BOOK III

INTRODUCTION

1. Apollo at Delphi, through the oracular utterance of his priestess, pronounced Socrates the wisest of men. Of him it is related that he said with sagacity and great learning that the human breast should have been furnished with open windows, so that men might not keep their feelings concealed, but have them open to the view. Oh that nature, following his idea, had constructed them thus unfolded and obvious to the view! For if it had been so, not merely the virtues and vices of the mind would be easily visible, but also its knowledge of branches of study, displayed to the contemplation of the eyes, would not need testing by untrustworthy powers of judgement, but a singular and lasting influence would thus be lent to the learned and wise. However, since they are not so constructed, but are as nature willed them to be, it is impossible for men, while natural abilities are concealed in the breast, to form a judgement on the quality of the knowledge of the arts which is thus deeply hidden. And if artists themselves testify to their own skill, they can never, unless they are wealthy or famous from the age of their studios, or unless they are also possessed of the public favour and of eloquence, have an influence commensurate with their devotion to their pursuits, so that people may believe them to have the knowledge which they profess to have.

2. In particular we can learn this from the case of the sculptors and painters of antiquity. Those among them who were marked by high station or favourably recommended have come down to posterity with a name that will last forever; for instance, Myron, Polycletus, Phidias, Lysippus, and the others who have attained to fame by their art. For they acquired it by the execution of works for great states or for kings or for citizens of rank. But

those who, being men of no less enthusiasm, natural ability, and dexterity than those famous artists, and who executed no less perfectly finished works for citizens of low station, are unremembered, not because they lacked diligence or dexterity in their art, but because fortune failed them; for instance, Teleas of Athens, Chion of Corinth, Myager the Phocaean, Pharax of Ephesus, Boedas of Byzantium, and many others. Then there were painters like Aristomenes of Thasos, Polycles and Andron of Ephesus, Theo of Magnesia, and others who were not deficient in diligence or enthusiasm for their art or in dexterity, but whose narrow means or ill-luck, or the higher position of their rivals in the struggle for honour, stood in the way of their attaining distinction.

3. Of course, we need not be surprised if artistic excellence goes unrecognized on account of being unknown; but there should be the greatest indignation when, as often, good judges are flattered by the charm of social entertainments into an approbation which is a mere pretence. Now if, as Socrates wished, our feelings, opinions, and knowledge gained by study had been manifest and clear to see, popularity and adulation would have no influence, but men who had reached the height of knowledge by means of correct and definite courses of study, would be given commissions without any effort on their part. However, since such things are not plain and apparent to the view, as we think they should have been, and since I observe that the uneducated rather than the educated are in higher favour, thinking it beneath me to engage with the uneducated in the struggle for honour, I prefer to show the excellence of our department of knowledge by the publication of this treatise.

4. In my first book, Emperor, I described to you the art, with its points of excellence, the different kinds of training with which the architect ought to be equipped, adding the reasons why he ought to be skilful in them, and I divided up the subject of architecture as a whole among its departments, duly defining the limits of each. Next, as was preëminent and necessary, I explained on scientific principles the method of selecting healthy sites for

fortified towns, pointed out by geometrical figures the different winds and the quarters from which they blow, and showed the proper way to lay out the lines of streets and rows of houses within the walls. Here I fixed the end of my first book. In the second, on building materials, I treated their various advantages in structures, and the natural properties of which they are composed. In this third book I shall speak of the temples of the immortal gods, describing and explaining them in the proper manner.

CHAPTER I

ON SYMMETRY: IN TEMPLES AND IN THE HUMAN BODY

1. The design of a temple depends on symmetry, the principles of which must be most carefully observed by the architect. They are due to proportion, in Greek *ἀναλογία*. Proportion is a correspondence among the measures of the members of an entire work, and of the whole to a certain part selected as standard. From this result the principles of symmetry. Without symmetry and proportion there can be no principles in the design of any temple; that is, if there is no precise relation between its members, as in the case of those of a well shaped man.

2. For the human body is so designed by nature that the face, from the chin to the top of the forehead and the lowest roots of the hair, is a tenth part of the whole height; the open hand from the wrist to the tip of the middle finger is just the same; the head from the chin to the crown is an eighth, and with the neck and shoulder from the top of the breast to the lowest roots of the hair is a sixth; from the middle of the breast to the summit of the crown is a fourth. If we take the height of the face itself, the distance from the bottom of the chin to the under side of the nostrils is one third of it; the nose from the under side of the nostrils to a line between the eyebrows is the same; from there to the lowest roots of the hair is also a third, comprising the forehead. The length of the foot is one sixth of the height of the body; of the forearm, one fourth; and the breadth of the breast is also one fourth. The other members, too, have their own symmetrical proportions, and it was by employing them that the famous painters and sculptors of antiquity attained to great and endless renown.

3. Similarly, in the members of a temple there ought to be the greatest harmony in the symmetrical relations of the different

parts to the general magnitude of the whole. Then again, in the human body the central point is naturally the navel. For 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 will touch the circumference of a circle described therefrom. And just as the human body yields a circular outline, so too a square figure may be found from it. For if we measure the distance from the soles of the feet to the top of the head, and then apply that measure to the outstretched arms, the breadth will be found to be the same as the height, as in the case of plane surfaces which are perfectly square.

4. Therefore, since nature has designed the human body so that its members are duly proportioned to the frame as a whole, it appears that the ancients had good reason for their rule, that in perfect buildings the different members must be in exact symmetrical relations to the whole general scheme. Hence, while transmitting to us the proper arrangements for buildings of all kinds, they were particularly careful to do so in the case of temples of the gods, buildings in which merits and faults usually last forever.

5. Further, it was from the members of the body that they derived the fundamental ideas of the measures which are obviously necessary in all works, as the finger, palm, foot, and cubit. These they apportioned so as to form the "perfect number," called in Greek *τέλειον*, and as the perfect number the ancients fixed upon ten. For it is from the number of the fingers of the hand that the palm is found, and the foot from the palm. Again, while ten is naturally perfect, as being made up by the fingers of the two palms, Plato also held that this number was perfect because ten is composed of the individual units, called by the Greeks *μονάδες*. But as soon as eleven or twelve is reached, the numbers, being excessive, cannot be perfect until they come to ten for the second time; for the component parts of that number are the individual units.

6. The mathematicians, however, maintaining a different view,

have said that the perfect number is six, because this number is composed of integral parts which are suited numerically to their method of reckoning: thus, one is one sixth; two is one third; three is one half; four is two thirds, or δίμοιρος as they call it; five is five sixths, called πεντάμοιρος; and six is the perfect number. As the number goes on growing larger, the addition of a unit above six is the ἕφεκτος; eight, formed by the addition of a third part of six, is the integer and a third, called ἐπίτριτος; the addition of one half makes nine, the integer and a half, termed ἡμιόλιος; the addition of two thirds, making the number ten, is the integer and two thirds, which they call ἐπιδίμοιρος; in the number eleven, where five are added, we have the five sixths, called ἐπίπεμπτος; finally, twelve, being composed of the two simple integers, is called διπλάσιος.

7. And further, as the foot is one sixth of a man's height, the height of the body as expressed in number of feet being limited to six, they held that this was the perfect number, and observed that the cubit consisted of six palms or of twenty-four fingers. This principle seems to have been followed by the states of Greece. As the cubit consisted of six palms, they made the drachma, which they used as their unit, consist in the same way of six bronze coins, like our *asses*, which they call obols; and, to correspond to the fingers, divided the drachma into twenty-four quarter-obols, which some call dichalca others trichalca.

8. But our countrymen at first fixed upon the ancient number and made ten bronze pieces go to the denarius, and this is the origin of the name which is applied to the denarius to this day. And the fourth part of it, consisting of two asses and half of a third, they called "sesterce." But later, observing that six and ten were both of them perfect numbers, they combined the two, and thus made the most perfect number, sixteen. They found their authority for this in the foot. For if we take two palms from the cubit, there remains the foot of four palms; but the palm contains four fingers. Hence the foot contains sixteen fingers, and the denarius the same number of bronze *asses*.

9. Therefore, if it is agreed that number was found out from the human fingers, and that 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, we can have nothing but respect for those who, in constructing temples of the immortal gods, have so arranged the members of the works that both the separate parts and the whole design may harmonize in their proportions and symmetry.

CHAPTER II

CLASSIFICATION OF TEMPLES

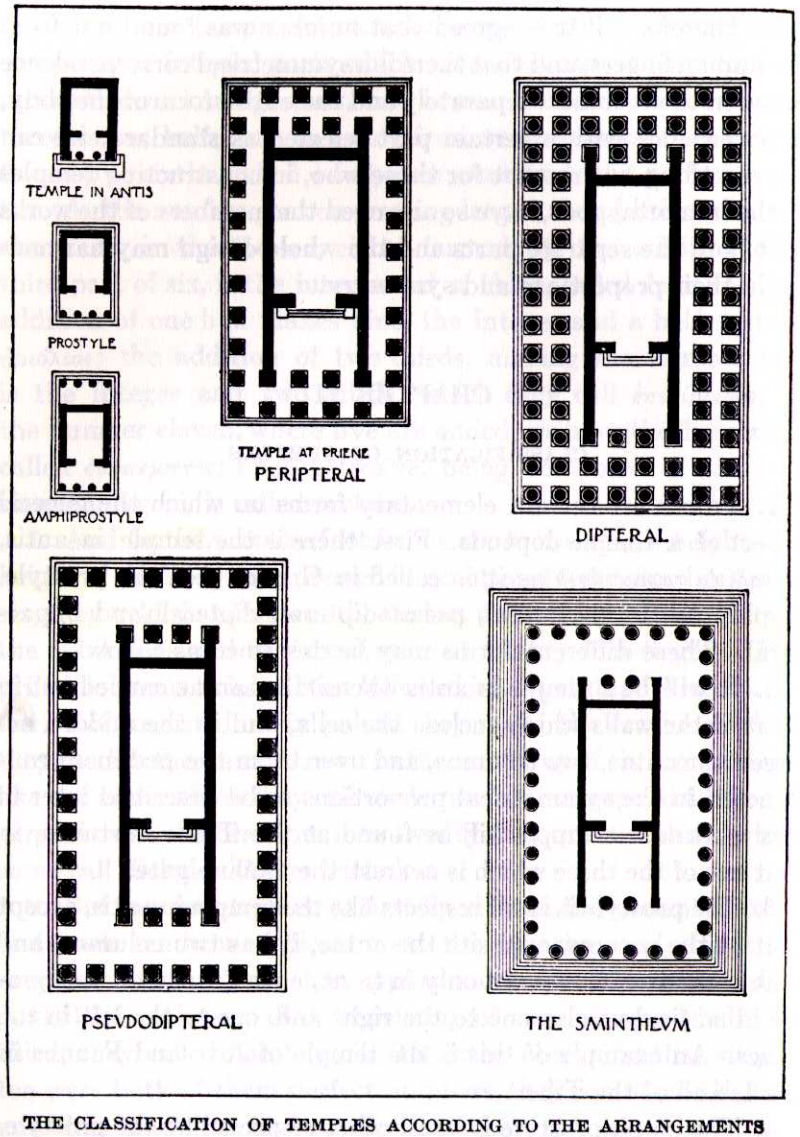
1. There are certain elementary forms on which the general aspect of a temple depends. First there is the temple in antis, or ναὸς ἐν παραστάσιν as it is called in Greek; then the prostyle, amphiprostyle, peripteral, pseudodipteral, dipteral, and hypaethral. These different forms may be described as follows.

2. It will be a temple in antis when it has antae carried out in front of the walls which enclose the cella, and in the middle, between the antae, two columns, and over them the pediment constructed in the symmetrical proportions to be described later in this work. An example will be found at the Three Fortunes, in that one of the three which is nearest the Colline gate.

3. The prostyle is in all respects like the temple in antis, except that at the corners, opposite the antae, it has two columns, and that it has architraves not only in front, as in the case of the temple in antis, but also one to the right and one to the left in the wings. An example of this is the temple of Jove and Faunus in the Island of the Tiber.

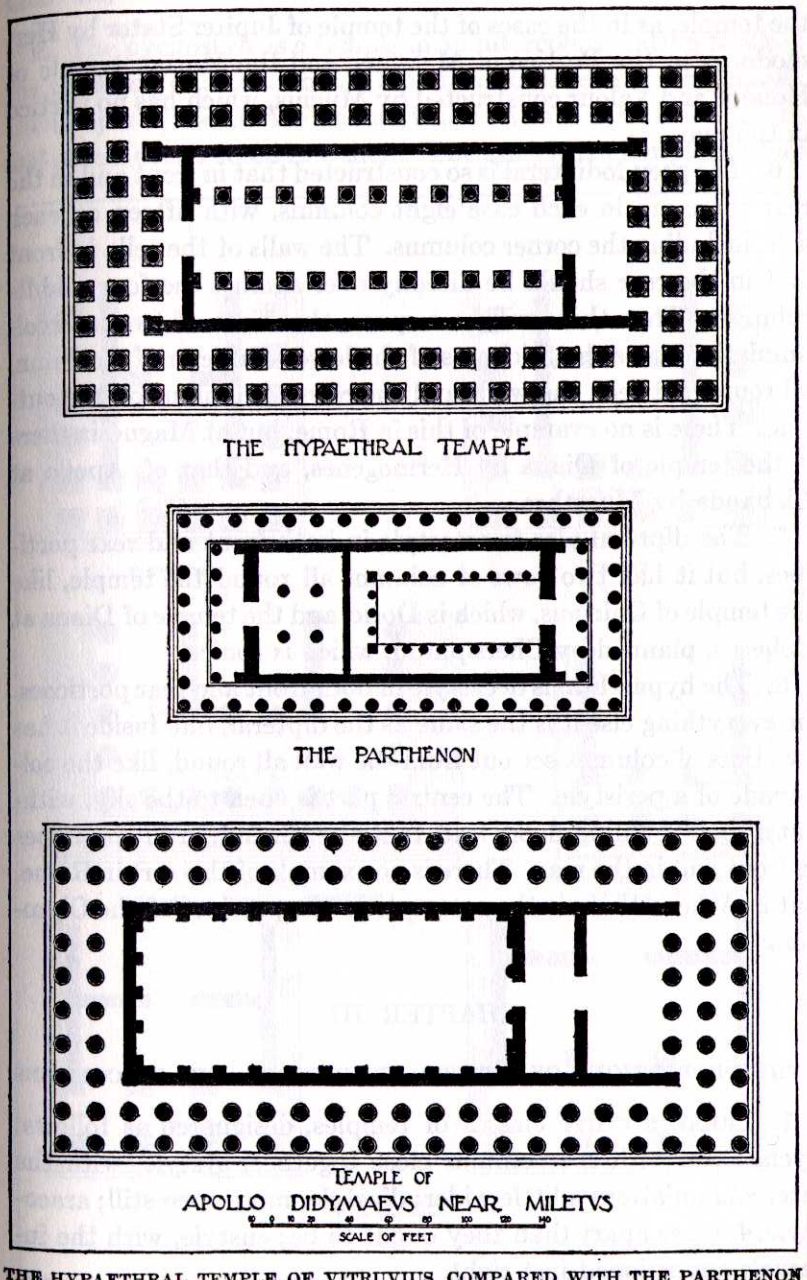
4. The amphiprostyle is in all other respects like the prostyle, but has besides, in the rear, the same arrangement of columns and pediment.

5. A temple will be peripteral that has six columns in front and six in the rear, with eleven on each side including the corner col-



THE CLASSIFICATION OF TEMPLES ACCORDING TO THE ARRANGEMENTS OF THE COLONNADES

umns. Let the columns be so placed as to leave a space, the width of an intercolumniation, all round between the walls and the rows of columns on the outside, thus forming a walk round the cella of



THE HYPAETHRAL TEMPLE OF VITRUVIUS COMPARED WITH THE PARTHENON AND THE TEMPLE OF APOLLO NEAR MILETUS

the temple, as in the cases of the temple of Jupiter Stator by Hermodorus in the Portico of Metellus, and the Marian temple of Honour and Valour constructed by Mucius, which has no portico in the rear.

6. The pseudodipteral is so constructed that in front and in the rear there are in each case eight columns, with fifteen on each side, including the corner columns. The walls of the cella in front and in the rear should be directly over against the four middle columns. Thus there will be a space, the width of two intercolumniations plus the thickness of the lower diameter of a column, all round between the walls and the rows of columns on the outside. There is no example of this in Rome, but at Magnesia there is the temple of Diana by Hermogenes, and that of Apollo at Alabanda by Mnesthes.

7. The dipteral also is octastyle in both front and rear porticoes, but it has two rows of columns all round the temple, like the temple of Quirinus, which is Doric, and the temple of Diana at Ephesus, planned by Chersiphron, which is Ionic.

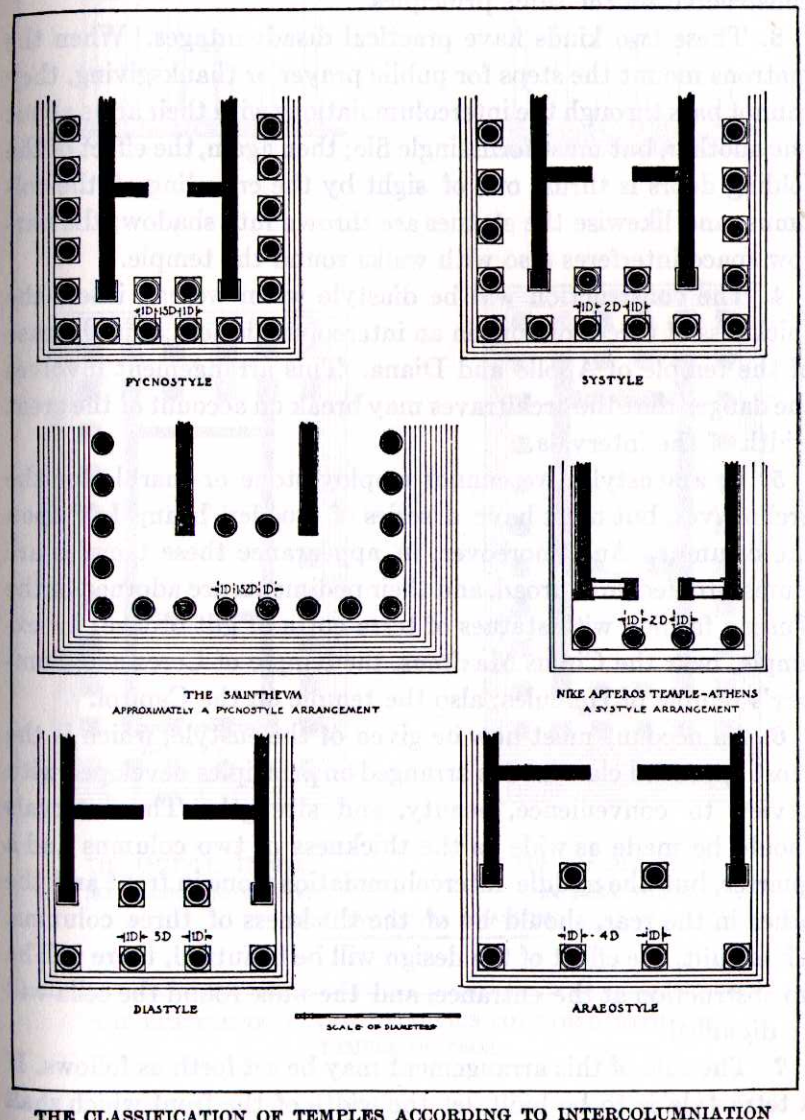
8. The hypaethral is decastyle in both front and rear porticoes. In everything else it is the same as the dipteral, but inside it has two tiers of columns set out from the wall all round, like the colonnade of a peristyle. The central part is open to the sky, without a roof. Folding doors lead to it at each end, in the porticoes in front and in the rear. There is no example of this sort in Rome, but in Athens there is the octastyle in the precinct of the Olympian.

CHAPTER III

THE PROPORTIONS OF INTERCOLUMNIATIONS AND OF COLUMNS

1. There are five classes of temples, designated as follows: pycnostyle, with the columns close together; systyle, with the intercolumniations a little wider; diastyle, more open still; araeostyle, farther apart than they ought to be; eustyle, with the intervals apportioned just right.

2. The pycnostyle is a temple in an intercolumniation of which the thickness of a column and a half can be inserted: for example, the temple of the Divine Caesar, that of Venus in Caesar's forum, and others constructed like them. The systyle is a temple in which



THE CLASSIFICATION OF TEMPLES ACCORDING TO INTERCOLUMNIATION

the thickness of two columns can be placed in an intercolumniation, and in which the plinths of the bases are equivalent to the distance between two plinths: for example, the temple of Equestrian Fortune near the stone theatre, and the others which are constructed on the same principles.

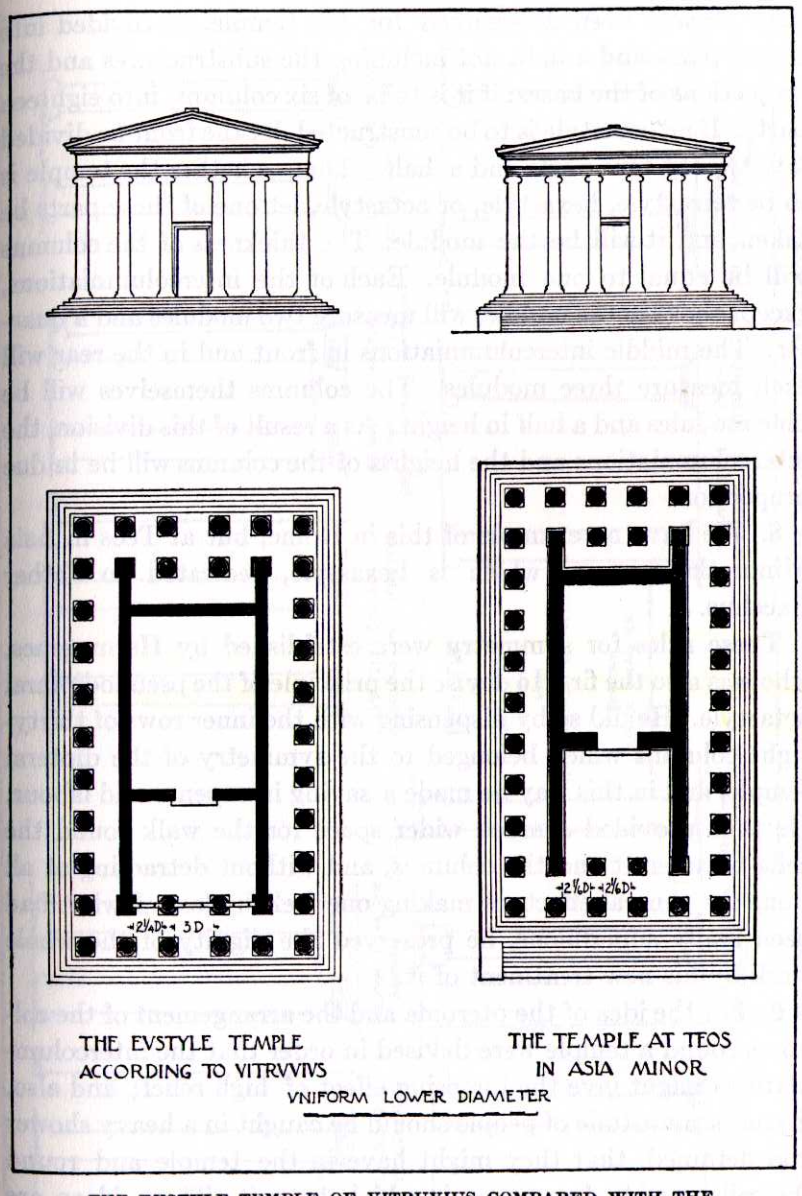
3. These two kinds have practical disadvantages. When the matrons mount the steps for public prayer or thanksgiving, they cannot pass through the intercolumniations with their arms about one another, but must form single file; then again, the effect of the folding doors is thrust out of sight by the crowding of the columns, and likewise the statues are thrown into shadow; the narrow space interferes also with walks round the temple.

4. The construction will be diastyle when we can insert the thickness of three columns in an intercolumniation, as in the case of the temple of Apollo and Diana. This arrangement involves the danger that the architraves may break on account of the great width of the intervals.

5. In araeostyles we cannot employ stone or marble for the architraves, but must have a series of wooden beams laid upon the columns. And moreover, in appearance these temples are clumsy-roofed, low, broad, and their pediments are adorned in the Tuscan fashion with statues of terra-cotta or gilt bronze: for example, near the Circus Maximus, the temple of Ceres and Pompey's temple of Hercules; also the temple on the Capitol.

6. An account must now be given of the eustyle, which is the most approved class, and is arranged on principles developed with a view to convenience, beauty, and strength. The intervals should be made as wide as the thickness of two columns and a quarter, but the middle intercolumniations, one in front and the other in the rear, should be of the thickness of three columns. Thus built, the effect of the design will be beautiful, there will be no obstruction at the entrance, and the walk round the cella will be dignified.

7. The rule of this arrangement may be set forth as follows. If a tetrastyle is to be built, let the width of the front which shall



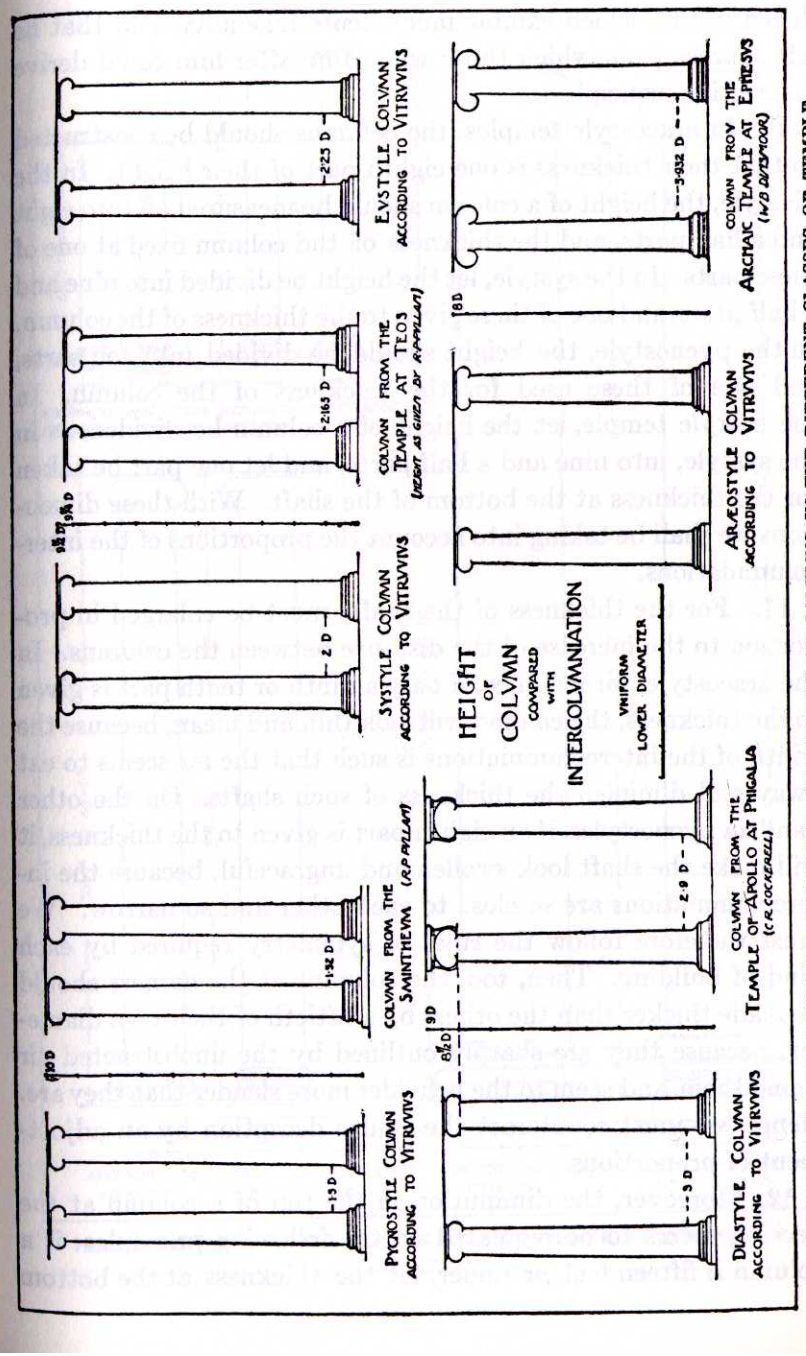
THE EUSTYLE TEMPLE OF VITRUVIUS COMPARED WITH THE TEMPLE OF TEOS

have already been determined for the temple, be divided into eleven parts and a half, not including the substructures and the projections of the bases; if it is to be of six columns, into eighteen parts. If an octastyle is to be constructed, let the front be divided into twenty-four parts and a half. Then, whether the temple is to be tetrastyle, hexastyle, or octastyle, let one of these parts be taken, and it will be the module. The thickness of the columns will be equal to one module. Each of the intercolumniations, except those in the middle, will measure two modules and a quarter. The middle intercolumniations in front and in the rear will each measure three modules. The columns themselves will be nine modules and a half in height. As a result of this division, the intercolumniations and the heights of the columns will be in due proportion.

8. We have no example of this in Rome, but at Teos in Asia Minor there is one which is hexastyle, dedicated to Father Bacchus.

These rules for symmetry were established by Hermogenes, who was also the first to devise the principle of the pseudodipteral octastyle. He did so by dispensing with the inner rows of thirty-eight columns which belonged to the symmetry of the dipteral temple, and in this way he made a saving in expense and labour. He thus provided a much wider space for the walk round the cella between it and the columns, and without detracting at all from the general effect, or making one feel the loss of what had been really superfluous, he preserved the dignity of the whole work by his new treatment of it.

9. For the idea of the pteroma and the arrangement of the columns round a temple were devised in order that the intercolumniations might give the imposing effect of high relief; and also, in case a multitude of people should be caught in a heavy shower and detained, that they might have in the temple and round the cella a wide free space in which to wait. These ideas are developed, as I have described, in the pseudodipteral arrangement of a temple. It appears, therefore, that Hermogenes pro-



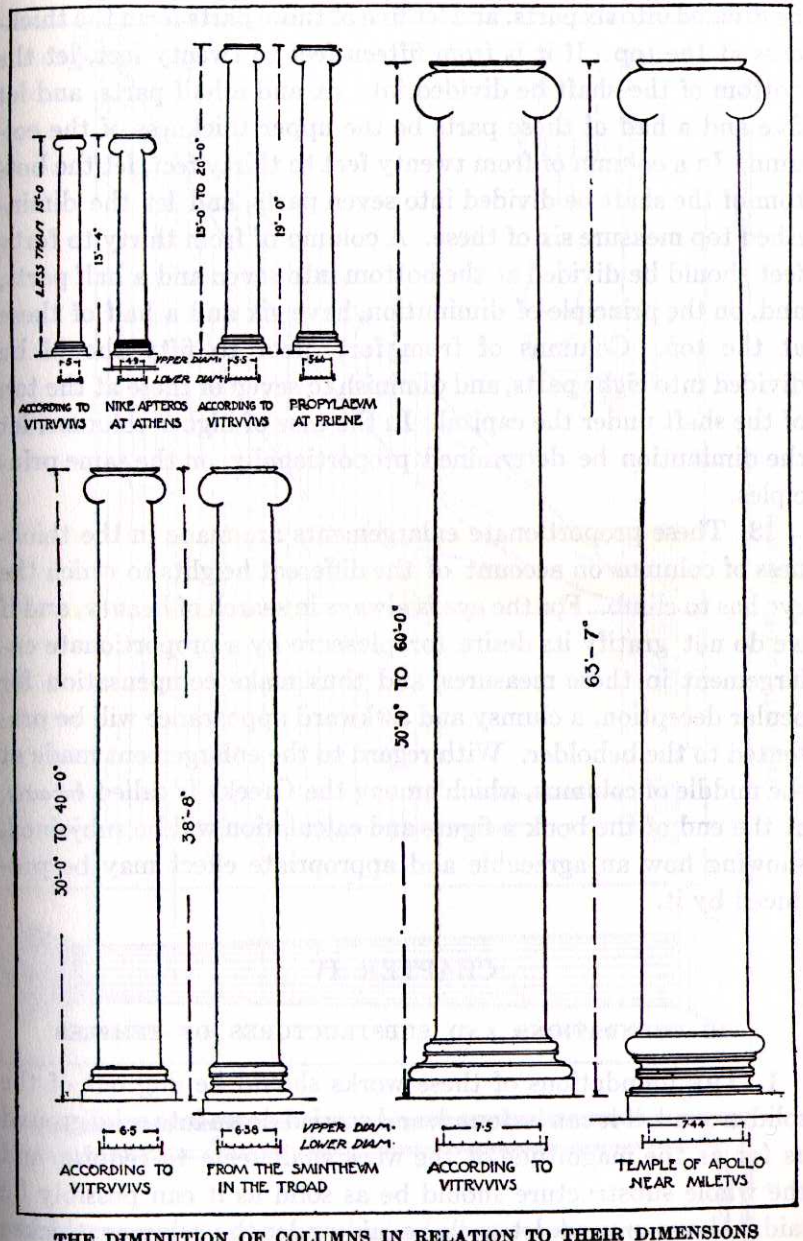
VITRUVIUS' RULES FOR THE DIAMETER AND HEIGHT OF COLUMNS IN THE DIFFERENT CLASSES OF TEMPLE COMPARED WITH ACTUAL EXAMPLES

duced results which exhibit much acute ingenuity, and that he left sources from which those who came after him could derive instructive principles.

10. In araeostyle temples, the columns should be constructed so that their thickness is one eighth part of their height. In the diastyle, the height of a column should be measured off into eight and a half parts, and the thickness of the column fixed at one of these parts. In the systyle, let the height be divided into nine and a half parts, and one of these given to the thickness of the column. In the pycnostyle, the height should be divided into ten parts, and one of these used for the thickness of the column. In the eustyle temple, let the height of a column be divided, as in the systyle, into nine and a half parts, and let one part be taken for the thickness at the bottom of the shaft. With these dimensions we shall be taking into account the proportions of the intercolumniations.

11. For the thickness of the shafts must be enlarged in proportion to the increase of the distance between the columns. In the araeostyle, for instance, if only a ninth or tenth part is given to the thickness, the column will look thin and mean, because the width of the intercolumniations is such that the air seems to eat away and diminish the thickness of such shafts. On the other hand, in pycnostyles, if an eighth part is given to the thickness, it will make the shaft look swollen and ungraceful, because the intercolumniations are so close to each other and so narrow. We must therefore follow the rules of symmetry required by each kind of building. Then, too, the columns at the corners should be made thicker than the others by a fiftieth of their own diameter, because they are sharply outlined by the unobstructed air round them, and seem to the beholder more slender than they are. Hence, we must counteract the ocular deception by an adjustment of proportions.

12. Moreover, the diminution in the top of a column at the necking seems to be regulated on the following principles: if a column is fifteen feet or under, let the thickness at the bottom



THE DIMINUTION OF COLUMNS IN RELATION TO THEIR DIMENSIONS OF HEIGHT

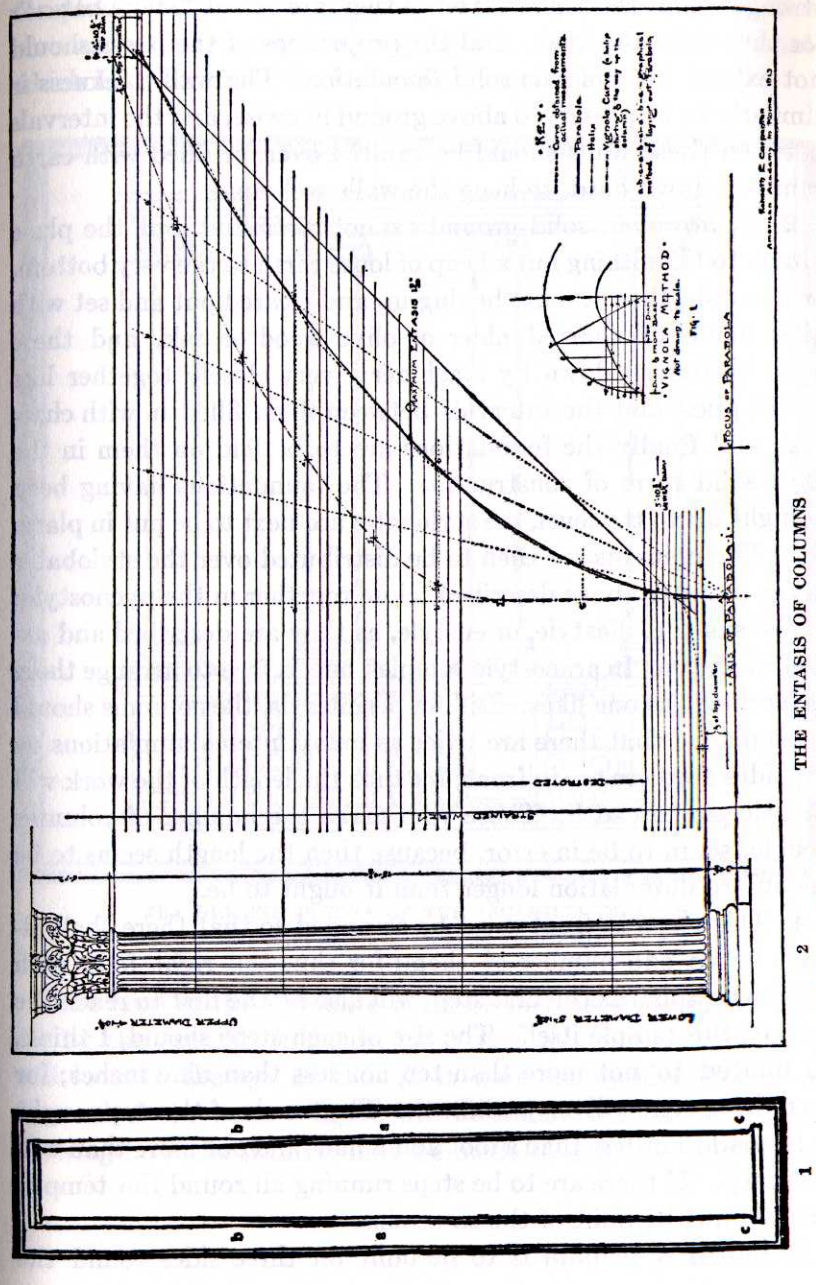
be divided into six parts, and let five of those parts form the thickness at the top. If it is from fifteen feet to twenty feet, let the bottom of the shaft be divided into six and a half parts, and let five and a half of those parts be the upper thickness of the column. In a column of from twenty feet to thirty feet, let the bottom of the shaft be divided into seven parts, and let the diminished top measure six of these. A column of from thirty to forty feet should be divided at the bottom into seven and a half parts, and, on the principle of diminution, have six and a half of these at the top. Columns of from forty feet to fifty should be divided into eight parts, and diminish to seven of these at the top of the shaft under the capital. In the case of higher columns, let the diminution be determined proportionally, on the same principles.

13. These proportionate enlargements are made in the thickness of columns on account of the different heights to which the eye has to climb. For the eye is always in search of beauty, and if we do not gratify its desire for pleasure by a proportionate enlargement in these measures, and thus make compensation for ocular deception, a clumsy and awkward appearance will be presented to the beholder. With regard to the enlargement made at the middle of columns, which among the Greeks is called ἔντασις, at the end of the book a figure and calculation will be subjoined, showing how an agreeable and appropriate effect may be produced by it.

CHAPTER IV

THE FOUNDATIONS AND SUBSTRUCTURES OF TEMPLES

1. The foundations of these works should be dug out of the solid ground, if it can be found, and carried down into solid ground as far as the magnitude of the work shall seem to require, and the whole substructure should be as solid as it can possibly be laid. Above ground, let walls be laid under the columns, thicker by one half than the columns are to be, so that the lower may be



THE ENTASIS OF COLUMNS

1. The entasis as given by Fra Giocondo in the edition of 1511.
2. The entasis from the temple of Mars Ultor in Rome compared with Vignola's rule for entasis.