

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 *ἑφεκτος*; 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 παραστάσει* as it is called in Greek; then the *prostyle*, *amphiprostyle*, *peripteral*, *pseudodipteral*, *dipteral*, and *hypæthral*. These different forms may be described as follows.

2. It will be a temple in *antis* when it has *antæ* carried out in front of the walls which enclose the *cella*, and in the middle, between the *antæ*, 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 *antæ*, 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-

CHAPTER I

THE ORIGINS OF THE THREE ORDERS, AND THE PROPORTIONS
OF THE CORINTHIAN CAPITAL

1. CORINTHIAN columns are, excepting in their capitals, of the same proportions in all respects as Ionic; but the height of their capitals gives them proportionately a taller and more slender effect. This is because the height of the Ionic capital is only one third of the thickness of the column, while that of the Corinthian is the entire thickness of the shaft. Hence, as two thirds are added in Corinthian capitals, their tallness gives a more slender appearance to the columns themselves.

2. The other members which are placed above the columns, are, for Corinthian columns, composed either of the Doric proportions or according to the Ionic usages; for the Corinthian order never had any scheme peculiar to itself for its cornices or other ornaments, but may have mutules in the coronae and guttae on the architraves according to the triglyph system of the Doric style, or, according to Ionic practices, it may be arranged with a frieze adorned with sculptures and accompanied with dentils and coronae.

3. Thus a third architectural order, distinguished by its capital, was produced out of the two other orders. To the forms of their columns are due the names of the three orders, Doric, Ionic, and Corinthian, of which the Doric was the first to arise, and in early times. For Dorus, the son of Hellen and the nymph Phthia, was king of Achaea and all the Peloponnesus, and he built a fane, which chanced to be of this order, in the precinct of Juno at Argolis, a very ancient city, and subsequently others of the same order in the other cities of Achaea, although the rules of symmetry were not yet in existence.

4. Later, the Athenians, in obedience to oracles of the Delphic Apollo, and with the general agreement of all Hellas, despatched

thirteen colonies at one time to Asia Minor, appointing leaders for each colony and giving the command-in-chief to Ion, son of Xuthus and Creusa (whom further Apollo at Delphi in the oracles had acknowledged as his son). Ion conducted those colonies to Asia Minor, took possession of the land of Caria, and there founded the grand cities of Ephesus, Miletus, Myus (long ago engulfed by the water, and its sacred rites and suffrage handed over by the Ionians to the Milesians), Priene, Samos, Teos, Colophon, Chius, Erythrae, Phocaea, Clazomenae, Lebedos, and Melite. This Melite, on account of the arrogance of its citizens, was destroyed by the other cities in a war declared by general agreement, and in its place, through the kindness of King Attalus and Arsinoe, the city of the Smyrnaeans was admitted among the Ionians.

5. Now these cities, after driving out the Carians and Lelegans, called that part of the world Ionia from their leader Ion, and there they set off precincts for the immortal gods and began to build fanes: first of all, a temple to Panionion Apollo such as they had seen in Achaea, calling it Doric because they had first seen that kind of temple built in the states of the Dorians.

6. Wishing to set up columns in that temple, but not having rules for their symmetry, and being in search of some way by which they could render them fit to bear a load and also of a satisfactory beauty of appearance, they measured the imprint of a man's foot and compared this with his height. On finding that, in a man, the foot was one sixth of the height, they applied the same principle to the column, and reared the shaft, including the capital, to a height six times its thickness at its base. Thus the Doric column, as used in buildings, began to exhibit the proportions, strength, and beauty of the body of a man.

7. Just so afterwards, when they desired to construct a temple to Diana in a new style of beauty, they translated these footprints into terms characteristic of the slenderness of women, and thus first made a column the thickness of which was only one eighth of its height, so that it might have a taller look. At the

foot they substituted the base in place of a shoe; in the capital they placed the volutes, hanging down at the right and left like curly ringlets, and ornamented its front with cymatia and with festoons of fruit arranged in place of hair, while they brought the flutes down the whole shaft, falling like the folds in the robes worn by matrons. Thus in the invention of the two different kinds of columns, they borrowed manly beauty, naked and unadorned, for the one, and for the other the delicacy, adornment, and proportions characteristic of women.

8. It is true that posterity, having made progress in refinement and delicacy of feeling, and finding pleasure in more slender proportions, has established seven diameters of the thickness as the height of the Doric column, and nine as that of the Ionic. The Ionians, however, originated the order which is therefore named Ionic.

The third order, called Corinthian, is an imitation of the slenderness of a maiden; for the outlines and limbs of maidens, being more slender on account of their tender years, admit of prettier effects in the way of adornment.

9. It is related that the original discovery of this form of capital was as follows. A freeborn maiden of Corinth, just of marriageable age, was attacked by an illness and passed away. After her burial, her nurse, collecting a few little things which used to give the girl pleasure while she was alive, put them in a basket, carried it to the tomb, and laid it on top thereof, covering it with a roof-tile so that the things might last longer in the open air. This basket happened to be placed just above the root of an acanthus. The acanthus root, pressed down meanwhile though it was by the weight, when springtime came round put forth leaves and stalks in the middle, and the stalks, growing up along the sides of the basket, and pressed out by the corners of the tile through the compulsion of its weight, were forced to bend into volutes at the outer edges.

10. Just then Callimachus, whom the Athenians called *κατατηξίτεχνος* for the refinement and delicacy of his artistic work,

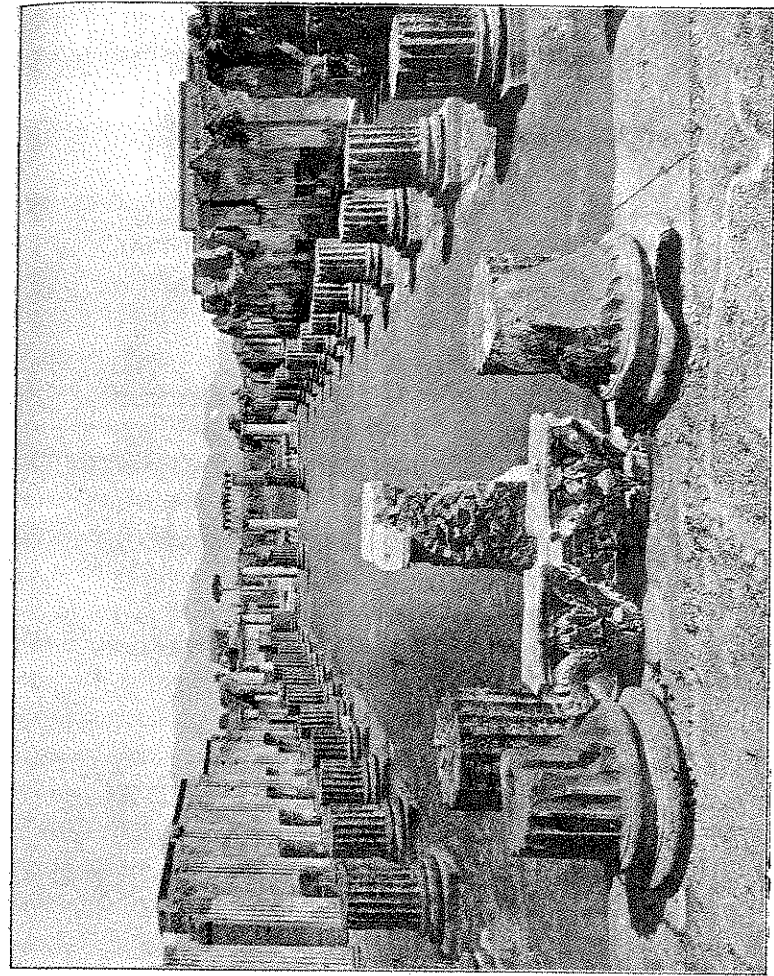
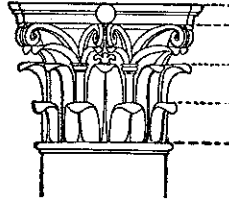
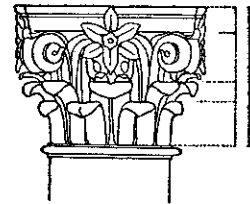


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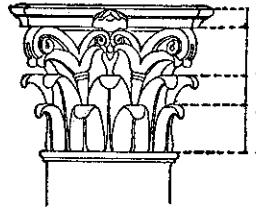
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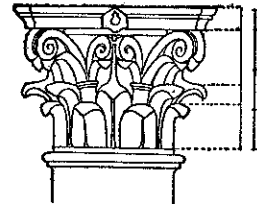
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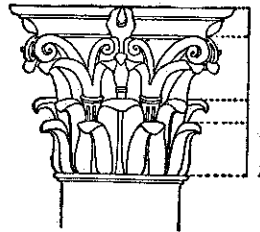
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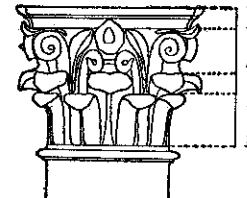
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FROM THE TEMPLE OF
MINERVA AT ASSISI



4
FROM THE TEMPLE OF
CASTOR & POLLUX, CORI



5
FROM THE TEMPLE OF
VESTA AT ROME.



6
THE CORINTHIAN CAPITAL
FROM CORI

THE CORINTHIAN CAPITAL OF VITRUVIUS COMPARED WITH THE MONUMENTS

passed by this tomb and observed the basket with the tender young leaves growing round it. Delighted with the novel style and form, he built some columns after that pattern for the Corinthians, determined their symmetrical proportions, and established from that time forth the rules to be followed in finished works of the Corinthian order.

11. The proportions of this capital should be fixed as follows. Let the height of the capital, including its abacus, be equivalent to the thickness of the base of a column. Let the breadth of the abacus be proportioned so that diagonals drawn from one corner of it to the other shall be twice the height of the capitals, which will give the proper breadth to each face of the abacus. The faces should curve inwards, by one ninth of the breadth of the face, from the outside edge of the corners of the abacus. At the bottom the capital should be of the thickness of the top of the column omitting the congé and astragal. The height of the abacus is one seventh of the height of the capital.

12. Omitting the height of the abacus, let the rest be divided into three parts, of which one should be given to the lowest leaf. Let the second leaf occupy the middle part of the height. Of the same height should be the stalks, out of which grow leaves projected so as to support the volutes which proceed from the stalks, and run out to the utmost corners of the abacus; the smaller spirals between them should be carved just under the flower which is on the abacus. The flowers on the four sides are to be made as large as the height of the abacus. On these principles of proportion, Corinthian capitals will be finished as they ought to be.

There are other kinds of capitals set upon these same columns and called by various names, but they have no peculiarities of proportion of which we can speak, nor can we recognize from them another order of columns. Even their very names are, as we can see, derived with some changes from the Corinthian, the cushion-shaped, and the Doric, whose symmetrical proportions have been thus transferred to delicate sculptures of novel form.

CHAPTER II

THE ORNAMENTS OF THE ORDERS

1. SINCE the origin and invention of the orders of columns have been described above, I think it not out of place to speak in the same way about their ornaments, showing how these arose and from what original elements they were devised. The upper parts of all buildings contain timber work to which various terms are applied. And not only in its terminology but actually in its uses it exhibits variety. The main beams are those which are laid upon columns, pilasters, and antae; tie-beams and rafters are found in the framing. Under the roof, if the span is pretty large, are the crossbeams and struts; if it is of moderate extent, only the ridgepole, with the principal rafters extending to the outer edge of the eaves. Over the principal rafters are the purlines, and then above these and under the roof-tiles come the common rafters, extending so far that the walls are covered by their projection.

2. Thus each and every detail has a place, origin, and order of its own. In accordance with these details, and starting from carpenter's work, artists in building temples of stone and marble imitated those arrangements in their sculptures, believing that they must follow those inventions. So it was that some ancient carpenters, engaged in building somewhere or other, after laying the tie-beams so that they projected from the inside to the outside of the walls, closed up the space between the beams, and above them ornamented the coronae and gables with carpentry work of beauty greater than usual; then they cut off the projecting ends of the beams, bringing them into line and flush with the face of the walls; next, as this had an ugly look to them, they fastened boards, shaped as triglyphs are now made, on the ends of the beams, where they had been cut off in front, and painted them with blue wax so that the cutting off of the ends of the beams, being concealed, would not offend the eye. Hence it was in imitation of the arrangement of the tie-beams that men