

round arch in connection with the pointed when it suited their purpose to do so, there is no building that I know of in which the change from one style to the other is defined as it is in buildings in the north.

As already remarked Gothic architecture was an importation; the pointed arch which is the basis of the style was not an Italian invention, and though used by them, the possibilities of its use (except in a few buildings) were not developed as we find in the buildings of the north. This is not to be wondered at when we consider the environment of the architects of the Gothic period in Italy—on all hands they were surrounded by the remains of Roman architecture, with the result that classic thought and design was never dead, but only slept, and was ever ready to assert itself in some feature or design, or in the appropriation of ready-made materials of ancient buildings.

The designers of the cathedrals north of the Alps were under no such influence—they knew nothing of classic art, and pursued the practice of the Gothic, working on without a suspicion that any other style existed.

As an illustration of this, I remember some years ago examining some fine old glass in Litchfield Cathedral; in one of the panels there was a representation of the building of Solomon's Temple; in this picture the Temple is shown as a great Gothic cathedral, the artists who designed it probably never suspecting that it might have been in another style.

The vital principle of classic architecture is horizontal, that of Gothic is vertical; one is that of the column and lintel involving the idea of rest, the other is that of the arch, the flying buttress and pinnacle, involving the idea of life and motion.

The two ideas are directly opposed to each other; the moment classic architecture admits the arch it ceases to be true to itself in any real artistic sense; on the other hand if it refuses to use the arch it confines itself within limitations of construction.

Unfettered by any classical restraint the architects of the north carried the use of the pointed arch to its highest perfections, and in their great cathedrals have left us examples of skill in scientific and artistic construction which, though often imitated, have never been surpassed.

Italian architects on the other hand were always under restraint, and while forced by the fashion of the time to use the pointed form of arch, they were never able, except in a few instances, to do so with the boldness and skill of their contemporaries of the north. They often employed it for mere ornament, and in many instances in so faulty a manner that the arches had to be held together with iron ties from the day of construction.

While the Italians here failed to produce buildings in the Gothic style of the purity of design and skill in construction that are to be found in the north, they have, nevertheless, executed many noble buildings in which we can study their successes and failures in dealing with a style that was not indigenous to the country and in which they endeavoured to reconcile the principles of two styles that are far apart, and which we are inclined to consider unreconcilable.

Besides the influences to which I have already referred, there are other two which we find more or less strongly marked in mediaeval work—these are, first, local, and second, personal influences.

Local influence was a natural result of the division of the Italian people into two hostile camps of the Guelfs and Ghibelines; the adherence to one faction or the other not only kept the cities apart, but often at war one with the other. When we consider the disturbed condition the country was in, in consequence of these quarrels, we might expect to find art retarded and incapable of development—on the contrary, however, we find that progress was made, but owing to the lack of community and freedom of intercourse, the principal cities developed the Lombard and Gothic styles of architecture in a manner peculiar to themselves. Thus we have well defined local characteristics of the Lombard style at Pisa and neighborhood, and of the Gothic style in Venice, Verona, Bologna, Florence, etc. These cities, along with others which might be named, became at a later date local centres or schools of painting, each marked by treatment of their subjects peculiar to the great masters of the respective schools. We thus have in the domain of the fine arts the Venetian, Florentine, Pisan, Milanese and other schools, and in like manner we have the local characteristics of the respective cities marked in their architecture.

The personal influence exerted by individual architects is more marked in Italian buildings than in those north of the Alps. In the great cathedrals of France and England the names of the designers is in most cases unknown, but in Italian architecture individual names are brought prominently before us.

Among the more prominent I may mention Arnolfo, son of the German architect whom I have already referred to as giving the design for the first Gothic building in Italy. Arnolfo's name is associated with the great duomo and the church of Santa Croce in Florence.

Pisa, a celebrated centre of mediaeval art, sent forth a number of sculptors and architects, but her most distinguished son was Nicola Pisano, whose sculptures adorn the cathedral at Siena and Orvieto, and who furnished the design for San Antonio at Padua and probably for the cathedral at Orvieto. His son Giovana was scarcely less distinguished than his father.

In the following century Giotto, distinguished as a painter as well as an architect, constructed buildings in the Gothic style of which the campanile of the duomo is, at Florence, the most distinguished example. These men, with others I might mention, not only impressed their individuality upon their works, but formed centres or schools of design.

Apart from the local types of the Gothic style and the personal influences to which I have alluded, we have occasional buildings in which local influence is not evident and where the design is so unlike other Italian buildings as to suggest foreign influence; the most notable example of this influence is found in the greatest of all Italian buildings, the Cathedral of Milan.

I might go on to mention in detail features of Italian buildings that attract the attention of the traveller who has previously visited the great cathedrals of the north, and who at once realizes that he is in a different art atmosphere. He will notice the absence of buttresses on the flanks of the buildings, the absence of flying buttresses, the small size of the windows and the absence or meagerness of tracery with which they are ornamented, the absence of colored glass, the absence of triforiums over the nave arches and the meanness of the clerestories. He will notice how columns are used singly or in pairs—and the use of colour on the walls. Of these details time forbids me to speak, but before closing I will mention one material used in the construction of Italian buildings that meets us at every stage in our study of Gothic architecture, that is bricks and terra cotta. Italian brickwork is remarkable for the skill shown in the use of what we are inclined to deem an inferior material in the elaboration of arches, tracery, cornices and mouldings, but as this is a subject somewhat foreign to this paper, and one that requires an evening for itself, I only refer to it.

STRENGTH OF COLUMNS.

IF the fibres in any material body were exactly rectilinear, so that a rod being placed on one end in a vertical position, no one of the particles were opposite to the intervals between any two in a transverse section below it, it might be conceived that no force compressing the rod in the direction of its length would produce any other effect than that of diminishing its length. But as we find that all bodies when so compressed may be bent and finally broken, such a disposition of the particles is destitute of probability. In fact, when a pillar is compressed by a great weight above it, either the fibres already curved have their curvature increased so that the whole pillar bends, or the particles in some of the transverse sections are forced outwards by lateral pressures arising from those above and below their intervals being thrust between them, and then the pillar swells on its whole periphery. The consequence in either case is that the cohesion of longitudinal fibres is impaired or destroyed, and the pillar is at length broken or crushed. The strength of a pillar when so compressed must evidently depend upon the number of particles in a transverse section, that is, upon the area of such section, but since besides the displacement of those particles from the longitudinal pressure their lateral cohesion must be overcome before they can be thrust outwards, it is evident that the strength is not proportional to the area simply, but to some function of that area. No law on which any dependence can be placed has yet been discovered for the strength of a pillar in such circumstances.