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Customer Reviews

Lace begins by linking medieval cathedral design to earlier Roman designs, while also explaining basic terminology. In preceding basilica churches, priests sat on either side of the bishop, and the altar was between the bishop and the congregation - usually on a raised platform and situated over the body of a saint. (Early saints were Christian martyrs.) The entire area, apse and altar, was called the chancel. Later singers were installed on either side of the aisle between the altar and the chancel rail, and their area became the choir. The large area in which the congregation stood or knelt (Chairs or pews would not be used until after the Middle Ages) was called the nave, usually divided into aisles by rows of columns used to support the roof. Only baptized Christians were permitted in the nave - others could stand outside in the atrium and listen. Under Roman law, priests were exempt from taxes, making their occupation desirable and leaving no room for them in the apse. Wings, called transepts, were built on each side of the chancel - these also gave churches the shape of a cross. As churches expanded, they outgrew the basilica style with flat roofs supported by beams (first wood, then stone) resting on pillars that could not be spaced far apart. As interior space grew, the number of pillars needed increased to the point that they interfered with the congregation's ability both to see and hear the service. The answer - the arch. The advantage of an arched roof over a flat one was that instead of weight pressing straight down on a beam, it could be

directed outward and down the sides to a point where it could shift to a pillar or wall. Arches reduced the need for pillars. Stone increasingly replaced wood as the primary construction material since arches were able to handle the greater weight; stone also lessened the danger of fire. As the number of churches grew, so did the demand for relics. Relics were thought to have healing powers, and became the most valuable objects in a church as well as in an entire city. As Rome's power decreased, warfare became more common and churches became more like fortresses. The increased importance of relics pushed back the main altar into the end of the apse, and the bishop's throne then was set between the altar and the congregation. Churches collected additional relics and built individual shrines to each of them - these altars were placed in niches around the apse on either side of the main altar. Additional shrines were built into the walls of the transepts. Troubled times led to churches becoming places of refuge as well as worship, and unbaptized were admitted both for physical safety and spiritual guidance. The atrium became unnecessary and vulnerable, and moved inside the walls to become the cloister - an open area where clergy could retreat for meditation. When the atrium, along with its attractive columns, disappeared, towers were introduced on each side of the entrance to relieve the blank face of the entrance wall, house the bells used to call to services, and provide a vantage point from which to spot approaching danger. The fall of the Roman Empire (its last emperor was deposed in 476), brought the Dark Ages. Learning declined, and church architecture skills were lost. Little progress was made during most of the next 500 years. The millennium was foreseen to signal the end of the world; instead, it brought a new dawn for western Europe. Classical architecture was rediscovered and hope revived. Barrel-vault churches too the fore, but needing considerable support, windows were small and far between - creating a dim interior. Their overall capacity, however, was unable to house the large numbers who came to worship at the site of relics. (Offerings enriched sanctuaries; cures and miracles paid for costly churches.) After the early Middle ages, the need for a fortress-church diminished. Architects looked for ways to make churches less massive by reducing the weight of the roof to reduce the thickness of supporting walls. This was accomplished by replacing barrel vaulting by cross supporting arches diagonally over sections of the nave, forming a series of bays. Sections of walls, buttresses, were used to counteract outward forces on the walls. Portions of the wall freed from the stress of supporting the roof could now be used for windows. The problem with early groin vaults was that they worked well only for square bays. The right height for the arch was one-half the length it spanned. Anything less produced too much vertical pressure. The pointed arch created much more vertical downward pressures. The Gothic vision held that the more symmetrical and geometrically precise a cathedral, the more it might lead those worshipping there to a better

understanding of God. A square with its four equal sides was preferable to an unbalanced rectangle, an equilateral triangle was superior to any other. Light, however, was much more important. Sun worship had been an integral part of religions all over the world. The reason some cathedrals took generations to build was not because of the difficulty of construction but because work often had to be suspended while more money was raised. The most direct way to raise money was simply to ask for it - appeals from pulpits. Many of the largest gifts were commemorated in stained glass windows. In many cathedrals the most prominent windows - near the entrance, were given by craft guilds, while those from the local nobility ended up high on the walls. When normal appeals proved insufficient, chapters might bring out the relics of their patron saints for display, charging pilgrims to view the leg bone of one or the skull of another. When local audiences had been exhausted, the canons frequently took the relics on tour. Another was the sale of indulgences. Master masons, not architects, were in charge of both design and construction during the early period of cathedral building. Rarely did he draw plans - instead, he carried a general concept of size and style in his head. Only when construction began did he mark off where walls, buttresses, and pillars would be. Later this role was taken over by architects - who did no physical labor but were more like managers. Master builders and architects were frequently buried in the cathedrals they built. Stone carvers were divided into 'roughstone' masons who shaped the hard stones for the walls and ceilings, and 'freestone' masons (later known as freemasons, and became the origin of modern Masonic Lodge social organizations) who did more delicate work in softer materials. Most masons began as quarrymen; there were no explosives to blast the stone - instead, they had to bore a series of holes into the rock and place wet timbers within the holes; when the timbers expanded, the stone cracked and huge blocks broke free. Dust created by shaping the stones before leaving the quarry sent many to early graves. Those who worked with lead in the stained glass windows were called plumbers - they also made the lead sheets the protected wooden roof beams, and the tubes for guttering. Volunteer workers would have been highly resented by those from whom they took away much-needed employment. Medieval cathedrals were usually built on the site of older, often smaller churches. Where cathedrals replaced earlier churches, the layout was determined by the location of the crypt. Many of these crypts were already hundreds of years old, and many had to be braced with new retaining walls. To ensure perfect 90-degree right angles, builders used triangles whose sides were in the ratio of 3:4:5 - measurements established by Pythagoras. The choir and apse were normally built first, the transepts next, followed by the nave and any attached buildings such as a baptistery, bell tower. Three sets of foundations were required for the choir and apse - the innermost foundations held the giant piers on which the walls of the choir rested. Next came the

foundations of the lower walls that would surround the apse and run down the outside of the aisles on each side. Finally trenches were dug for the foundation of the buttresses needed to brace the choir walls. Frequently builders found moist, even marshy, soil, not bedrock. Then they normally drove a series of wooden piles deep into the ground and sawed off the tops to form a level surface. The tops then might be capped with iron heads and heavy planking to act as a footing for the wall. For Notre Dame, built on an island, the entire site was ringed underground by a huge stone retaining wall designed to hold the soil in place. The date when a cathedral was said to have begun was when the first stone was put in place. Cathedral walls were nowhere near as massive as in preceding Romanesque churches. The apse and choir were ringed by a three-level wall. The lower level (the arcade), was solid stone for only a few feet near its top. On this solid part rested a series of giant columns (80 to 100 feet high) with pointed arches in between. The second level was the triforium - only about 20 feet, with two or sometimes three smaller arches (sometimes filled with stained glass windows) between each pier instead of one arch as in the arcade. The third level was the clerestory, soaring 60' or more above the triforium - more huge expanses of colored glass through which sunlight passed. Medieval builders provided interior or exterior walkways located above the arcades, and sometimes between the triforium and clerestory. These were intended to facilitate surveillance of and maintenance to the building, its roof, and the stained glass without erecting expensive scaffoldings that would damage carvings. Access to the galleries were by spiral stone staircase known as vices, usually tucked into a wall or buttress. These also provided a pathway during construction for workers and lighter materials. Stones were carried to the walls by laborers using 'barrows' that looked like stretchers. At some point a clever builder attached a wheel to one end and invented the 'wheelbarrow.' Wooden frames not only held stones in place to form arches, but also ensured they would be uniform since the same model was used for all similar arches. Scaffolding poles were lashed together with rope and planks placed across them to hold workers and their materials. During the Protestant Reformation, altar rails, statutes, and much of the stained glass were destroyed.

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