

## **ORDINATIO: THE VITRUVIAN CONCEPT AS A GENERATOR OF ARCHITECTURAL DESIGN**

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**ABSTRACT:** The article aims to investigate the role of the concept of *ordinatio*, listed by Vitruvius in *De architectura* treatise as one of the six fundamental components of the architectural design. By mapping occurrences of the concept through the text, the article proposes to contribute with a better comprehension of this concept which has been largely discussed in works regarding this Vitruvian treatise, due to the lack of clarity in which that its definition is presented in the original text regarding the operational and architectural points of view.

**KEYWORDS:** Vitruvius; *Ordinatio*; Architectural Design Theory.

### ORDINATIO: O CONCEITO VITRUVIANO COMO GERADOR DO PROJETO ARQUITETÔNICO

**RESUMO:** O artigo é dedicado a investigar o papel do conceito de *ordinatio*, elencado por Vitruvius no tratado *De architectura* como um dos seis componentes fundamentais da arquitetura, na concepção projetual. Através do mapeamento das ocorrências do conceito através do texto, o artigo propõe contribuir para uma melhor compreensão deste que tem sido um dos conceitos mais discutidos a respeito da obra vitruviana, por conta da pouca clareza com que a sua definição é apresentada no texto original sob o ponto de vista operativo/arquitetônico.

**PALAVRAS-CHAVE:** Vitruvius; *Ordinatio*; Teoria do Projeto Arquitetônico.

### INTRODUCTION

This article addresses part of the author's doctoral research, which aims to discuss the theory of architectural design in Vitruvius's treatise through the analysis of the theoretical concepts and their applicability as described by Vitruvius in his text. These analyses are based on the assumption that Vitruvius's text contains a consistent theory of architectural design, which is expressed through the six components of architecture: *ordinatio*,

*dispositio, eurythmia, symmetria, decor* and *distributio*.<sup>1</sup> This assumption, though not detailed in this work, is based on studies linked to Vitruvius as an architect in the service of the Roman government, possibly belonging to the *Ordo Apparitores*<sup>2</sup> and identified as an Augustan intellectual, as described in the works of Pierre Gros and Elisa Romano.<sup>3</sup> Vitruvius is understood in this sense to be a professional whose duties and connections with power and with other professionals offered him access to specialist knowledge, and whose encyclopedic training enabled him to create an architectural design theory that should be consistent.<sup>4</sup>

Considering that Vitruvius's text has no parallels in antiquity to enable a comparative study of its architectural theory, the primary and sole source for understanding Vitruvian theory is the text itself, and that its various translations can be considered as secondary sources due to the inherent characteristics of translation. This research therefore aims to contribute to the discussion about Vitruvian architectural theory strictly from the point of view of the text, taking it as the only source, even when dealing with ordinary concepts.

The research method for defining the theoretical concepts therefore consists firstly of mapping their appearance in the text, and secondly of analysing their usage in the various passages of the text in which they occur, since even those not directly related to architectural design theory can be traced in the search of Vitruvius's understanding of each particular concept. Graphical analysis also allows identification of the sequence in which the concepts are approached, their importance in a determined passage and the relations between them.

## ORDINATIO AS THE GENERATOR CONCEPT OF DESIGN

The purpose of this particular article, then, is to address the mapping and analyses involved in developing an understanding of *ordinatio*. Since the definition of *ordinatio* presented in the second chapter of Book II includes a major understanding of *ordo* in broad terms as well as of *quantitas, membrum, numerus, modulus* and *symmetria*, this work therefore seeks to analyse all occurrences of these roots in the first six books as found in the Harleianus manuscript. These occurrences, compared with at least three different translations, involve a myriad of fragments of text which I believe can enhance understanding of *ordinatio*, as it will be described.

The analysis of the occurrences of the root ORD allows them to be classified into three types: a theoretical definition, the applicability of this in design terms and other acceptations of the root. From a total of 35 occurrences, the 15 most relevant for understanding the concept are concentrated in Books I, III and IV. The theoretical definition

<sup>1</sup> I, 2, 1. Architectura autem constat ex **ordinatione**, qua graece *taxis* dicitur, et ex dispositione, hanc autem Graeci *diathesisin* vocitant, et eurythmia et symmetria et decore et distributione quae graece *oeconomia* dicitur.

<sup>2</sup> About this subject, see Gros, 1994, p. 75-90.

<sup>3</sup> See Romano, 1987.

<sup>4</sup> On the subject of the design's theory consistency in Vitruvius, see Geertman, 1994, p. 7-30.

can be found in the second chapter of Book I, where three of the four occurrences of the root can also be found. While the applicability of the concept is concentrated in the 11 relevant occurrences in books III and IV, in which the design procedures of various types of temple are described. The other acceptations of the root can be found throughout the treatise and will be referenced when they contribute towards its understanding.

And so we make a start on analysing the actual definition of the concept of *ordinatio*, which Vitruvius introduces as being:

*Ordinatio est modica membrorum operis commoditas separatim univarseque proportionis ad symmetriam comparatio. Haec componitur ex quantitate quae graece posotes dicitur. Quantitas autem est modulorum ex ipsius operis sumptio e singulisque membrorum partibus universi operis conveniens effectus. (I, 2, 2).*

In the light of this somewhat imprecise definition, we can establish some preliminary conclusions. The first is that *ordinatio* includes the architect's work on the parts comprising the design. This procedure involves adapting elements according to a rule, which Vitruvius termed *quantitas*, to achieve a goal of *symmetria*. That said, we can also understand firstly that the design is something based on parts or *membra*, and secondly that these parts have an initial pre-defined configuration, since they have to be adapted to achieve *symmetria*.

Still in the second chapter, the term reappears in the sixth paragraph,<sup>5</sup> where Vitruvius defines the *decor* obtained by tradition and states that the appearance of a work would jar if elements of the Doric were transferred to the Ionic, since it includes foreign details to the consuetudinary order. It can therefore also be established that he sees the notion of *ordo* as something that has been constructed over time, based on architectural tradition. As something predetermined, or at least expected, *ordinatio* can thus be considered as a prior configuration or a pre-established arrangement.

Before moving on in this investigation of *ordo* in Books III and IV, it's needed to broaden understanding of the definition of *ordinatio* by expanding understanding of other terms in the definition, the first of which is *quantitas*. The root QUANTIT only appears five times in the treatise. In Book I the term is defined in the second chapter as the adoption of modules for measuring the elements, based on the members of the work itself. Returning to the considerations above, if a design is composed of elements that have in themselves some pre-established configuration and have to be adapted to comprise the design as a whole, the procedure of *quantitas* would therefore be an adjustment of the initial configuration of the elements by measuring and scaling according to a common modular unit, established based

<sup>5</sup> I, 2, 6. Ad consuetudinem autem decor sic exprimitur, cum aedificiis interioribus magnificis item vestibula convenientia et elegantia erunt facta. Si enim interiora prospectus habuerint elegantes, aditus autem humiles et inhonestos, non erunt cum decore. Item si doricis epistylis in coronis denticuli sculpentur aut in pulvinatis columnis et ionicis epistylis [capitulis] experimentur triglyphi, translatis ex alia ratione proprietatibus in aliud genus operis offendetur aspectus aliis ante ordinis consuetudinibus institutis.

on the dimension of one of the elements making up the design. Further on, in Book III, the term appears as a modular quantification,<sup>6</sup> in Book IV as modular measurement,<sup>7</sup> and finally in Book V as related to the largeness of elements measured by interval.<sup>8</sup> So it can be concluded that the notion of *quantitas* is related to the sizing of elements, but a sizing governed by fixed intervals that relate to the concept of the module.

Continuing this investigation of the definition of *ordinatio*, it is also necessary to expand understanding about what the elements of the design are, or the *membra*, and what the author understands by *modulus*. The root MEMBR appears 24 times in Books I to VI. In Book I it appears in the definitions of *ordinatio*, *eurythmia*, *symmetria* and in other passages without any clear definition. In the first chapter of Book III, it can be understood that the *membra* of the human body include the palm, the head, the foot, the forearm and the chest, for example. Nonetheless, Vitruvius does not specifically nominate what the architectural *membra* are, but it is possible to deduce some in passages of Book III and thus understand that, when dealing with temples, they are the structural and decorative parts in stone that constitute them.<sup>9</sup> Also, we can identify as *membra* the parts selected in chapter five: capitals,

<sup>6</sup> III, 5, 2. Quo altius enim scandit oculi species, non facile persectat aeris crebritatem, dilapsa itaque altitudinis spatio et viribus, extractam incertam **modulorum** renuntiat sensibus **quantitatem**. Quare semper adiciendum est rationi supplementum in **symmetriarum membris**, ut, cum fuerint aut altioribus locis opera aut etiam ipsa colossicoter, habeant magnitudinum rationem.

<sup>7</sup> IV, pre, 2. Ex tribus generibus quae subtilissimas haberent **proportionibus modulorum quantitates** ionici generis moribus, docui.

<sup>8</sup> V, 4, 4. Igitur intervallo tonorum et hemitoniorum et tetrachordorum in voce divisit natura finitque terminationes eorum mensuris intervallorum **quantitate**, modisque certis distantibus constituit qualitates, quibus etiam artifices qui organa fabricant, ex natura constitutis utendo comparant ad concentus convenientes eorum perfectiones.

<sup>9</sup> III, 1, 1-2. Aedium compositio constat ex **symmetria**, cuius rationem diligentissime architecti tenere debent. Ea autem paritur a proportione, quae graece analogia dicitur. Proportio est ratae partis **membra** in omni opere totiusque commodulatio, ex qua ratio efficitur **symmetriarum**. Namque non potest aedis ulla sine **symmetria** atque proportione rationem habere compositionis, nisi uti ad hominis bene figurati **membra** habuerit exactam rationem. Corpus enim hominis ita natura composuit, uti os capitis a mento ad frontem summam et radices imas capilli esset decimae partis, item manus palma ab articulo ad extremum medium digitum tantundem, caput a mento ad summum verticem octavae, cum cervicibus imis ab summo pectore ad imas radices capillorum sextae, <a medio pectore> ad summum vertices quartae. Ipsius autem oris altitudinis tertia est pars ab imo mento ad imas nares, nasum ab imis naribus ad finem medium superciliorum tantundem, ab ea fine ad imas radices capilli frons efficitur item tertiae partis. Pes vero altitudinis corporis sextae, cubitum quartae, pectus item quartae. Reliqua quoque **membra** suas habent commensus proportionem, quibus etiam antiqui pictores et statuarii nobiles usi magnas et infinitas laudes sunt adsecuti.

III, 5, 8. De volutarum descriptionibus, uti ad circinum sint recte involutae, quemadmodum describantur, in extremo libro forma et ratio earum erit subscripta. Capitulis perfectis deinde columnarum non ad libellam sed ad aequalem **modulum** conlocatis, ut, quae adiectio in stylobatis facta fuerit, in superioribus **membris** respondeat **symmetria** epistylorum (...).

columns, architraves, friezes, timpani, pediments and acroteria.<sup>10</sup> Later, Vitruvius discusses the way in which an element of the human body can become a measurement reference for the others, compared with recognized measuring systems like the digit, the span and cubit.<sup>11</sup> The author can thus be understood to be proposing the adoption of an element as a reference measurement for creating a system for the rest of the work.

Vitruvius suggests also the adoption of a perfect number as a way of creating subdivisions of this system of measurements. The concept of *numerus*, which as the author says was calculated based on the human body, is employed as a divider of the reference element, which would be the design module, thus creating sub-modules that can be obtained from the division of the initial interval into 10, 6, or even 16 parts.<sup>12</sup> From this observation we can consequently conclude that one or other elements of the work will have the capacity of generating modules, and would therefore form the base reference for the others, thus

<sup>10</sup> III, 5, 13. **Membra** omnia, quae supra capitula columnarum sunt futura, id est epistylia, zophora, coronae, tympana, fastigia, acroteria, inclinanda sunt in frontis suae cuiusque altitudinis parte XII (...).

<sup>11</sup> III, 1, 5. Nec minus mensurarum rationes, quae in omnibus operibus videntur necessariae esse, ex corporis **membris** collegerunt, uti digitum, palmum, pedem, cubitum, et eas distribuerunt in perfectum **numerus**, quem Graeci teleon dicunt. Perfectum autem antiqui instituerunt **numerus** qui decem dicitur; namque ex manibus digitorum **numerus**; ab palmo pes est inventus. Si autem in utrisque palmis ex articulis ab natura decem sunt perfecti, etiam Platoni placuit esse eum numerum ea re perfectum, quod ex singularibus rebus, quae monades apud Graecos dicuntur, perficitur decusis. Qui simul autem undecim aut duodecim sunt facti, quod superaverint non possunt esse perfecti, donec ad alterum decusis perveniant; singulares enim res particulae sunt eius numeri.

<sup>12</sup> III, 1, 6-8. Mathematici vero contra disputantes ea re perfectum dixerunt esse **numerus** qui sex dicitur, quod is **numerus** habet partitiones eorum rationibus sex **numero** convenientes sic: sextantem unum, trientes duo, semissem tria, besem quem dimoeron dicunt quattuor, quintarium quem pentemoeron dicunt quattuor, quintarium quem pentemoeron dicunt quinque, perfectum sex. Cum ad supplicationem crescat, supra sex adiecto asse ephectum; cum facta sunt octo, quod est tertia adiecta, tertiarium alterum, qui epitritos dicitur; dimidia adiecta cum facta sunt novem, sesquialterum, qui hemiolius appellatur; duabus partibus additis et decusis facto bes alterum, quem epidimoerum vocitant; in undecim **numero** quod adiecti sunt quinque, quintarium, quem epipempton dicunt; duodecim autem, quod ex duobus **numeris** simplicibus est effectus, diplasiona. Non minus etiam, quod pes hominis altitudinis sextam habet partem, (ita etiam, ex eo quod perficitur pedum **numero**, corporis sexies altitudinis terminavit) eum perfectum constituerunt, cubitumque animadverterunt ex sex palmis constare digitisque XXIII. Ex eo etiam videntur civitates Graecorum fecisse, quemadmodum cubitus est sex palmorum, in drachma qua nummo uterentur, aereos signatos uti asses ex aequo sex, quos obolos appellant, quadrantesque obolorum, quae alii dichalca, nonnulli trichalca dicunt, pro digitis viginti quattuor in drachma constituisse. [Nostris autem primo fecerunt antiquum **numerus** et in denario denos aeris constituerunt, et ea re compositio nominis ad hodiernum diem denarium retinet. Etiamque quarta pars quod efficiebatur ex duobus assibus et tertio semisse, sestertium vocitaverunt. Postea quam animadverterunt utrosque **numeros** esse perfectos, et sex et decem, utrosque in unum coiecerunt et fecerunt perfectissimum decusis sexis. Huius autem rei auctorem invenerunt pedem. E cubito enim cum dempti sunt palmi duo, relinquitur pes quattuor palmorum, palmus autem habet quattuor digitos. Ita efficitur, ut habeat pes sedecim digitos et totidem asses aeracius denarius.

raising the question of how can one element potentially define the modulation of a design as a whole.

In attempt to understand this, the research moves on to some significant passages in the 13 occurrences of the root *MODUL*. The first of these is in Book III, where the author explains how to obtain the reference module for the design of a Eustyle temple based on a division of the front face according to the number of columns, taking one of the parts as the module for the whole design, corresponding to the diameter of the columns.<sup>13</sup> The theme of adopting a module generated from subdividing the frontal dimension of a temple is returned to in Book IV, in this case a Doric temple.<sup>14</sup> The other themes of architecture are addressed as the treatise continues and a less strict approach to a modular system can be seen as the solemnity of the buildings decreases.<sup>15</sup> We can therefore conclude from these passages that the establishment of modules is based on design constraints, such as the site, together with prior decisions at the outset of the design, such as definition of the genre of columns to be used, which is in turn related to the *decor*, or with the type of intercolumniation, which also has a relationship with *decor*.

To sum up, we have the action of design beginning with the definition of some rules. The first of these would be the adoption of a system of geometric order, the *ordinatio*, which governs the parts according to a modular rule in a procedure called *quantitas*, or modular quantification. To achieve this procedure a reference interval, or *modulus*, needs to be established, which can be defined in various ways – stricter in the case of temples and more flexible in less formal buildings, yet related to preliminary decisions and subject to the

<sup>13</sup> III, 3, 7. Huius autem rei ratio explicabitur sic. Frons loci quae in aede constituta fuerit, si tetrastylus facienda fuerit dividatur in partes XI s<emisseque> praeter crepidines et proiecturas spirarum; si sex erit columnarum, in partes XVIII; si octostylus constituetur, dividatur in XXIV et semissem. Item ex his partibus sive tetrastyli sive hexastyli sive octostyli una pars sumatur, eaque erit **modulus**. Cuius **moduli** unius erit crassitudinis columnarum. Intercolumnia singula, praeter media, **modulorum** duorum et **moduli** quartae partis; mediana in fronte et postico singula ternum **modulorum**. Ipsarum columnarum altitudo **modulorum** habebunt iustam rationem.

<sup>14</sup> IV, 3, 3. Nos autem exponimus, uti **ordo** postulat, quemadmodum a praeceptoribus accepimus, uti, si qui voluerit his rationibus attendens ita ingredi, habeat **proportiones** explicatas, quibus emendatas et sine vitii efficere possit aedium sacrarum dorico more perfectiones. Frons aedis doricae in loco, quo columnae constituuntur, dividatur, si tetrastylus erit, in partes XXVII, si hexastylus, XXXXII. Ex his pars una erit **modulus**, qui Graece embater dicitur, cuius **moduli** constitutione ratiocinationibus efficiuntur omnis operis distributiones.

<sup>15</sup> V, 9, 3. Columnarum autem **proportiones** et **symmetriae** non erunt isdem rationibus quibus in aedibus sacris scripsi; aliam enim in deorum templis debent habere gravitatem, aliam in porticibus et ceteris operibus subtilitatem. Itaque si dorici generis erunt columnae, dimetiantur earum altitudines cum capitulis in partes XV. Ex eis partibus una constituatur et fiat **modulus**, ad cuius **moduli** rationem omnis operis erit explicatio. Et in imo columnae crassitudo fiat duorum **modulorum**; intercolumnium quinque et **moduli** dimidia parte; altitudo columnae praeter capitulum XIII **modulorum**; capituli altitudo **moduli** unius, latitudo **modulorum** duorum et **moduli** sextae partis. Ceteri operis **modulationes**, uti in aedibus sacris in libro III scriptum est, ita perficiantur.

constraints. Based on adoption of the *modulus*, all the design elements have to be measured based upon this reference interval, including its subdivisions, based on the notion of *numerus*.

Returning to the relevant occurrences of the root ORD, now in terms of the applicability of the concept, and seeking to validate the proposals listed above, we come to books III and IV. From the seven relevant occurrences in Book III, the first two reinforce the idea that *ordinatio* consists of a pre-established rule for each type of building, like a set of predetermined or expected formal relationships handed down from the ancients,<sup>16</sup> which we should respect because, as Vitruvius writes, “they ordered the members of the designs through proportion and *symmetria* to thus achieve harmony”.<sup>17</sup>

The other occurrences in Book III relate the root ORD to the alignment of elements. In four of these, the author associates *ordines* with *columnarum*<sup>18</sup> throughout Book III, meaning a line of columns or colonnade. In the third chapter Vitruvius associates *ordines* with *matres*,<sup>19</sup> meaning a row of matrons in a line, referring in this strange passage to their inability of passing arm in arm through the narrow intercolumniation. Both cases, albeit quite different, refer to the connection of *ordo* with arrangement according to alignment.

The relevant occurrences in Book IV are concentrated in chapters II and VIII, with the root ORD appearing three times in the latter. In these sections Vitruvius writes about

<sup>16</sup> III, 1, 4. Ergo si ita natura composuit corpus hominis, uti proportionibus **membra** ad summam figurationem eius respondeant, cum causa constituisse videntur antiqui, ut etiam in operum perfectionibus singulorum **membrosum** ad universam figurae speciem habeant commensus exactionem. Igitur cum in omnibus operibus **ordines** traderent, maxime in aedibus deorum, operum et laudes et culpae aeternae solent permanere.

<sup>17</sup> III, 1, 9. Ergo si convenit ex articulis hominis **numerus** inventum esse et ex **membris** separatis ad universam corporis speciem ratae partis commensus fieri responsum, relinquunt, ut suscipiamus eos, qui etiam aedes deorum immortalium constituentes ita **membra** operum **ordinaverunt**, ut proportionibus et **symmetriis** separatae atque universae convenientesque efficerentur eorum distributiones.

<sup>18</sup> III, 2, 5-7. Peripteros autem erit, quae habebit in fronte et postico senas columnas, in lateribus cum angularibus undenas. Ita autem sint haec columnae conlocatae, ut intercolumnii latitudinis intervallum sit a parietibus circum ad extremos **ordines columnarum**, habeatque ambulationem circa cellam aedis, quemadmodum est in porticu Metelli Iovis Statoris Hermodori et ad Mariana Honoris et Virtutis sine postico a Mucio facta. Pseudopteros autem sic conlocatur, ut in fronte et postico sint columnae octonae, in lateribus cum angularibus quinae denae. Sint autem parietes cellae contra quaternas columnas medianas in fronte et postico. Ita duorum intercolumniorum et unae crassitudinis columnae spatium erit ab parietibus circa ad extremos **ordines columnarum**. Huius exemplar Romae non est, sed Magnesiae Dianae Hermogenis Alabandei et Apollinis a Menesthe facta. Dipteros autem octastylus et pronaos et postico, sed circa aedem duplices habet **ordines columnarum**, uti est aedis Quirini dorica et Ephesi Dianae ionica a Chersiphrona constituta.

<sup>19</sup> III, 3, 3. **Matres** enim familiarum cum ad supplicationem gradibus ascendunt, non possunt per intercolumnia amplexae adire, nisi **ordines** fecerint; item valvarum ad spectus abstruduntur columnarum crebritate ipsaque signa obscurantur; item circa aedem propter angustias impediuntur ambulationes.

the permitted flexibility in relation to the geometric scheme in other types of temple.<sup>20</sup> Furthermore, the relationship between *ordinatio*, *symmetria* and *dispositio* can be seen when the author states that other types of temples can be *ordinatae* with the same *symmetriis*, yet forming different *dispositiones*.<sup>21</sup>

In terms of the pre-definition that characterises the adoption of *ordinatio*, it is important to recall the commissioning and construction process for a public architectural work in ancient Rome. This process began with the nomination of a curator, specifying the commission in comparison with other existing works, as states Pierre Gros.<sup>22</sup> The curator was then charged with choosing an architect, who was responsible for developing the design according to the commission and therefore including the prior definitions and expected geometric scheme for the building, which might be adapted by the architect according to the site and other constrictions, but without his participation in the important initial decision. The building scheme was therefore something imposed on the architect, who was responsible for designing it accordingly, and his greatest challenge and highest reward, as Vitruvius tells in Book VI, was the establishment of the modular relationships between the parts, and not really the formal origination of the building.<sup>23</sup>

Finally, we come to the last concept in the definition of *ordinatio* according to Vitruvius: *symmetria*. Although the study of this concept involves the analysis of a large number of occurrences – 74 in the first six books – the following approach will be just enough to propose the understanding of *symmetria* as an attribute achieved by a work of architecture when complying with the procedure of *quantitas* on a base established by *ordinatio*.

<sup>20</sup> IV, 2, 2. Ita unaquaeque res et locum et genus et **ordinem** proprium tuetur. E quibus rebus et a materiatura fabrili in lapideis et marmoreis aedium sacrarum aedificationibus artifices dispositiones eorum scalpturis sunt imitati et eas inventiones persequendas putaverunt (...).

<sup>21</sup> IV, 8, 4-6. Item generibus aliis constituuntur aedes ex isdem **symmetriis ordinatae** et alio genere **dispositiones** habentes, uti est Castoris in circo Flamino et inter duos lucos Veiovis, item argutius Nemori Dianae columnis adiectis dextra ac sinistra ad umeros pronai. Hoc autem genere primo facta est, uti est Castoris in circo, Athenis in arce et in Attica Sunio Palladis Minervae. Earum non aliae sed eadem sunt **proportiones**. Cellae enim longitudinibus duplices sunt ad latitudines uti reliquae; ex is omnia quae solent esse in frontibus, ad latera sunt translata. Nonnulli etiam de tuscanicis generibus sumentes columnarum **dispositiones** transferunt in corinthiorum et ionicorum operum **ordinationes**, et quibus in locis in pronao procurunt antae, in isdem e regione cellae parietum columnas binas conlocantes efficiunt tuscanicorum et graecorum operum communem ratiocinationem.

<sup>22</sup> About this subject, see Gros, 1983, p. 425-452; Mortet, 1902-1908.

<sup>23</sup> VI, 8, 9. Quibus autem copiarum generibus oporteat uti, non est architecti potestas, ideo quod non in omnibus locis omnia genera copiarum nascuntur, ut in proximo volumine est expositum; praeterea in domini est potestate, utrum latericio an caementicio an saxo quadrato velit aedificare. Itaque omnium operum probationes tripertito considerantur, id est fabrili subtilitate et magnificentia et dispositione. Cum magnificenter opus perfectum aspicietur, a domini potestate inpensae laudabuntur; cum subtiliter, officinatoris probabitur exactio; **cum vero venuste proportionibus et symmetriis habuerit auctoritatem, tunc fuerit gloria area architecti.**



This understanding appears quite clearly in the definition of the concept in Book I, where *symmetria* would be the dimensional correspondence between the design elements achieved through mathematical operations taking one part as the module for the scale of all the elements.<sup>24</sup> These operations are founded on geometry, as the author explains when addressing the necessary knowledges of the architect in the first chapter, stating that the difficult problems of *symmetria* are resolved by geometric theories and inventive methods.<sup>25</sup>

As he does with *ordinatio*, Vitruvius tries to construct a reason for the pursuit of this attribute in architecture. This reason appears in Book II, founded on two premises: tradition, which comes from the accumulated experience of construction, bringing certainty to decisions previously unsure and vague; and nature, through which analogy with the human body provides a reference for the employment of *symmetria*.<sup>26</sup>

Another important connection with the term *symmetria* relates to the notion of genre of columns. Vitruvius repeatedly relates the concept with the term genre throughout books III and IV, when he describes the *symmetria* of the Ionic genre, the *symmetria* of the Corinthian genre and the *symmetria* of the Doric genre, with 19 occurrences of the root SYMMETR concentrated in these passages. Completing the theme of temples in Book IV, Vitruvius uses the term a further seven times when addressing possible flexibility of the rules of *symmetria*, which can be altered and combined to form new proposals.

This examination allows further proposals. The first is that *symmetria* is linked to a set of dimensional relationships commensurable between the elements but coordinated by a module, creating a dimensional coordination system for the elements. The second concerns

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<sup>24</sup> I, 2, 4. Item **symmetria** est ex ipsius operis **membris** conveniens, consensus ex partibusque separatis ad universae figurae speciem ratae partis responsus. Uti in hominis corpore e cubito, pede, palmo, digito ceterisque particulis **symmetros** est eurythmiae qualitas, sic est in operum perfectionibus. Et primum in aedibus sacris aut e columnarum crassitudinibus aut triglypho aut etiam embatere, ballista e foramine, quod Graeci peritretion vocitant, navibus interscalmio, quae dipechyaia dicitur, item ceterorum operum e **membris** invenitur **symmetriarum** ratiocinatio.

<sup>25</sup> I, 1, 4. Quae cur ita sint, haec sunt causae. Litteras architectum scire oportet, uti commentariis memoriam firmiorem efficere possit. Deinde graphidis scientiam habere, quo facilius exemplaribus pictis quam velit operis speciem deformare valeat. Geometria autem plura praesidia praestat architecturae; et primum ex euthygrammis circini tradit usum, e quo maxime facilius aedificiorum in areis expediuntur descriptiones normarumque et librationum et linearum directiones. Item per opticen in aedificiis ab certis rationibus caeli lumina recte ducuntur. Per arithmeticen vero sumptus aedificiorum consummantur, mensurarum rationes explicantur, **difficilesque symmetriarum quaestiones geometricis rationibus et methodis inveniuntur**.

<sup>26</sup> II, 1, 7. Tum autem instruente animo se eprospicientes maioribus cogitationibus ex varietate artium natis, non casas sed etiam domos fundatas et latericiis parietibus aut e lapide structas materiaeque et tegula tecta perficere coeperunt, deinde observationibus studiorum e vagantibus iudiciis et incertiis ad certas **symmetriarum** perduxerunt rationes. Posteaquam animadverterunt profusos esse partus ab natura et materiam abundantem copiarum ad aedificationes ab ea comparatam, tractando nutrierunt et auctam per artes ornaverunt voluptatibus elegantiam vitae. Igitur de his rebus, quae sunt in aedificiis ad usum idoneae, quibusque sunt qualitatibus et quas habeant virtutes, ut potuero, dicam.

the existence of a different *symmetria* for each genre of columns. The third considers the dependence of the design's high quality on a greater number of modular dimensional relationships between the different elements achieved. And moreover, as the seriousness and public character of the design decrease, the rules of *symmetria* can be more flexible.

## CONCLUSION

The proposal achieved from understanding *ordinatio* comes together as a preliminary geometric scheme that would act as a framework of possibilities from which the design would begin. This design would be a geometric scheme adopted from prior definitions, such as the expected configuration of the building, site constrictions, surroundings and the architectural language predetermined in the commissioning of the design, and therefore probably without the architect's decision. It is a primary procedure that geometrises the site, adapting pre-established building schemes, such as the six temple types listed by Vitruvius in the second chapter of Book III,<sup>27</sup> to the dimensions and features of the site and also establishing subdivisions of this initial geometry in the light of the genre of columns to be employed, to generate a kind of modular grid.

So, as a last proposal, the analysis of Vitruvius's descriptions of man's proportions laid out in Book III, allows comparison of *ordinatio* with the geometric system created for establishing the human figure based on geometry by the association of a square and a circle,<sup>28</sup> upon which one or more modular grids can be established using measured intervals taken from a component part of the body, such as the foot or palm. This scheme works both as a general system for localization of the parts, which supports the *dispositio*, and as modular dimensioning of the parts, to provide the basis for the achievement of *symmetria*.

<sup>27</sup> III, 2, 1. Aedium autem principia sunt, e quibus constat figurarum aspectus; et primum **in antis**, quod graece naos en parastasin dicitur, deinde **prostylos, amphiprostylos, peripteros, pseudodipteros, hypaethros** (...).

<sup>28</sup> III, 1, 3. Similiter vero sacrarum aedium membra ad universam totius magnitudinis summam ex partibus singulis convenientissimum debent habere commensus responsum. Item corporis centrum medium naturaliter est umbilicus. Namque si homo conlocatus fuerit supinus manibus et pedibus pansis circinique conlocantum 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 invenietur. Nam si a pedibus imis ad summum caput mensum erit eaque mensura relata fuerit ad manus pansas, invenietur eadem latitudo uti altitudo, quemadmodum areae quae ad normam sunt quadratae.

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