# On a Human Scale. Drawing and Proportion of the Vitruvian Figure

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*Abstract*

*Among the images that describe the proportions of the human body, Leonardo da Vinci's one is certainly the most effective, despite the fact that the iconic drawing does not faithfully follow the measurements indicated by Vitruvius.*
*This research concerned the geometric analysis of the interpretations of the Vitruvian man proposed in the Renaissance editions of* De Architectura*, carried out after the aniconic* editio princeps *by Sulpicio da Veroli.*
*Giovanni Battista da Sangallo drew the Vitruvian figure directly on his Sulpician copy, very similar to the images by Albrecht Dürer in* The Symmetry of the Human Bodies *[Dürer 1591]. Fra Giocondo proposes in 1511 two engravings of homo ad quadratum and ad circulum in the first Latin illustrated edition of* De Architectura*, while the man by Cesare Cesariano, author of the first version in vernacular of 1521, has a deformed body extension to adapt a geometric grid. Francesco di Giorgio Martini and Giacomo Andrea da Ferrara also propose significant versions believed to be the origin of Leonardo's figuration due to the friendship that bound them. The man inscribed in the circle and square in the partial translation of Francesco di Giorgio's* De Architectura *anticipates the da Vinci's solution although it does not have explicit metric references, while the drawing by Giacomo Andrea da Ferrara reproduces a figure similar to Leonardo's one. The comparison between the measures expressed by Vitruvius to proportion the man and the various graphic descriptions allows us to understand the complex story of the exegesis of the Roman treatise.*

*Keywords: geometry, drawing, measure, proportion, Vitruvian man.*

## Man and architecture: measure and proportion according to Vitruvius

In the definition of the Renaissance "new man", the rediscovery of Vitruvius' *De Architectura* was very interesting for scholars and architects of the time. The treatise, in addition to addressing in ten books the problems and fundamental principles connected to architecture –*utilitas*, *firmitas* and *venustas*– according to a precise technical-constructive language and appropriate terminology, transmits a series of philosophical-mathematical theories deriving from the elaborate geometric research in Greece on proportions and harmony. On these concepts, which influenced the Renaissance architectural language of the orders, Vitruvius found a correspondence between the ordered and proportionate structure of the human body and the architecture.

This theory, exposed in the thematic section of Templar architecture, is the most consistent and extensive of the work, to which the Augustan engineer and theorist dedicates books III and IV. To introduce this topic, the author refers to the concepts of *symmetria* [1] and *analoghia* [2], recomposing fragments of various Hellenistic treatises and canons.
A templar complex is the bearer of symmetry –harmony, order, proportion– similarly to *homo bene figuratus*, a harmonic-proportional organism defined by Nature both in the modularity of its parts and in its totality [3].
The treatment examines the human physical proportions according to anthropometric units of measurement – the finger, the palm, the foot, the cubit: in fact, a proportional


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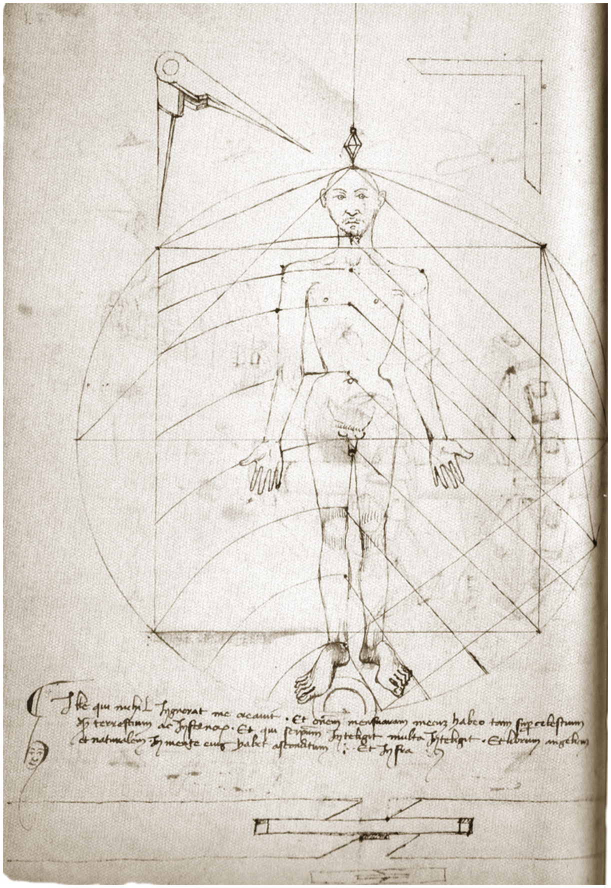
relationship closely relates each of the individual parts of the body. Thus, the ancients established that in the perfect architectural work, and especially in sacred buildings, there was a precise agreement between the maximum and detailed measures of the individual components and orders.
The natural and immanent module in reality lies in the parts of the human body whose relations are mutually commensurable. Compared to the total height of the body, the foot is its sixth part, while the head is the eighth. The face is ten times in height, similarly to the hand, whose effective length goes from the tip of the middle finger to the beginning of the palm. The face is further tripartite: chin-nostrils, nostrils-median eyebrows, and forehead.
We then learn the reason why in ancient times 6 (of Euclidean origin), 8 (proportions of the Canon of Polycleitus) and 10 (of the Pythagorean school) were considered perfect numbers.
Multiple modular relationships give beauty and harmony to a work and converge in a focal point towards which the single elements tend. Vitruvius in the navel identifies the focal sign of man. This vital centrality also derives from a conviction of Hellenic tradition, which can already be traced in Homeric culture and tributary of previous similar opinions of oriental cultures, as well as from an ideology rooted in Roman culture documented since the time of Plautus (III / II century B.C.).
The navel is the origin from which to trace the circumference –"round scheme"– in which to inscribe the man, a perfect figure like the sphere according to the Pythagorean School. The lying and supine position clearly highlights the parts of the body and their relative modular relationships, as well as the possibilities of movement of the limbs. Furthermore, the inscription of the body in a square also defines the proportion of the figure, which rationalizes and translates the perfect human figure in its circular definition into whole number measurements. According to the Greek unit of measurement, the width of the open arms is equivalent to six feet or four cubits, while in the Vitruvian system this value defines the height of the man. The correspondence between width and height not only expresses the main dimensions of the figure, but through this geometric principle, Vitruvius determines the areal regularity of the square.
However, Vitruvius does not mention about a true squaring of the circle; much less of a possible areal equivalence between the two geometric figures [Gros 1997, p. 279]. He associates the construction of the surface of the square with technical-architectural tools at right angles –norms or squares– and that of the circle with the compass – a tool for geometric and architectural drawing, which is, also indispensable for finding and transferring measurements. The man lying with his hands raised vertically straight above the head and the feet together would correspond in height to the measure of the perch, a third architectural instrument used in the Roman world as a 5-cubit scale, similar to the graduated ruler or the metric cord. Vitruvius teaches the

*Fig. 1. M. di Iacopo called il Taccola, Drawing of the proportions of the human body, De ingeneis, c. 1420. Ink on paper, 30 x 22 cm, Munich, Bayerische Staatsbibliothek, Clm. 197, f. 36v.*



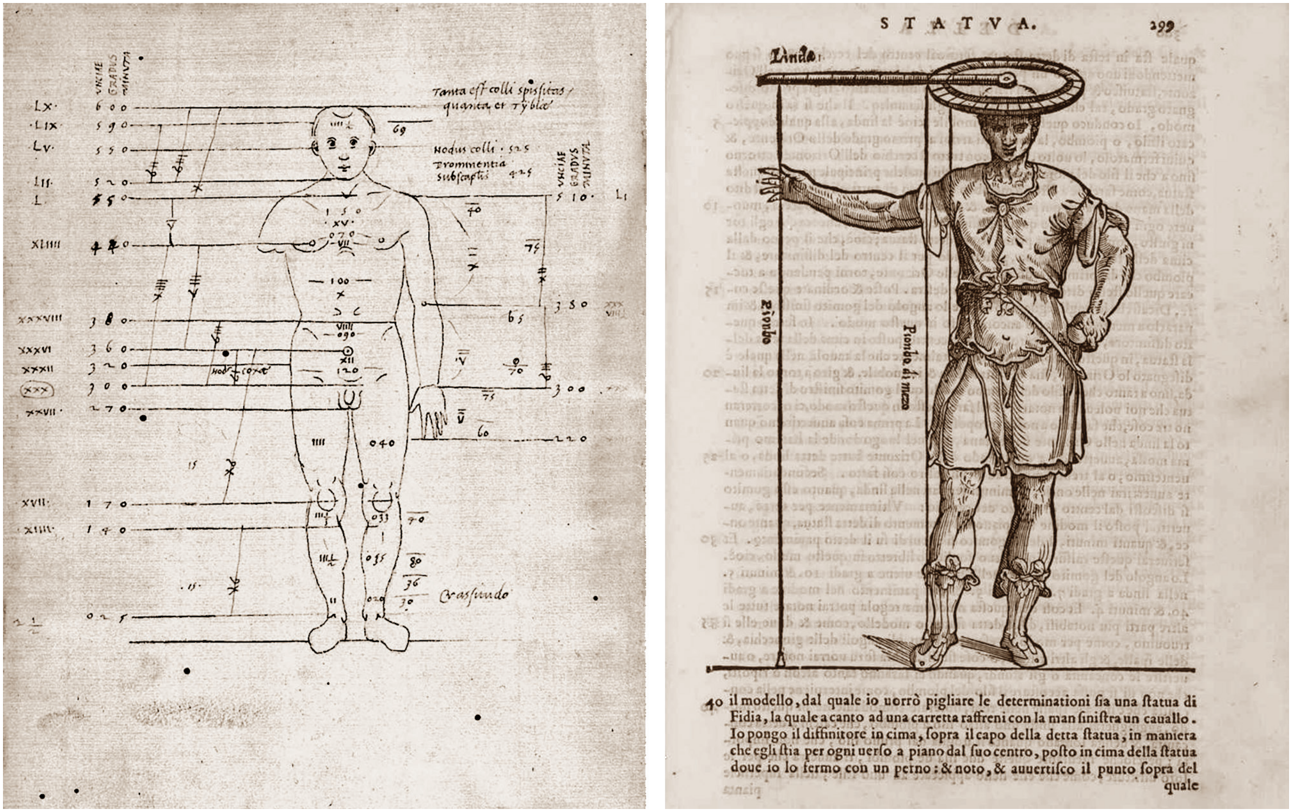
importance of geometry and measurements for sculpture and architecture using *homo ad circulum and ad quadratum as a yardstick and ratio* [Zöllner 1995, pp. 337-339].

## *De Architectura,* translation and graphic interpretation between the 15th and 16th centuries

From the fifteenth century, there was a real rediscovery of the Vitruvian treaty. Re-reading and studying the work, many scholars and architects ventured into the arduous exploit of interpreting the Latin text. Among the main difficulties was the translation of technical terms to explain fundamental architectural principles with an obscure meaning, and the loss, copy by copy, of the illustrations that originally accompanied the Augustan treatise, depriving the argumentation of clarity.

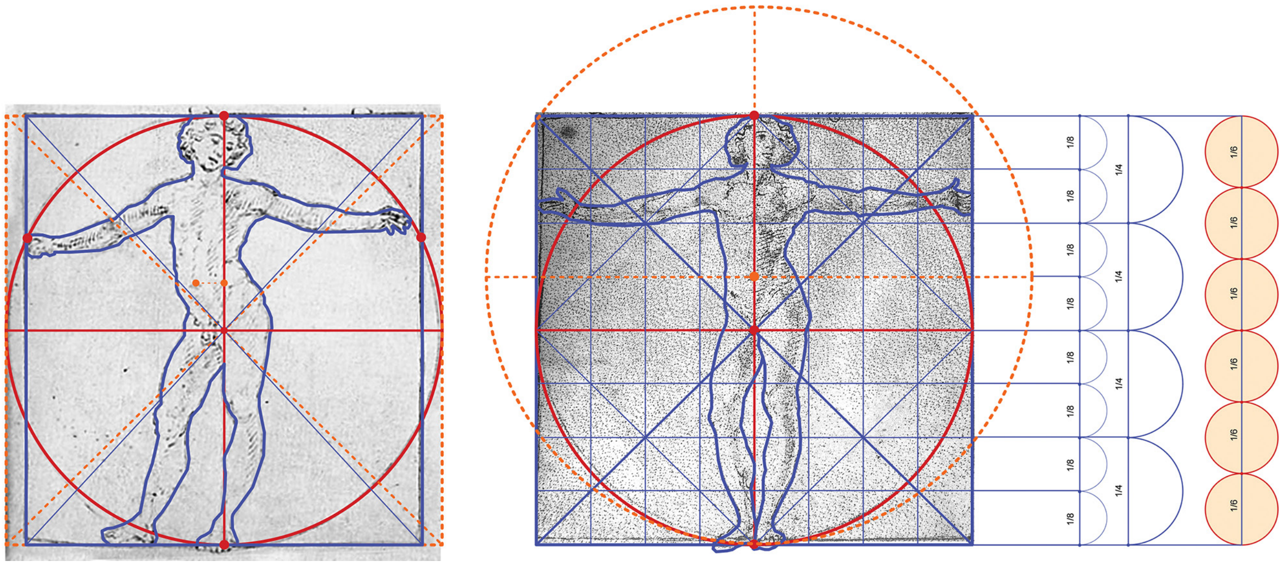
Initially, the interest in the textual problems of *De Architectura* was exclusively of philologists and only later of architects, useful in filling the graphic deficiencies of the grammarians. An example is the aniconic Roman *editio princeps* by Giovanni Sulpicio da Veroli (1486), laid out with large margins precisely to give a way, to those interested, to enrich the text with images [Sdegno 2005, p. 171].

*Fig. 2. a) L.B. Alberti, Ideal measurements and proportions of the male figure, Tabulae dimensionorum Hominis, MS Canon Misc. 172, f. 232v, Oxford Bodleian Library; b) L.B. Alberti, Finitorum, De Statua, 1468.*



Many authors translated the treatise and gave graphic form to the contents explained: among them, the passage that defined the perfect man and his ideal proportional system, based on pre-established relations and modules applicable to architectural projects.
The Vitruvian man was not only a metaphorical and geometric metaphor, but from the fifteenth century, he assumed an additional conviction compared to that provided by the Augustan treatise writer. In fact "with the Renaissance revival of the Greek mathematical interpretation of God and the world, and invigorated by the Christian belief that Man as the image of God, embodied the harmonies of the Universe, the Vitruvian figure inscribed in a square and a circle became a symbol of the mathematical sympathy between microcosm and macrocosm" [Wittkower 1988, p. 25]. The relationship between the structure of the universe and man has already interested scholars since the middle Ages, although the representation of this concept differed greatly from the ancient proportional canons [4]. The figurations of man, drawn according to different expressive principles in different eras (from the 10th to the 17th century) were often framed within circles (or curved lines), to highlight the transposition between the earthly limit of the human being and the perfect dimension of the celestial world [5] [Zanini 2009].
In the centuries preceding the Renaissance, scholars knew Vitruvius's *De Architectura*, as shown by the image created between 1300 and 1400 by Mariano di Iacopo called the *Taccola*. The engineer of Siena, author of the treatise *De Ingeneis*, represents a man with his arms extended at his sides, back straight, feet and head tangent to the ends of a circle inscribed in a square (fig. 1).
The Vitruvian scheme inspired several treatise writers from the second half of the fifteenth century: among them Lorenzo Ghiberti, who was the first who devoted himself to the theme of the Vitruvian man. He analyzed the disposition of the *homo ad circulum*, especially for the diversity of posture of the limbs and for the identification of the human center in the genitals and not in the navel [Ghiberti 1912, I, pp. 227-231]. The circle in this case is no longer

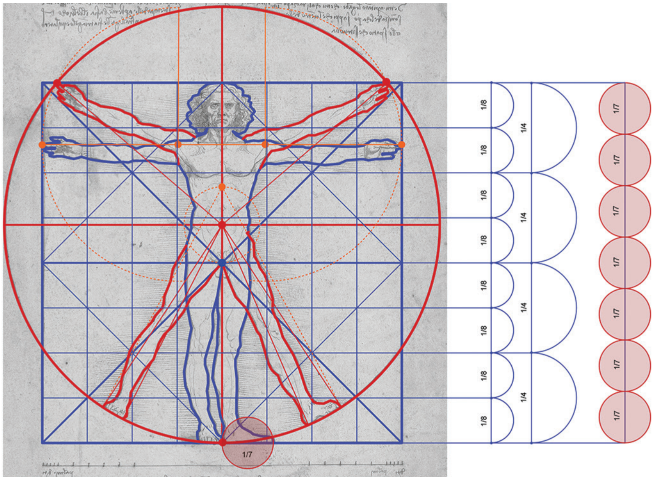
*Fig. 3. a) F. di Giorgio Martini, man in the circle and in the square, Codex Saluzziano 148 (f. 6v), Treatise on civil and military architecture, handwritten copy of about 1482-1486, Turin, Biblioteca Reale. Identification of the geometric references of the drawing (rectangle and circle), (graphic elaboration by V. Riavis); b) F. di Giorgio Martini, Homo ad circulum, Treatise on Architecture and Machines, c. 1480, Ms. Ashburnham 361, f. 5r. Study and identification of concentric geometric figures of circles and squares (graphic elaboration by V. Riavis).*



a symbol but is the result of a geometric and measuring construction [Zöllner 1995, p. 340].
Other fifteenth-century authors such as Leon Battista Alberti, Filarete, Piero della Francesca and Francesco di Giorgio Martini also gave their reinterpretation of the classical canon, changing the basic unit of measurement.
Of the Vitruvian text, Alberti took up the setting and concepts especially on man and architecture in *De Re Aedificatoria* [Alberti 1485]. Furthermore, in *De statua*, written between 1447 and 1464, he proposed an accurate system of measurement and definition of the human body based on the tools *exempeda* [6] and *finitorium* [7] [Alberti 1804] (fig. 2b).
The studies of Filarete and Francesco di Giorgio barely hinted at the connection between measure and geometry, focusing instead on anthropomorphism. Filarete –like Ghiberti, did not identify the center of man in the navel– argued that a building derived from the shape, limbs and measures of the man, and the geometrical schemes of square and circle were fundamental instruments for measurement [Filarete 1972, I, pp. 20, 21 e 28].
However, in the illustration of the perfect man there were several unresolved issues. Vitruvius writes of an upright man inscribed in the square and a supine one in the circle. Therefore two images that cannot both have the same position. There is not distance or ratio between the center of the square and the center of the circle (between the genitals and the navel). He also divides the height of the man into ten modules taking a cue from the measurement of the face that goes from the hair root –and not from the top of the head– to the base of the chin, and indicates the foot as $^{1}/_{6}$ of the height of the man [Sgarbi 2012, p. 184].
The Sienese painter and architect Francesco di Giorgio Martini testifies great interest in the proportional study of man and subsequent application in the architectural field. This research is evident in his fragmentary translations of the Vitruvian treatise, in which he tried to give a graphic form to the man inscribed in the circle and square. In the *Treaty on civil and military architecture* (1481-1484) [Di Giorgio Martini 1979], he outlines the modules of buildings based on the human body proportions of the human body, thus also relating architecture and anatomy [8]. Analyzing two Vitruvian versions proposed by Francesco di Giorgio (figs. 3a, 3b), we can see how they undoubtedly anticipate da Vinci's solution, especially due to the superimposition of the two geometric figures. However, both images do not exhibit the symmetry of the body with respect to the central vertical axis, preferring the ¾ pose, while the coincident geometric centers are at the level of the genitals and not of the navel.
Furthermore, the small male figure of the Turin *Codex Saluzziano* (f. 6v), inserted in a page to describe the necessary correspondences between the city and the human body, is represented inscribed in a circle and in a rectangle, whose geometric arrangement involves the modification of the height and proportionality of man. The silhouette is in a structure devoid of rigor and which seems to casually lap the two geometric figures [Sgarbi 2012, p. 178] [9] (fig. 3a). The identification of the anthropometric center in the genital area is also present in the work of the Venetian monk Francesco Zorzi [Zorzi 1525] that provides the image of a man with legs apart and arms folded inscribed in a circle (fig. 4) [Perissa Torrini 2018].
*The Study of Proportions of the Human Body* (fig. 5) by Leonardo da Vinci of 1490 kept at the Gallerie dell'Accademia in Venice in the *Gabinetto Disegni e Stampe* (cat. no. 228) is the most famous representation of the Vitruvian Man. However, there are not always precise correspondences

*Fig. 4. F. Zorzi, Quod homo imitetur mundum in figura circulari [Zorzi 1525, tome VI, chp. 2, p. Cv] (graphic elaboration by V. Riavis).*

*Figs. 5, 6. L. da Vinci, Study of proportions of the human body, c. 1490, Venice, Gallerie dell'Accademia. Geometric and modular analysis (graphic elaboration by V. Riavis); Giacomo Andrea da Ferrara, proportions of the human body inscribed in a circle and in a square, Vitruvio Ferrarese, Ferrara, Biblioteca Ariostea, Ms. Cart., 1490-1515, [Sgarbi 2004, f. 78v]. Geometric analysis of the human figure and comparison with Leonardo's one (graphic elaboration by V. Riavis).*



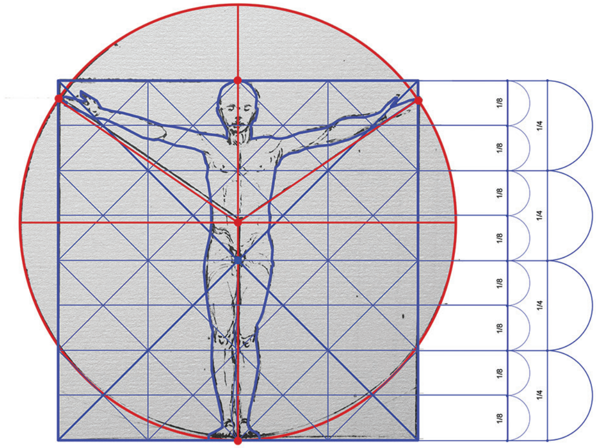
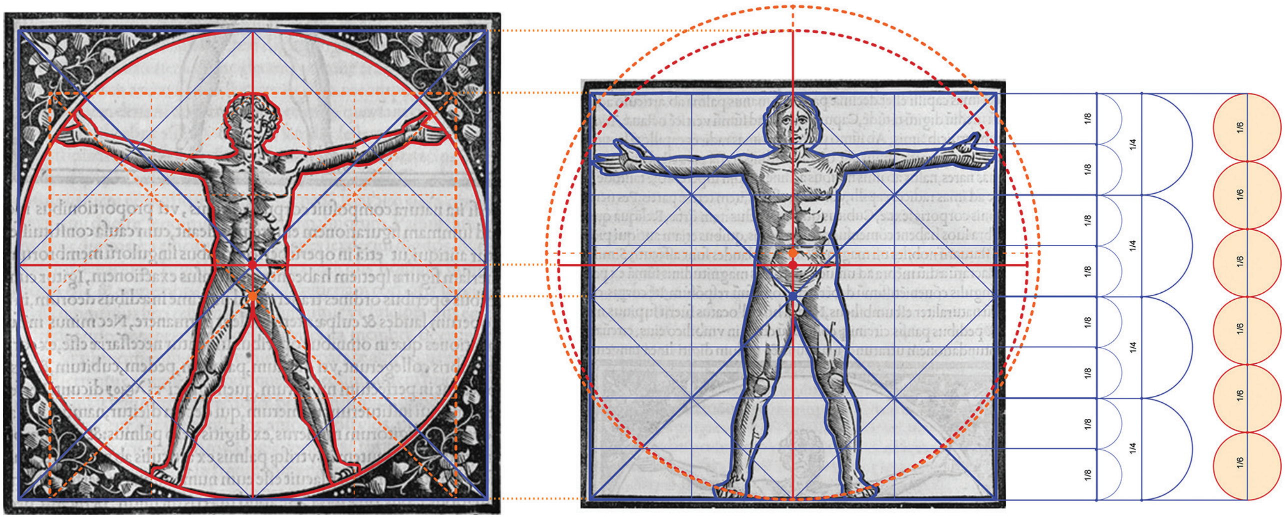
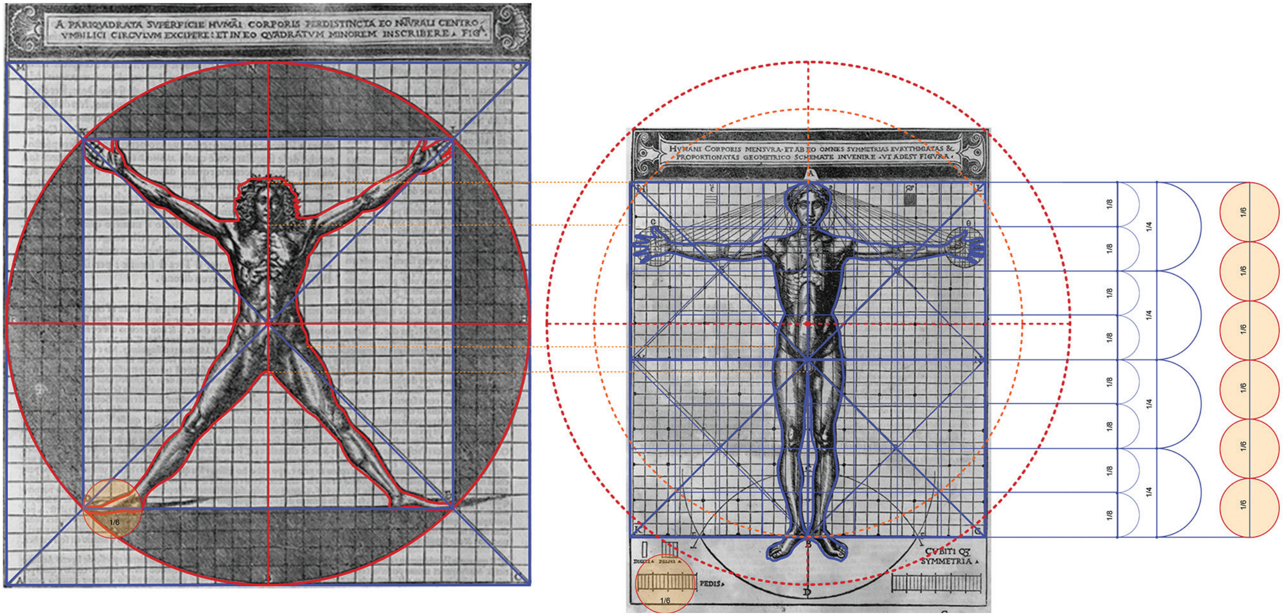




*Fig. 7. a, b) Fra Giocondo, Homo ad circulum and Homo ad quadratum [Vitruvius Pollio 1511, p. 22 recto and verso]. Resizing and geometric analysis of the two different illustrations by Giovanni Giocondo (graphic elaboration by V. Riavis).*



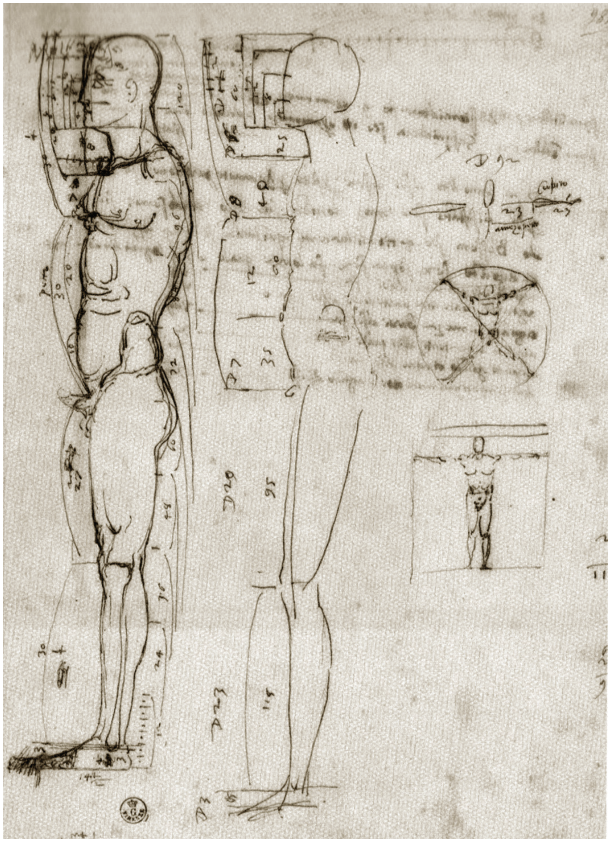
between the proportional description provided by the Augustan author and the da Vinci's figuration, perhaps because Leonardo drew the concept not knowing Latin and without having a copy of the *De Architettura*. The well-known representation is more than anything else the result of careful studies on human anatomy, mathematics and proportion [10] as well as the friendship with Francesco di Giorgio Martini and Giacomo Andrea da Ferrara with whom, met on several occasions in 1490, probably discussed the Vitruvian passage in question. Leonardo's man bases on the real measurement of the human body. It is the result of a long anthropometric and movement investigation initiated by the author as early as 1487 and confirmed by a series of earlier drawings –later copied by Carlo Urbino in the Huygens Codex (ca. 1560-1580)– which led him to a dimensional system that largely coincided with the Vitruvian description.
Inserted within a seemingly concentric circle and square, the one-busted man has four legs and four arms that define two different overlapping positions.
The profile of the left foot defines the unit of measurement and it is "the seventh part of man" according to Leonardo [Di Teodoro 2019]. The human figure divided into seven parts with a unit of measurement corresponding to 26 cm, therefore smaller than the Vitruvian one. A mathematical body, more than natural, in good physical and mental health, not altered by emotions: it is a conceptual model, drawn with precise contours deeply understandable by the intellect.
The image of Leonardo is very similar to that of his close friend Giacomo Andrea da Ferrara (fig. 6), who tragically died in 1500. The analogy presupposes a collaboration between them on the study of the Vitruvian canon, presumably initiated between the pages of the front and back of a single sheet of the *Vitruvio Ferrarese* [Sgarbi 2004; 2012, p. 181]. The square respects the layout scheme used by Giacomo Andrea in the manuscript: the square and the circle are not concentric, but they are tangent in their lower sides. The circle is pleonastic and the human body

*Fig. 8. a) C. Cesariano, Homo ad circulum et ad quadratum, engraving, 37.2 x 25.1 cm, Milan, Castello Sforzesco, Ente Raccolta Vinciana, [Cesariano 1521, p. Lr]. Geometric references (elab. V. Riavis); b) C. Cesariano, Humani corporis mensure et ab eu omnes symmetrias eurythmiatis, engraving, 31,2 × 21,6 cm, Milan, Castello Sforzesco, Ente Raccolta Vinciana [Cesariano 1521, p. XLIXr]. Resizing, comparison and geometric analysis between the two illustrations proposed by Cesariano (graphic elaboration by V. Riavis).*



only touches it at the points coinciding with the square. Furthermore, the two geometric figures have the same ratio between side and radius equal to 0.603 and the same dimension of radius (110 cm) [Pierantoni 2009, pp. 132, 133]. The silhouette with legs tight together and arms outstretched is partially similar to Leonardo's drawing, but it is much sketchier and the body is more slender.
Da Vinci's man graphically personifies the Renaissance mentality, although its meaning and great innovation remained unknown to those who later ventured into giving visual form to the words of Vitruvius, almost nullifying the results achieved by Leonardo [Perissa Torrini 2009].

*Fig. 9. A. da Sangallo the Younger, Vitruvian man, c. 1528, Florence, Gallerie degli Uffizi, Gabinetto dei Disegni e delle Stampe, n. A 1249r.*



Fra Giocondo was the first curator to provide an illustrated printed edition of the treatise and to correct the Latin text to make it more understandable. He published the work several times: the first in Venice in 1511 [Vitruvius Pollio 1511] and in subsequent reprints in the years 1513, 1522 and 1523 [Di Teodoro 2014]. In support of the description of *homo ad circulum* and *ad quadratum* he inserted two distinct images with poor graphic and proportional precision (fig. 7a, b). The two versions are not at the same scale and on consecutive fronts of the page: assuming the side of the square as the height of the man, we have therefore proportioned the figure inscribed in the circumference. The geometric research shows that the position of the navel of the two silhouettes is different, at the same height. A dimension that should be invariable (fixed and not subject to movement) would relate precisely to the distance from the top of the head to the navel. By superimposing the two images and assuming the height of the man as a scale parameter, we also note that the two geometric figures are not concentric: the origin of the circumference is in the navel, while the meeting point of the diagonals of the square is in the pubis.
Luca Pacioli [Pacioli 1889, p. 129] and Cesare Cesariano also addressed the question of measure and geometry, giving greater importance to anthropomorphic measurements and the link with geometry. This emerges in the first edition in the vernacular language edited by Cesare Cesariano [Cesariano 1521], in which the figuration of man is very forced, disproportionate and tense, inserted within a square grid. The hands and feet touch the vertices of the square whose median lines intersect at the center of the circumference that circumscribes the human figure. Man stretched to the ends of the geometric perimeters of perfectly superimposed figures. The letters on the sheet correspond to the fundamental points of tangency and intersection (fig. 8a). We compared the human figure with another image proposed by the treatise on the symmetry and measurements of the human body (fig. 8b). In this case, we used the foot reference to relate the two solutions, depicted on the side in the *homo ad circulum et ad quadratum* and in the graphic scale of the study of proportions. The main parts maintain the same proportional ratio and the same focal points in both versions. The grid has more representative utility than metric, as it is independent from the graphic scale reported by the author. Very similar to the representation of Cesariano is the one represented in the work of Walther Hermann Ryff [Ryff 1547, pp. 124r -125v].

The Vitruvian notion, on the other hand, covered only a conceptual interest for Antonio da Sangallo the Younger, who in 1528 drew two small separate sketches of the *homo ad circulum* and *ad quadratum* close to the right margin of a sheet, preferring to devote himself rather to anatomical measurements (fig. 9). We deduce from the drawings how he took the measurements of the limbs, taking them from reality, thus abandoning the canon of Vitruvius. For example, the Augustan essayist indicates that a foot measures 16 fingers, a dimension in nature considered too large by Antonio da Sangallo who reduces it to 14 fingers referring to the real model. He also brings the height of the entire human body to 120 fingers instead of 96, thus changing the entire measurement system [Zöllner 1995, p. 341]. A little later are the images of *Champfleury* by Geoffroy Tory [Tory 1529]. The simplified drawings are significant because they recall Leonardo's composition and the choice of superimposing two postures and two geometric figures. Tory also inserts two circumferences (one centered in the genitals and one in the navel) and divides the image into modular relations (fig. 10).
Antonio da Sangallo's younger brother, Giovanni Battista Cordini called '*il Gobbo*' is known for the Vitruvian studies started from 1513, aimed at translating and integrating the Sulpician version of the treatise. In particular, his annotations on the *editio princeps* present interesting representation of the Vitruvian man presumably made in 1540. Surely, Giovanni Battista knew the figurations of Fra Giocondo (1511, 1513) and of Cesariano (1521), but did not take them as reference [Sdegno 2005, p. 171].
The author draws the human figure on four blank pages added posthumously to the volume (pp. 55-58). The modules divide the height of the first man, represented on page 55, into 100 fingers and into four parts of 25 fingers each, with further subdivision of the upper quarter comprising the head. On the reverse of this sheet, he shows the profile of the man at the same scale, drawn by tracing for transparency. The foot also in this case measures one sixth of the height of a man. The third figure represents the *homo ad circulum* (fig. 11), with arms outstretched and legs apart inserted inside the circle, whose posture is an evident reference to the work of Albrecht Dürer *Vier Bücher von menschlicher Proportion* [Dürer 1591] printed after the author's death in 1528 [11] (fig. 12). The figure, slightly reduced compared to the previous ones, has horizontal lines that mark its proportion. Cordini's Vitruvian figure traces an omphalocentric circumference with a radius that from the center reaches the tip of the middle finger of the raised arm. Almost imperceptible grooves made on the book by the author with a stylus allowed him to set the geometry of the drawing [Sdegno 2005, pp. 172, 173-175].

*Fig. 10. G. Tory, De la proportion des lettres, representation of the human figure [Tory 1529, p. XVIIr]. Identification of main geometric shapes and centralities (graphic elaboration by V. Riavis).*

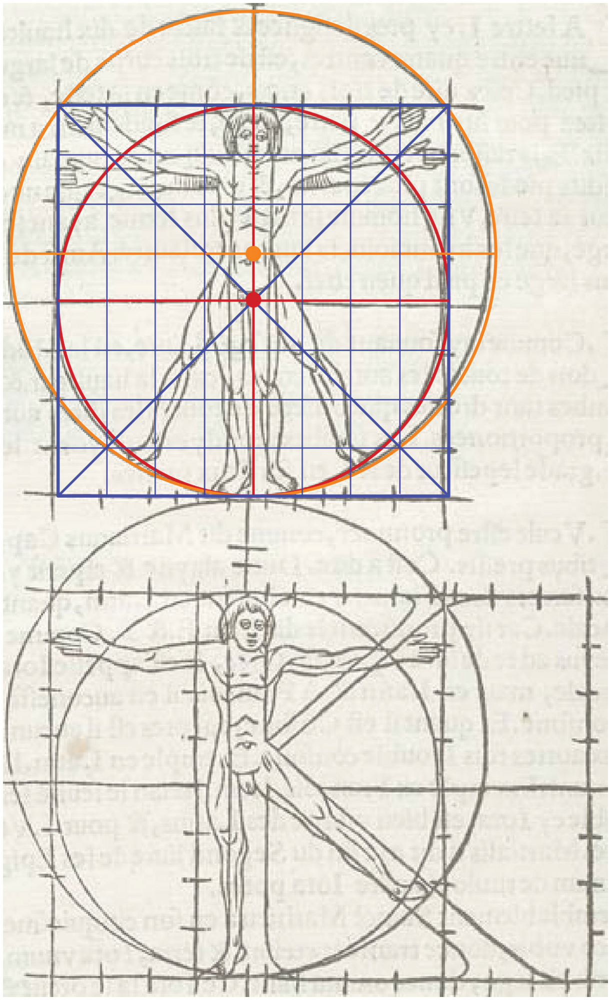


Fig. 11. G.B. Cordini da Sangallo, homo ad circulum. From: Vitruvius, De Architectura, editio princeps, Rome, Biblioteca dell'Accademia Nazionale dei Lincei e Corsiniana, inc. 50.F1, p. 57. The green lines highlight the engraved geometric construction (graphic elaboration by V. Riavis).*

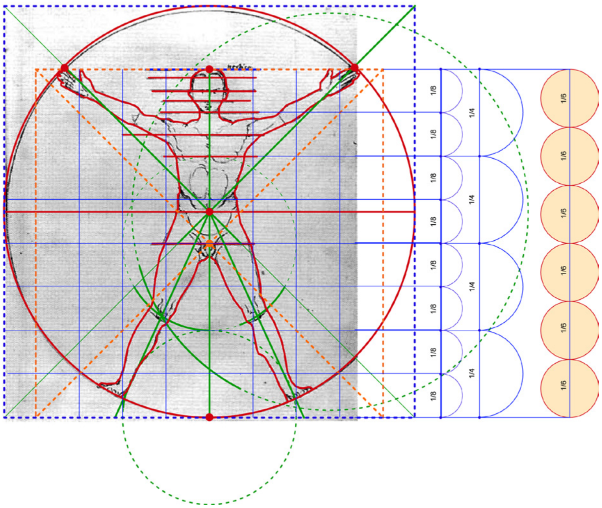
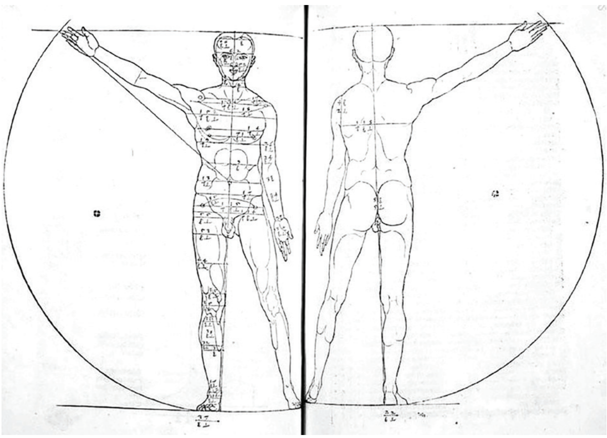


*Fig. 12. A. Dürer, proportional study on the human figure [Dürer 1591, book II, pp. 58v-59r].*



In conclusion, the late sixteenth-century edition edited by Giovanni Antonio Rusconi appears to be the figurative answer requested in the aniconic *editio princeps*, as this version of the treatise does not contain the Vitruvian text, but presents an extraordinary set of 160 woodcuts accompanied by short explanatory texts [Rusconi 1590].
Rusconi deliberately conceived the tables with a didactic character: in fact, they visually explained the various passages of the Vitruvian text and the related commentary referring to the alphabetic letters shown in the drawings. A narrative iconography, therefore, but with great precision and extraordinary pictorial quality, on the tradition of the treatise of Vitruvius published by Cesare Cesariano rather than the versions of Fra Giocondo and Daniele Barbaro.
We compared the images of the Vitruvian man proposed by Rusconi, using the graphic reference provided by the foot identified in two images and in the total height of the human figure (figs. 13a-13c). The images of *homo ad circulum* and *ad quadratum* identify different and distinct points as geometric centers of the figures, also in this case.

## Conclusions

There were numerous attempts to represent the Vitruvius canon relating to the proportions of the human body. The different authors, independently or in relation to the various translations of *De Architectura*, proposed very different schemes and sometimes similar to the one by da Vinci, the only one imposed as a real icon despite the fact that it remained in the dark for a long time and presents variables with respect to what defined in the treaty.
The matter of figuring the Vitruvian man fueled reflections on the theory of architecture and later critics interpreted it as the symbol of Humanism. The theme reflected the mentality of the time, based on the study of antiquity, expressed by philological activity and motivated by the awareness of the centrality of man. The latter in particular, with its geometry, proportion and modularity, was the yardstick of the world.
For graphic interpreters, drawing the descriptions of the treatise correctly was a very complex operation. Vitruvius's textual descriptions were not fully understandable and the authors, despite the possible influences and exchanges of opinion, proposed graphic solutions that were never univocal. Some of them decided to represent *homo ad circulum* and *ad quadratum* distinctly, inserting two men with dissimi-

lar features in the circle and square without relating them to each other. The figurations that synthetically express the concept reported in the Vitruvian work do not follow a rigorous geometric proportional study, so much so that compared with each other they do not even correspond. Other authors started more in-depth research trying to superimpose the circle and square figures with the human one, identifying one or more anthropometric centers. The multiple Vitruvian men lead to the contradiction of a single and universal aesthetic of the geometric and anthropomorphic proportion, traceable instead in Leonardo da Vinci's Study of proportions of the human body.

## Notes

[1] The term "Symmetry" indicates the commensurability of all the components of a work according to a rigorous system based on a modular unit –*commodulatio* [Gros 1997, p. 273, n. 27]. The beauty of an organic whole finds its origin in the Pythagorean precepts on numerical harmony and is figuratively defined in the Canon (about 450 B.C.) by Polykleitos, whose application is demonstrated in the sculpture and human representation in the *Doryphoros*– a canon later surpassed by Lysippus – and architecturally by Ictino with his treatise on the Parthenon [Gros 1997, p. 278, n. 37].

[2] With the word "analogy", Vitruvius would refer to the substantiated adjective *anàlagon*, which in his day denoted a proportional system on a modular basis, defined ratio symmetriarum globally for the definition of buildings. The subdivision into modules also recalls the theory set out by Plato in Timaeus, according to which nature is composed of fundamental particles – the Platonic solids – and the analogy is nothing more than a numerical system with recurring relations [Gros 1997, p. 273, n. 28].

[3] Architecture is a mimetic art deriving from natural truth with modular connotations, whose form according to the Aristotelian conception is immanent in the world but not already present exclusively, similarly to the Platonic hyperuranium of ideas [Gros 1997, pp. 274-275, n. 30].

[4] Geometric patterns in the middle Ages were useful in facilitating drawing.

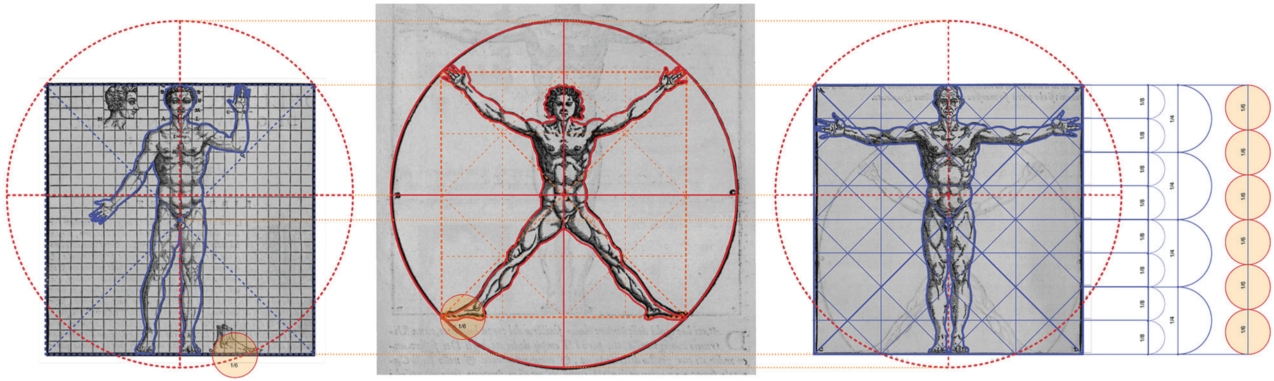
[5] We can consider several examples in this regard. The figure of the Orante by San Quirce de Pedret, Salsona Museu de Pedret (10th century). The miniature from the Latin Codex by Hildegard of Bingen (1098-1179). The miniature of the *Anatomical Man from the Très Riches Heures du Duc de Berry* by the Limbourg brothers (1410-1416). The Cosmic Man by Robert Fludd taken from the *Utriusque Cosmi Historia* (1617) [Zanini 2009, pp. 135, 136]

[6] The *exempeda* is a straight modular rod as long as the object to be measured, suitable for detecting lengths and movable squares in the shape of compasses (*normae*), with which to measure thicknesses, distances and diameters. These tools can determine the exact size and ultimately the proportions of any part of your model.

[7] *Finitorum*, or *definitor*, a circular disk with a rotating graduated rod, from which hangs a plumb line that measures the points of the figure in the space.

[8] There are numerous drawings of human figures especially related to architectural elements (for example capitals for faces) but also to plans and altitudes of basilicas.

*Fig. 13. a, b, c). G.A. Rusconi, Vitruvian men and proportions [Rusconi 1590, pp. 46, 47, 48]. Geometric and comparative analysis on the drawings proposed by Rusconi (graphic elaboration by V. Riavis).*



[9] The height of the man corresponds to only one side of the square (in this case a rectangle) and to the diameter of the circle.

[10] Leonardo later edited the illustration of Pacioli's *De Divina Proportione* between 1496 and 1497.

[11] According to Dürer, the beauty of the human body was not based on abstract concepts and calculations, but was based on empirical calculation. For this reason, he devoted himself to measuring a large number of individuals, without however obtaining a definitive and ideal model, since it is changeable in relation to times and fashions.

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