macrocosm), the earth (microcosm) and the human body endures.



This template (circle, square, gnomon) has a practical aspect. It features in the laying out of a city, and here Vitruvius describes how you use the movement of the sun to lay out the square on the ground that forms the basis of a town. For the Romans it was no coincidence that such cosmic ordering produced optimal arrangement for the passage of restorative breezes through the streets (26-27).

On the subject of the body â?? whether the tradition here refers to actual bodies, idealised bodies, symbols, functions, or the body as metaphor would not have been important to the antique mind. And there is a variation to this tradition, that of the universe as understood by the philosopher Plotinus (c. 204-270 AD), a follower of Plato though some 600 years later, for whom it was apparent that the cosmos is made up of concentric spheres, successive stages through which the soul must pass in order to participate in unity with the cosmos. The circle is there in full force, but the body is something to leave behind, disconnected from the divine order, incidental and even loathed. When his students offered to have his portrait painted, Plotinus remarked that he did not want this â??image of the imageâ?• to be left for posterity.

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The Renaissance was heir to, and in some cases rediscovered, these classical, Vitruvian, and Neoplatonic traditions.[1] The most compelling image of a circular logic comes from Leonardo da Vinciâ??s (1452â??1519) representation of Vitruviusâ?? man in 1487.[2]

Da Vinciâ??s text accompanying his drawing focuses on the dimensional relationships between body parts, and provides no description of what else he might have meant the diagram to convey. The architectural historian Rudolf Wittkower describes this and similar Renaissance drawings: â??the Vitruvian figure inscribed in a square and a circle became a symbol of the mathematical sympathy between microcosm and macrocosmâ?• (25). Historian Martin Gem elaborates:

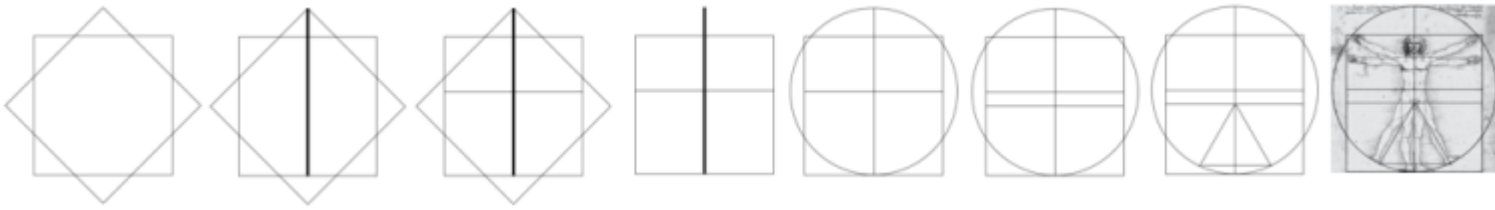
> what we discover is an identity of the square and the circle, surpassing mere sensual perception and existing as the unique divine essence that reveals its limited image in the square, and its absolute, limitless reality in the circle (104).

The truths to which the Vitruvian man refers are meant to transcend what our senses tell us, in a way presenting the inexpressible paradoxes relating the limited and the infinite. According to Nicholas of Cusa (1401-1464) whose work da Vinci would have known,

> Thus, the fabric of the world (*machina mundi*) will *quasi* have its center everywhere and its circumference nowhere, because the circumference and the center are God, who is everywhere and nowhere. (Quoted by KoyrÃ©, 1957, p.17).

Da Vinci doesnâ??t explain how he constructed his geometrical figure. But there are several conjectures online. Itâ??s likely that da Vinci was following a standard gross approximation to the problem of squaring the circle (world-mysteries.com), corroborated by the drafting exercise below.

If the square has sides of 2 units, then the diameter of the circle is simply 1 plus the square root of 2, which is approximately 2.414. The schema does not actually square the circle. The area enclosed by the circle is about 11% larger than the square. But the geometry maps on to da Vinciâ??s figure.



There are other symbolic aspects to da Vinciâ??s figure and those of his contemporaries. The male body is often depicted in a priapic state (ie with an erection). In da Vinciâ??s diagram the circle centres on the umbilicus, the square is centred on the groin, hence reinforcing the nascent cosmology of Renaissance humanism: man as the generator, the geometer, the producer of the universe.

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If our bodies really are located in the circle then itâ??s a container of paradoxical character, infinite extent, and boasts of the bodyâ??s generative capabilities â?¦ if not the alien character of Renaissance thinking to the twenty-first century mind.

The true moderns of course rejected such cosmologies in place of a scientific, open, and all-seeing world view, tinged in no small measure with sentiment. For example, Edmund Burke (1729-1797) rejected the Vitruvian model:

> men are very rarely seen in this strained posture; it is not natural to them; neither is it at all becoming (91).

In a way returning to Vitruviusâ?? body as it emerged upright from the forest, and gazed â??upon the splendour of the starry firmament,â?• Burkeâ??s modern body stands on the cliff top beholding the vastness of the sky, the spectacle of terror and wonder, immersed in the emotion of a highly individualised sense of the sublime. But the other side of this modern coin is possessed by the technorationalist, the emotionally detached dealer in numbers, commodities, brands and the circulation of capital, over which no one seems to have mastery.



[1] The architect Leon Battista Alberti (1404â??1472) made the recently re-discovered writings of Vitruvius widely known in about 1450.

[2] Da Vinci was in the company of other artists and proto-scientists keen to draw the figure, sometimes as illustrations to the publication of Vitruviusâ?? book: eg by Francesco di Giorgio (1439-1502), Cesare Cesariano (15th-16th c), and Fra Giocondo (1433-1515).

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For critical commentary on the generative/procreative model of Vitruvian man see

- Agrest, Diana I. 1988. Architecture from without: Body, logic, and sex. *Assemblage*, (7)28-41.

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- Jill Burkeâ??s blog: Leonardoâ??s Measure â?? The Genitals of Vitruvian Men

Category

1. Architecture

Tags

1. bodies
2. body
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4. cosmos
5. da Vinci
6. Leonardo
7. square
8. Vitruvian man

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