CHAPTER VI

BUILDING MATERIALS, CONSTRUCTION, AND ARCHITECTURAL PERIODS

Six centuries lie between the dates of the earliest and the latest buildings at Pompeii; and in order to understand any structure rightly we must first of all ascertain to what period it belongs. It is indeed rarely possible to fix dates with exactness for the earlier time; but certain periods are so clearly differentiated from one another, that in most cases there is no room for doubt to which of them a building is to be assigned. Before undertaking to characterize these periods, however, it will be necessary briefly to notice what building materials were used, and how they were turned to account in construction.

Exclusive of wood, which was more freely used in Pompeii than in Campanian towns to-day, the principal building materials were Sarno limestone, two kinds of tufa (gray and yellow), lava, a whitish limestone often called travertine wrongly, marble, and brick.

The Sarno limestone (pietra di Sarno) is a deposit from the water of the Sarno, and is found in beds along the course of the river. It contains many impressions of the leaves and stems of plants, and varies greatly in compactness; it closely resembles the Roman travertine, except that it has a more decided yellowish tint.

Gray tufa is a volcanic dust which has been hardened by the presence of water into rock. It has a fine grain, and is easily worked; it was quarried in the vicinity of Nocera. The volcanic dust which formed the yellow tufa was thrown out in an earlier period, when the Sarno plain was still a part of the sea, and so hardened in salt water; it is more friable than the gray tufa, and not so durable.

The lava, which came originally from Vesuvius, was quarried
at Pompeii. Three varieties may be distinguished, differing in density according as they were taken from the lower or the upper strata: solid lava, or basalt, which, being heavy and extremely hard, was extensively used for pavements and thresholds; slag, like the scoriae found on the sides of Vesuvius to-day; and cruma, the foam of the lava stream, which is light and porous, but on account of its hardness has good resisting qualities.

The whitish limestone has a fine texture, without impressions of leaves, and is of an even color; it was to some extent employed as a substitute for marble. It was not quarried at Pompeii, and was not extensively used; the most important example of its use is in the later colonnade about the Forum. The white Carrara marble (marmor lunense) was preferred for columns, pilasters, and architraves; but colored marbles of many varieties, cut into thin slabs and blocks, were used as a veneering for walls and in the mosaic floors.

Bricks were used only for the corners of buildings, for doorposts, and in a few instances, as in the Basilica and the house of the Labyrinth, for columns; brick walls are not found in Pompeii. The bricks seen in corners and doorposts (Figs. 11, 95) are simply a facing for rubble work. They are ordinarily less than an inch thick; they have the shape of a right-angled triangle, and are so laid that the side representing the hypotenuse — about six inches long — appears in the surface of the wall. Sometimes fragments of roof tiles, more or less irregular in shape, were used instead. The bricks of the earlier time contain sea sand and have a granular surface, with a less uniform color; the later bricks are smooth and even in appearance.

The flat oblong roof tiles ( tegulae ), measuring ordinarily 24 by 19 or 20 inches, had flanges at the sides; over the joints where the flanges came together, joint tiles in the form of a half-cylinder ( imbrices ) were laid, like those in use at the present day (Figs. 114, 117).

The styles of masonry are characteristic and interesting. We may distinguish them as masonry with limestone framework, rubble work, reticulate work, quasi-reticulate work, ashlar work, and, in the case of columns and entablatures, massive construction.

The masonry with limestone framework dates from the earliest period. The walls were built without mortar, clay being used instead. Since this served only as a filling, without strength as a binding material, it was necessary to arrange the stones themselves in such a way that the wall would stand firm. This result was accomplished by using large, oblong blocks, not only for corners and doorposts, but also for a framework in the body of the wall; as shown in our illustration, alternate vertical and horizontal blocks were built up into pillars which would hold in place the courses of smaller stones that filled the intervening spaces. The material of the larger, hewn blocks, as well as of the smaller fragments, was Sarno limestone, with occasional pieces of cruma or slag.

The rubble work, opus incertum, consists of fragments irregular in shape, of the size of the fist and larger, laid in mortar. The material used in the earlier times was ordinarily lava; later, Sarno limestone. Corners and doorposts at first were built of hewn blocks; afterwards bricks and blocks of stone cut in the form of bricks were used for this purpose, and in the latest period frequently brick and stone combined, opus mixtum.

Fig. 9.—Wall with limestone framework.
or *opus compositum* — a course of stone alternating with every two or three courses of brick. An example of the *opus mixtum* is seen in the entrances of the Herculanum Gate (Fig. 113). Rubble work is the prevailing masonry at Pompeii; in comparison the other kinds described may be considered exceptional.

The reticulate work, *opus reticulatum*, formed the outer surface of a wall, the inner part of which was built up with rubble. It was composed of small four-sided pyramidal blocks, of which only the base, cut square and smooth, showed on the surface; the tapering part served as a key to bind the block into the wall. These blocks, which measured from three to four inches square at the base, were laid on their corners, so that the edges ran diagonally to the horizontal and vertical lines of the wall; the pattern thus formed had the appearance of a net, hence the name. The material was in most cases gray, occasionally yellow, tufa. The corners and doorposts were at first made of the same kind of stone cut in the shape of bricks; later of bricks. This style of masonry was in vogue at Rome, and apparently also at Pompeii, in the time of Augustus (Fig. 12; see also the pedestal in the foreground of Plate I).

The quasi-riculate work belongs to the early years of the Roman colony. In appearance it lies between rubble and reticulate work, differing from the latter in that the small blocks are less carefully finished and are laid with less regularity. The material is generally lava, but tufa and limestone are also found. The corners and doorposts are of brick, or of brick-shaped blocks of tufa or limestone (Fig. 11).

Ashlar work, of carefully hewn oblong blocks laid in courses, is found in the older portions of the city wall (Fig. 109) and in the walls of the Greek temple in the Forum Triangulare; it was used otherwise only for the fronts of houses (Fig. 10). The material in the earliest times was Sarno limestone, later gray tufa. With the coming of the Roman colony ashlar work went out of use, even for the corners of houses and doorposts.

In the construction of columns and many architraves large blocks were used. Previous to the time of the Roman colony these were of gray tufa, or, in rare instances, of limestone; a coating of white stucco was laid on the surface. From the advent of the colony to the time of the Early Empire, the whitish limestone was used; after that, Carrara marble.

Bearing in mind the styles of construction just described, we may now turn to the architectural history of Pompeii, which, as we shall see, falls naturally into six periods.

The first period is that to which the Doric temple in the Forum Triangulare and the city walls belong. From the style of the temple, we may safely conclude that it was built in the sixth century B.C.; the evidence is too scanty to enable us definitely to fix the date of the walls. The building materials used were the Sarno limestone and gray tufa.

The second period may be designated as the Period of the Limestone Atriums, so characterized from the peculiar construction of a number of houses found in different parts of the city. On the side facing the street these houses have walls of ashlar work of Sarno limestone (Fig. 10), but the inner walls are of limestone framework (Fig. 9).

Almost no ornamental forms belonging to this period have come down to us; so far only a single column has been found, built into the wall of a house. It is of the Doric style, and once formed part of a portico that ran along the west side of the small open space at the northwest corner of Stabian and Nola streets; it is thus the sole remnant of a public building. In the only complete house that has survived from this period, the house of the Surgeon, there was a portico in front of the garden, but the roof was supported by square pillars, not by columns. There is no trace of wall painting.

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Fig. 16.—Facade of Sarno limestone, house of the Surgeon.
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Characteristic as the construction of the limestone atriums is, it is difficult to determine to what age they belong. The beginning of the period cannot be determined even approximately. The end, however, is fixed by the earlier limit of the next period, the Second Punic War. We may, therefore, assign the houses with the limestone atriums to a period just preceding this war; reckoning in round numbers, they were built before 200 B.C.

In the third, or Tufa Period, came the climax of the development of Pompeian architecture prior to the Roman domination. The favorite building material was the gray tufa.

With the exception of the Greek temple mentioned above, all the public buildings of Pompeii that do not belong to the time of the Roman colony have a homogeneous character; a list of them would include the colonnade about the Forum, the Basilica, the temples of Apollo and of Jupiter, the Large Theatre with the colonnades of the Forum Triangulare and the Barracks of the Gladiators, the Stabian Baths, the Palaestra, and the outer part of the Porta Marina with the inner parts of the other gates. Closely associated with these public edifices is a large number of private houses; as a specially characteristic example, we may mention the house of the Faun.

All these buildings are similar in style and construction; they evidently date from a period of great building activity. It must also have been a period of peace and prosperity; for the whole city, from the artistic and monumental point of view, underwent a transformation. Certain Oscan inscriptions, an early Latin monumental inscription, and a few words, dating from 78 B.C., scratched upon the plaster of the Basilica, oblige us to place the Tufa Period before the time of the Roman colony; yet not long before, for the next oldest buildings date from the first years of the colony. The time of peace that furnished the background for the period can only have been that between the Second Punic War and the Social War, about 200 to 90 B.C.; the Tufa Period was approximately the second century before Christ.

In marked contrast with the Period of the Limestone Atriums, the Tufa Period has a pronounced artistic character. It is preeminently a period of monumental construction. Buildings and public places are adorned with colonnades of the Doric, Ionic, and Corinthian orders. The simple and beautiful forms of the Greek architecture are used, sparingly indeed, but without petty detail and with evident fear of excessive ornamentation. Columns and architraves are white, with only slight suggestion of the earlier Greek polychrome decoration. A variety of color, however, is laid on the walls, and with this period the history of Pompeian wall decoration begins.

The Tufa Period coincides throughout with the time of the first style of decoration. This, known as the Incrustation Style, aimed to imitate in stucco the appearance of a wall venerated with colored marbles. Wall paintings are wholly lacking, but pictures, often of rare beauty, are found in the mosaics of the floors. In this period, we may truly say that Pompeian architecture was at its best. With it the pure Greek tradition dies out; all the buildings of later times bear the Roman stamp.

The buildings of the Tufa Period are easily recognized by the unobtrusiveness of the materials used in their construction. The rubble work is mostly of lava; but gray tufa was used exclusively, not only for ashlar work in façades, but also for columns and entablatures. The surface of the tufa was coated with a layer of fine white stucco, which gave it the appearance of marble. The use of marble for building purposes, however, is foreign to this period; and it speaks well for the culture of the Oscan Pompeians that they had pleasure in beauty of form above richness of material.

The fourth period covers the earlier decades of the Roman colony, from 80 B.C. to near the end of the Republic. According to inscriptions which are still extant, soon after the year 80 a wealthy colonist, Gaius Quinctius Valgus, when duumvir with Marcus Porcius as colleague, built the Small Theatre, and afterwards, when quinquennial duumvir with the same colleague, the Amphitheatre also. Both structures have the quasireticulate facing (Fig. 11); and several other buildings in which the same style of masonry is found without doubt belong to the same period—the Baths near the Forum, the temple of
Zeus Milichius, a building just inside the Porta Marina, and apparently the hall at the southeast corner of the Forum, which we shall identify as the Comitium; with these should be included also the original temple of Isis, which was destroyed by the earthquake of 63 A.D. Few houses dating from this period have been discovered; the provision made by the preceding period in this respect had been so generous that new houses were not needed.

From the aesthetic point of view the fourth period falls far below that just preceding; the exhaustion of resources and the decline of taste due to the long and terrible war are unmistakable. Theatre, Amphitheatre, and Baths were alike built for immediate use, with crude and scanty ornamentation; and where richer ornament was applied, as in the case of the temple of Isis, it could not for a moment be compared with that of the Tufa Period in beauty and finish.

The wall decoration of the fourth period is of the second Pompeian style, which came into vogue just after the founding of the colony, and which we shall call the Architectural Style; for in part, as the first style, it imitated a veneering of marble, not however with the help of slabs or panels modelled in stucco, but by the use of color only, laid on walls finished to a plane surface; in part it made use of architectural designs which were painted either correctly or with at least some regard for proper proportions.

The fifth period extends from the last decades of the Republic to the earthquake of the year 63 A.D. In the entire period, covering more than a century, we are unable to distinguish a series of buildings which may be classed together in style and construction as constituting a homogeneous, representative group. Here and there we can point out a piece of masonry which, from its similarity to that of the fourth period, may be assigned to the end of the Republic; again, walls with reticulate facing of tufa and corners of brick-shaped blocks of the same stone belong to the time of Augustus (Fig. 12), while reticulate work with corners of brick (Fig. 95) is of later date; but there is a total lack of those distinguishing characteristics which would serve to set off by themselves all the buildings belonging to a particular time. Consequently in the case of each structure it is necessary to take into account all the circumstances, and then to form an independent judgment regarding its style and date.

The difficulty is further enhanced by the fact that three styles of wall decoration fall within the limits of the same period. The Architectural Style, already mentioned, remained in vogue to the time of Augustus; it then gave place to the third or Ornate Style, which is characterized by a freer use of ornament and the introduction of designs and scenes suggestive of an Egyptian origin. The fourth or Intricate Style came in about the year 50 A.D., and represents, with its involved and fantastic
designs, the last stage in the development of Pompeian wall decoration. In the fifth period marble began to be employed as a building material; the earliest dated example of its use is the temple of Fortuna Augusta, erected about 3 B.C.

The sixteen years between the earthquake of 63 A.D. and the destruction of the city form the sixth period in the architectural history of Pompeii. The buildings belonging to it can be easily recognized, not only from their similarity in style and ornament, but also from certain external characteristics, as newness of appearance, unfinished condition, and the joining of new to broken walls. The only important building wholly new is the large bathing establishment, the Central Baths, at the corner of Stabian and Nola streets. For the rest, effort seems to have been directed toward restoring the ruined buildings as nearly as possible to their original condition. The wall decoration throughout is of the Intricate Style.

The measurements of buildings in the Roman Period conform to the scale of the Roman foot, while the dimensions of structures antedating the Roman colony in most cases reduce to the scale of the Oscan or old Italic foot. The Roman foot (296 mm.) may be roughly reckoned at 0.97 of the English foot (304.8 mm.); the Oscan foot (275 mm.) is considerably shorter. As the Roman standard is of Greek origin, we may perhaps find a structure conforming to it that was designed by a Greek architect before the Roman Period.